DEPARTMENT OF PRIMARY INDUSTRIES QUEENSLAND 1887–1987

The First One Hundred Years

P.J. Skerman





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DEPARTMENT OF PRIMARY INDUSTRIES QUEENSLAND 1887–1987

The First One Hundred Years

P.J. Skerman





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THE DEPARTMENT OF AGRICULTURE ESTABLISHED

To understand the history of the Department of Primary Industries, it is necessary to study the land settlement and land policies of Queensland in the middle and late nineteenth century.

Early pastoral dominance

Allan Cunningham discovered the Darling Downs in Queensland in 1827 and the first flocks arrived in January and March 1840 under the ownership of John Campbell of "Beebo" and Patrick Leslie of "Toolburra". By 1853 nearly all the land in the entire pastoral district of the Darling Downs had been taken up by "Pure Merinos"- a group of aristocratic pastoralists of excellent family connections who, as transplanted Britishers, soon created or tried to create a society as similar as possible to that of the Old World that they had left. Political, judicial and social institutions were transferred and adapted to meet the needs of those who controlled the destiny of the area, and the Downs squatters were soon able to establish ascendancy over the remainder of southern Queensland. (Waterson, D. B., *Squatter, Selector and Storekeeper*, Sydney, 1968, p. 11)

The squatters adopted an economic interpretation of the land question, which held that the land should be used in the way for which it appeared best suited and that government policy should reflect this - a rural policy. During the 1860s and 1870s, the economic argument was to be put forward by the squatters who dominated both the economic and political life of the Colony. The 1859 constitution favoured them as franchise was based on property and income qualifications. (Taylor, G. P., *Pacific Historical Review*, Vol. 37, 1968)

The squatters had benefited from the Orders-in-Council of 9 March 1847, which had given them undisturbed possession of the land. Rentals were ridiculously low and runs were usually under-assessed, but the main feature of the 1847 regulations was the grant to the squatters of a pre-emptive right conceding a monopoly of all alienation by the Crown. Pre-emption at £1 per acre resulted in almost one-third of a million acres of the finest land in the Settled District being freeholded by the Pure Merinos before the pre-emptive right expired in 1865.

The Settled District of Queensland's Darling Downs was defined in The Crown Lands Alienation Act of 1868 as follows:

Commencing on the Main Dividing Range at Maryland and bounded thence by Herries Range and the range separating the Condamine from the Macintyre, Weir and Moonie Rivers to the head of Wilkie's Creek, thence by the watershed separating the Condamine River from Wilkie's Creek, thence by that creek to its head in the Main Dividing Range, thence by that range south-easterly and south-westerly to Maryland, the point of commencement. (Cooper, F. A., *Statutes in force in the Colony of Queensland*, Vol. I, 1881,p. 721) In direct contrast to the squatters' view was the view based on a political interpretation, which recognised the effects of land and settlement policies on the structure of society and sought to create a land system that would result in the development of a form of society that was considered desirable. This approach, which might be termed the "urban approach", had greater moral justification than the rural approach but often disregarded the economic interests of the Colony.

There was also division among the squatters. Those in the unsettled districts, which covered the greater part of the Colony, still followed the older extensive methods of sheep raising and looked for a traditional squatter policy of longer leases and lower rents. The squatters of the settled districts, holding the best land in the country and knowing that their land would one day be required for closer settlement, began to adopt more intensive methods of stock management, which required investment in costly improvements and made freehold possession preferable to terminable leaseholds.

The Darling Downs squatters, whose land was under a great threat of resumption, made use of their pre-emptive rights to buy up the strategic areas of their runs and at the same time blocked or amended closer settlement legislation in Parliament to protect and further their interests. (Taylor, 1968)

To cultivate in the 1860s was to be a traitor to one's own group during its fight for survival. Profits were high and easily earned during the fifteen years before 1866 and there was no compulsion to experiment in this direction. (Waterson, p. 62)

Queensland agitation for legislation which would demolish the stranglehold imposed by the squatters on Queensland society came not from the would-be farmers and "honest working men" so much as from a formidable combination: Brisbane merchants, artisans, and professional men; Western squatters who were jealous of the Downs pastoralists' pre-eminence, economic success and exploitation: and an all-important faction on the Downs led by storekeepers and newspaper proprietors who desired wider political and social opportunities as well as the chance to advance their own material interests. These elements were reinforced by a group that could almost be termed professional politicians-men avid for a paid office with its power and prequisites. The Selection Acts did not have one father but many progenitors, each of which had something to gain from a legislative defeat of the Pure Merinos. (Waterson, p. 2)

Agriculture's start and progress

A slow start for agriculture

Under the first of the Selection Acts, The Crown Land Alienation Act of 1860, the Government was pledged to define and set apart for agricultural occupation not less than 700 000 acres on the shores of the navigable waters of Moreton Bay, Wide Bay, Port Curtis and Keppel Bay; and also, within five miles of all towns with a population exceeding 500 people, reserves of at least 10 000 acres to be surveyed and called Agricultural Reserves. The land was to be sold in areas ranging from 40 to 320 acres, at a price of 20 shillings per acre; and if within six months the purchaser had occupied and begun to improve or cultivate the land he was given a deed of grant of the land. Agents could not be used. Land orders could also be given to immigrants who paid their own way from Europe, equal to

£18 and after two years' endeavour a further £12. To encourage growth of cotton, the Governor could issue land orders during the next three years (1860-63) to the extent of £10 and during the next two years a further £5 by way of premium for every bale of good cleaned Sea Island cotton without any admixture of damaged or discoloured cotton and weighing three hundred pounds, the growth and produce of the Colony, which could be [sent] to Great Britain and during the said periods one half of above premiums would be given for the common description of cotton.

The Hon. J. C. Heussler, a Member of the Legislative Council in 1887, claimed that between 1861 and 1866, acting as immigration agent on the Continent, he introduced between 800 and 9000 people, mainly from Germany, and was instrumental in settling them, mostly as farmers, in the Logan district. Land orders of £18 were given to them. In the same period, Henry Jordan (Minister for Lands in 1887) acting in Britain brought out 36 054 immigrants with personal capital totalling £1 000 000 sterling (1200 paid their fares in full, 6222 were assisted with passage, and 17 282 were given free passage). (*QPD*, Vol. 51, 1887, p. 14)

Lack of finance by the small man competing with the squatters, extensive dummying (use of fictitious names in land deals), evasion of conditions of occupancy, and poor classification of land for agriculture generally resulted in the land being retained for grazing.

Progress in agriculture

On 1 April 1861, the total area of land under cultivation in Queensland was 3253 acresonly 3.28 per cent of the country land (agricultural areas) held as freehold. Agriculture had made little progress, owing to the high rate of wages, the uncertainty of getting labour when required and the difficulty of conveying produce to market over roads that were always bad and often impassable. It was more economical to import almost any kind of agricultural produce than to grow it. On the other hand, the Registrar-General stated that livestock and its products, such as tallow, wool, hides and horns (which formed 93.53% of the Colony's exports), were the main and indeed the only productive interest of the Colony. He said that the importance therefore of the pastoral interest could hardly be over-estimated. (Registrar-General's Report, *Statistical Register of Queensland* 1860, pp. xv-xvi).

By 1863 the total area under cultivation was 11 262 acres. The main crops were maize in the Brisbane and Warwick districts; cotton around Brisbane, Gladstone, Ipswich and Maryborough; wheat near Warwick and potatoes around Brisbane, Drayton and Warwick. All were cultivated in small holdings adjacent to towns.

By 30 December 1865 only 14 414 acres were cultivated but there was a significant increase by 30 December 1866, no doubt owing to some cultivation by new selectors, especially of cotton. Cotton increased sixfold during the year owing to the special land orders of the 1860 Act. The Brisbane, Ipswich, Logan and Maryborough districts were mainly responsible.

Pastoralists' dominance and squatters' power

The pastoralists' dominance continues

The financial crisis in 1866 placed some squatters in a serious financial position. They had over-capitalised by making extensive purchases of land under The Leasing Act of 1866 when much of the choice land near the new Toowoomba and Warwick railway was selected by scores of dummies and agents. On 17 August 1867 the incoming McKenzie Ministry instructed the Surveyor-General, A. C. Gregory, to issue new regulations, which paralysed agricultural endeavour on the eastern Darling Downs. (Waterson, p. 40) The regulations permitted free selection of Agricultural Reserves before survey in areas of 80 to 320 acres at an annual rental of 2s 6d per acre for seven years. The only condition imposed was that one-sixth of the land be cultivated within one year of selection. This land was quickly acquired by pastoralists without competition. Two "Pure Merinos" who had just entered the Ministry produced dummying on a scale that was unique in the Colony (Waterson, p. 40), and the cultivation requirement was often waived.

The Land Act of 1868 stipulated that all runs in the Settled District were to be divided by the lessee into equal halves, the regional Land Commissioner then selecting the half to be resumed for closer settlement. Tenants were given a ten-year lease of the remainder. The provisions for closer settlement included free selection, lower prices graded according to the classification of the land, conditional purchase on a ten-year time payment system, and a wide choice of types of selection. It eventually favoured the squatters because they held the best land and agriculture could not be carried out successfully elsewhere, and even the largest selections made available were too small for economic stock-rearing. The agricultural selector needed a considerable amount of capital to establish himself on his land, to pay the annual rent, to meet the cost of compulsory improvements, and to cover living expenses until his first crop was sold. But there was little demand for what he produced. Apart from a temporary, limited success with cotton growing, no export crop had been developed and transport facilities hardly existed. Bv legitimate purchase and fraudulent dummying, the squatters bought up all the land they required to give them full ownership and the security that went with it. (Taylor, 1968) Throughout the 1870s roughly 25 per cent of Queensland's entire revenue was derived from land sales. The outstanding feature of the Downs pastoral industry between 1860 and 1875 was the creation of a score or more of giant freehold estates from the leased runs of the Settled District. (Waterson, p. 33)

A steady rise in population and the continued expansion of settlement resulted in the Electoral Acts of 1872 and 1874; these revised the constituency system and introduced full male suffrage. Squatter domination of Parliament was broken and the urban, or liberal, voice achieved power for the first time. (Taylor, 1968) Further resumptions during this period were contested by the squatters, but with the change in government their cause was lost.

The Crown Lands Alienation Act of 1876, brought in by the new Government, provided for agricultural settlement on a larger scale, but in the form of smaller, less economic holdings. The classification system of 1868 was abandoned, and the price varied both with demand and an auction system introduced wherever there was competition, a change that favoured the better-off selector. Compulsory personal residence for the five-year term of the lease by the lessee himself or his registered agent, with forfeiture the penalty for non-residence, brought dummying to an end.

The areas for agricultural settlement ranged from 40 to 640 acres. Many lessees soon found the area insufficient for an economic unit and sold out to the nearest squatter once they had obtained the title. Others left their farms periodically to obtain outside work, thus breaking the condition of personal residence and hence the law. It was in this situation that the Inspecting Land Commissioner, Peter McLean, who later was named Under-Secretary for Agriculture, had to judge between bona fide settlers and those who were deliberately evading the law. Many holdings were forfeited. In the furore that erupted in Parliament in November 1887 when his appointment as Under-Secretary was being debated, McLean was charged with obstructive officialism, endeavouring to dispossess men from their holdings and falling foul of all with whom he came in contact.

In this way, much of the land alienated under the 1876 Act came into squatter possession as it had done as a result of the 1868 Act, but in a different way. It delayed intensive agricultural use of the central Downs and the development of railways. Between 1877 and 1882 a series of land exchanges took place whereby the freehold squatters transferred 49 278 acres of agricultural land to the Crown for subsequent selection, in return for 87 032 acres of pastoral country.

Decline of the squatters' power

Dutton's revolutionary 1884 Crown Lands Act, which took effect on 1 March 1885 was the final blow to the squatter. Sir Samuel Walter Griffith, the Premier, wished to retain the value of the Colony's asset, so direct sales of land by auction were abandoned and leasing of Crown Lands was adopted. The Act was designed to encourage on the western Downs and other unsettled districts the new element of small graziers who had arisen in the Settled District as a by-product of the Selection Acts. It gave the opportunity to frustrated managers and successful farmers' and squatters' sons to acquire runs of their own. (Waterson, p. 16)

The Act encompassed existing pastoral leases. Half of the leased area was to be resumed and declared Crown Land, and a lease was granted on favourable terms over the remainder at an annual rent per square mile. The important provision as far as agricultural settlement was concerned was the declaration of Agricultural Areas. These had to be inspected, surveyed, divided into specified areas of 320 acres to 1280 acres and opened for leasehold selection at an annual rent of at least 3d per acre, with the option of purchase at any time during the lease. Leases were to be for fifty years and the land had to be fenced around the boundaries within the first five years.

The easy terms of selection under this Act reduced capital costs and enabled poor landless men to take up small selections. The immediate result of the proclamation of the Act was a marked decrease in government land revenue, but it did increase the agricultural use of the land. By 1885, the area under cultivation had increased from a mere 24 433 acres in 1866 to 209 130 acres.

In that year the area of grazing farms applied for was only 18 832 acres, and of agricultural farms, 65 304 acres. In 1886, the area applied for as grazing farms totalled 242 120 acres and as

agricultural farms 222 837 acres, at an average rental of 4d per acre with a purchase price to convert to freehold of £1 5s 0d. (Foxton, *QPD*, Vol. 51, 1887, p. 9)

The pressure on the Lands Department by applicants seeking land-not only local enthusiasts but also an increasing number of immigrants-led Dickson and Dutton to divorce the actual settlement of people from the "bread and butter" operations of survey and mapping and place land settlement under a separate Department of Agriculture in 1887. With wider vision, the Hon. Henry Jordan saw the time was also ripe for instruction in crop and animal husbandry. Livestock disease was at the time under the Chief Inspector of Sheep within the Colonial Secretary's Department; it was transferred to the supervision of the Department of Agriculture, under the Stock Branch, in 1897.

The Department established

Late in 1886 the Imperial Government had invited representatives of the Colonial Governments to an Imperial Conference to discuss, among other matters, the major questions of defence and communications. On 20 January 1887 the Queensland Governor, Sir Anthony Musgrave, commissioned the Premier, the Hon. Sir Samuel Walter Griffith, and the Agent-General in London, Sir James Francis Garwick, to represent Queensland. The Premier departed the following day, not returning to Queensland until 30 June 1887.

In the Premier's absence, the Colonial Treasurer, the Hon. Sir James Robert Dickson, Member for Enoggera, was appointed Acting Premier. Dickson was a prominent auctioneer and estate agent. He initiated the moves, supported by the then Minister for Lands, the Hon. Charles Boydell Dutton (Member for Leichhardt), that led the Executive Council to decide to establish a Department of Agriculture.

The first official notice of the establishment of the Department appeared in the *Queensland Government Gazette* as follows:

Queensland Government Gazette Vol. XLI Saturday, 18th June, 1887 No. 34 Department of Public Lands Brisbane, 17th June, 1887 Notice

It is hereby notified for general information, that His Excellency the Governor, by and with the advice of the Executive Council, has been pleased to establish a Department of Agriculture, to be managed by an Under Secretary, with the necessary staff, and under the direct control of the Secretary for Public Lands. C. B. Dutton

This notice was immediately followed by another, issued the same day:

Department of Public Lands Brisbane, 17th June, 1887

His Excellency the Governor, with the advice of the Executive Council, has been pleased to appoint

effect from 1st July, 1887. C. B. Dutton

Peter McLean owned and worked a small mixed farm, on which he engaged in cropping, grazing and dairying, in the Logan district. He was elected Member for Logan on 23 November 1878 and held office till 26 July 1883, acting as Secretary (Minister) for Public Lands and Mines for just over six weeks, from 7 December 1878 to 21 January 1879, during the Douglas Ministry. In 1882, he was made Chairman of a Select Committee to investigate the connection of B. D. Morehead & Co. with land sales in the Springsure and Peak Downs districts. McLean was defeated as Member for Logan by E. J. Stevens, who took office on 17 August 1883. He was appointed, over the heads of existing civil servants, to the Civil Service by the Hon. C. B. Dutton on 23 November 1883 as Inspecting Commissioner and Commissioner (Land Sales), Department of Public Lands, for Beenleigh, Brisbane and Ipswich in the Moreton District at a salary of £500 per year. For the next four years he dealt in the field with the recent Land Selection Acts. From this position he was suddenly named Under-Secretary for Agriculture on the recommendation of the Hon. C. B. Dutton at the salary of £500 per year.

The decision to establish the Department of Agriculture was first revealed to the Legislative Council in the Governor's opening speech during the fifth session of the Ninth Parliament on Tuesday 19 July 1887. His Excellency, Sir Anthony Musgrave, stated:

I am glad to note the large and increasing demand for land for occupation by bona fide settlers. My Ministers are deeply sensible of the importance of encouraging agricultural settlement, by giving increased facilities to intending selectors for acquiring full information as to the nature and quality of the land open for occupation, and by assisting in the collection and diffusion of practical knowledge as to the profitable cultivation of the soil. With this object, I have, in anticipation of your sanction, authorised the establishment of a Department of Agriculture, under the charge of the Minister for Public Lands. (*QPD*, Vol. 51, 1887, pp. 325)

A short Address-in-Reply was accorded the Governor and, in moving the adoption of this Address, the Hon. Dr W. F. Taylor stated:

I am very glad to learn that the present Ministry have come to the conclusion that it is advisable to establish a Department of Agriculture...the want of some such Department has long been felt...I am perfectly certain that it will confer a great benefit on the farming community.

In seconding this motion, the Hon. Horatio Wilson (Postmaster-General) added:

...I must join with the Hon. Dr. Taylor in an expression of satisfaction that the Government intend to give increased facilities to intending selectors for acquiring valuable information as to the nature and quality of land open for occupation. This is a matter which has been very much neglected in the past, and it is quite time that some systematic effort should be made in order that the Department of Agriculture should be placed on a sound footing.

On the other hand, the Hon. F. T. Gregory thought that, with regard to the finances of the Colony, it was not the time to establish a Department of Agriculture. The Hon. A. J. Thynne introduced a rather sour note when he said in connection with the Department:

The gentleman who is to have the control of the Department is one who has an unfortunate knack of falling out with everyone with whom he comes in contact and that is a very bad omen for the success of the Department. To create a Department of Agriculture for the purpose of getting rid, out of another branch of the service, of an unworkable official seems to be very bad policy. (*QPD*, Vol. 51, 1887, p. 17)

The Hon. A. J. Thynne later became the first Minister for Agriculture and played a major part in establishing the Queensland Agricultural College. Peter McLean was still the Under-Secretary.

Meanwhile, Peter McLean was instructed by the Minister for Lands to visit New South Wales, Victoria, South Australia and New Zealand to enquire into the workings of the Agricultural Departments in these Colonies and also the village settlement schemes in New Zealand. Parts of his report are as follows:

In New South Wales he found that the establishment of a Department of Agriculture was presently before Parliament. At the time some agriculture was taught at the Technical College during a course of two years leading to a Certificate of Expert in Agriculture but no practical agriculture was included.

A Department of Agriculture had been established in Victoria under a Minister for Agriculture in 1872. In 1884 a private member submitted to the Legislative Assembly a Bill for the purpose of establishing agricultural colleges and forming a council of agriculture, pending an endowment of 15 000 acres of land for state agricultural colleges and experimental farms. Dookie College was established on 4800 acres, which had previously been an unsuccessful government experiment farm. A second college was being set up at Longerenong.

The Victorian Department of Agriculture had recently established a system of experimental fields, or test stations. Arrangements were made with some intelligent industrious farmer to set apart 62 acres of land for the use of the Department. Sites were selected to encompass varying soil and climatic conditions representative of surrounding districts. Soils were analysed and the farmer was provided with seed and necessary fertilisers. He grew the crop, recorded growth history, weighed the crop and was allowed to retain it. Such a scheme could be adopted in Queensland. The Victorian Department of Agriculture was engaged in the distribution of trees from an extensive nursery at Macedon along the Geelong Melbourne railway-black wattle was grown. (McLean arranged for 170 olive truncheons, black wattle seeds and two tanning plant seeds from India to be sent to Queensland.) All statistical information was collected by the Statistical Department.

In 1870 South Australia passed a resolution through Parliament: "That in the opinion of this House it is desirable steps should be taken to establish a School of Agriculture and also a necessary appendage thereto, and within a convenient distance from the city, an Experiment Farm, and to appoint an experienced and skilful Professor of Agriculture for the purpose of encouraging a more rational mode of farming than at present obtained in South Australia." For the purpose of securing the services of a thoroughly competent Professor of Agriculture, Parliament voted a salary of £800 per annum. In 1881, Professor J. D. Custance arrived and was authorised to procure offers of sites suitable for a school of agriculture and experiment farm. A farm of 828 acres was purchased by the Government about one mile from Roseworthy and about thirty miles from Adelaide. The college was under the Lands Department, with an annual vote of £3000. Students spent half of their time in school and half on the farm.

At Lincoln in New Zealand, fourteen miles from Christchurch, a school of agriculture had been established as a branch of the Canterbury College of the University of New Zealand. The farm was 660 acres. A large part of the land set apart as an endowment for the school was sold and the proceeds were used to erect a very extensive building, a long way in advance of current requirements. Half of the time was spent by students in the field and half in classwork. (*Journal of the Legislative Council*, Vol. 37, Pt. III, 1887, pp. 1097-1100) Most of these ideas were eventually put into practice in Queensland.

The first opportunity for the Opposition and backbench Members of the Legislative Assembly to discuss the establishment of the Department of Agriculture and the appointment of the Under-Secretary came when Parliament was asked to grant supply to the Department for 1888 at its sitting on 29 November 1887, almost five months after the creation of the Department and the appointment of Peter McLean. Present at this sitting was the new Minister for Lands, the Hon. Henry Jordan (South Brisbane). He had replaced the Hon. C. B. Dutton on 30 August 1887, when Dutton had been moved to the Ministry of Works and Mines in place of the Hon. William Miles (Darling Downs), who had died recently. Jordan moved that there be granted, for the service of the year 1888, the sum of £1800 for salaries in the Department of Agriculture. (QPD, 29 November 1887, p. 1857)

The sum of £1800 sought in the estimates included £500 for the salary of the Under-Secretary, £300 for that of the Colonial Botanist, F. Manson Bailey, who was transferred from the Department of Public Lands, and £1000 for "contingencies", which included clerical assistance.

The Minister for Lands (the Hon. Henry Jordan), explaining the thoughts that led to the establishment of the Department, told the House that he was of the opinion that it was absolutely necessary in the interests of the public, and in order that the Land Act should be successfully worked in the settlement of the people upon the Colony and especially of agriculturists, that they should have a Department of Agriculture. There was important work in that direction which could not be done with success by the officers in the Lands Department before that Agricultural Department was organised. A commencement was made, and the Inspecting Commissioner for the Moreton District was appointed to the position of Under-Secretary of the Department, because it was absolutely essential that there be some competent person who took an interest in the matter, and who believed in farming in the Colony, to go through the runs divided, and select portions especially suited for agricultural purposes. Jordan's intention was that McLean's time should be "considerably taken up in that very important work". He said that he did not know any man in the Colony who would do it more faithfully or more successfully, or who was better qualified for the work. McLean had had practical experience and Jordan believed that his visit to the south had enabled him to acquire additional information which would be of great advantage.

They were now organising the system with a view to affording the fullest information to all persons desirous of settling upon the land, especially persons arriving from the old country. Jordan had given instructions during the first week he was in office that maps should be prepared of all the land resumed under the Land Act, and that the maps should show what land was resumed, how it was divided into grazing and agricultural areas, upon what terms it could be taken up and what it was best suited for. Those maps would be lithographed and sent to the surveyors throughout the Colony, and they were under instructions to send in
reports so that they might know exactly what the land was. Thus instructed, the Department would be able to give the fullest information, and would be successful in settling a large number of people upon the land. Jordan believed the result would prove, if the present Government had time to carry on the work, and if the future Government concurred with the views expressed by the Hon. Member for Barcoo (Francis Reid Murphy) that the Act was a good Act and might be successfully administered; it would be found that the system they were now attempting to organise would be very successful indeed in effecting the great objects of the Land Act.

Continuing the debate next day, the Hon. Minister for Lands said:

As to the framework of the Agricultural Department, the foundation of the whole thing, he supposed, was this: there was in the Colony a vast area of land suitable for agricultural settlement; a very large area of that land had recently been given up by the pastoral tenants of the Crown under the Land Act of 1884, and a very large quantity of the land resumed was suitable for the highest purpose to which the land could be put. Of course the highest use the land could be put to was that it should be tilled. A wealth came out of the ground, but not spontaneously; there must be labour-the labour must be married to the soil... The agricultural land was, however, in patches all over the Colony, and areas of agricultural land near to a market, to the seaboard, or to rivers, had to be sought out.

Honourable Members opposite, continued Jordan, would excuse him for again referring to the experience of 1860.

They had then an admirable system, and people came out to the Colony in thousands to settle upon the land, but when they got here it was found that the agricultural reserves were bad land. The whole thing failed on that account. As he had said before, between 6000 and 7000 people came out the first year, most of them farmers, and paying their own passages, but it was found the agricultural reserves upon which they were to settle were badly selected. That was patent to everyone and was the reason for the failure in the early days of the establishment of agriculture in the Colony.

The Government wished to repair that failure, and they had this fact now to go upon. They had the land to deal with, and special means were now being taken to see where that land was, what it was most suited for, and that should be set aside for agricultural farms - what should be reserved especially for tilling, and what might be proclaimed as grazing farms. One of their first duties was to appoint a suitable person to find out that land.

As Jordan had said the previous night

...surveyors could not be depended upon in that matter. They were professional men, and when they had surveyed the land scientifically and correctly they had done with it. With the small experience he had had in the Lands Office, he had found that he could not place much dependence upon their opinion as to what was suitable land for agriculture and what was not.

...What they wanted then was a reliable man, trustworthy, and diligent, with some common sense and a fair share of intelligence, whom they could trust to go on to the resumed portions of country and reserve proper portions of them for agricultural settlement - not necessarily for immediate settlement, but for settlement by-and-by as their population increased and as settlement advanced in the Colony. That would be one of the most important functions to be fulfilled by the gentleman to whom they were now referring. Hon. Members might say he was too sanguine, but he expected a large immigration under the land-order system.

They had made a good start and if the proper means were taken to make known in the old country the land-order system, and the fact that they had large areas of land for settlement and that the land was being prepared in every way for settlement-village settlement and agricultural settlement generally - he was satisfied they would have a large immigration of

bona fide farmers. But what should they do with the people when they got here? They wanted to organise some system for putting those people on the land. They had the land for them - they had some seventeen village settlements almost ready to be proclaimed, and two of them would be proclaimed by the end of the week, and he understood there would be a rush for them. It would be part of the duties of McLean not only to select the land for agricultural settlement but to carry out the system organised for putting the people on the land. They must have someone to do that.

They could suppose a large immigration of people coming from the other side of the globe and landing here, but what would they do unless there was someone to take them by the hand, to lead them to the office and show them the maps, and tell them how to get on to the land and give them help to get there and put them practically on the land? If that was not arranged for, the whole thing would be a failure. He believed the system proposed would commend itself to the judgment of all gentlemen - and he believed the designation would include every member of the Committee - who wished to see their land honestly, fairly and thoroughly settled, agriculturally and pastorally. He had never been one of those who decried pastoral occupation - on the contrary, he had always admitted it was the great industry of the Colony. But he thought at the same time that the industry, and every other industry in the Colony of Queensland, would be benefited by the establishment of a great agricultural industry in no way antagonistic to the other industries of the Colony.

The Minister for Works, the Hon. C. B. Dutton, who when Minister for Lands had notified in the Government Gazette the establishment of the Department of Agriculture and the appointment of McLean as Under-Secretary, supportingly said that McLean's chief duties would be to examine those lands of which the Lands Department had not sufficient knowledge to enable them to say whether they should be reserved for agricultural purposes for immediate or future use, or whether they should be dealt with as grazing lands. It was only by carefully examining lands of that kind, which were confined to portions of certain districts, that that could be done. They knew that there was land in some districts on the eastern side of the range that ought to be reserved for agricultural purposes, though it might not be used for twenty years. On the other hand, there were other places on the same side of the range where there was no probability of the land ever being used for agricultural purposes and it ought to be made available for grazing purposes. McLean could do the practical side of the work. The first thing to do was to enable men to get on the land and to give them good advice and directions that would enable them to begin work with the least possible amount of delay and suffering and that work, Dutton maintained, McLean was fully competent to perform.

The Hon. Sir James Robert Dickson (Enoggera), who initiated the move to form the Department, said everything must have a beginning, and although the arrangements of the Department of Agriculture might not be as satisfactory to some Honourable Members as it would undoubtedly require to be made, still they ought to regard the important fact that agriculture in the Colony ought to have more attention than it had received. He was fully convinced of that, and he thought the proposed arrangement most judicious and that Parliament should begin to show an interest in agriculture, at least in a small way. He had no hesitation in stating that he trusted the time would arrive when agriculture in the Colony would demand the attention of a Minister, because at that time not only agricultural pursuits but also the science of agriculture were but imperfectly understood. If Parliament looked to the future greatness of Queensland, they must consider that the agriculturists had

a right to receive more attention from the Government. He thought that, although that was a day of small things, they ought to welcome the appearance of that item on the Estimates, and he would most undoubtedly support it.

Some members favourably disposed towards the Department of Agriculture felt that the small sum being voted was ridiculous and that the Department should be established on a scientific basis with a full staff and headed by a well-qualified experienced officer as Under-Secretary. This feeling was best exemplified by Francis Kates (Darling Downs), flour miller, who said the people in the agricultural districts were pleased to hear that at last the Government had made a move in that direction, and appointed an Under-Secretary for Agriculture, but the sum of £1800 was quite ridiculous, when they considered that from £20 000 to £25 000 was voted for the Mining Department. He had always said, and would repeat now, that the agricultural industry must come to the fore before long. He looked upon it as the premier industry of the Colony - as being far more important than the mining industry. The mining industry was only for a time, whereas agriculture was for all time.

Maurice Hume Black (Member for Mackay), prompted by his objection to the appointment of Peter McLean, launched an attack on the formation of the Department. He said that they knew that under certain climatic conditions wheat could be grown in the Colony: they knew that, as a rule, the wheat crop here was an unsuccessful one, and that taking wheat cultivation for a number of years was disastrous to those engaged in it; they knew that in good seasons hay and such like agricultural produce could be grown in Queensland. They did not want an Agricultural Department to teach them that. They also knew that in a bad season they could not grow enough for home consumption, and they did not want an Agricultural Department to teach them that. He would like to know from the Minister for Lands what it was that the Department of Agriculture was going to teach them that they did not know at the present time. The appointment of a Department of Agriculture was at the present time perfectly useless and unnecessary. It was a waste of public money that they could ill afford. It was an extravagance on the part of the Government at the present time, for which they had not shown any reasonable excuse. (The Hon. M. H. Black was to become Minister for Public Lands from June 1888 to August 1890, having under his care the Department of Agriculture.)

The most trenchant criticism, however, was levelled not at the establishment of the Department, but at the appointment of Peter McLean as Under-Secretary. More complaints were forthcoming. Boyd Dunlop Morehead (Balonne), Leader of the Opposition and representing the squatters, immediately jumped into the attack, no doubt irked by McLean's connection with the 1882 enquiry into B. D. Morehead & Co. land sales. He objected to McLean, a short-term Minister for Lands who had lost his seat at the last elections and who had fallen foul of the farmers in the execution of his work as Commissioner under the Land Acts, being brought in as Under-Secretary above able existing civil servants. He said the appointment was political (a forerunner of "jobs for the boys").

Numerous speakers agreed that McLean was not the right person for the position and several suggested that his title should be changed to outline his duties more clearly. The Hon. John Murtagh Macrossan (Townsville) voiced this feeling, saying that McLean might be right enough for the work which was intended by the late Minister for Lands (the Hon. C. B. Dutton)-to go and select agricultural areas, and say whether certain districts should be set apart as grazing areas or as agricultural areas. Macrossan therefore believed

the vote was a misnomer, and said he would advise the Minister for Lands to change the name of the vote and call that officer "Selector of Agricultural Areas" or some such name. There would then be no objection to the vote passing.

All members agreed that Peter McLean was a gentleman, diligent in his work and an able speaker, but felt his knowledge of agriculture was too limited.

The Minister for Lands (the Hon. Henry Jordan) then threw the remainder of his package deal into the ring. (QPD, 29 November 1887, p. 1858) He stated that they had not rested there, however. They wanted to place agriculture upon a proper foundation. They wanted to have science applied in connection with agriculture in the Colony, and it was the intention of the Government to employ a gentleman to be called the "Instructor in Agriculture" who should be thoroughly competent to give lectures and form classes which would be the nucleus of agricultural education in the Colony. It was intended to give this gentleman £600 a year. He would be competent to give instruction to young men in chemistry, botany, geology, analysis of soils and comparative anatomy. Now that was a beginning and it was no use Honourable gentlemen confusing the teacher of agriculture with the functions to be performed by Mr. McLean. They expected to get a man from the Agricultural College at Washington, nominated and recommended by the Government there as thoroughly competent, and he had no doubt that they would have the fullest confidence in the nomination. He was satisfied that the expenditure of £600 for an instructor of agriculture would be a profitable expenditure and to say that he would be under the Under- Secretary was saying something that would not necessarily be the case. He would be under the Minister. He would instruct classes in agriculture, and in all the sciences that were necessary for its successful practice. In that way they would lay the foundation of agricultural schools in the Colony very economically and very successfully.

The vote was finally passed by Parliament, the Department of Agriculture had its blessing and Peter McLean remained Under-Secretary for almost thirteen years till 1 May 1900, still at his original salary of £500 a year. He had proved diligent, capable, honest and hard-working and was to play a large part in the early development of the Department, bringing into being many of the ideas he had accumulated as the result of his early trip to southern Colonies and New Zealand. The promised Instructor in Agriculture recruited from America was Professor E. M. Shelton, a wheat breeder from the Kansas Agricultural College, appointed on 15 January 1890. He later became the first principal of the Queensland Agricultural College.

The original supply vote enabled the appointment of Ernest George Edward Scriven as clerk in the Department of Agriculture on 14 January 1888 at a salary of £200 per year. He was to rise through the ranks to become Under-Secretary of the Department of Agriculture and Stock in 1904, holding the office till he retired on 31 December 1924. The appointment of Scriven completed the initial staff of the Department of Agriculture. They were Peter McLean, Under-Secretary, F. Manson Bailey, Colonial Botanist, and E. G. E. Scriven, Clerk. They were housed in two small rooms, 14 feet square, in the Department of Public Lands in George Street, Brisbane.

It can be seen that the real pressure for a Department of Agriculture came from the immediate problem of land settlement being brought to bear on the then Minister for Lands, the Hon. C. B. Dutton, its actual founder. For the wider horizons of agricultural

science and crop and animal husbandry, credit must be given to his successor, the Hon. Henry Jordan, who initiated the appointment of an instructor in agriculture to launch agriculture on a scientific and instructional basis.

THE FIRST DECADE: 1887-1897

Administration and objectives

In its first ten years the Department was administered by six different Ministers. The first three were Ministers for Public Lands; the next two were Ministers for Public Lands and Agriculture; and the sixth was Postmaster-General and Secretary for Agriculture, and then Secretary for Agriculture alone.

The Hon. C. B. Dutton (Leichhardt), Minister for Public Lands in the first Griffith Ministry (13 November 1883 to 13 June 1888), authorised the establishment of the Department, appointed its first Under-Secretary and sent him on a fact-finding southern tour. Just two months later, on 30 August 1887, he handed over his portfolio to the Hon. Henry Jordan (South Brisbane) under the same Premier.

Jordan organised the appointment of the first Instructor in Agriculture from America, but ten months later the McIlwraith Ministry gained office and the Hon. M. Hume Black (Mackay) became Minister for Public Lands on 13 June 1888. He held the position under the succeeding Morehead Ministry till 12 August 1890. His was a very fruitful Ministry for the Department of Agriculture: in the space of two years he initiated the state nurseries, the travelling dairies, agricultural conferences, and the appointment of bacon-curing and tobacco experts, and organised coconut planting on the northern offshore islands.

Black was succeeded by the Hon. Alfred Sandlings Cowley (Herbert) as Secretary for Lands and Agriculture on 12 August 1890 in the second Griffith Ministry. He served till 27 March 1893. He saw the implementation of the Sugar Works Guarantee Act, which gave assistance for the erection of central sugar mills, and investigated sites for the Queensland Agricultural College.

The Hon. Andrew Henry Barlow (Ipswich) held the Lands and Agriculture portfolio from 27 March 1893 to 6 May 1896, in the second McIlwraith Ministry, a time of stringency and reduction in the Civil Service after the great February floods. He sponsored the appointment of Henry Tryon as entomologist, arranged Tryon's two visits to New Guinea to acquire improved varieties of sugarcane, arranged for the export of excess sugar to Canada and presented The Diseases in Plants Act of 1896.

Finally, Colonel the Hon. Andrew Joseph Thynne, M.L.C. in the Nelson Ministry, became Postmaster-General and Secretary for Agriculture on 6 May 1896, shedding the former portfolio to become the first full Minister for Agriculture on 27 March 1897. On 9 July of that year the Queensland Agricultural College, the site of which he had helped select, was opened.

Stock matters, which had been under the Colonial Secretary's jurisdiction, were brought under the Ministry of Agriculture to create the Branches of Agriculture and Stock. An instructor in fruit culture was appointed in November 1896 and the *Queensland Agricultural Journal* was set in train.

In the early years the Department's few staff members were occupied in surveying agricultural potential, settling people on the land, providing them with information associated with agriculture, acquiring economic plants and seeds and distributing them widely to farms representative of various districts; relaying the latest American rural information which was thought pertinent to launch Queensland into its new agricultural era to promote self-sufficiency in basic foodstuffs; collecting, identifying and cataloguing the native vegetation; establishing dairying, wheat and tobacco industries; collecting raw materials and sending them overseas to test markets; aiding the sugar industry by introducing new cane varieties and helping to establish central sugar mills; initiating plant quarantine measures; encouraging cool storage and export of commodities; sowing the seeds for better agricultural education and bringing farmers together in conference-a magnificent achievement.

The first ten years in the life of the Queensland Department of Agriculture produced some dedicated peripatetic staff members who not only imparted knowledge freely, but travelled widely throughout the Colony so that the young Department was seen to be interested in the Colony's welfare. This publicity confirmed the wisdom of its founding and created a good deal of goodwill, which was to ensure its place in the future of Queensland's rural development.

But with an initial staff of two in July 1887, one of whom was travelling in the southern Colonies for most of the first six months and the other a housebound Colonial Botanist with no money provided for plant-collecting trips, Queensland saw little of its officers during the first two years, though they were by no means inactive. A Secretary joined them in January 1888. In the first annual report, presented in May 1888, Peter McLean, the Under-Secretary, stated:

Up to the present time, the work of this Department has been confined to:

- 1. The inspection of resumed halves of runs, with reference to the suitability of the land or any part of it for agriculture and the procuring of samples of soil for exhibition in the office of the Department (consisting of one room in the Department of Public Lands).
- 2. Procuring and distributing seeds of new plants of commercial value to bona fide planters and farmers, care being taken to ascertain through the local Land Agents as to whether the applicants for seeds are really farming the land.
- 3. Obtaining and supplying information for intending selectors as to where the good land is situated, quality thereof, means of access, distance from a market, etc.
- 4. Initiating correspondence with kindred departments in other parts of the world, so that advantage may be taken of their experience in any matters that may prove of value to this Colony. (*An. Rept Dept Agric.*, 1888, p. 1)

The staff of the Department of Agriculture in 1890 were listed in the *Blue Book of Queensland* for 1890.

Land inspection and settlement

Land inspection and promotion of settlement

After his return from his southern trip, McLean inspected and reported on the agricultural and grazing capabilities of the resumed half of each of the following pastoral runs:

"Taabinga", "Barambah", "Boonara" and "Boonbyjan" in the Burnett; "Glenlyon", "Stonehenge", "Canning Creek", "Whetstone" and "Coolmundi" in the Warwick-Stanthorpe-Inglewood district; "Chinchilla" on the Western Downs; and "Taromeo" near Blackbutt. He also inspected and reported on sites at "Taabinga" (Kingaroy), "Kooroongarra" (Western Downs) and "Perseverance" (Crow's Nest) for village settlements.

Village settlements came into being as "Co-operative Communities" (Co-operative Land Settlement Groups) in 1893. Land settlement was promoted in publications: in the first year twenty "Papers for the People, by Practical Men", each treating a different subject connected with agriculture, were consolidated, with 20 050 printed by the Government Printer, of which 15 000 were issued gratuitously. These were followed by A *Queensland Guide*, which incorporated the above papers and general information about Queensland opportunities. Three thousand copies were printed-1 000 were illustrated and distributed outside the Colony and 2000, without illustrations, were spread locally. (*An. Rept Dept Agric.*, 1888, p. 2) There was much correspondence regarding the quality of land open for selection, its adaptability for given crops, and means of communication.

Co-operative Land Settlement Groups

In 1887 Peter McLean had inspected village settlements in New Zealand where unemployed people were placed on the land in groups operating on a co-operative principle. He assessed their application to Queensland: "It can only be a temporary measure to help solve the question of finding employment for the unemployed in large towns. The area of land is too small and prospects of additional work outside the group are uncertain. But if land of first class quality is allotted within reasonable distance from and access to a market this type of settlement would benefit the State."

This idea was adopted and under The Co-operative Communities Land Settlement Act of 1893 groups were allotted areas of land "but unfortunately they were formed at the wrong time of the year and the members therefore arrived at their settlements too late in the season to secure immediate results from their labours". (*An. Rept Dept Agric.*, 1893-94, p. 18).

Except for Mizpah, Obertown Model and Reliance, the groups did not go upon the land as a body, but in detachments of a few people at a time, the remainder staying behind comfortably housed in Brisbane. Consequently, there was more time spent over the necessary preliminary work of housing so many families than would have been the case had the groups gone out with their whole strength and roughed it, as many men had to do before them. The grant of £12 per member was soon expended and a further advance became necessary to save them from starving.

In June 1893, the Under-Secretary was able to write:

Many of those who during the past year have settled upon the land have had little or no previous knowledge of agriculture and especially has this been noticeable in connection with the village settlement clauses of the Land Act. The Department has been of great service to this class of settlers as is evidenced by the large number of letters seeking information on almost every phase of agriculture which have entailed much thought and labour to answer and also by the numerous applications for the bulletins issued, the demand for them being a proof of their value. The enquiries for suitable land to settle upon, noticed in my previous reports still continue, and I do not think I am out of my province in saying that much of the selection in the

past year has resulted from the information gained in this office and this has been the case not only with our own people, but also with farmers of experience from the other Colonies. Enquiries have come from many outside parts-from Great Britain, India, America, etc. resulting in some valuable additions to our community some of those from the South overlanding with their household goods and chattels, and entering upon their new property with an evident knowledge of their business. (*An. Rept Dept Agric.*, 1892-93, p. 23)

After a little over two years' experience, McLean reported on 30 May 1895:

I regret that many of the co-operative communities are in a state of collapse and are furnishing another lesson as to the utter futility of attempting settlement on the land under a co-operative system. The manner in which they were formed did not augur well for their success: the greater bulk of the people comprising the groups had not the slightest knowledge of the undertakings they were entering upon, although many of them declared in their official returns that they were farmers or had farming experience. It is, moreover, a mystery to me how these men with their avowed experience could have permitted their fellow members to delude them with the belief that farming would be successfully and profitably pursued with a fixed system, as provided in the rules of the group of eight or nine hours work a day, and it was patent from the commencement that the spirit of co-operation, so essential to the success of such schemes, was wanting.

In the same Departmental report McLean provided details of all groups formed and settled (pp. 15-19).

In his annual report dated 30 June 1896, the Under-Secretary reported that the groups had been dissolved, the cost to the Government being $\pounds 14$ 175 7s 6d and the practical result-nil!

The real reason for the failure of the community system was the failure of the members to live in amity amongst themselves and hold things in common as they said they would. However, an independent group at Wallumbilla was successful and did not cost the taxpayer one penny as each had his own farm.

Agricultural Societies and Conferences

Agricultural and Horticultural Societies

Upon the motion of Mr Pugh, M.L.A., in 1867 Parliament granted subsidies to agricultural societies for the advancement and encouragement of agriculture and stock raising. (Scriven, *Rep. Dep. Agric. Stk*, 1922-23, p. 6) The members of a society applying for aid had to number at least 50 and their subscriptions total not less than £50.

On 1 July 1889 the administration of aid to these societies was transferred from the Colonial Secretary to the Department of Agriculture. One shortcoming encountered was the close vicinity of societies to one another rather than one society involving several contiguous districts (this multiplicity of societies was a drain on revenue).

The other continuing problem for many years was the tendency to regard an annual show as the be-all and end-all of a society's existence, rather than wider activities aimed at the general improvement of agriculture. The committees were mainly businessmen living in towns and not bona fide farmers. The Royal Agricultural Society of Toowoomba was formed in 1860; the Drayton and Toowoomba Agricultural and Horticultural Association followed in 1861; and the Queensland Pastoral Society of Springsure was formed in 1865. All presumably were unsubsidised initially, but in the year 1889-90 thirty-four societies, including the above, received Departmental aid to the tune of £3729 10s 0d, with an individual maximum payment of £250 to the National Agricultural and Industrial Association in Brisbane.

Agricultural conferences

A small agricultural conference was held at Beenleigh in mid-1889 with the object of the extension of agricultural resources, dairying and general producing interests in the Logan district. Here Peter McLean, Under-Secretary for Agriculture, read a paper on silos and silage. He also suggested that a more representative conference be organised in the future, and P. R. Gordon, Chief Inspector of Sheep (in the Colonial Secretary's Department), suggested that an agricultural conference be held during and in conjunction with the show week of the National Agricultural and Industrial Association. Gordon, McLean and the Secretary of the Association, Mr Smith, organised the programme; it was duly presented in the Association's rooms in Elizabeth Street on 21, 22 and 23 August 1889 and the following papers were read, mainly by members of the Government: "Silos and Ensilage", by P. McLean (Under-Secretary); "Dairying", by Baron Jones (Manager, Travelling Dairy); "Soils", by Philip MacMahon (Curator, Botanic Gardens); "Cultivation of Lymph for Pleuropneumonia", by J. Tolson (under the Chief Inspector of Sheep); "Fodder Plants", by J. Henderson, "Kinghome" farm, Tamborine; and "Viticulture", by Henri Tardent (representing the Winegrowers Association of Roma). (Henderson and Tardent later joined the Department of Agriculture.) The papers and discussion were published in pamphlet form and distributed throughout the Colony; a copy was given to each member of the Legislature.

Attendance at the 1889 conference was not as high as anticipated, owing to difficulty in locating the room and probably because it was divorced from the showgrounds. For Tardent's address the number was particularly small (40 persons) and the Chairman (McLean) remarked, "If it had been a circus or a nigger performance the place would have been full to overflowing." Taking the conference as a whole, the farmer audience voiced the opinion that there had been "a great deal too much of the theoretical in the papers...theory was all very good, but just now they wanted practical ideas. They wanted men to come forward and tell them what they had actually done in the way of agriculture". This comment was not lost on McLean and subsequent meetings had much greater farmer involvement.

Conferences were held at Beenleigh, Maryborough, Rockhampton and Bundaberg during 1890-91. The Beenleigh conference, held on 4 and 5 August 1890, organised by James Savage (President) and Wilson Holliday (Secretary) of the Agricultural and Pastoral Society of Southern Queensland, provided for three Government speakers, four farmers and the first female speaker, the wife of Professor Shelton, who presented her paper "Canning Fruits". Professor Shelton, the Instructor in Agriculture, presented two papers, "Manures and their Application" and "Silos and Silage". Fodder plants, dairying, cotton, wheat, fruit, sugar growing and drainage were discussed.

These annual conferences were continued in 1892 at Beenleigh, then Bundaberg, Rockhampton and Mackay. They then lapsed for a few years until revived by the Hon. A. J. Thynne: a residential conference was held at Gatton College from 10 to 12 June 1897, attended by delegates elected by farmer's organisations throughout the State.

The Hon. J. V. Chataway said:

The value of the Gatton Conference was not so much due to the papers or discussions as to the way the delegates were thrown together from early morning until late at night...I was surprised at the modified views of many of the representatives at its conclusion. A delegate perhaps came from the north, a man perhaps who had never before met the successful wheat grower of the Downs but about whom nevertheless he had certain views. The same with the wheat grower. He had pictured the planter as an individual rolling in riches, and subsidised, perhaps by the kindly State. He discovered however, that it was not as he thought. The north discovered and the south discovered that each had his troubles and strangely enough they found that the troubles of both were almost identical. The driving home of this truth of the unity of interests of all the agriculturists of Queensland is probably the most important gain in such conferences at present.

Residential conferences followed at Rockhampton (1898), Mackay (1899), Warwick (1900), Bundaberg (1901), Maryborough (1902) and Cairns (1905). The Cairns conference was confined almost solely to discussion of the problems of the sugar industry.

Plant and seed introduction

Department of Agriculture

The Queensland Acclimatisation Society and the Brisbane Botanic Gardens had amassed a large collection of plants of agricultural interest to Queensland and had distributed both seeds and plant material before the formation of the Department of Agriculture. However, McLean deemed it necessary to direct the distribution more specifically to farmers and, having no farm headquarters or experimental station, he acquired seed and apportioned it among selected farmers in various representative areas of the State. In his annual report dated 1 July 1888, he stated inter alia:

It will be the constant aim of this Department to aid and assist the agriculturists of Queensland, both by the dissemination of practical information and seeds, and also by the testing of new, rare and untried plants of other Colonies and countries that promise to prove of commercial value to this Colony. (*An. Rept Dept Agric.*, 1888, p. 1).

McLean discovered that agriculture departments in other States distributed seeds but did not request reports on their performance. He deplored this waste of information and so for the Queensland Department he instituted a register of all seeds or plants sent out. With each parcel of seed a letter was sent to the recipient asking him to note carefully all particulars of growth, rainfall, nature of the soil, probable yield per acre, etc., the results whereof, upon the crop arriving at maturity, to be forwarded to the Department for recording. In this way, the value to the Colony of each new plant and the adaptability of different localities for different crops could be estimated.

Before the end of 1887, McLean had collected three Indian wheats from Dr Bancroft, a private experimenter on land owned by Messrs Joyce Bros. of "Cregmore", Dalby; Mexican wheats from Dookie College, Victoria; "Ward's Prolific" wheat from James Ward of "Netherby", South Australia; coffee and annatto from James Dick of Cooktown;

Japanese flour maize from James Henderson, a collector of exotic plants at Tamborine; rice, hedge plants (*Duranta plumieri* and *Murraya exotica*) and broom millet from New Zealand; baobab seed from Melbourne; English Colorado red No. 67, 72, 88, 25 and 17 wheats from Dr Bancroft; olives (*Olea europaea rubra*) from Dookie College; wattles (*Acacia pycnantha* and *A. decurrens*) for tanning bark from Adelaide; Giant Honduras sorghum; Liberian coffee; skinless barley, rye and ramie (*Boehmeria nivea*). These seeds were very widely distributed, especially the rust-resistant wheats, olives, sorghum, annatto, coffee and wattles.

In 1889 a parcel of forage legume seeds was received from Paris, including three varieties each of birdsfoot trefoil, soybeans, dolichos and lucerne, tree lucerne and Bokhara clover, and two grasses: Teff grass (*Eragrostis tef*) from Abyssinia and barnyard grass (*Panicum frumentaceum*). Notable introductions were the Bahia navel orange (one report stated that if the American Department of Agriculture had done nothing else for the States than introduce this orange, it had repaid the expense in maintaining it), and the American Riverbank grape (*Vitis riparia*), which was resistant to *Phylloxera*.

These were distributed to growers in all parts of the State: Seally Bros, Trelawny, Harrisville; Gore & Co., Yandilla; W. B. Slade, Glengallan; B. Hudson, Warwick; Kable Bros, Brightly, Mackay; C. Carrington, Herberton; J. Homley, Upper Tent Hill, Gatton; W. Irvine, Roma; D. Jones, Redbank Plains; B. Gulliver, Acacia Vale, Townsville; J. Clift, Warwick; N. J. R. Gregory, Toowoomba; Brennan and Geraghty, Maryborough; P. O'Kelly, Mary River, Maryborough; M. Tansey, Boonara; and J. B. Henderson, Tamborine.

Seed and plant distribution within the Department became the province, after 1889, of the state nurseries at Mackay and Kamerunga (in the area of tropical crops) while the Botanic Gardens continued its own programme, distributing mainly to schools for Arbor Day and cities for beautification. Grain-crop material came mostly from state farms and private seedsmen, and a wide variety of plants came from the Queensland Acclimatisation Society (a role later to be taken over by the Botanic Gardens).

Botanic gardens

The instructions given to Charles Fraser, who laid out the Brisbane Botanic Gardens in July 1828, were "to establish a public garden, to collect the vegetable products of the country, to make observations on their uses and importance, especially the forest trees, and to report on the nature of the soil". The Gardens could claim to be the oldest public institution in the Colony, and there was certainly none that had given as much healthful, refining, and elevating enjoyment to so many people.

On 12 April 1855 the Imperial Government appointed Walter Hill Superintendent of the Brisbane Gardens, at the salary of £300 per year. At the time the Gardens covered only six acres and had no access to the river. Trustees were appointed and they were able to increase the area to $27\frac{1}{2}$ acres, with access to the river.

On Separation in 1859, Hill was appointed Colonial Botanist and Curator of the Botanic Gardens and he held this position until he retired in 1881, aged 60. His appointment was in the Department of Public Lands, with responsibility to the Surveyor-General. Hill's major

work was the introduction, cultivation and distribution of planting material of crop plants. Most of our major tropical crops were introduced during his term: allspice, clove, nutmeg, cinnamon and black pepper, coffee, Paraguay and China tea, camphor, tamarind, breadfruit, caper, tobacco, rice, American sarsaparilla, coconut, date, Daum and Guinea oil palms, six species of guava, the mango, the rose, Malay custard and star apples, sour sap and sweet sap, cherimoya, alligator pear (avocado), Chinese date, plum and joppadilla plum, granadilla, edible hovenia, areca nut, jackfruit, longan, litchi and jujube, papaw, organ tree, lace bark tree of Jamaica, logwood teak tree of India, and the tallow tree, twenty varieties of vines, twelve of pineapples, eight of banana and ten of orange. Important crop plants included Sea Island and upland cotton, sugarcane, sisal hemp, cinchona (quinine), gamboge, and indigo. (*Journal of the Legislative Council*, Vol. V, 1863, pp. 1-3)

In his report on the Gardens on 6 May 1861, Hill reported great difficulty in contending with the incessant growth of *Cyperus rotundus (Hydra)*, or nut grass, which defied every exertion for its eradication.

In his annual report for 1861-62, Hill wrote: "With the means placed at my disposal (£100 in the first budget in 1860) I have succeeded in forming the nucleus of a Public Botanical Library and Museum." He forwarded the £100 to Sir William Hooker, then Director of the Royal Botanical Gardens at Kew, who sent out some very valuable books with which to found a library. They were kept in Hill's residence until 1881. F. M. Bailey, who succeeded him, took them to the Queensland Museum in Queen Street. (Everist, S. L., *History of the Queensland Herbarium and Botanical Library 1855 to 1976*, 1982).

Hill had put together some herbarium specimens but they were destroyed by damp and white ants and he could get little help from the Government to remedy the storage problem.

In 1887 the Gardens were transferred to the Department of Agriculture. In addition to the Brisbane Botanic Gardens, the Government sponsored reserves in Brisbane and provincial cities by providing grants for the establishment of parks and gardens. To represent the Government and to oversee the expenditure, Peter McLean, Under-Secretary, was appointed Curator of Botanic Gardens, Parks and Reserves and, ex officio, a Trustee, on 30 March 1889, at no extra salary. (The extent of the Government grants and the localities assisted are shown in the Department's annual report for 1890-91 [p. 203]). On 23 April 1889 Philip MacMahon was appointed Curator at a salary of £300 per year.

These reserves were under the supervision of trustees and the Secretary reported yearly to the Under-Secretary for Agriculture, attaching an audited balance sheet.

On 1 July 1890 the grounds of the Government Domain were placed under the management of the Curator of the Brisbane Botanic Gardens, Philip MacMahon. A meteorological station was set up on the same date and daily reports were sent to the Chief Weather Bureau. Some five and a half months later, on 15 December 1890, a fierce gale greatly injured the trees, the roof was blown off the old bush house, and the leaves of almost every plant in the Gardens were literally cut to pieces by hail. A new enlarged bush house was erected, 117 feet long and 46 feet wide. There were also a propagating department and a very old curator's residence. The new Curator, MacMahon, reported on 30 May 1891:

In providing furniture, etc. when I endeavoured to reside in the present house, I spent, as a beginning £100. This, with doctor's fees, and other expenses incurred in consequence of fever, contracted through the utterly unsanitary state of the building, has been a dead loss to me. A small but valuable private collection of books on Botany and allied sciences, which I am obliged to keep for reference in the Gardens, is rapidly becoming spoiled from damp. The building is unfit for an office: it has been condemned by experts on several occasions as absolutely prejudicial to health. Seeds stored in it rapidly lose the germinating properties, and this has been the cause of much inconvenience. I would earnestly ask that a suitable house may be provided as soon as practicable.

A new residence was provided in 1891-92. An aviary was also in existence.

A major flood occurred in March 1890 and the greater part of the Gardens went under water, which at the rosery was ten feet in depth. The damage was gradually repaired but increased labour was required to maintain the existing plantings and develop new schemes. Ideas in train were "the formation of a proper collection of plants, native and foreign, arranged in their natural orders and correctly labelled, the establishment of a pharmaceutical garden for the use of chemists and doctors who are required by law to pass an examination in botany" and seats and shelters for the public. With regard to labelling of plants, F. M. Bailey, Colonial Botanist, suggested in his 1890-91 report that:

... the labelling should be the responsibility of the Government Botanist for accuracy. The scientific name must be correct on the plant, as local names for the same plant differ. The Queensland Botanist should be able to assist in the determination, classification and naming of plants. At present all botanical specimens must be handed over to the Government Botanist in Victoria for determination and distribution.

MacMahon reported in May 1890 that the general public had visited the Gardens in large numbers, especially on Sundays and public holidays, and damage was trifling. "The practice (which at one time was the most objectionable feature in the Gardens) of semi-intoxicated men of the `loafer' type camping in the Gardens on seats, under shrubs, etc. has greatly diminished owing to the vigilance of the Ranger and garden policemen." (*An. Rept Dept Agric.*, 1889-90, p. 45)

The Ministry for Lands and Agriculture asked MacMahon to submit a plan for instruction of children in horticulture and his scheme was approved. In cooperation with the Department of Public Instruction that Department called a meeting in the bush house of the Botanic Gardens on 6 April 1891 at which large numbers of children from the city and suburban State Schools, accompanied by their teachers, were present. The gathering was addressed by the Minister for Public Instruction, the Minister for Lands and Agriculture (the Hon. Alfred Sandlings Cowley), the Under-Secretary for Agriculture and the Curator of the Gardens (Philip MacMahon). As a result it was decided to institute a series of classes of instruction in scientific and practical horticulture; these commenced the following week and continued for several years. Children ranging in age from 12 to 15 years from boys' and girls' schools were taken separately, the girls on Monday afternoons and the boys on Friday afternoons. Classes were held in April-May. Groups of sixteen pupils operated plots 17 - 25 feet. In the first year 36 schools, embracing 224 pupils, were involved. A special classroom was erected in 1891.

In 1890 the Minister for Public Instruction, the Hon. Charles Powers, introduced Arbor Day to "inculcate into the minds of school children a love of horticulture and arboriculture". In that year Arbor Day was held on 1 August, but as this date was unsuitable for some schools it was decided that in future 1 May would be Arbor Day.

The institution of Arbor Day resulted in heavy demands from the various State Schools for trees. The Curator was concerned that some of the trees requested were entirely unsuitable for the area and suggested that native trees could profitably be planted.

For Arbor Day, 1 August 1890, 7650 trees were distributed — from the Botanic Gardens, Brisbane (3451); the Botanic Gardens, Toowoomba (409); the Botanic Gardens, Maryborough (600); the Botanic Gardens, Rockhampton (564); Queen's Park, Ipswich (41); the Acclimatisation Society, Brisbane (2551); and the State Nursery, Kamerunga (34).

Plant introduction and distribution occupied a good deal of time and involved much correspondence. Plant material was dispatched all over Queensland to individuals, schools and organisations. A meticulous record was kept and the distributions of individual plants or seeds and the destination were recorded in full in the early annual reports of the Department. Upkeep of the Gardens was always difficult, with proliferating grass and weed growth during periods of intense rainfall. Mowing was done by scythe "using seven men daily till midday in lush times", until February 1891, when a one-horse all-steel Deering mowing machine was obtained at a cost of $\pounds 19$ 10s 0d and it saved the initial cost in two months.

The great floods of 1893 did immense damage to the Gardens. The Curator's graphic description below is taken from his annual report to the Under-Secretary:

Floods. On the 5th February 1893, a disastrous flood covered the greater part of the Gardens, doing immense damage. This flood was repeated a fortnight later, on 19 February, and between these floods and for some time afterwards, the low-lying portions of the Gardens were sodden with moisture. The result was the entire destruction of all herbaceous plants in the lower portions of the grounds, and such was the moist condition of the soil that such plants as pelargoniums, verbenas, and the host of flowering plants used in bedding, were killed in every part of the Gardens.

In the flood of 5 February the current swept across the point upon which the gardens are situate, and its force was terrific. My residence was toppled over, and my private collection of books, all my furniture, as well as all office records &c., were destroyed. Sheds and stables, with their contents, were swept away. The glass propagating-house was knocked down, and all the plants therein covered by the flood to a considerable depth. The old bush-house was under water, a considerable portion carried away, the rest bent over, and the greater part of the plants destroyed. Fences were levelled with the ground or swept away. Huge trees were rooted out of the ground on the river bank and swept away, and several large clumps of bamboos were carried down the river. Several landslips occurred, several acres of land being carried away into the river. Over the whole lower portion of the gardens a thick deposit of mud and sand was placed. This varied from a few inches to upwards of 2 feet in thickness. All the lower walks were rendered impassable by this deposit, and it was nearly two months after the waters subsided before it was possible to walk on the slimy ooze deposited on the lawns and borders. On that portion of the Gardens where my residence stood, and on the Government Domain adjoining, large ponds were scooped out by the action of the water. The value of trees and vegetation in checking the destructive action of floods was well demonstrated in the Gardens, as well as in many other places on this occasion. The force of the current which swept across the point upon which the Gardens are situate was checked by the numbers of trees which it encountered, and a vast quantity of debris was entangled and detained. I am confident that if it were not for this filtering, as it were, to which the flood waters were subjected in their passage through the Gardens, a very much greater amount of damage would have been done in the

lower portions of Alice and Edward Streets and in that vicinity. This protecting action of timber was also very noticeable at several points up the river, where houses having trees on the up-river side escaped, while others in the vicinity were washed away. In the Gardens also the refreshment kiosk, which was protected by trees on the exposed side, escaped, though situate in the course of the current, while much stronger buildings near, but without such protection, were destroyed.

This points to the desirability of planting exposed points along the river with suitable trees, in order to mitigate the effects of future floods. The binding effects of buffalo grass (*Stenotaphrum americanum*) was well illustrated. In many places round beds had been made in swards of this grass, and these beds were scooped out to a depth of two or three feet, while the ground covered by the grass remained uninjured, and in several instances the formation of gullies was stopped in this way, for as soon as the water began to wash away the earth upon which it grew, the buffalo grass hung down in a sort of curtain across the face of the forming gully, and prevented further erosion.

As regards the plants killed by these floods, it would be a tedious and useless waste of time to enumerate all the plants destroyed, but for the guidance of persons wishing to plant in positions subject to floods, I append lists of some of the principal and best-known plants which were killed (Appendix A) and which survived (Appendix B) (*An. Rept Dept Agric.*, 1892-93, pp. 48-53). In many instances one specimen of a plant perished and another of the same kind survived at no very great distance from each other. Clay subsoil, or deficient drainage, or both, contributed in no small degree to the death of many plants. An adequate system of drainage is every year becoming more essential here. I append a map showing the contour line of the flood.

Reconstruction after the floods involved a good deal of attention during the remainder of 1893 and 1894.

An interesting observation MacMahon made in his 1895-96 report was that "the increased force in the water mains consequent upon the opening of the Mount Crosby Reservoir caused many old pipes to burst". During that year he also produced *A Queensland Garden Illustrated*, and gave a series of lectures to adults in the Normal School.

In an official visit to the Sydney, Melbourne and Adelaide Gardens during 1896-97, MacMahon collected one thousand plants for the Brisbane Gardens.

The most important visitors during this year were the members of the International Fruit Conference who "considered that the Gardens provide one of the best advertisements Queensland can have to show the wonderful range of her products".

The role the Botanic Gardens played in the early introduction of economic plants is shown in Appendix A, prepared by J. F. Bailey, Curator. This was published in the annual report of the Department for 1909-10 (pp. 128-135).

State nurseries

Lewis A. Bernays of the Queensland Acclimatisation Society undertook a private tour of north Queensland and on 13 January 1880 presented a paper, "Economic Tropical Horticulture in North Queensland", to the Legislative Assembly, which on 6 July ordered it to be printed. In it he suggested that a tropical nursery be established, restricted to a very few acres, managed by the Government and not by trustees (as was the Acclimatisation Garden), as a centre for the propagation and distribution of economic tropical plants.

In a letter dated 15 June 1888 from the Minister for Lands and Member for Mackay (the Hon. M. Hume Black), Peter McLean was asked to set up experiment farms. On instructions from the Minister on 5 July he proceeded to Mackay, Cairns and Port Douglas to make enquiries regarding this venture. At Mackay McLean found that "nearly every European tilling the soil has devoted his whole time, energy, and money in the cultivation of sugar cane and now that the season has been so unusually dry, the cane in many places badly frosted, the price of sugar so low and the labour question in such a state of uncertainty, the farming community are at their wits end to know what to fall back upon as likely to prove a remunerative crop".

A Mr McDonald, at a meeting of farmers at Walkerston during McLean's visit, moved "That this meeting was of the opinion that if the Government would establish a test farm or nursery in this district, with the necessary machinery for producing fibre and oil, it would give the farmers the opportunity of seeing those different plants growing and manufactured and that they might deem suitable for their different soil and locality". This motion was adopted both here and later at Mackay.

McLean, in assessing the situation, stated:

I find that the test station system could not be successfully adopted in this district, inasmuch as the crops which the agriculturist might be asked to test would not be at all likely to remunerate him for his time and labour. Agriculture has all along been so much confined to one thing, that anything that the producer would be asked to test would be looked upon wholly in the light of an experiment, with the result so problematical that I have indicated in connection with this system. Neither do I consider it advisable that an experimental farm should be established, but I believe that a State Nursery could be started and carried on at a comparatively small cost to the Colony and which would prove of immense benefit to the district.

He suggested that a nursery be established on a portion of "The Lagoons", a recreational reserve three miles from Mackay.

Going further north, as far as Mossman, McLean decided that a nursery should also be provided at Cairns on a Government reserve about eight miles from the town, near the Barron River and the village of Kamerunga.

The Mackay State Nursery was established in May 1889 by David Buchanan, who was appointed overseer on 11 March 1889 at a salary of £150 per year. He had twenty acres of land fenced and five acres cultivated in time to plant, on 29 May, two Mediterranean and eight Egyptian wheats obtained by the Under-Secretary from Messrs Vilmorin, Andrieux and Co. of Paris. These were bearded varieties and were in full ear on 10 August.

Numerous introductions of fruit trees, grapes, tobacco, fibres, oil and root crops were planted before 1893. In 1890, because dairymen had found the northern grasses poor, coarse and rank, it became necessary to supplement grazing with fodder crops; plots of Kaffir corn (*Sorghum* sp.) sweet sorghums (*Sorghum bicolor* (*saccharatum*) varieties Honey Dew and Early Orange), maize, oats, barley, rape, rye, pepper grass (*Panicum whitei* from Cooper's Creek) and Nantes carrot were planted to test their adaptability and yield.

From 1893 on emphasis was placed on sugarcane varieties as several young men were entering the sugar industry. Six and a half acres of ground were prepared and planted to cope with the demand for sets. In 1893, between 10 January and 10 May, 118 farmers were

supplied with planting material of New Guinea origin brought in by Cowley. There was also great interest in Kewensis, a seedling cane from Kew, which had originated in Barbados. In January 1896 a large consignment of New Guinea canes selected by Henry Tryon was received and planted. In 1897 it was decided to convert the Mackay nursery into a sugar experiment station.

At Kamerunga twenty acres of scrub land were cleared and a small nursery was established. Ebenezer Cowley was appointed manager on 7 September 1889, on a salary of £150 per year. Arriving at Cairns on 12 September, he was taken to Kamerunga by Hartley, Acting Land Commissioner. The weather was very dry and this, combined with a plague of caterpillars, caused the failure of the first crop of maize and sweet potatoes. Cowley found that most of the farmers in the district were Chinese, who cultivated one variety of rice, Cavendish bananas and maize. He noticed that the crops were very free of weeds.

Cowley was quickly on the job, as the list of plants under trial in May 1890 shows. On his return from collecting sugarcane varieties in New Guinea in 1893 he planted them in the nursery, which, with Mackay, became the main source of sugarcane plants. During June and July 1894 some 2250 plants of New Guinea canes were given to nine planters in the Port Douglas-Cairns and Herbert districts.

During the 1896-97 year, Cowley reported that he had 79 varieties of sugarcane growing, including his own introductions, the Kew seedling and Henry Tryon's selections from New Guinea. The latter were doing well and the variety "Batse" introduced in 1893 was popular with the growers and especially with children as it was so sweet.

Coffee had proved to be an exciting crop and several growers had had success with it. Cowley requested that a handbook on coffee culture be prepared and distributed.

Colonial Botanist

Walter Hill was Colonial Botanist from 1859 until 1881.

The Queensland Acclimatisation Society, formed at the suggestion of His Excellency the Governor, Sir George Bowen, in 1862, was patterned on a similar society in England. With a membership including members of the Legislature and prominent citizens, it advised the Government on many matters of Queensland interest in the absence of a Department of Agriculture. In 1873, it recommended to His Excellency the Marquis of Normanby, its Patron, that a tropical nursery and a herbarium be established. (*An. Rept Qld Acclimatisation Soc.*, 1873, p. 7) In its annual report in 1874 it recorded:

You will be glad to learn that a Herbarium of the Flora of Queensland has been commenced by the Government, in response to the suggestion of this Society. The work has been entrusted to Mr. F. M. Bailey, Botanical Collector, under the supervision of Mr. Commissioner Coxen, Trustee of the Museum, of which institution it is to form a feature. In recognition of the suggestion having originated with the Society, one of your Vice Presidents, Mr. L. A. Bernays, has been invited by the Government, and has consented to advise with Mr. Coxen on the matter.

The President of the Society at this time was the Honourable Sir Maurice C. O'Connell, M.L.C.

In that year (1874), Thorne & Greenwell published Bailey's *Handbook of the Ferns of Queensland, Compiled from the Most Recent Works on Ferns, and an Introduction to Fern Study*. Frederick Manson Bailey, a Fellow of the Linnean Society, was trained in horticulture and was a farmer, storekeeper and private botanical collector. He reared and supported a large family. He worked mainly on the identification and description of native and naturalised plants, especially ferns, algae, fungi, lichens, mosses and liverworts. He established a reputation in the botanical field and amassed a private collection of plant specimens.

In 1875, the Queensland Government appointed a board to enquire into the causes of diseases in livestock and also the plants of Queensland. Bailey was appointed to the Board, with responsibility for botanical aspects of the enquiry, and served on it for about five years. Arising from this enquiry, he published in 1877 his *Inquiry for Seeds and Grasses and Other Fodder Plants With a List of the Grasses of Queensland* (21 pages), and in 1878 *An Illustrated Monograph of the Grasses of Queensland*.

The Herbarium was housed in temporary accommodation in the first General Post Office building on the western side of Queen Street, between George and Albert Streets. In 1874, Bailey was appointed Keeper of the Herbarium under Charles Coxen, the Honorary Curator, while K. T. Staiger, Government Analyst, was also given the job of Custodian of the Queensland Museum in the Parliamentary Building nearby, also in Queen Street. (Mack, G., *The Queensland Museum 1855-1955*)

A new building for the Museum was erected in William Street in 1878 (it later became the State Library) and the collections were transferred to it in January 1880. Bailey added his own personal collection to the Herbarium.

W. A. Haswell was appointed Curator of the new Museum in January 1880 but resigned in November. Bailey was then appointed Temporary Curator of the Queensland Museum, under the Secretary for Public Works and Mines, at a salary of £200 a year. On 1 July 1881, he was appointed Colonial Botanist at £350 a year, under the Secretary for Public Lands and responsible to the Surveyor-General, retaining his previous appointment as well until 1882. He was transferred to the Department of Agriculture as Colonial Botanist at its founding on 1 July 1887. He thus continued, without interruption, his ongoing research in connection with Queensland plant communities. He continued as Colonial Botanist until his death at the age of 88 years, in 1915. He had suffered two dismissals and re-instatements.

Bailey was first dismissed on 31 August 1893 by the Hon. A. H. Barlow, the current Minister for Public Lands and Agriculture, when the financial crisis called for a reduction of 10 per cent in the Civil Service. Such was the public outcry that he was reinstated on 1 January 1894. This experience no doubt led Bailey to write a little later:

To persons who have never given a thought to the importance of the assistance rendered by the Botanist to the artisan, farmer, horticulturist, or pastoralist, he is looked upon as a faddist and a dealer in long meaning names, and it is in this light that he is mostly placed before people by our newspaper. Practical men in the above branches, who may be termed the real backbone of the country, however, do not hold this idea. They know full well that in every phase of work where plants or plant products play a part, without the help of the Botanist very great and often inextricable confusion and hence loss, occurs.

He was later to be invested a Companion of the Order of Saint Michael and Saint George (C.M.G.) for his devoted and brilliant service. (*An. Rept Dept Agric.*, 1895-96, p. 33)

Office-bound at the Queensland Museum during his first year with the Department because no money had been allocated for travel for collecting (also none was granted for the library), Bailey depended mainly on specimens sent to him by the public for identification and comment. He accumulated twenty specimens of fungi from various economic hosts and, not being a plant pathologist, despatched them to the well-known mycologist Dr M. C. Cooke in England for identification.

In the Department's inaugural year (1887) Bailey found time to publish, in conjunction with P. R. Gordon, Chief Inspector of Sheep (in the Colonial Secretary's Department), an illustrated booklet, *Plants Reputed Poisonous and Injurious to Stock*, printed by the Government Printer. Bailey's interest in poisonous plants continued and he gradually added to the list as new information accumulated.

As one of the eight Commissioners appointed to collect and prepare exhibits for the Centennial International Exhibition in Melbourne, Bailey spent a good deal of time during 1888 preparing a collection of 537 specimens of indigenous woods in rough and polished state (probably the most varied and valuable ever seen from a single colony), 162 native Queensland grasses and a collection of economic plants for the display. These attracted considerable attention. The woods and grasses were all labelled and catalogued.

During 1889-90 the Department of Agriculture moved into offices in William Street, vacated by the Commissioners for the Melbourne Exhibition in 1888. These premises were the Department's headquarters for many years.

The Colonial Botanist set up the Museum of Economic Botany on the William Street level; it included exhibits sent to the Melbourne Exhibition and probably also material from a museum of economic botany started by the Acclimatisation Society in 1886. In addition, it contained fibres, gums, fruits and botanical specimens from Queensland and also from other parts of the world.

Bailey, quoting an English authority, stated:

The object of these museums is to show the practical application of botanical science. They teach us to appreciate the general relations of the vegetable world to man. We learn from them the sources of innumerable products furnished by the vegetable kingdom for our use and convenience, whether as articles of food, of construction and application in the arts of medicine or curiosity. They suggest new channels for our industry, they show us the variety in form and structure presented by plants, and are a means of direct instruction in most important branches of useful knowledge. We see from them the particular points upon which further information is needed, especially as to the origin of many valuable timbers, fibres and drugs, in order to perfect our knowledge of economic botany. In brief, the museum shows us how little, as well as how much, we know of the extent to which herbs, shrubs, and trees contribute to our necessities, comforts and numberless requirements. (*An. Rept Dept Agric.*, 1899-90, p. 33)

The museum attracted a lot of visitors, including sawmillers seeking information on timber. Trial shipments of hundreds of tons of timber - for paving blocks, etc. - were sent to England to test the market.

Because of the increasing size of the collections, a second room was acquired on another floor in 1890-91. The upper floor housed the Queensland woods and a carpologic

(structure of fruit and seeds) collection, drug plants and 100 different plant blights, while the lower floor held the fibre crops and their products-mats, matting, rope, etc., showcases of tobacco, cotton, food preparations, fruits in glass jars, cereals in ear, and a mounted collection of indigenous grasses. The museum was added to from time to time and created a great deal of interest. Material from the Kew Museum and New Guinea fibres donated by Sir William Macgregor were included.

On 4 June 1889 Bailey joined a scientific expedition to the Bellenden Ker (Wooroonooran) Range in north Queensland under the leadership of A. Meston, who wrote: "Mr. Bailey bore the unpleasant ordeal and all other unpleasant privations during the trip with a cheerful fortitude highly creditable to a man of his age [62] and very gratifying to myself...On 4 July Bailey and myself went out collecting and displayed an amicable unanimity by falling into a creek together, and a great deal of self-possession and agility in getting out again". The party returned to Brisbane on 25 September. Bailey made a large and interesting collection of botanical specimens, including many that were new to science, as well as others discovered for the first time in Australia.

This expedition, the first of its kind sent out in Australia by an Australian Government, brought credit to the Premier, the Hon. D. B. Morehead, and the Minister for Lands, the Hon. M. Hume Black, for approving it.

The influence of the companionship of the Colonial Botanist will be traced here and there by the observant reader:

The shades of night were falling fast, As o'er the mountain summit passed A botanist man, extremely nice, Who bore a plant with strange device, "Dendrobium hispidum."

His brow was stern, his beard below Looked white as the Antarctic snow, And like a silver bugle rung That weirdly scientific tongue, "Pogonatherum saccharoideum."

In tall old trees he saw the bright Orchidian blossoms, pink and white, Above the spectral mosses alone, And from his lips escaped a groan, "Bulbophyllum purpurascens."

"Try not to climb," the young man said, "Beware the loose rocks overhead; That granite creek is deep and wide." But loud that fearless voice replied, "Polypodium subauriculatum."

"Oh stay," the leader said, "and rest A half-hour on this turkey's nest." A tear stole slowly from his eye, But still he answered with a sigh, "Acrostichum neglectum." "Beware of every snake you see, Beware the awful stinging tree, Beware where cryptogams you seek." A voice replied across the creek, "Alsophila rebeccae."

At midday there as in the shade The pious men of that brigade Uttered a brief impromptu prayer, A voice called through the startled air, "Hymenophyllum javanicum."

A botanist in the evening fog, Was found beside a bean-tree log, Still grasping like a patent vice A plant which bore the strange device, "Bulbophyllum nematopodum."

There in the twilight cold and gray So peacefully serene he lay, But at this stage-if not before -Two wild-eyed men with axes swore, "We'll kill you, Bailey!"

A. Meston, An. Rept Dept Agric., 1889-90, p. 97

Bailey was also aware of the early presence and potential danger of noxious weeds and drew attention to their presence. The Department was active in its early years in the eradication of noxious weeds from Crown Lands and from land reserves, in cooperation with local authorities. In 1882, the Divisional Boards Act Amendment Act authorised the Boards to cause the destruction of noxious weeds. A specimen of prickly pear (*Opuntia inermis*) had been taken to Scone in New South Wales in 1839 and from this one plant had spread over eighty years to infest 60 000 000 acres of land in Queensland and New South Wales.

Prickly pear was declared a nuisance under the Act by 22 Boards. The first was the Tarampa Board, on 10 May 1883. The others, in order of date, were Parroo, Warroo, Inglewood, Baramba, Gogango, Glengallan, Dalrymple, Bauhinia, Toombul, Walloon, Taroom, Woolloongabba, Wallumbilla, Thuringowa, Purga, Ithaca, Brassall, Murweh, Antigua, Isis and Bundamba. The last mentioned was on 25 August 1887, just one month after the formation of the Department of Agriculture. (Mann, J., *Cacti Naturalised in Australia and Their Control*, Brisbane, Govt. Printer, 1970)

The first mention of the Department's interest in the pear problem was in a statement made by the Under-Secretary (*An. Rept Dept Agric.*, 1888-89):

This cactus which was at first introduced as an ornamental plant, has now become a perfect pest and may well be classed among the noxious weeds. 100 lb of Messrs. Taylor, Murchison and Sharpes scrub exterminator were used on pear on waste land on the Brisbane River with little success, but Mr. Winks of Mount Flinders near Ipswich has had success. A patch of pear at Jondaryan is going to be used for experimental treatment with it.

The Department was to continue its interest into the next decades. W. Watson, the Departmental ham and bacon curing expert, carried out experiments with prickly pear as pig food, which he pronounced to be a success.

Noogoora burr (*Xanthium pungens*) took its name from Noogoora Estate, about twelve miles from Ipswich. It was introduced to the estate in imported cotton seed. At one time a very small amount of money would have cleared the whole district. After cotton-growing failed one man could have cleared the whole of the Noogoora burr, but the estate was sold and taken over for cattle on agistment and these plus floods soon spread the pest. (Macfarlane, A., *QAJ*, Vol. 3, p. 131) No Act allowed Council landholders along the Brisbane River to eradicate it and no Act allowed the Councils of North and South Brisbane to enter private land.

In May 1894, Bailey wrote: "Fourteen years ago, when the pest [Chinese burr-*Triumfettia rhomboidea*] was discovered in the Colony a few pounds would have rid the Colony of it altogether, and now it covers hundreds, perhaps thousands of acres of some of the best country and is still spreading." In that year he reported on troublesome and noxious weeds "which might be inserted in any Act as noxious weeds to be destroyed" - forty-four in all that were troublesome from time to time. Most have now stabilised in population and only six remained on the official list of declared noxious weeds in 1977.

In 1897 Bailey visited Thursday, Hammond, Goode and Turtle Islands with the assistance of Frank L. Jardine (after whom the Jardine River was named) of "Somerset". He suggested a rubber plantation be planted there; this was subsequently arranged and the trees are still standing.

He also established a grass garden on the Acclimatisation Society's grounds at Bowen Park with the cooperation of the Manager, William Soutter, who was later to be the Departmental Superintendent of State Farms. He was the father of R. E. "Dick" Soutter, Queensland's most famous wheat breeder.

Bailey was a prolific writer. Before joining the Department he published nine substantial works on ferns, grasses, flora of Queensland and poisonous plants. In the first decade of the Department he added thirty-five more (see Appendix B). By this time Queensland flora was well understood and Bailey was ready to publish his most enduring books-the six volumes of *Queensland Flora*, issued from 1901. (See Appendix B.)

Agricultural experimentation and education

Appointment of Professor E. M. Shelton as first instructor in agriculture

Following an approach made by the Hon. Henry Jordan, Minister for Lands, in 1887 (*QPD*, 29 Nov. 1887, p. 1860) to the Secretary for Agriculture, United States of America, for a suitable man "to give such instruction as may be found most likely to conduce to the advancement of agriculture in Queensland and who is well acquainted with the American methods of instruction and practical farm operation", Professor Edward Mason Shelton,

Professor of Agriculture and first principal of the Kansas State Agricultural College at Manhattan, and a well-known wheat breeder, was appointed. He took up duty on 15 January 1890 at a salary of £750 per year, under the direction of the new Minister for Lands, the Hon. M. Hume Black.

In March 1890 Shelton attended the inaugural Rust in Wheat Conference called in Melbourne by the Hon. J. L. Dow, Minister for Agriculture, with the Under-Secretary, Peter McLean, and was elected to a continuing committee to investigate the problem.

From 8 to 25 March 1890 he toured north Queensland to study the agricultural problems of tropical Queensland, visiting Mackay, Townsville, Hughenden, Cairns, Geraldton (Innisfail), Halifax, Ingham, Bowen and Rockhampton "making meanwhile numerous detours by buggy and on horseback in each district visited". He lectured at seven of these centres. This trip impressed Shelton with the resources of the State and the slight use being made of them. He stated he had "a profound conviction that Queensland in the variety and extent of its natural resources is scarcely surpassed by any like area of the globe and if these advantages were known to the world, they would attract to our shores what Queensland now needs above everything else, working farmers and small capitalists".

Shelton was largely instrumental in organising the first agricultural conference, held at Beenleigh on 4 and 5 August 1890. He contributed two lectures, "Manures and Their Application" and "Silos and Silage", and took a leading part in the discussion. His "moving finger" wrote *Bulletin* No. 1 (July 1890), Pig Raising and Pork Making with Ham and Bacon Curing (Facts and Suggestions in the Rearing, Management and Marketing of Swine), and "having writ" moved on to *Bulletin* No. 3 (September 1890), The Cultivation of Maize (with facts and suggestions as to its utilisation), *Bulletin* No. 5 (November 1890), Canning and Otherwise Preserving Fruits for the Home and Market (largely prepared by Mrs Shelton), and *Bulletin* No. 8 (February 1891), Recent Experiments Made at the American Agricultural Experiment Station.

As a result of his travels throughout the State, Shelton produced *Bulletin* No. 19, Wheat growing in Queensland, in September 1892. It included a map of potential wheat-growing areas, which was remarkably prophetic in view of the fact that he had been in the country only two and a half years and had to travel by train and horse transport.

Bulletins No. 22, The Cultivation of Wheat in Queensland (March 1893), No. 24, Our Stock Foods and How to Use Them (May 1893), Soil Wastes in the Cane Fields (1896) and Silos and Ensilage (1896) followed.

In 1895-96, Shelton was engaged also in the inspection of lands for agricultural settlement under the provisions of The Agricultural Land Purchases Act of 1894, and in choosing the site of the future Queensland Agricultural College.

He was appointed the first principal of the Queensland Agricultural College at Gatton on 1 July 1897, after vigorously campaigning for its establishment.

Shelton resigned in 1898, and eventually returned to America to establish an orchard. He maintained contact with the Queensland Department of Agriculture until his death in 1928 at the age of eighty-one years.

Experimental fields as test stations

Following the establishment of the state nurseries, McLean decided to establish experimental fields in various parts of the Colony to assess the productivity of the varying soils. He said these would

... be formed on the lands of intelligent industrious farmers, who will be asked to set apart a small area of their land for use of the Department; the labour necessary for the cultivation of the plants will be given by the farmer, the Department supplying the seed and whatever fertilising agent the soil may be destitute of, and, as a reward for the labours bestowed, the farmer will get the crop-the farmers in the neighbourhood, moreover, profiting by the experiments. This system, I submit, can be carried out at a comparatively small cost to the Department, and will be found to be of incalculable benefit, especially to our older farming districts, where the land has to a certain extent, become exhausted. (*An. Rept Dept Agric.*, 1888-89)

Such experimental plots were widely cultivated in the 1890s, Shelton planting 30 varieties of wheat at several sites. It was noted that "preference is not now being given to the hard, horny, flintier, rust resistant varieties because of miller resistance. New varieties must have both rust resistance and good milling qualities". The millers objected to the hard wheats because they demanded extra machinery and attention to grinding, and also because their flour was rather dark, and so offered the growers a reduced price.

State farms

During the last few months of the Department's first decade, in anticipation of a new regime in Queensland agriculture, state farms were established at Westbrook near Toowoomba and at the Hermitage near Warwick.

Westbrook was acquired under the Agricultural Lands Purchase Act and its area was 431 acres. The site was chosen by the Hon. A. J. Thynne (the first Minister for Agriculture) and A. H. Benson, Instructor in Fruit Culture. Work commenced on 8 February 1897 and Henri Alexis Tardent, a viticulturist at Roma, was appointed manager on 19 April 1897 at a salary of £156 per year. Some 140 acres of forest land were cleared of timber, with roots removed to a depth of 18 inches, and ploughed. An orchard was planted with deciduous fruit trees to test the value of plums, prunes, peaches, apricots and pears for drying and canning. A vineyard of wine, table and raisin grapes was planted to test the suitability of the soil and district for wine-making. A collection of 333 varieties of wheat from Dr Cobb's stud plants (he was the New South Wales Plant Pathologist) was successfully planted, as well as cowpeas, sorghum, millet, corn, pumpkins, vegetables and fodder crops.

Hermitage, an area of 240 acres, was purchased from the Canning Downs Estate. The site was chosen by Benson. Some clearing and ploughing were completed before the end of the financial year, and the manager, Charles Ross, took up his duties during the last week in June 1897. Benson, in postulating on the future of the farm, said:

It is my intention to make a speciality of wheat culture...with the breeding and improvement of wheats, especially so with regard to the improvement of their milling and rust resisting qualities. This, in my opinion, is one of the most important if not the most important branch of work connected with the State Farms of the Darling Downs and Central Districts.

Henri Tardent, the first manager of Westbrook State Farm, died in 1929. This tribute to his work in Queensland agriculture appeared in the *Queensland Agricultural Journal*, 1929, Vol. 32, p. 414.

In Memoriam-Henri A. Tardent

By the death on Thursday, 5th September, at his home, "Ormonts," Wynnum, of Henry [sic] A. Tardent, Queensland lost a citizen of the best and most patriotic type. Born in Switzerland seventy-seven years ago, the late H. A. Tardent, though practically self-educated, proved himself a brilliant scholar, with a special gift for languages. At the age of sixteen he went to Poland as a teacher of French. Later he went to Russia, and graduated at Odessa University as Professor of the French and German languages. In 1887 he migrated to Queensland. For some years he was at Roma, where he entered into wine-making and general farming. Later he became the first manager of the Westbrook and Biggenden State farms. Afterwards and almost until the end he followed up journalism and literature, serving for some years on the staff of the Brisbane "Daily Standard", and contributing numerous articles to "The Worker" as well as to other papers. He was the author of many treatises, biographies, and essays. Besides his contributions to Australian papers, he was this country's correspondent to the Paris "L'Illustration", the "Revue", of Geneva, and the "Gazette de Lausanne". His published works (some of them prize essays) include biographies of Richard John Randall (Queensland artist), George Essex Evans (Queensland poet), and Mrs. Ellis Rowan, whose paintings of Australian wild flowers are of the highest order of artistic excellence. He also wrote "Reflections on an Australian Literature", "The Influence of Poetry on Modern Life", "Art and its Value as a National Asset", "The Functions of the State in Relation to its Commercial Life", "Arbitration v. War for the Settlement of International Disputes", "The Future Development of Western Queensland", "Science as Applied to Agriculture", and "Australia's Contribution to the World War", besides numerous works in French on various phases of Australian life and its development. He was some time contributor to this Journal. His writings in French and Swiss publications, marked as they were by a high literary tone, did much to bring Australia, and particularly Queensland, before the eyes of large and new audiences in Europe, with results wholly beneficial to the country's reputation that are difficult to appraise. An article by him on "The Birth of Canberra", starred in the Paris "L'Illustration" with appropriate photographs, was a brilliant example of the best in high-class journalism, and probably proved one of the most effective advertisements the Commonwealth has received in any country outside of Britain itself. As a crowning and fitting climax to his numerous contributions to French papers, work regarding which but few Australians had any knowledge, he was awarded in March by the French Government the distinction of O.A. (Officier d'Academie) for services rendered to literature, science, and art.

The funeral to Bulimba Cemetery was largely attended, those present including the Consuls of Switzerland and France, and representatives of the Authors and Artists' Association, Royal Geographical Society, Alliance Francaise of Brisbane, various Labour organisations, different departments of the public service, and other bodies.

Among those gathered around the graveside were many-men of culture from our universities, men of science, men of letters, and men of affairs-who knew that the sad ceremony in which they were taking part was no ordinary one, but that the casket being committed to the earth in their presence contained the remains of a good Australian-one whose work and worth, recognised during his life by an ever-growing circle, will be appreciated more and more as the future unfolds. For Australian culture, still in its formative stage, owes a debt to Henri Tardentits sponsor and champion, its guide, philosopher, and friend. When it is rightly understood, when Australian art, letters, science, music, and all the various forms of national self-expression in their highest come into their own, Henri Tardent will be accorded a place in the history of its development that his pioneering labours on its behalf and his unbounded faith in its future have earned for him.

With his possession of high intellectual qualities, wide scholarship, and culture in many branches of study, Henri Tardent was one of those rare souls who, by his sunny nature and overflowing good will, endeared himself to those fortunate enough to be numbered among his intimates.

Drought and flood relief

Drought, fodder conservation and distribution

After the initial establishment year, the anticipated dawn of a new era of productivity was to be dimmed by the stark reality of drought. Peter McLean, in his annual report on the Department for the year ending 30 May 1889, wrote:

Sir, I have the honour to submit for your consideration, the Annual Report upon the working of this Department and in so doing to express my regret that, owing to the severe drought from which the Colony has suffered for so long, and from which it is just emerging, the results are below what I anticipated... It is generally admitted that no such drought as that we have passed through has ever before been experienced in this Colony, so wide and far-reaching has it been in the disastrous results which have arisen from it, the agricultural, pastoral and commercial industries have all suffered...

The drought has not, however, passed away without, I believe, teaching a valuable lesson to those who live directly from the soil. The rainfall throughout the Colony is quite sufficient for all our requirements, if proper steps towards conservation were taken. In anything like a favourable season plant life is so vigorous that large supplies of fodder could be secured in the form of hay and ensilage, and many who have never before thought of saving hay, have made up their minds to be more provident in future, and since the breaking up of the drought a number of farmers are making ensilage, some by the stack method, others by the old silo process. (*An. Rept Dept Agric.*, 1888-89, p. 1)

The wheat crop on the Darling Downs in 1899 was severely damaged by heavy frosts in October and the farmers made considerable quantities of hay, which they wished to sell. McLean visited the Downs to discuss with them how best to dispose of it but there was little interest as the attendance at the three meetings was nine, seven and three respectively. The Under-Secretary had found it uneconomic to send the hay to South Africa to feed the horses, mules and bullocks employed by the British Army at the Cape and in Natal during the Boer War (1899-1902). Obviously, the farmers wanted the Government to purchase the hay from them, as McLean told them, "The tendency to lean on the Government, to be wet-nursed, so to speak is a growing evil. It tends to weaken the individual energies of the farmers, as well as to lessen the activity of the agricultural societies." He announced that the Railway Department, in consultation with the Minister for Lands, had decided that freights on farmers' produce (hay) sent to Brisbane to be forwarded to northern and western markets would be reduced by 33 1/3 per cent.

Let the farmers rise to the occasion now that they have the opportunity afforded them by the reduced railway rates. Fodder is scarce in many parts of the Colony...Let them hasten to send away whatever they can spare, and, satisfied with a moderate profit, have the satisfaction that, after all the difficulty about the hay, they have helped themselves, and are beholden to none for that help. (*QAJ*, 1900, pp. 165-166)

The principle of allowing a rebate on freights for fodder for starving stock was to become a basic part of drought strategy.

In May 1895, Professor Shelton pressed fodder conservation further in his report (*An. Rept Dept Agric.*, 1894-95, p. 21):

It is interesting to note the demand that has arisen, through the recent development of the dairy industry, for special information in the modern methods of fodder growing and preservation. The need for stock food, beyond the natural supplies, has been brought painfully home to dairy farmers by the unusually severe criteria of 1893-4 and the unprecedented drought and cold of the present season. Two brief tours through the Darling Downs district were devoted wholly to the matters of fodder and fodder making.

Shelton deplored the fact that he had no central station where he could demonstrate the techniques rather than preach about them.

Flood relief

The first decade in the Department's history witnessed major flooding: the flood of 1890 and the 1893 flood (described under "Botanic Gardens") were devastating to some agricultural areas. In his 1889-90 annual report McLean wrote:

The late floods which have been general over nearly all the settled portion of the Colony have caused great loss and suffering especially to the farming community. Appeals have been made to the Government for relief in the shape of seed to replant land from which the crops have been swept or destroyed by flood waters. Large quantities of seed potatoes, maize, oats and lucerne seed have been forwarded to Maryborough, Bundaberg, Oxley, Logan, Tarampa, Laidley and other places. The sum of £258.15.9 has been refunded by the Flood Relief Committee for Southern Queensland to cover the amount expended by the Government in the purchase of seeds.

When the February floods of 1893 caused so much havoc the Under-Secretary wired the Departments of Agriculture in Sydney and Melbourne for seed. Seed to the value of £5000 was purchased and distributed at cost price to 1200 farmers and market gardeners in forty-one districts. The Central Flood Relief Committee estimated that 15 014¹/₂ acres were swept away and the occupiers proposed replanting 9489 ¹/₂ acres.

No sooner was that work finished than the Central Flood Relief Committee had to do it all over again because of floods in June of the same year.

Crop production, including sericulture

Grain growing

Wheat

In 1887 wheat grown for grain totalled 8248 acres and yielded 182 308 bushels. The population of Queensland was then 366 940. By 1897 the acreage under wheat for grain was 59 875 acres and the yield was 1 009 293 bushels. Queensland's home consumption requirement was then just under 3 000 000 bushels. (Bell, *QAJ*, 1947, Vol. 65, p. 9) Professor E. M. Shelton was very closely involved in the early wheat-growing ventures.

In early 1887 floods curtailed the acreage under wheat and other crops. The 1888-89 season was disastrous for wheat in Queensland. The Department obtained rust-resisting wheat from Messrs Joyce Bros of "Craigmore", Dalby, Mexican wheat from Dookie Agricultural College in Victoria, and "Ward's Prolific" from Mr Ward of Netherby, South

Australia, and distributed packets to 200 farmers. Only 38 farmers, from Toowoomba, Pittsworth, Nanango, Roma, Woombye, Emu Vale, Gatton, Gowrie Junction, Redbank Plains and Maryborough, reported any success.

For the next season eight varieties of Egyptian wheats were obtained from Vilmorin, Andrieux and Co. of Paris, and distributed to selected farmers and to the state nursery at Mackay. In addition, the varieties "Purple Straw" from South Australia, "Champlain Hybrid" from Dookie, "Steinwedel's Early Prolific" from South Australia and "Zimmerman" from America were distributed. A Mediterranean wheat from the Paris collection named "Belotourka" proved quite rust-resistant and yielded 34 bushels per acre at Mr Bellingham's farm at Pittsworth. "Steinwedel's Early Prolific" also proved very rust-resistant and these two varieties, along with eleven varieties of Carter's hybrids from England and "Ward's Prolific" from South Australia, were widely distributed in the next season. F. A. Gore of Yandilla obtained from his brother, Major St George Gore, R.E., some Indian wheats, which showed great promise.

In March 1890 a conference on rust in wheat was held in Melbourne at the request of the Hon. J. L. Dow, Minister for Agriculture, and attended by Professor E. M. Shelton and Peter McLean. Recommendations for wheat growers were formulated, printed and circulated with a request to growers to inform the Department of the results. The recommendations asked each State to experiment on rust control over a number of years, monitor and map rust occurrence and weather conditions, and send farmers questionnaires to obtain information.

As Queensland had no experiment farm, Peter McLean (through W. Allen, M.L.A.) obtained the cooperation of two farmers, John Rooney of Hendon and J. Marriage of Yangan, to conduct the trials. The Australia-wide selection of treatments indicated the meagre knowledge of rust and experimentation at the time. The six unreplicated treatments were: lime (21 bushels per acre); kainit (400 lb per acre); salt (320 lb per acre); Bordeaux mixture applied to growing crop; sulphate of iron applied to growing crop; and sulphate of copper applied to growing crop. The responses were all negative.

A second rust-in-wheat conference was held in Sydney in 1891 and a third in Adelaide in March 1892. From the Sydney conference emerged recommendations to:

- 1. sow early to escape rust
- 2. cut wheat in the dough stage to secure a better milling sample
- 3. continue to import, select and hybridise varieties to develop rust resistance
- 4. establish seed stations in selected districts to maintain seed stocks of improved varieties for distribution
- 5. obtain red wheats, which are hard and more resistant to rust
- 6. practise a rotation to reduce rust incidence
- 7. sow thinly to reduce rust
- 8. burn all straw in the field, and turn straw for bedding into manure for non-cereal crops.

The conference also recommended a wide range of experiments in cultivation, drainage, spraying, intermediate hosts and influence of insects. At the Adelaide conference it was estimated that the loss from rust in wheat in the 1889-90 season was £2 500 000. From the answers to farmers' questionnaires it emerged that time of sowing and wheat varieties were

most important. Departments were asked to set up laboratories for milling tests and a committee including Professor Shelton was named to systematise variety names.

The fourth rust-in-wheat conference was held in Brisbane in March 1894 to report on progress. The main topic was rust resistance. The Department had plots at Allora and Roma, but the Allora plots were destroyed by hail before harvest. At Roma, of the ninety-seven plots planted fewer than twenty escaped serious rust injury. In descending order of rust resistance the varieties were Sicilian Bart, Marshall's No. 3, Marshall's No. 8, Allora Spring, Ward's White, Victorian Defiance, Gore's Indian, Belotourka, Fluorspar, King's Jubilee, Square-headed Sicilian, Early Para, Australian Wonder and Indian Pearl.

The fifth conference was held in Melbourne on 21 May 1896. It dealt with rust-resistant wheats and their milling qualities, and was thrown open equally to wheat growers, millers and scientists. Some millers, used to handling soft, white, starchy wheats, objected to the new rust-resistant wheats, which were hard to grind and often dark, and either refused to buy them or offered a reduced price. The Melbourne conference hoped to bring scientists and millers together on this issue, the scientists to prove to the millers that the new rust-resisting and rust-escaping wheats had a much higher nutritive value than the familiar varieties, that they made as white and sound a loaf as the old, and that several of them were identical with wheats now in use in the largest wheat-growing and milling districts in the world. Unfortunately the millers boycotted the conference, and it resolved into an exchange of ideas and updating of rust-research information.

At the request of the residents of Barcaldine, Peter McLean visited the district in September 1892 to report on its possibilities for wheat-growing. He passed on to the residents his impression, which was a favourable one, not only regarding wheat but also for the production of all kinds of crops that could be raised where wheat would grow. He inspected several local artesian bores and found that water suitable for irrigation could be obtained from some of them. He also visited Hughenden, to find wheaten hay being grown under irrigation from wells, and Herberton, where a Mr Newell, with seed supplied by the Department, had an excellent crop of wheat ready for a grain harvest, causing him to state: "Wheat has now been proved from St. George in the south to Mitchell and Longreach and Herberton in the north-a sufficiently large area."

Professor Shelton in his *Bulletin* Wheat Growing in Queensland, published in September 1892, said:

It may be said in strict truth that, outside of the sugar plantations and the small fruit growing districts along the coast, the great end of Queensland farming has been the production of horse feed. Here, in a country ranking with the first in the abundance, cheapness and excellent quality of its natural herbage, hay in all its forms has found the best market in the world...On the first appearance of rustiness in the crop or on the slightest provocation in the shape of threatened drought, the mower was put to work and the wheat crop was sent to market as hay. In any event the crop was worth nearly or quite as much in the condition of hay as it would fetch when allowed to ripen into grain, and there were fewer risks in the hay crop and less labour and simpler machinery to harvest it. The temptation thus to convert the wheat crop into horse provender was irresistible and the farmer who succumbed to it had the soundest of business reasons for the course he took.

During 1894-95 Professor Shelton extended his wheat-variety experiments from the farms of Andrew Rickert at Allora and P. Smith near Roma (the main stations) to the comparison

of thirty varieties each on the farms of John Newell (Herberton), A. Madge (Clermont), Alexander McLaughlin (Springsure) and Thomas Cox (Hughenden). In the following year the Herberton and Hughenden co-operators were unable to help and these sites were dropped; Clermont was abandoned because of its similarity to Allora; and Barcaldine was included to check if the rainfall was sufficient to grow wheat successfully at least three years out of five. "If this latter proved successful, the district around Barcaldine is certain, at no great distance of time, to be famous for its wheat and flour. Our experiments aim at the solution of this problem, and are being conducted on the farms of William Campbell and Peut Bros."

Year	Harvested	Yield	Average yield	Remarks
	for grain	(bushels)	per acre	
	(acres)		(bushels)	
1887	8 248	182 308	22.10	Drought
1888	9 305	8263	0.89	-
1889	8 459	134 335	15.88	
1890	10 390	207 990	20.02	
1891	19 306	392 309	20.32	
1892	31 742	462 583	14.57	
1893	28 883	413 094	14.25	
1894	28 997	545 185	18.80	
1895	29 650	12 950	.436	Drought
1896	35 831		c.17.00	J

The return of wheat crops for ten years to include the 1896 crop is shown in the following table.

In 1896, Queensland imported some 863 469 bushels of wheat to the value of £179 956 and 32 996 tons of flour worth £370 419, and produced 601 254 bushels of wheat worth £112 735. Thus there was considerable room for expansion of the local industry. In 1895 the small village settlement at Wallumbilla planted 800 acres and interest in wheat-growing was extending to the open downs of the Central Highlands. During 1896-7 several Victorian farmers settled near Emerald to grow wheat on an extensive scale.

In his June 1896 report Professor Shelton made a plea for the institution of a special wheat farm in one of the wheat-growing sections of the Colony, preferably the Darling Downs. He said:

The proposed Agricultural College farm at Tarampa is not in a distinctly wheat growing district. The comparatively dry region, west of the Range will in the future...be the seat of the wheat growing industry of the Colony. Work to be really useful to the wheat growing interest, must be done under conditions of soil and climate similar to those which obtain where the wheat of the Colony is grown. Such a farm would justify its existence from the start. It would furnish conveniences for the study on a large scale of measures for counteracting the dreaded rust plague; it would inevitably become the centre of knowledge in the Colony of those, to the wheatgrower, often vexatious problems connected with the nutritive and milling qualities of wheats, methods of cultivation and times of seeding, manuring, qualities of seed as affecting the crop, naturalisation of foreign varieties, etc. From this central wheat farm new varieties of proved value would be distributed to the wheat growers.

Maize

About 1827 there was a good area under cultivation to maize at the penal settlements around New Farm and Bulimba, and also at Ipswich in 1828.

In 1867 Walter Hill, Curator of the Botanic Gardens, was presented with 130 varieties of maize (source unknown) and on planting and harvesting them reported that in no instance did they equal, much less exceed, the yield of the maize commonly grown in the Colony.

In early 1888 Japanese flour maize obtained by the Department from James Henderson of Tamborine was distributed. It was used as a substitute for wheat as a flour for breadmaking, but proved of doubtful value.

Maize was the major crop in southern Queensland in 1887, with an area of 73 882 acres grown mainly in the Gatton, Normanby, Marburg, Bundaberg, Toowoomba, Brisbane, Warwick, Highfields, Logan and Ipswich districts. Generally it was grown for grain for home consumption and for sale as horse, poultry and pig feed.

In 1889 Queensland imported 216 254 bushels of maize, mostly from New South Wales, but a favourable growing season in 1891 produced a surplus and the Department arranged for the British-India Steam Navigation Company to fill the holds of its ship in April on its return journey. It returned a price of 31/3d per quarter (28 lb) on the London market, compared with the local price of 2/3d per bushel (56 lb). However, maize from America hit the London market soon afterwards and prices fell below the level of its economic production in Queensland, so shipments ceased.

Much of the early maize crop was sown on cleared land by hand; the seed was dropped in the furrow made by a single-furrow plough and covered at the next passage. In newly cleared scrub land it was sown between the remaining stumps with a walking-stick planter with a spring-release trip mechanism. The planter, carrying seed in its body, was fitted with digging plates and as the hole was dug, the top plate was tripped by spring and the seed was released.

In November 1893, the Department obtained twenty-five tons of seed maize from America as farmers had asked for a change of seed. Seven different varieties were received and performed reasonably well. Local maize-improvement work was to start in the next decade. In 1896, 115 715 acres were sown over far-flung coastal and near-coastal areas.

Rice

As far back as 1861 rice was growing in the Brisbane Botanic Gardens and in the garden of the Hon. Louis Hope at Cleveland. In 1869 Major A. J. Boyd, later editor of the *Queensland Agricultural Journal*, introduced rice into his sugar plantation "Ormeau" on Pimpama Island (bounded by the Logan, Albert and Pimpama Rivers). He used Japanese seed and distributed it to local growers. The Acclimatisation Society distributed seed in 1871. In 1878, 3 cwt of seed, including seventeen varieties, were imported by the Brisbane Botanic Gardens from India.

Only 575 acres of rice were grown in Queensland in 1887, mainly rice varieties of no fixed nomenclature grown by Chinese in the northern district of Douglas, generally in swampy

land. By 1897 only 470 acres were recorded from the Cairns and Douglas districts, where Upland varieties were grown under natural rainfall. Continued use of local varieties led to a reduction in yield, so in 1891 eleven varieties were obtained by Sir Thomas McIlwraith in India and cultivated at St Helena and the state nurseries. In 1892, new varieties were imported by the Department from India, China and Japan.

Root crops

English potatoes

English potatoes for home consumption occupied some six to eight thousand acres yearly during the decade 1887-97; they were a staple article of diet. An improved variety, "White Elephant", was obtained by the Department from Victoria, but happily it belied its name and gave improved yields in all districts.

Sweet potatoes

Sweet potatoes were grown to the extent of 2000 to 3000 acres, the tubers being used mainly for pig food, although in north Queensland they were used as food for the Pacific Islanders.

Arrowroot

Arrowroot (*Canna edulis*) cultivation was restricted mainly to the Logan district and some 200 to 300 acres were planted annually. Flour was produced at local mills but the product could not break into the London market because West Indian arrowroot (*Maranta arundinacea*) was the only arrowroot registered under the Food and Drug Act of Great Britain, and it had to be sold under the distinctive name Queensland arrowroot. In the early 1860s Messrs Grimes Bros grew a considerable quantity of arrowroot both on Oxley Creek and the Brisbane River flats, and later on their property, "Rockholme", on the Coomera River, where they erected an arrowroot mill. F. Lahey & Sons also produced cornflour at Pimpama. (Boyd, *QAJ*, Vol. 4, pp. 335-339) The Department of Agriculture attempted to open up a market in South Africa during the Boer War when the London market was closed and the price offering was £46 per ton compared with the local Brisbane price of £11 to £12 per ton. When arrowroot flour was in poor demand, the bulbs were widely used as pig food.

Fibre crops

Cotton

Cotton was one of the earliest crops grown in Queensland. In 1827 thirty acres were under cultivation at the penal settlement at Stradbroke Island. After this settlement was abandoned cotton-growing lapsed for some years.

In 1852 experiments were made by Captain Logan and Messrs Ambrose Eldridge and Poole on the Brisbane River. In that year 70 bales and 18 bags of cotton were shipped by them through the agency of Messrs J. and G. Harris to England, and in 1854, 18 bales of 600 lb each were shipped to Sydney to be forwarded to London on SS *Great Britain*. This was grown at Milton.

In 1853 and in succeeding years the Brisbane River frontage between A. and J. Carmichael's sawmills and the South Brisbane Cemetery was largely planted with cotton, as were several other places along the river.

In 1861, the following varieties were growing in the Brisbane Botanic Gardens: Sea Island types (*Gossypium barbadense*) - Chester, New Orleans, Honduras, Boyd's Prolific and Deans; Upland types (*G. hirsutum*) - Patte's Gulf and Peruvian. (Bailey, J. F., *Rep. Dep. Agric. Stk*, 1909-10, p. 130)

In 1860, only 14 acres of cotton were grown in Queensland but following the 1860 Land Act, which made land available from the agricultural reserves under land orders, the area under cotton rose to 14 674 acres in 1870. Dr John Dunmore Lang is credited with the enthusiastic sponsorship of cotton as a potential major crop for Queensland and, with Henry Jordan, was responsible for considerable migration of intending farmers from England. (See Chapter 1.)

During the years 1861 to 1865 the Civil War in the United States devastated cotton-growing in its Southern States and caused a "cotton famine" in Lancashire. The American cotton ports were blockaded by Federal ships and Britain obtained supplies from India. The American cotton fields did not produce much for several years after peace was declared as the now emancipated slaves refused to work. In 1860, thirty-five countries began to provide cotton to British manufacturers, Queensland amongst the number. (Boyd, *QAJ*, Dec. 1900, p. 539)

During the American Civil War thousands of idle men were walking the streets of Lancashire. J. W. Lee, who had cotton experience, came to Queensland and took up land on the Pimpama River where there was a commercial settlement to grow cotton. He put in ten acres of Sea Island cotton with spade labour and sent six bales of cotton overseas; they sold in London for 5s1d per lb. The Manchester merchants were reported in the *Manchester Guardian* as saying that they had never seen a finer sample of cotton from any country in the world.

In his speech to the Legislative Council on 30 April 1861, the Governor said,

Recent intelligence from Europe and America has given a strong impulse to the projects already on foot for growing cotton in Queensland. Frequent experiments have proved that this Colony is beyond all doubt, capable of exporting that staple even to the extent of far exceeding its present production of wool.

On 12 June 1861, the Legislative Assembly announced it had agreed to the following resolutions:

- 1. That, considering the importance of promoting and establishing another export staple from Queensland, it was desirable that land be granted to any person or company undertaking the cultivation of cotton on an extended scale.
- 2. That the Government be therefore empowered to grant land in fee simple in blocks of not less than 320 nor more than 1280 acres, if within two years capital in the proportion

of \pounds 5000 to each 640 acres should have been expended in preparing for and in carrying on the cultivation of cotton.

3. That the above resolutions be transmitted to the Legislative Council with a message desiring their concurrence therein.

In the *Statistical Register of Queensland* 1861, it was noted that the most interesting features were the increase in the cultivation of wheat in the district of Warwick and the first appearance of cotton in any appreciable quantity. It was expected that nearly 200 bales of cotton would be exported from Queensland during 1862.

In 1861, there were three companies growing cotton in Queensland, the Caboolture, the Ipswich and the Maryborough companies. During 1862, another two cotton companies began operations, the Manchester Company and the Victoria Company, the plantation of the former being situated on Nerang Creek and that of the latter on Hotham Creek, two small navigable rivers flowing into Moreton Bay. In addition to these five cotton companies many individuals were farming cotton on plantations, some of which were of considerable scale. (*Statistical Register of Queensland* 1862)

When returns from cotton in the boom period 1861-72 were a very remunerative £30 to £40 per acre, the Government of the Hon. A. Macalister (1866-67) stimulated further development by offering a bonus of £5 per bale of 300 lb of ginned cotton, in the form of a land order to those who exported the fibre. The bonuses paid did not always serve the farmer, as in most instances the farmer sold his cotton in the seed to the merchant exporter, who, on the bills of lading, claimed the bonus. However, through the land orders many West Moreton farmers were enabled to secure freehold title and become permanent settlers in the district. (Jones, *QAJ*, Feb. 1907, p. 118)

Captain Robert Towns, a Sydney merchant, obtained from the Queensland Government a grant of 4000 acres of land on the Logan River and in August 1863 his schooner, the *Don Juan*, brought 67 Kanakas to his plantation to work the cotton fields. Fifty-seven of them in 1867 transferred to Captain the Hon. Louis Hope's sugar plantation at Ormiston. (Holthouse, 1978)

During this time, with cotton being grown all over the West Moreton and Logan districts, the holidays of the State Schools were set to coincide with the cotton harvest.

After record production in 1872 the industry declined owing to the cessation of the American Civil War and the lower prices ruling in consequence, the losses occasioned by the severe attacks of the bollworm, and for many seasons losses owing to a long period of phenomenally wet weather at picking time. The United States of America regained its lead in cotton production and the thirty-five countries that had exported cotton during the Civil War mostly abandoned export because they could not compete. Moreover, the bonus of £5 per bale had ceased in 1868.

By 1887, the year the Department was founded, Queensland production had dropped from 15 acres in 1886 to nil. A resurgence in the cotton industry occurred in the 1890s with the formation of the Ipswich Cotton Company, which enjoyed a subsidy of £5000 offered by

the Government for the first 5000 yards of cotton goods manufactured. The goods were made and the subsidy was paid.

The Under-Secretary, Peter McLean, in 1890-91 obtained from a well-known Manchester manufacturer, H. Lee, a list of the most suitable cotton varieties to grow and, acting on his advice, procured a large quantity of seed from America. This was distributed amongst intending growers in West Moreton. Around Ipswich results were very satisfactory, especially with the Hawkins Improved, Jeff Welborn's Pet, Peterkin Improved and Okra varieties. Yields ranged from 1000 to 2000 pounds of seed cotton per acre.

The ravages of the bollworm caused much concern and at the agricultural conference in Beenleigh on 9 and 10 May 1892 mention was made of a "straw soniser" to spray the insecticide Paris green or London purple over the crop. The Department purchased the larger-capacity machine, capable of spraying vertically as well as horizontally, for £32. It was worked by one horse and covered two to four acres per hour.

The Ipswich Cotton Company, for reasons unconnected with the profitability of cotton cultivation in small areas with white labour, ceased operations and the market failed.

A third revival of interest in cotton cultivation occurred after the 1902 drought.

Ramie (Boehmeria nivea)

Interest in ramie fibre around Mackay in the 1888-89 year led the Department of Agriculture to distribute plants supplied by the Acclimatisation Society and seed it had purchased to Mr Henderson of Tamborine and the Land Agent at Mackay for distribution. Subsequent reports stated the crop was growing splendidly in the vicinity of Marion Mill, Mackay. A Death's decorticating machine had been imported. In 1889 Peter McLean compiled a pamphlet on the crop, giving all the latest information on the subject, extracted from the bulletins issued from the Royal Botanical Gardens, Kew. A central factory to treat the crop from a sufficient number of farms was needed.

In May 1892 Ebenezer Cowley, Manager of the State Nursery at Mackay, had half an acre of ramie established, but in the following year, in the absence of a suitable decorticating machine and because of the failure to float a company to handle the crop, he ploughed it out, keeping a few plants as a reserve "till a suitable machine was available".

In his 1890-91 annual report, McLean wrote

The great obstacles to the fibre industry in Queensland are the high price of labour in comparison with those countries in which the manufacture of fibre takes a prominent place among the industries and the want of proper machinery to manipulate the raw plants.

Sisal hemp and other fibres

Some one thousand sisal hemp (*Agave sisalana*) plants were obtained from Yucatan during 1892. Some were distributed and some were planted at Kamerunga State Nursery and at the Fraser Island nursery. Cowley, the overseer at Kamerunga, said:

The armed leaf would seem to offer itself to the matter of defence. A grove of agave would be impassable to troops until laid low by artillery. The work of destruction would in many cases
occupy considerable time, and so, perchance, prove a valuable aid in that particular. A considerable number of plants are available for distribution. (*QAJ*, 1898, Vol. 3, pp. 222-227)

Some plants were sent to Thursday Island along with Mauritius hemp (*Furcraea gigantea*) in aid of the defences there, and Cowley also sent Manila hemp plants (*Musa textilis*) to Captain Griffiths to add to the coconuts planted on the islands.

Sisal hemp was to be tried more extensively during the next decade.

Sugarcane

Sugarcane (*Saccharum officinarum*) was grown in Queensland as far back as 1828, when it was used as a fence around the vegetable gardens attached to the penal settlement at Brisbane. Backhouse and Walker observed it being used for the same purpose in 1836. (Bailey, J. F. *Rep. Dep. Agric. Stk*, 1909-10, p. 131)

In December 1859 an effort to produce sugar from cane growing in the Botanic Gardens was made by Thomas Bowden, who was "introduced by Dr. Lang for the purpose of commencing sugar cane growing and manufacture of sugar". The juice was passed between steel rollers and 6 pounds of sugar were made in a copper vessel at a Brisbane biscuit factory or bakery. (Easterby, H. T., *The Queensland Sugar Industry*, Govt Printer, Brisbane, 1933)

In his annual report on the Botanic Gardens of 6 May 1861, Walter Hill wrote that sugarcane had been "experimented upon during the past and previous seasons, and its thriving condition would seem to indicate that it might be cultivated with profit". During the following year he reported that 2000 plants had been distributed and remarked that "the success of the experiments hitherto made in its cultivation has drawn the attention of private growers in this direction, and there can be no doubt that cultivation on a more extended scale than hitherto would be attended with satisfactory and profitable results".

The first sugar made in Queensland of which there is any official record was manufactured by John Buhôt in 1862 from canes obtained from the Botanic Gardens. (Bailey, 1901, p. 131) A committee consisting of Messrs S. W. Griffith, Morton, Buzacott and Macrossan was appointed to enquire into claims by Buhôt and reported in 1874 that Buhôt was the first person who had made granulated sugar in Queensland from sugarcane grown in the Colony; and that before 1862 (when Buhôt succeeded in making such sugar) many persons had contemplated the possibility of growing sugarcane for profit in the Colony, but it was not ascertained whether sugar could actually be produced from such cane; the committee recommended that a free grant of 500 acres of land be made to Buhôt as a reward.

In 1863 Captain Louis Hope put 20 acres under cane on "Ormiston", his plantation near Brisbane, and he is generally conceded to be the father of the Queensland sugar industry. He employed Buhôt to advise him in the construction of a mill to crush the cane, which was completed in 1864. (Holthouse, 1978, p. 157) In recognition of his services to the State in that respect, an Act was passed in the Queensland Parliament in which it was stated, "Whereas it is just and expedient that the important services of the Honourable Louis Hope in his endeavour to establish the production of sugar should be recognised".

Parliament then proceeded to authorise Hope to select land in one or two portions, the whole not exceeding 2560 acres, within thirty miles of the coast, and to obtain a grant in fee simple of such land. (Easterby, 1933)

Walter Hill wrote on 18 July 1864:

During the year a new sugar plantation has been formed [in the Botanic Gardens] composed of several new varieties lately introduced to the Colony, principally from the South Sea Islands and Mauritius, being the varieties known as "Walta", "Tilvo-ura", "Tiboo", "Chica-ga", "Pinang", "Diard" and "Guinghan". All the previous introductions have flourished-the ribbon, the green (or yellow) and the Tahitian cane. The latter contains little saccharine matter...I have been able to distribute a great number of canes amongst intending growers, and the demand exceeds supply.

In 1863 Captain Robert Towns imported sixty-seven Kanakas to work on his cotton plantation, but cotton declined and Hope took fifty-seven of the Kanakas to work on his Ormiston cane land. Captain Claudius Buchanan Whish also used Kanakas for his cane venture on the banks of the Caboolture River in 1865. Between 1863 and 1868 some 2107 Kanakas were introduced to work on canefields "volunteering to serve three years". Terms and conditions were abused and in 1868 the Queensland Government passed the Polynesian Labourers Act to protect their interests. By the early 1880s there were about 13 000 Kanakas in Queensland and on Boxing Day 1883 a riot broke out in Mackay between Kanakas and the white populace. The Griffith Government then passed The Pacific Island Labourers Amendment Act of 1884, restricting the field work of Kanakas, and in August 1885 another Pacific Islands Labourers Amendment Act of 1884, restricting the field work of Kanakas, and in August 1885 another Pacific Islands Labourers Amendment Act of 1978).

Because of the parlous state of the industry in April 1892, the Pacific Islanders Extension Act was passed to permit planters to adjust to white labour. (On 29 November 1887 M. Hume Black had said in the debate on the estimates for the new Department of Agriculture: "They should have sent Mr. Peter McLean to the Mauritius or some other tropical sugar growing country and have asked him to enquire as to what were the conditions under which sugar could be grown at a profit, exclusive of black labour.")

Between 1866 and 1880 Walter Hill secured new canes for the Botanical Gardens collections from Java (1866-67), Mauritius, New Guinea (a green and yellow cane cultivated by the natives), Singapore, Hawaii and Sandwich Islands, sent exchange material to Mauritius and Hawaii, and sent new material to the United States Department of Agriculture in Washington, to South Carolina, the West Indies, Fiji and Sandwich Islands. He also sent cuttings to South Australia for Port Darwin, 96 000 cuttings to a Mr Hall to establish a plantation at Rockhampton, and planting material for some 20 000 to 30 000 acres of new plantations on the Johnstone River (Innisfail) and the Burdekin flood plain.

In 1875 Hill wrote: "It is now becoming almost impossible for the Gardens to act longer as a nursery for this plant...the Reserves suggested in the far north (Mackay and Kamerunga) would be found most suitable places but then there would be no one there to take proper care of the plants." During 1877-78 more land was secured at Oxley on a forest tree nursery. Walter Hill retired in 1881. By 1889 the two abovementioned nurseries in north Queensland were in operation and they took over the handling of sugarcane acquisitions.

In 1875, a disease termed "rust" broke out in the fields growing "Bourbon" cane and brought ruin to many cane farmers but resistance was found in the "Rappoe" or "Rose Bamboo" variety, restoring confidence. A disease called "Pou Blanc" was found in the same year on sugarcane imported from Singapore.

In 1878 there were sixty-eight sugar mills in operation, some crushing their own cane, some buying cane and others buying juice from smaller mills. In 1881 the Colonial Sugar Refining Company's Act was passed, whereby the company was allowed to buy freehold land in the Mackay and Herbert River districts if it erected sugar mills to the value of $\pounds 20\ 000$ within five years. This was easily accomplished and by 1887, when the Department was founded, it had 38 000 acres in three plantations at Homebush (Mackay), Victoria (Ingham) and Goondi (Innisfail). By the end of 1888, the Company had invested $\pounds 624\ 000$ in Queensland. (Easterby, 1933)

The financial crisis of 1886 saw local sugar prices fall to a very low level; it was stated that all plantations were operating at a loss, and some small mills became bankrupt. Angus Mackay, who was sent as Queensland's Commissioner to the Philadelphia Exhibition, was instructed by the Government to visit the West Indies in 1883 and make enquiries into the central mill system, whereby the farmers who grew the cane became shareholders in the mills. In November 1885 a petition was presented to Parliament and this subsequently led to the inauguration of the central mill system. Thomas Pearce of Mackay took a leading part and disclosed that cane farmers were adversely affected by being confined to supplying the mills of plantation owners and asked for assistance to make cane-growing a white man's industry. The Government made available £50 000 to groups of farmers at North Eton and Racecourse in the Mackay district to erect mills to crush cane grown only by white labour, but the latter condition could not immediately be put into effect. (Easterby, 1933)

In November 1889 a Commission was set up by the Government to enquire into the depressed state of the sugar industry. The members-William Henry Groom, M.L.A. (Toowoomba), as chairman, Alfred Sandlings Cowley, M.L.A. (Ingham), Henry Edward King, a Brisbane barrister, and William Robertson as secretary-found that the situation was caused mainly by working with borrowed capital, a fall in sugar prices, and the high cost of black labour. The Commission recommended that cane growing be separated from sugar manufacture and that Kanaka labour be retained for a longer period. It remained in use till Federation.

The Sugar Works Guarantee Act, whereby about £500 000 was advanced by the Government for the erection of central mills, became law in 1893. The growers offered their land on mortgage as security for the advances made for building the mill and tramways. The Government held the deeds of the lands, but the growers had the sole management of the mills' affairs. The Department of Agriculture administered the Act. In the case of Racecourse and North Eton Mills, erected before the Act came into force, there were five Government directors and four growers. North Eton was the first central mill to manufacture sugar in Australia and the forerunner of the White Australia movement in sugar. (Easterby, 1933)

The Colonial Sugar Refining Company cut up its Mackay estates into small farms. The Department of Agriculture during 1891-92 did much to help the plantation owners and likely selectors to further this movement.

Leaflets setting out particulars of the conditions under which plantation owners were prepared to lease or sell land to farmers were prepared. On 30 June 1897 seven central mills were operating: Marion (1895), Pleystowe (1895) and Plane Creek (1896) in the Mackay district, Mulgrave (1896) near Cairns, Gin Gin (1896) near Bundaberg, Mount Bauple (1896) near Maryborough and Nerang near Southport.

Peter McLean was able to report in 1893:

Success has attended the operations of the Central Sugar Mills during the past year. The mills having been erected before a full supply of cane was available practically caused them to be inoperative during the first three years of their existence so far as repayment of their indebtedness to the Government is concerned. Since that time their progress has been in an upward direction.

Inquiries in 1893 showed that Mackay had 143 farmers, with central mill shareholders growing 4351 acres; Bundaberg figures were 148 farmers and 4264 acres; and Herbert River (Ingham) figures were 68 farmers and 3293 acres.

In 1893 the Department of Agriculture sent Ebenezer Cowley, Manager of Kamerunga Nursery, to New Guinea to obtain new varieties of sugarcane. He obtained, from Delena, the canes Mahoavu, Arabora, Batoe, Iduari, Kikeria, Akewa, Chenoma, Oiva and Oraya. None of these, however, became an important commercial cane. (King, N. J., *50 Years of Scientific Progress*, Brisbane, Govt Printer, 1950)

A seedling received from the Royal Botanical Gardens at Kew and named "Kewensis" performed very well, being thick, exceedingly heavy and producing a large number of canes per stool. It came originally from Barbados.

In August 1895, Henry Tryon, Entomologist and Plant Pathologist in the Department, was commissioned to collect cane varieties in New Guinea. He brought back sixty-six varieties, which arrived in January 1896 and were sent to the state nurseries at Kamerunga and Mackay and also to the Department of Agriculture in New South Wales. Among this selection was "Badila", which is considered the best variety ever introduced to Queensland. At the time 95 per cent of the cane grown in north Queensland was "Badila".

Over-production was a worry to the sugar industry in 1894 and seven hundred tons of raw sugar were exported to Canada from Queensland in 1895, a forerunner of preferential treatment for sugar from Queensland. (Easterby, 1933)

In the annual report of the Department for 1894-95, Professor Shelton stated:

The effects of different fertilisers both upon the growth of cane and its contained sugar is already a major gap in knowledge on many plantations and will become more important as time goes on. Research is needed in:

1. the growth of varieties

- 2. the value of nitrogen, phosphorus, potash and mixed fertilizers
- 3. the value of stable manure and plantation refuse, e.g. bagasse
- 4. the effect of irrigation
- 5. chemical analyses of cane from each of these experiments.

This foreshadowed some of the work to be undertaken by the future Bureau of Sugar Experiment Stations.

Shelton was later to state:

The real solution of the sugar problems in the North (in the light of the demise of Kanaka labour) seems to me to lie in the direction of the conversion of the plantations into farms managed and for the most part worked by the owners themselves...maximum yield upon smaller areas of land by heavy manuring and deep and thorough ploughing and subsequent cultivation and the substitution of improved machinery for hand labour will...be the future policy of the cane growers of Queensland. (*An. Rept Dept Agric.*, 1899-1900, pp 27-28)

During August 1894 a disease in which a gummy exudate was produced when the cane was cut across the stem appeared in several plantations, and especially in cane being cut into sets for planting. Henry Tryon, the Entomologist, was called on to investigate its occurrence in the Wide Bay and Burnett districts in October 1894. His investigations revealed that it had been noticed periodically for at least the previous three years. Tryon diagnosed the cause as a microbe, *Bacillus vascularum*, invading the sap vessels of the cane.

The diseased cane made extraction of the sugar in the mills more difficult and lengthened the process. Tryon wrote a very detailed 64-page bulletin entitled "Gumming of Cane", which was published by the Department in 1895. Remedial measures recommended were the ploughing-out of diseased cane and use of green manure as a rotation crop, the planting of only disease-free sets, and draining the land; the Government was urged to look closely at legislative measures to prevent introduction of diseased material from overseas and to establish a well-equipped sugar experiment station to scientifically examine all aspects of cane growing.

In July 1895, Henry Tryon submitted a report, "Grub Pest of Sugar Cane", which was published by the Department in 1896 in a 56-page bulletin. From field investigations Tryon ascertained that the pest had been reported since 1872 over a wide range of districts, sometimes diminishing yields by up to 50 per cent by feeding on the roots (stools) of cane. Common practice had been to follow the plough, collect the grubs turned up and encourage birds to eat them. The common pest was *Lepidiota albohirta*. Tryon suggested, among other remedies, fumigation with carbon bisulphide. The grub pest was to continue well into the succeeding decades.

A review of the sugar industry published in the *Mackay Sugar Journal* of 1896 (Easterby, 1933) summarised it thus:

The epoch of small mills in large areas of semi-cultivated lands is passing away. The small mills are now very few and far between...Instead of these we can now boast of some of the largest and most complete factories in the world. In our sugar districts are grouped around these mills the homesteads of settlers who have taken up cane culture. The change is a striking one. While there has been an increase of 33,000 acres in the area cultivated with cane since 1882 and while the output of sugar may be said to have practically doubled itself, the whole change has been for the benefit of Queensland and of Australia. It is so customary to associate

the Queensland sugar industry with the presence of a large coloured population in our midst that it is worth noting that the number of Polynesians employed in the whole Colony has fallen from 9,362 on 1 January 1891 to 7,850 on 1 January 1895. White men working for themselves and using the best labour saving implements are displacing the coloured workers rapidly. The large estates are rapidly becoming peopled with small farmers.

In 1887, when the Department was founded, 51 815 acres of cane were grown, of which 36 800 acres were crushed, yielding 60 806 tons of sugar. Mackay led with 17 422 acres, Bundaberg cultivated 12 794 acres and Ingham 5506 acres. The value of the crop was $\pounds 1 100589$.

In 1897, just ten years later, the total area under cane had increased to 98 641 acres, of which 65 482 acres were crushed. At this stage prices were low and barely reached the cost of production because of the bounty being paid on beet-sugar production in Europe.

Tobacco

The early crops of tobacco in Queensland were grown mainly by Chinese, a conservative group whose traditional methods were hard to alter. However, some Europeans cultivated the crop and as early as 1879 a McArthur Jones in the Rockhampton area received a medal for his tobacco leaf at the Sydney International Exhibition. W. MacPhillips in 1881 was the first settler on the MacIntyre River to grow tobacco and by 1883 grew 14 acres.

In 1890 Samuel Lamb was appointed tobacco expert "to impart instruction in the best methods of cultivating the plant, of combating various insect and fungous pests that assail it, the best methods of harvesting and curing the crop and preparing it for sale". He immediately made an extensive tour of the State's tobacco areas extending from Port Douglas to Goondiwindi, visiting Port Douglas, Mossman, Mulgrave, Daintree River, Herberton, Atherton, Nigger Creek, Cairns, Russell and Barron Rivers, Geraldton (Innisfail), Johnstone River, Mourilyan, Townsville, Bowen, the Don River, Guthalungra, Armstrong Creek, Mackay, Walkerston, St Lawrence, Rockhampton, Yeppoon, Byfield, Bundaberg, the Burnett district, Maryborough, Wide Bay, Warwick, Emu Vale, Killarney, Naomi Dale, Inglewood, Goondiwindi, Texas, Stanthorpe, Bald Mountain and Wallangarra. In 1892 he visited Chinchilla, Crow's Nest, Meringandan, Ravensbourne, Goombungee, Toowoomba, Helidon, Nerang, Tiaro and Childers.

On his return Lamb reported that the tobacco so far grown in north Queensland had not been a great success, tobacco manufacturers finding it too thin and too mild for their use, even when grown from seed imported from Virginia and Kentucky. This variation from the seed type (these tobaccos having thick, heavy leaf when grown in their native states) resulted partly from the differences in soil and climate, and partly from differences in treatment of the plant during growth and in the curing of the leaf. He felt that north Queensland should grow good cigar leaf rather than heavy strong leaf.

Lamb noted three main deficiencies in the industry:

1. a lack of knowledge on the growers' part of the plant itself and its treatment, and of the conditions under which tobacco of different qualities could be grown and cured;

- 2. the lack of means on some growers' part to provide the appliances necessary for the successful curing of the leaf, and
- 3. the very limited market that Queensland afforded for the disposal of the leaf produced. *An. Rept Dept Agric.*, 1890-91, Appendix No. 2, p. 166)

To help growers overcome the first deficiency, in November 1890 Lamb wrote a *Bulletin* (No. 6) entitled Tobacco: Its Cultivation in Northern Queensland, giving full details of the crop, its botany, soils, planting (seedbeds and field), topping, suckering, pressing, harvesting, drying, grading, bulking, packing and shipping.

The remedy for the second deficiency-lack of appliances-was to limit the acreage handled to the facilities available and the remedy for the third-lack of markets-was to produce leaf of high enough quality to compete with overseas producers.

Lamb had seen some excellent tobacco-growing soils and encountered some good cigar leaf at Bloomfield River in the north, some good cigarette leaf in central Queensland, and rich heavy leaf suitable for plug tobacco at Texas, Killarney and Inglewood. He strongly opposed the Government's protective duty of 1s 6d per lb on imported tobacco leaf, 3s per lb on manufactured tobacco and 6s per lb on cigars and cigarettes. He stated that no Queensland leaf had yet realised a price equivalent to the cost and duty of even a moderate class of imported American tobacco (though there was some prejudice against Queensland tobacco).

With the Government's protective import duty the profits made by Queensland's growers are not legitimate profits, and do not benefit the Commonwealth, but are made at the expense of revenue...until the quality of Queensland grown leaf is raised to sufficient excellence to command a price slightly in advance of the imported leaf, the profits made by the cultivators will not be real but a mere transference of money from the pockets of taxpayers to the pockets of cultivators...A much more effectual and less costly method of fostering the industry would be the payment of a bounty of 3d per lb on all leaf of a given standard of quality sold outside the Colony.

Lamb strongly recommended the establishment of an experimental tobacco farm both for investigation and as a school of tobacco farming. The experimental farm would determine the most suitable varieties; test the native species for commercial use and for cross-breeding; and establish methods of cultivation and curing, fertiliser needs and means of insect pest and fungi control. He also suggested abandoning an open curing shed in favour of a closed shed in which temperatures could be controlled.

On the expiry of his term Lamb moved to the Department of Agriculture in New South Wales.

In 1892 McLean distributed seed of twenty-six tobacco varieties throughout the southern, central and northern areas. In 1895 he reported that tobacco cultivation was still almost wholly in the hands of Chinese, and Professor Shelton reported:

Tobacco growing requires the utmost skill and industry combined with the keenest intelligence, yet it is in the hands of our most conservative people-the Chinese. Everything connected with the growth and preservation of the crop in Queensland is out of date and wholly of the past. The coarsest and least valuable varieties are grown, the cultivation done almost wholly with a hoe, and the subsequent curing, the most delicate of agricultural processes, is hardly up to the

standard of efficient haymaking!...the first step in improving the product is to place the industry in the hands of men who are themselves capable of improvement.

McLean added: "I would strongly urge the appointment of an expert especially for the instruction in the art of drying, curing and preparation for market." His request was granted with the appointment of Robert Slaughter Nevill as Tobacco Expert from 14 October 1897 at a salary of £500 a year.

Coffee

Coffee was grown in the Brisbane district as early as 1836. In 1862 a plantation was formed in the Brisbane Botanic Gardens, the plants having been raised from seed obtained from plants growing in Captain Wickham's garden at Newstead in 1858. In the year 1873, 6400 plants were sent out from the Gardens and 5000 plants were distributed in 1882. The Acclimatisation Society introduced the variety "Mocha". Another coffee type also under cultivation was Arabian coffee (*Coffea arabica*). Liberian coffee (*C. liberica*) was distributed from the Gardens in 1882 but did not perform well.

In 1892 McLean, Under-Secretary, said that enquiries for the cultivation of coffee were being received and the Department had supplied trees. Owing to the havoc caused to the coffee industry in Ceylon (now Sri Lanka) by coffee leaf disease (*Hemileia vastatrix*), steps were being taken to prevent its importation.

Arabian and Liberian coffee were grown by Ebenezer Cowley at Kamerunga in 1892, and Maragogype was grown in 1894. In 1893 R. W. McCulloch wrote *Bulletin* No. 1 (Second Series), entitled Coffee Growing and Its Preparation for Market (16 pages, published in September). T. A. Bromiley of Pialba was credited by J. E. Noakes of Maryborough as having been the first man in southern Queensland to approach the question of coffee culture in a proper manner, and he considered his efforts should receive every encouragement. Bromiley grew five acres of Arabian coffee as he found his area too cold for Liberian coffee, the seed of which he had received from Messrs Cutler Bros of Clump Point. Cowley said that Mr Dick of Cooktown and Mr Lewis of Russell River were the first two gentlemen who planted coffee and prepared it for market in north Queensland. W. J. Thompson, an experienced coffee planter of Mulgrave Road, Cairns, established a plantation in 1893. Seed for these plantings was supplied by Kamerunga State Nursery.

As a result of this interest in coffee McLean said enquiries were being received from people in India and Ceylon regarding the availability of land for coffee-growing in Queensland. "It has been proved that the area here suitable for coffee is large and there is evidence that the cultivation of this product will soon be on a firm footing and rank amongst the prominent agricultural industries."

In summing up the future of coffee-growing in Queensland, Cowley said: "One thing which has come under my direct observation is that very cheap labour is absolutely necessary. White labourers, paid at reasonable rates would hardly earn their wages at coffee culture. Where aboriginals can be employed or where a farmer has a large family it would be different." In 1895 the Under-Secretary, dealing with this question, stated, "The question of labour has hitherto been a bar to extended cultivation but as it has been decided

that Pacific Island labour can be employed in connection therewith, that obstacle has been removed." (*An. Rept Dept Agric.*, 1896-97)

The other problem was local markets. Samples of Queensland-grown coffee had been sent to London and had drawn very favourable comment, but A. P. Corrie (*QAJ*, Vol. 3, pp. 216-217) drew attention to the local situation:

Queenslanders are inveterate tea drinkers-tea dipsomaniacs, I had almost said...Why does coffee growing languish? The reason is there is no adequate demand. Then demand is regulated by consumption. Tea is in possession and possession is nine points of the law. At Buderim a Mr. G. A. Riebe has developed his own machinery to heat the crop. His plantation was commenced some years ago and its success or failure is unknown.

Photographs of the plantation and pulper appeared in the Queensland Agricultural Journal.

Towards the close of the first decade in 1897 D. Buchanan, Overseer of the Mackay State Nursery, was able to write:

The cultivation of coffee has at last been practically commenced in this district upon a commercial scale. For many years isolated trees and small patches have been cultivated in a haphazard way and Mr. Costello has for some years had a small plantation: but until the Queensland Coffee Estate Company (at Mackay) commenced operations on a large scale nothing had been done to lay down a plantation of this profitable plant upon business principles. This action has led to a big demand for seed and so I have written an article "Will Coffee Growing Pay?" for the "Mackay Standard". Mr. John Dansey, Manager of this Coffee Estate has stated "There are a number of people now at Mackay on the lookout for coffee lands, and [I] have no doubt that before long the neighbourhood will be a great district for its cultivation."

The Department was to appoint a coffee expert in December 1898 as a result of the recommendation of the Royal Commission of Enquiry into the Sugar Industry in Queensland, appointed 28 November 1889, that an experienced tropical agriculturist be appointed.

Coconut planting

The Hon. Robert Philp, M.L.A. (of Burns, Philp & Co.), suggested that coconuts be planted on the islands of the north and Peter McLean, in cooperation with the Harbours and Rivers Department, devised a scheme of operation. McLean sent to New Guinea, Fiji and Tonga for planting material. The thinking was:

Not only will these palms with their handsome foliage enhance the appearance of our many islands, but the fruit will be a blessing to any who may unfortunately be wrecked thereon. Some of the islands being so situated that, although not far from the mainland, they are quite out of the track usually taken by ships passing along the coast, with the consequent lessened chance for those wrecked thereon of being found...the palm also supplies oil, fibre and coco-nut butter.

On 2 August 1890 J. Armitage was appointed Superintendent, Coconut Planting, at a salary of $\pounds 200$ a year, but planting was delayed for a time because of the dependence on the Customs Branch for transport from island to island. The Portmaster placed the cutter *Lizzie Jardine* at the disposal of the Department and nurseries of palms were established prior to their transfer to plantations.

During the 1891-92 year 6700 plants were set out on the islands from Mackay to Cairns. Between Mackay and Whitsunday, plantings were made on Dent, Repulse, Middle, Keswick and Goldsmith Islands, at Shaw's Peak, Kennedy Sound, Port Newry, Wigton Island, Dovan's Peninsula, M. (Carlisle) Island, Brampton Island, Refuge Bay, Cockermouth, Calder, Prudhoe, Seaforth, Lindeman, Long, Small and Redcliffe Islands and Fern Reef. Near Townsville, plantings were made on Bramble Rocks, Herald, Orpheus, Eclipse, Fantome, Curacoa, Falcon, Esk and South Palm Islands, while out from Cairns nuts were started on Fitzroy and Green Islands, Oyster Cay, Hope, Low, Woody, Clermont, Lizard, Rocky, N.E. Piper, K. Forbes and Sir Charles Hardy Islands.

In addition to coconuts, some mangoes, guavas, and Kauri pine trees were planted.

On 23 July 1892 Joseph A. Griffith took over the cutter from Armitage at Mackay and planted 300 coconuts on Brampton Island and 350 in a nursery at Port Newry. He also planted sweet potatoes, yams and watermelons. By 1894 coconuts had been planted on 49 islands between Prudhoe Island, south of Flat-top, and Sir Charles Hardy Island, north of Cooktown, the largest plantation being 1407 trees on Carlisle Island.

The drought of 1895 severely affected some trees. During 1895-96 another 10 000 nuts were planted, including 500 in a nursery at Kennedy Sound and 200 at Neck Bay. It was expected that some of the earlier plantation trees would bear in 1896 or 1897 and might be leased to obtain revenue, but the trees did not bear because of the earlier drought.

During 1896-97 large transplantings were made into a plantation on Kennedy Sound. At this time, the Home Secretary was concerned at the conditions associated with the Aborigines in the Mackay district and asked the Police Magistrate to suggest what should be done. In discussion with Peter McLean it was suggested that an Aboriginal station be set up on Carlisle or an adjacent island under the care of a married couple, that a small steam launch be purchased, and that the Aborigines be employed to tend the plantations. When the trees bore in the following year the female Aborigines could be employed in the preparation of copra and fibre.

Eventually the cutter *Lizzie Jardine* became unseaworthy and a substitute vessel could not be found. The chief difficulty met with in this work was the preservation of the coconut plantations from fire and vandalism: the accessibility of the islands from the mainland and the consequent depredations of camping and fishing parties spelt their doom. (Bell, 1947)

Fruit

Bananas

The main fruits grown commercially in Queensland in the 1880s and 1890s were bananas, pineapples and oranges. Most of the bananas were grown by Chinese around Cairns, Port Douglas, Cooktown, Mourilyan and Townsville in the late 1880s, with some extension into the Maroochy and Logan districts later. However, transport to southern markets was a problem, and attempts were made by the Department through Sir William MacGregor in 1890-91 to introduce improved varieties from New Guinea that could stand longer sea voyages than those being used at that time. In 1892 eight varieties from Java and

twenty-six varieties from New Guinea were received at Kamerunga nursery. In all, about 4000 acres of bananas were grown in Queensland at that time.

Pineapples

The Brisbane district (mainly Nudgee and Nundah) provided half the output of pineapples in Queensland in 1887, with the Maryborough and Mackay districts occupying minor places, and the Cairns and Logan districts entering the market towards the end of the decade. Disease appeared at Nudgee in 1891, causing the Department to think seriously of appointing a plant pathologist, and Henry Tryon, the Entomologist, was called in to diagnose the trouble-a fungus.

In November 1892 a consignment of thirteen cases of pineapples from Nundah was sent to San Francisco to test the American market. Professor Shelton had arrived at a temperature of 60°F as being a suitable shipping temperature. The fruit, smooth and rough-leaved varieties, were packed in various ways, in grease-proof and ordinary paper, kiln-dried sawdust and open crates, and in straw envelopes. The consignment left Brisbane on 26 November and reached San Francisco on 22 December, but the pineapples had been picked in hot weather and had travelled to Sydney in the heat, which caused them to ripen quickly, and the whole consignment was lost. However, the experience showed that unwrapped pineapples in open cases travelled best.

A shipment to Canada was also lost through over-ripeness. In 1896-97 two shipments of pineapples were sent to London, one from Cairns per SS *Banffshire* in November 1896 and one from Brisbane per SS *Jumna* in February 1897. The November shipment arrived in good condition but the fruit were too small to compete with the produce from other tropical countries, and the February shipment was in poor condition when it was opened.

Citrus

Citrus fruit were grown mainly in the south-eastern corner of Queensland during the 1890s, with the Moreton district dominant and with minor areas at Maryborough, Rockhampton and Cairns. Oranges occupied almost one thousand acres in 1887, increasing to more than 2000 acres in 1897. During 1892-93 Professor Shelton carried out experiments to ascertain how long fruit could be kept under different temperatures. These proved that Queensland fruit could be landed in England if the necessary cool chambers could be provided, and shipping companies were approached to cooperate. A shipment of oranges to Canada arrived in good condition: the best treatment was found to be wrapping the oranges in tissue paper and packing them tightly in boxes of 150 to 300, according to size.

In the absence of an instructor in fruit culture, F. M. Bailey, the Colonial Botanist, represented Queensland at conferences held in Tasmania and New Zealand in early 1896 to discuss markets and the types of fruit in demand. The staffing gap was filled on 1 November 1896 by the appointment of Albert Henry Benson as Fruit Expert, at a salary of £450 per year, rising to £600 on 1 July 1897 on his promotion to the dual position of Director of State Farms and Instructor in Fruit Culture. Immediately after his first appointment Benson travelled extensively through the fruit-producing districts to become conversant with the agriculture and especially the fruit culture of the Colony, visited the state farms and judged fruit at several local shows, imparting improved technology

wherever he visited. He was to give outstanding service to Queensland's fruit industry during the next two decades.

The Diseases in Plants Act passed in 1896 was to have an important effect on the fruit industry.

Olives

In early 1888 olive truncheons sent from Victoria by Peter McLean (during his southern trip) were distributed to thirty districts from Beenleigh to Cooktown and west to Georgetown and Charleville. More truncheons were supplied by Mr Petrie of North Pine and by the Comptroller of Prisons from St Helena and a pamphlet was issued on the subject, but little interest was aroused. Messrs Finucane and Zagamai collected miscellaneous fruit and produced an oil of sufficiently good quality to suggest that there was a future for oil if the right varieties and extracting equipment were available. (McLean, *An. Rept Dept Agric.*, 1894-95, p. 4)

Viticulture

Several vineyards existed in south-east Queensland some years before the founding of the Department of Agriculture. The Minister for Lands (the Hon. M. Hume Black) wrote to McLean on 2 November 1888, asking what steps could be taken to increase the area under vines and to improve the manufacture of wines and instructing him to visit the chief centres of vine growing and wine manufacture in the southern parts of the Colony.

McLean visited vineyards at Mitchell (Searle's), Roma (Bassetts, Bourne's, Smiths, Robinson's, Twine's, Leach's and Harlan's), Toowoomba (Bayer's, Herzer's and Kean's), Warwick (Kircher's, Tetzel's, Sterling's), Ipswich (Irwin Bros), Beenleigh (Cox's, Batten's), and Brisbane (Pullen's, Gerler's and Child's).

At a meeting with vignerons at Mitchell he was asked to seek more water for irrigation; at Roma he was asked for help in forming a wine company to treat the grapes, and to seek lower freight on colonial wine. On his return McLean advocated the appointment of a viticulture expert, provided with a laboratory and an attached farm. He also brought back a manuscript on wine making written by H. Tardent of Roma and requested that it be printed. (Tardent was to join the Department of Agriculture as the first Farm Manager at Westbrook State Farm on 19 April 1897.)

During 1899, seeds of *Vitis riparia*, the Riverbank grape of America, were given to the Department by J. Mackenzie Shaw, Esq. A native of America, it is used in both Europe and America as a resistant stock upon which to graft European varieties. McLean stated : "In view of the probability of a visit from the dreaded *Phylloxera* it is well that our viticulturists should be armed with resistant stocks. Some of the seeds have germinated and will in due course provide plants for future operations." In the following year attempts were made to secure coloured plates showing the *Phylloxera* insect in various stages of life and the appearance of a grapevine when attacked. The photos were for distribution to schools.

In 1891-92 the Department sought suspension of the regulation under The Grape Vine Disease Act of 1877 preventing importation of vines so that good raisin and currant grape cuttings could be imported from South Australia and Victoria (then free from *Phylloxera vastatrix*) for Western Queensland. This was granted and 20 000 cuttings from Victoria and 20 000 from South Australia were received and fumigated before leaving the office. They were distributed and 75 per cent were successfully established. A sample of raisins received from Mr Searle of Mitchell during 1895-96 was declared equal to the Mildura product.

Edward Henry Rainford was appointed Viticulturist on 1 January 1898.

Sericulture

In its early years the Department looked closely at numerous industries that might offer some export incentive.

Mulberry trees (*Morus alba*) for the purpose of silkworm culture were introduced by the Botanic Gardens, the Acclimatisation Society and F. M. Bailey about 1865. In 1873 some 4500 cuttings were distributed from the Botanic Gardens. Interest in sericulture grew and in early 1893 a fresh batch of Italian "seed" was procured and distributed, for which the Department was indebted to Dr Enrico Quadjat of Padova (Padua), who retarded them to permit later hatching to occur. A bulletin by R. W. McCulloch, "Sericulture or Silkworms and How to Rear Them", was printed and distributed as *Bulletin* No. 23 in March 1893.

Some wild silkworms from India were also secured-Tusser (*Antherea mylitta*), which survived, and Eri cocoons (*Attacus ricini*), which died. However, more were to be secured as Eri lived on the leaves of the castor oil plant (*Ricinis communis*).

The Department also secured a model of a cottage reeling appliance, which it put in its Museum.

In 1895 eggs and cocoons of the Tusser were obtained from Italy. Many people, especially children, reared them but a large quantity was needed to provide enough for sale. Cocoons were sent to England but no reeling was done there and so they were sent to Turin in Italy. It was suggested that the Department buy the cocoons and export them, but the Turin people advised that the cocoons should be reeled here because the silk becomes less lustrous if reeled too long after the worms are dead.

Pastures, fodder crops and ensilage

From time to time in the 1880s reference was made to deterioration in the natural pastures in the drier areas of the State. In the early 1890s the Manager of Travelling Dairy No. 2, John Mahon, remarked on the poorer quality of the northern grasses for milk production, but the nutritive value of south Queensland's grasses was praised by the early dairymen.

Introduction of exotic grasses and legumes was begun in the early 1860s when lucerne (*Medicago sativa*) was common around Brisbane. Perennial rye grass (*Lolium perenne*), prairie grass (*Bromus unioloides*), red clover (*Trifolium pratense*) and white clover

(*T. repens*) were introduced by the Acclimatisation Society in 1865. Winter-growing species, they were no doubt introduced to fill the winter gap in Queensland's grazing capacity. At Headington Hill on the Darling Downs, Davenport and Fisher introduced large-scale mixed farming with up-to-date American equipment and in 1873 had more than 700 acres under cultivation, with lucerne (250 acres), wheat (300 acres) and maize (172 acres) as the main crops. Six years later, the proprietors had doubled their acreage, largely by increasing their lucerne pastures to 800 acres. On these bright green paddocks grazed 3000 sheep being fattened for the Brisbane market. Headington Hill's pastures of lucerne and prairie grass were soon copied by others, and in 1874 Canning Downs produced the first crossbred sheep for the Warwick and Stanthorpe butchers.

Guinea grass (*Panicum maximum*) was introduced at the Botanic Gardens in 1867 and at Kamerunga in 1893. Cowley reported that it was spreading widely, but it was hard to collect seed as it shattered quickly and it would be better to plant roots.

In 1891 J. S. Edgar, Curator of the Rockhampton Botanic Gardens, reported that *Panicum spectabile* (*Brachiaria mutica*) was an excellent grass and farmers who had given it a trial spoke highly of its nutritive qualities. In a few cases considerable areas were planted with it. In Edgar's opinion it was "the most valuable tropical grass yet introduced into the Colony". It had been introduced by Dr Joseph Bancroft in the 1870s from Dr Schomburg, the Director of the Adelaide Botanic Gardens, under the name wonder grass or giant couch (*Panicum muticum*). (Bailey, J. F., *Rep. Dep. Agric. Stk*, 1909-10, p. 129)

Another grass about which several people waxed ecstatic was red natal grass (*Rhynchelytum repens*), introduced by the Acclimatisation Gardens from Dr Schomburg in 1876. At Kamerunga in 1893 Cowley said the grass introduced as *Panicum teneriffae* var. *rosea* was an excellent fodder grass for Queensland. It had produced a great quantity of seed and had been distributed all over the Colony. It withstood dry weather, bore abundant leaf and could be cut four or five times a year, and both horses and cattle were ravenously fond of it. McLean reported in 1896 that it had yielded 2½ to 3 tons of hay per acre in Toowoomba. "It has come to stay and I consider it a valuable acquisition to all scrub farms."

During the 1870s canary grass (*Phalaris tuberosa*) was growing, under the name *P. nodosa*, at the Toowoomba Botanic Gardens, where E. Way was Curator. It is a winter-growing species and was later to become one of the most important perennial species for pasture improvement in southern Australia, under the name Toowoomba canary grass. Several grasses and legumes introduced during the same decade did not emerge as promising species.

F. M. Bailey, the Colonial Botanist, was a keen advocate of the better use of our native grass species. In 1896 he published a sixteen-page article entitled "Queensland Grasses" in the Department's annual report for 1895-6. In this he listed 113 species and described their suitability respectively for wet land, riversides, freshwater swamps, brackish-water swamps and Downs country, for cutting for green fodder, for sowing singly or for mixing to be cut when in flower for hay, for forming a firm, lasting meadow turf, for rough waste places, and for stabilising coast sands. He stated: "Queensland is proverbially rich in the number and nutritive character of the indigenous grasses...Perhaps the most striking feature is the extraordinary tenacity of life which many of them possess."

It was soon recognised that the Queensland winter months were too dry and cold to produce natural grazing of sufficient nutritive value to support satisfactory milk production by dairy cattle, and fodder crops were introduced. Winter crops of oats were grown at the Penal Settlement at Ipswich in 1828 and extensively later, being used mainly for grazing. Rye was another popular grazing crop and several English winter-growing grasses, clovers and medics were also sown.

However, the low winter rainfall was a problem. To help overcome this winter nutritive stress, the early agricultural advisers advocated growing summer fodder crops during the reasonably moist summer months and ensiling them for use during the winter. Maize was the crop most strongly promoted for this purpose, but sorghums had been introduced by the Acclimatisation Society in 1865 and kaffir corn was introduced by James Henderson of Tamborine during the 1880s. Ensilage of native grasses was advocated by Peter McLean but few successes were achieved, either in quantity or quality. Stack ensilage was recommended because it required little equipment (earth-digging machinery and mechanical forage harvesters were to be the tools of a distant future) and scaffolding was used to control stack structure.

At the first Agricultural Conference at the Royal National Association's Show in 1889 and at the Beenleigh Conference McLean had promoted silos and silage. At the former meeting James Henderson said the best crop for silage was Johnson grass, followed by kaffir corn, yellow milo maize, sorghum and pearl millet.

Crop protection

Plant diseases

In 1875, the Queensland Government appointed a board to enquire into the causes of diseases in livestock and also the plants of Queensland, and F. Manson Bailey was appointed to look after the botanical aspects of the enquiry. The budget for this enquiry was £2500, and four reports emanated: one on 30 June 1876, one on 30 June 1877, one in 1878 and the fourth on 26 March 1879.

The Board made a general recommendation relating to the prevention of new plant diseases:

In reference to the introduction of diseases and insects injurious to vegetation through the importation of infected plants, the Board is of the opinion that it would be desirable to have all imported plants carefully inspected, and if found diseased, subjected to such treatment as will prevent their spread to other plants here. (*Report*, 1877, p. 2) (Tryon, "Report on Insect and Fungus Pests", *An. Rept Dept Agric.*, 1889-90)

Few diseases were reported: gumming of citrus and a leaf fungus on the lemon; Oidium of grape vines, partly controlled by sulphur; powdery mildew of cucumber and pumpkins (controlled by sulphur dust, or 2 oz of salt in a gallon of water, or a weak ley of ashes); rust and smut in wheat; and sugarcane rust (there was debate as to whether it had a meteorological, nutritional or fungoid cause) and Pou blanc of sugarcane. Private investigations and reports by Dr Bancroft revealed the presence of nematodes on banana roots (Flask Worm disease), rust in wheat (*Proc. Roy. Soc. Qld*, 1885, Vol. 1,

pp. 1761-80). As an incentive to enquiry by private individuals the Government offered, in 1878, a reward for the discovery of an effective remedy for rust in wheat. (Tryon, 1890)

On 25 January 1886 the Hon. J. R. Dickson, Colonial Treasurer, instructed Henry Tryon to investigate diseases of fruit trees and other economic plants in the Toowoomba district. (Tryon was Assistant Curator of the Museum, a position to which he had been appointed on 1 February 1884; at that time he was the first Honorary Secretary of the Royal Society of Queensland, which had been founded one month earlier, on 1 January 1884.) Tryon visited Toowoomba for two weeks and compiled a 238-page report, "Inquiry into Diseases Affecting Fruit Trees and other Cultivated Economic Plants in the Toowoomba District", which he presented to the Minister for Public Instruction on 20 July 1889. It was published as a *Parliamentary Paper* and subsequently issued in the same year by the Department of Agriculture as "Report on Insect and Fungus Pests, No. 1". (Veitch, 1962) The diseases Tryon reported on were peach leaf curl, almond rust, gumming of peaches, black spot, leafscab and sooty mould on citrus, dodder, powdery mildew of the vine and cucurbits, black spot and leaf spot of the vine, maize rust and smut, wheat rust and a false potato disease.

In the annual report of the Department published on 30 May 1889 F. Manson Bailey, Colonial Botanist, reported on twenty-two fungi he had collected during 1888-89. Tryon also wrote at length on the occurrence and action of the diseases he had found, and possible remedies for them. He acknowledged Bailey's help in forwarding specimens to Dr Cooke in England for identification: Bailey had forwarded specimens of the twenty-two fungi.

Pineapples were a growing commercial industry around Brisbane, especially at Nudgee, and a disease that called for investigation appeared in 1891. Shelton and McLean visited the area and believed the cause was monoculture in pineapples. Having no plant pathologist on the staff of the Department of Agriculture, they forwarded specimens to Dr Cobb of the New South Wales Department of Agriculture for identification of the disease. Cobb replied that the disease was new to science, but on an invitation to visit Queensland he said he was too busy. This incident pressed home the need for a State plant pathologist. During 1892-93 Tryon spent twelve days in the pineapple plantations and reported that the disease was caused by an unknown fungus parasite on the roots under certain soil and climatic conditions, that it was not contagious, and that a rotation of crops would be beneficial.

In 1891 potato blight was discovered at Ravensbourne near Crow's Nest, and by 1893 it had occurred on thirteen farms there and also at Corinda. This was the first discovery of *Phytophthora infestans* in the Colony and Tryon was called in to inspect the occurrence. He recommended that only disease-free seed potatoes be planted and that all crops showing disease be completely destroyed. This outbreak of disease led Tryon to stress the need for an agricultural college and experiment farm for research in such diseases and the need for a Departmental entomologist. (*An. Rept Dept Agric.*, 1893-94, pp. 2-3)

On 1 August 1894 Tryon was appointed Entomologist in the Department of Agriculture. He did not sever his connection with plant pathology and was made Entomologist and Vegetable Pathologist in 1902.

The Grape Vine Disease Act of 1877 prevented importation of cuttings but in 1892 McLean sought suspension of the Act (see "Viticulture"). This Act had to be amended on 11 March 1896 to add prohibition of importation of grape cuttings into Queensland from Europe, Asia, Africa, North and South America, and from the Colonies of New South Wales, South Australia, Western Australia, Tasmania and New Zealand, to guard especially against the introduction of *Phylloxera* under the new Diseases in Plants Act. (*An. Rept Dept Agric.*, 1895-96. p. 12)

A Diseases in Plants Act was formulated by a board representing various interests but the first draft of the regulations was the work of the Entomologist, Tryon. The Act was formulated and introduced into Parliament in 1893 but time did not allow its passage and it was not passed till 1896. The regulations became effective from 11 September 1897. Meanwhile, similar legislation had become law in the other Colonies, based on a good deal of Queensland's draft material. (Bell, *QAJ*, July 1947, p. 11)

The Diseases in Plants Act dealt mainly with importation of plant material. Plant material from Ceylon, India, the East Indies, the East African colonies and all other countries in which coffee leaf disease (Hemileia vastatrix) existed was prohibited; importation of sugarcane and banana plants from New Guinea, the Sandwich Islands, Fiji or other countries where beetle borer of sugarcane (Sphenophorus obscurus) existed was banned; potatoes from Europe, America and all other countries in which the disease *Phytophthora* infestans occurred were not allowed into Queensland; and the limitations on grape plants under the amended Grape Vine Diseases Act were confirmed. All plant imports, labelled to show their nature and origin, had to arrive at a stipulated point of entry, where they would be inspected and disinfected or otherwise treated according to the regulations, with a certificate issued before they were released. Any plant material carrying a disease not already in the Colony was to be destroyed and other diseased material must be suitably dealt with. Nurseries were to be registered and inspected. All fallen fruit in orchards was to be collected before noon each day and boiled or buried, and the trees were to be sprayed with either resin wash for scale insects, sulphur, lime or salt wash, or Bordeaux mixture, or fumigated by the cyanide process.

The Diseases in Plants Act, although subject to early criticism, soon injected a much-needed improvement into the quality of marketed fruit.

The first eight Inspectors under the Act were appointed on 31 March 1897. They included McLean, Benson and Tryon. As new plant appointments were made, such officers also became Inspectors under the Act.

Entomology

Deciduous fruit grown in the Darling Downs area was damaged by fruit fly as early as 1853 and in the Brisbane area in 1864, although it was probably in the latter area earlier. The board, of which Bailey was a member, appointed in 1875 to enquire into causes of diseases in livestock and plants, recorded the presence of "grubs" in peaches in East and West Moreton and the Darling Downs and of "disease" in those of Rockhampton. The brief account of the damage indicates that fruit flies were implicated. (May, A. W. S., "The Fruit Fly Problem in Eastern Australia", *J. Entomological Soc. of Qld*, 1962, Vol. 1, pp. 1-5).

The first comprehensive publication on insect pests in Queensland was Tryon's 238-page report, entitled "Inquiry into Diseases Affecting Fruit Trees and other Cultivated Economic Plants in the Toowoomba District".

Tryon recorded damage by fruit fly at Goondiwindi in 1869, Roma and Surat in 1886 and Ingham in 1889. From these and other records, he estimated that fruit fly (*Strumeta tryoni* - named after him) was responsible for the destruction of considerably more than half of the fruit grown in the southern portion of the Colony.

In his annual report for 1892-93, McLean, the Under-Secretary, wrote:

The want of an entomologist in this Department is felt in a greater degree year by year. Many farmers send down insects for determination and ask for information concerning the pests that are destroying their crops. Having no officer competent to undertake this work, I am compelled to either fall back upon the officials of the Museum, and so interfere with the course of their duties, or to inform the applicants that I am not in a position to afford them the information they ask-a position which I feel greatly as it is clearly the duty of a Department of Agriculture to be able to deal with such matters.

The plea was heeded and on 1 August 1894 Henry Tryon was appointed Entomologist at a salary of £200 per year, rising on 1 July 1895 to £300 per year. In his first annual report a year later Tryon recorded insect pests on sixteen fruit varieties, three agricultural crops (pests included the beetle borer in sugarcane), five vegetables, pastures, shade trees, flowers, and stored products; he listed imported undesirable insects including the sugarcane borer, the bean and pea weevil, codlin moth and mussel scale of apples, but was unable to find the dreaded *Phylloxera vastatrix* infecting grape vines. He was able also to record and disseminate useful parasitic and predatory insects. He stated:

The arrival on two separate occasions in the Colony from the Sandwich Islands of sugar cane intended for use as "seed", harbouring an insect not previously established in the cane fields of the Colony, i.e. the notorious beetle borer *Sphenophorus obscurus* one of the worst insect pests of this valuable plant, as well as other incidents, have suggested the propriety of again urging the expediency of a Special Act of Parliament being passed which shall authorise the Governor in Council to prohibit or regulate the importation from beyond the Colony of any plant, fruit, vegetable, or other merchandise that may be reasonably expected to harbour or be affected by any insect fungus or disease, and which shall empower a duly constituted authority to detain and examine the same whenever arriving and prevent this being distributed until certified under its hand to be free from insect fungus or disease, or even whenever circumstances render such act necessary, condemn, to in fact, follow the procedure of other countries in this safe guarding the interests of both agriculturists and horticulturists. (Tryon, H., *An. Rept Dept Agric.*, 1894-95, p. 41)

In February 1895, Tryon reported to the Natural History Society of Queensland the occurrence on peach trees in New South Wales of a scale insect "whose recent introduction also into the fruit growing districts of the United States of America had already occasioned such widespread consternation there, viz., the San José or Pernicious Scale (*Aspidiotus perniciosa*)". Later in that year R. Hoggan of Ballandean, sent specimens to the New South Wales Department and it was identified as San José scale. Tryon himself discovered the scale in three orchards in the Stanthorpe area in the same year. On investigation later, he found that during the years 1894-97 this insect was repeatedly introduced into the Colony and widely disseminated in nursery stocks supplied by two Sydney firms. In 1897 it was found at Stanthorpe, Warwick, Allora, Brisbane, Emerald, North Coast, Maryborough and

Rockhampton. The Sydney nurseries had acquired it on apple and pear stocks from California. By 1897 it had spread to Western Australia and Victoria. Tryon observed that had notice been taken of the announcement of its discovery in 1895 and legislation been introduced, Queensland "would have been spared the presence of so decided an enemy of the orchard".

In October 1894 Tryon visited Mackay to enquire into the grub pest of sugarcane (*Lepidiota squamulata*) and advised growers to capture the adult beetles, destroy their feeding trees and fumigate the soil with carbon bisulphide. By 1895, 71 tons of beetles had been collected and destroyed; in 1896, sixteen tons were captured! One of the early users of carbon bisulphide for fumigation of the cane stools was J. C. Brünnich, Manager of the Colonial Sugar Refining Company's Mill at Homebush, Mackay, who on 31 March 1897 became Agricultural Chemist with the Department of Agriculture. Tryon collated his information in a 56-page publication entitled "Grub Pest of Sugar Cane (*Lepidiota squamulata*)" issued in July 1895.

During 1896-97, Tryon reported:

Instances have occurred of both rooted vines and vine cuttings being surreptitiously brought into the Colony in contravention of the law having for its object the prevention of the introduction of Phylloxera. These articles are usually concealed in bundles of fruit trees...In one instance, in which rooted vines from a country in which Phylloxera exists had not only been thus introduced but also planted, the vines themselves were rooted up and destroyed, and the soil in which they were growing suitably disinfected. Such illegal acts as are alluded to constitute a distinct menace to the vine growing industry of the Colony and its future development. It is worthy of consideration whether, as the occasion may arise, legal proceedings for the purpose of punishing offending parties, should not be taken that these undesirable occurrences may in future be prevented. (*An. Rept Dept Agric.*, 1896-97, p. 36)

Dairying

The travelling dairies

On 24 September 1888 the Secretary for Public Lands (the Hon. M. Hume Black) instructed Peter McLean to obtain as much information as possible about the travelling dairies operating so successfully in Victoria. D. E. Martin, the Victorian Secretary for Agriculture, informed him that the plant was provided by the Department, and that the salaries of the manager and his assistant and the cost of moving the plant from place to place were paid by the Department. The dairy was exhibited at work in each agricultural society's district, each society providing suitable accommodation, a couple of horses (or an engine) and the required quantity of milk. The plant remained ten days at each place. The cost of the travelling dairy plant, which included appliances for butter- and cheese-making was £236 15s 4d. A route for the dairy was arranged. A great amount of interest was taken by the country people in the proceedings, and general satisfaction was expressed at the work done.

The Victorian Secretary for Agriculture recommended the purchase of a plant from Messrs Bartram and Sons of Melbourne. This was done and the plant was brought to Queensland by Baron Jones, lately assistant to the dairy exhibit at the International Exhibition, Melbourne. Jones was appointed Manager of the Travelling Dairy in Queensland on 9 March 1889 at a salary of £250, increasing to ± 300 on 1 July.

The plant consisted of a "Sharples Russian" steam turbine cream separator with a capacity of 65 gallons; a "Laval" steam turbine cream separator, of 95 gallons capacity; a "Victoria" cream separator of 35 gallons capacity; a "Sharples Russian" milk and cream tester; a "Laval" pasteuriser with a capacity of 400 gallons; a "Laval" milk and cream cooler of the same capacity, with two other milk coolers, a "Dobson's Patent" and a "Moore's Patent"; a concussion churn; a butter worker; cheese vats and plant complete; a salting and cooling sink; and cheese presses.

Agricultural and pastoral societies established and subsidised since 1867 by the Government on the motion of Mr Pugh, M.L.A., were approached to ascertain which would be interested in cooperating in the use of the plant. Early applicants were Tallebudgera, Oxenford and Beenleigh. The Department allowed each agricultural society to nominate not more than five pupils, either male or female, to receive a special course of instruction from the manager, and interest was immediately forthcoming. Local farmers supplied the milk, a "Baby" separator separated the cream from the milk, and butter and cheese were made, the produce becoming the property of the suppliers. For many, this was the first encounter with a cream separator. Previously, cream had been skimmed from the milk set out in shallow pans. Donald (*Gympie 1867-1967*, Reid Printery, Gympie) claims a Mr H. W. Durietz of Eel Creek, Gympie, introduced the first cream separator into Australia from Sweden in 1881.

The first travelling dairy began operations at Tallebudgera on 15 April 1889, then visited Coomera, Beenleigh, Ipswich, Tamborine, Beaudesert, North Pine, the Brisbane Exhibition, Caboolture, Brookfield, Laidley, Rosewood, Pine Mountain, Biarra (Cressbrook), Toowoomba, Warwick, Allora, Killarney, Canning Downs South, Stanthorpe, Clifton, Greenmount, Yandilla and Roma. So popular and useful did it become that it was decided to procure a second plant for the northern portion of the Colony from W. R. Oxenford of Coomera. It started operations at Mackay on 24 September 1889, as Travelling Dairy No. 2, under John Mahon. Mahon had had extensive dairying experience in Victoria and had been appointed on 2 August 1889 at a salary of £250 per year, rising to £300 in 1893.

Interest in the travelling dairies was intense and was stimulated by prizes offered for the manufactured products by local farmers or business organisations. On 11 June 1890 an exhibition of dairy produce made by pupils of Travelling Dairy No. 1 was held in the Adelaide Street drill shed, lent for the occasion by the Commandant of the Defence Force and decorated with flowers and pot plants from the Botanic Gardens. Competitors entered from the electorates of Albert, Logan, Lockyer, Bundamba, Moreton, Oxley and Rosewood. The prize for the champion cheese was won by Miss Jessie Hunter of Laidley, that for the champion keg of butter was won by Mrs Bleakley of Upper Caboolture. The exhibition attracted numerous visitors who expressed surprise at the quality of the produce, especially the cheese, declaring it to be equal to the cheese imported from New Zealand and New South Wales.

In September 1890 Travelling Dairy No. 1 moved to the Wide Bay district from Roma, visiting Gympie, Tiaro, Maryborough, Yengarie, Pialba, Goorah, Miva, Alpha, Gunalda and Kilkivan, then Rockhampton, Abington, Knockroe, Greenlake Road and Gracemere.

Between 12 June and 20 October 1891 it operated at Fitzroy Park, Rockhampton, Rosewood, Coolarie, Springsure, Douglas Creek, and Bogantungun under Baron Jones, the first travelling dairy instructor. Jones resigned on 1 November 1891, and the dairy came under the control of James McCormick, who took it to Raglan, Pennhillvale, Kalkie, Sharon, Goondoon, Gin Gin, Mount Perry and South Kolan.

Cane farmers in north Queensland were not enjoying satisfactory returns in the late 1880s and many kept dairy cattle as a supplementary source of income. No. 2 dairy visited Mackay, Walkerston, Eton, Plane Creek, Marievale, Woodlands, Townsville, Black River, Ross River, Stewart's Creek, Alligator Creek, Woodstock, Drynie, Ayr, Maida Vale, Halifax, Ingham, Cardwell, Cairns and Port Douglas. On 26 March 1891 butter was sent from Townsville to Brisbane-the former consumer was now supplying its previous supplier.

From 27 May 1891, No. 2 dairy visited Cooktown, Laura, Charters Towers, Twelve Mile, Cape Road, Windsor Station, S. Weeks's and Price's (Upper Broughton), Hayston's (Lower Broughton), Bletchington Park, Homestead, Fox's Farm (Ellingslee), Hughenden, Prairie, Boundary, Stormington, Ravenswood and Kirk River, reaching Ravenswood Junction on 12 May 1892. The cream separator elicited general admiration and although temperatures in the north reached 112°F at Hughenden first-class butter was made.

During the 1892-93 year only a few areas were serviced by No. 1 dairy. Between 2 and 13 September it visited Calliope, Grassvale, Plains and finally Mutdapilly. There were insufficient applications to keep two dairies fully employed and No. 1 dairy was laid up and the staff discharged. On the Under-Secretary's recommendation, James McCormick was appointed Manager of the Government Dairy in Tasmania.

Between 20 May 1892 and 9 May 1893 No. 2 dairy visited Woodstock, returned to Brisbane on 9 June 1892 to be overhauled, and then proceeded to Wivenhoe, Fernvale, Deep Creek, Moombra, Esk, Marburg, Purga Creek, Milbong, Peak Crossing, Teviotville, Coochin, Danalgin, Engelsburg (Kalbar) and Boonah. At Boonah Mahon pronounced the Fassifern district "a splendid field for developing the dairying industry" and said that under systematic management it could supply the whole of Brisbane's requirements in that line of produce.

Between June 1893 and May 1894 Travelling Dairy No. 2 operated at Helidon, Tent Hill, Murphy's Creek, Southbrook, Westbrook, Pittsworth, Warwick, Dalby, Maida Hill, Toowoomba, Meringandan, Hampton, Goombungee and Douglas. Places visited during the 1894-95 year included Crow's Nest, Emu Creek, Cabarlah, Gowrie Junction, Gowrie Little Plain, Ramsay, South Toolburra, Darkey Flat, Greenmount, Chinchilla, Jandowae, Warra, Mitchell and Roma.

The travelling dairy was laid up from 1 August 1895 until 2 January 1896 because the extreme drought did not allow sufficient milk to process. On resumption the dairy visited Waratah, Harrisville, Roma, Browns Plains, Logan Village, Gympie, Wallumbilla, Helidon, Tent Hill, Laidley, Forest Hill, Blenheim, Thornton, Burnside, Hatton Vale and Rosedale. In 1896 it visited Gympie, Pye Creek, Cootharaba, Gunalda, Kilkivan, Brooya, Miva, Lagoon Pocket, and Glastonbury, but because of the scarcity of milk owing to the prevailing drought it ceased operations on 31 October 1896.

In the course of their existence the travelling dairies visited 166 country centres-108 in southern Queensland, 12 in central Queensland and 46 in the north. In all, 2168 farmers received tuition-1483 in south, 168 in central, and 517 in north Queensland. (Bell, *QAJ*, 1947, p. 8)

The Under-Secretary stated in his 1896 annual report:

For three years, two plants were in operation, and for seven years one has been constantly in the field. During the whole of this time no hitches have occurred, and notwithstanding that engagements were sometimes made months in advance, and dates fixed for certain places, I am not aware that an engagement was ever broken or a single locality disappointed. This result was brought about by careful organisation at the outset, and careful supervision during operations. That the Department was fortunate in the selection of experts is evidenced by the results, which testify more conclusively than any words that could be written or spoken.

John Mahon, describing his own experience, wrote:

It is gratifying to me to have to state that the unanimous feeling of those interested was one of appreciation of the Government's action in sending the Travelling Dairy and thus enabling the farmers to improve their system of manufacture, and, consequently by supplying local requirements, to keep in their own districts large sums of money which previously had been sent to purchase produce in other markets.

In summing up the work of the year 1893-94, the Under-Secretary, McLean, stated:

At the inception of the dairies two objects were in contemplation

- 1. the education of those engaged in dairying in the latest methods
- 2. the establishment of co-operative factories for the manipulation of milk in large quantities with a view to the possibilities of an export trade.

Establishment of factories

The butter and cheese produced by the travelling dairies became the property of the various farmers who supplied the milk and was used for home consumption or bartered with local storekeepers. However, in the wake of the travelling dairies' visits, individuals and business groups saw the potential for central manufacturing plants, and factories of various sizes sprang up in the respective districts.

In fact, McLean, writing for the 1891-92 annual report (p. 2), stated:

Notwithstanding that during 1891 we imported 313,419 lb [of butter] the time is rapidly approaching when our local production will exceed the consumption, i.e. in 1889, 781,441 lb were imported, in 1891, 313,419 lb...The export of butter will pay if carried out on a proper basis but under Queensland conditions there is little hope of success unless central factories-private or co-operative-are opened to give a large volume of output of uniform quality.

Rice mentions that the first central dairy in Queensland is claimed to have been established in 1887 by C. H. Buzacott of Hampton, on the Crow's Nest branch railway, and the first cheese factory at Yangan near Warwick in 1893. ("100 Years of Queensland Dairying", *QAJ*, Sept. 1959, p. 562) As they travelled around Queensland the dairy instructors pressed the need for and advantages of co-operative factories, but in his 1895-96 annual report, the Under-Secretary said: The butter and cheese factory system that has sprung up in our midst during the last six years as an outcome of the Travelling Dairy is almost wholly proprietary...I am of the opinion that a permanent success can only be secured by the co-operative principle, because the producer of the raw product puts his money into a factory for the production of the finished article. It is to his interest to keep up the supply of the raw material.

A central butter factory was erected at South Brisbane in 1890 and by the end of that year there were eight cheese and butter factories and five creameries. The creameries were wooden buildings where steam-driven cream separators were installed. Nearby farmers took their milk to the creamery, which, after separating the milk, sold the cream to a central butter factory and returned the skim milk to the farmers. This so-called separator butter was of better quality than either the farm-made or imported butter and attracted a higher price. (Rice, 1959)

The first co-operative butter and cheese factory was established in 1890 at Tiaro; its produce had a ready market in nearby Gympie, then a thriving gold-mining town. It was short-lived as a co-operative and closed in 1892, to be taken over by the Lowood Creamery Co. Ltd of Oxley.

An interesting development in cheese manufacture was recorded by Peter McLean in his 1892-93 annual report. Annatto, a colouring matter obtained from the seeds of a small tree, *Bixa orellana*, was used in the artificial colouring of milk for cheese manufacture and was being imported, but the tree was growing in the Brisbane Botanic Gardens and the seeds were distributed. McLean wrote:

The preparation of this article of commerce has been successfully effected by Mr. James Dick of Cooktown, which has been tested by the dairies and found to be equal to that imported. The manufacture of this, like the establishment of butter and cheese factories, may be credited to the efforts of this Department and to the teachings of the travelling dairy.

John Mahon's policy was that the travelling dairy should return for a second visit to any place that showed interest in establishing a factory.

As the building and equipping of factories was a costly undertaking, the Government passed the Meat and Dairy Produce Encouragement Act, initiated by Sir Thomas McIlwraith and assented to on 26 September 1893. A tax was placed upon the owners of cattle-the Meat and Dairy Produce Encouragement Tax-and the money derived from dairymen, at 15s per hundred head of cattle, was lent for the erection of factories for the manufacture of butter and cheese and used for the payment of a bonus of ¹/₄d per lb for all butter shipped overseas. The borrower had to mortgage his factory to the Meat and Dairy Board as security, no advance being made until enough work had been completed to afford security. Repayment was to be made in twenty years, with an annual payment of interest plus a proportion of the principal. The fund was under the control of the Department of Agriculture. To foster the expansion of dairying the Government in 1894 offered a bonus of ¹/₄d per lb for butter shipped overseas. (Rice, 1959)

The first six factories (factory being defined as a "dairy where the owner purchases his supply of milk and does not raise the whole supply himself") included the Greenmount Dairy Company Limited; the Happy Valley Factory; the Pilton Dairy Company; J. F. Howes, Oxley; the Toowoomba and Gowrie Junction Cheese and Butter Factory Company; and Daly Bros, Quinalow. All received assistance from the Fund.

John Mahon wrote in May 1894:

Pupils of mine are now managing the largest and most important factories in Queensland viz. Silverwood (Toowoomba), Central Dairy Factory (Brisbane), Happy Valley, Lanefield, Grandchester, Greenmount and Pilton. Sixteen cheese and butter factories and thirteen creameries are in full swing, eight factories and eight creameries of which have been established in the twelve months ending 5 May 1894, but only four factories and one creamery are co-operatively owned.

During 1894-95 seven cheese factories and fourteen creameries were established on the Darling Downs -"a district admirably adapted to dairying". During 1895-96 nearly two hundred separators were purchased by butter factories and farmers.

On-farm dairy production

The first dairy cattle were brought into Queensland from the Illawarra district in New South Wales in the 1840s and depastured near Ipswich. They were evidently few in number, as there were reported to be not more than 12 dairy cows in Queensland when it was separated from New South Wales in 1859. (Rice, 1959) There were, however, a large number of beef animals and nondescript cattle with poor dairy potential.

The routes taken by the travelling dairy gave John Mahon ample opportunity to observe the methods of production on the farms. He lost no chance to draw farmers' attention to the need for a better type of cattle to be kept for dairying purposes, and encouraged the introduction of better bulls. After visiting the Boonah district he reported that the Fassifern district was a splendid field for developing the dairying industry and that under systematic management it could supply the whole of Brisbane's requirements in that line of produce. But, he added,

At the present time farmers will milk only when butter is selling at a high price-as soon as it falls below 7d per lb the cows are turned out with their calves till the market rises. Though hundreds of tons of fodder are grown in the district the cows are not fed and fodder which could be conserved for times of need, is wasted.

The Under-Secretary had stated in May 1890 that

... in the southern part of the Colony where the dairy has worked it has been proved without doubt that our natural grasses possess nutritive qualities quite equal to any portion of Australia, but in the North, the experience of the manager of the travelling dairy No. 2 goes to show that the natural grasses are coarse and rank, and do not possess nearly the same proportions of butter and cheese making qualities as the grasses of the South.

This led John Mahon to suggest supplementary fodder crops for silage and hay and conservation.

By 1896, Professor Shelton, who had taken up his appointment as Instructor in Agriculture on 15 January 1890, was able to say:

There is a growing sentiment that further growth in dairying is dependent upon a large improvement in the dairy stock of the Colony and improved treatment of it. Creditable specimens of dairy cattle may now be seen in nearly every neighbourhood and improved dairy breeds...are now a feature of every agricultural show. In the important particular of providing winter supplies of fodder a great advance has been made. The sorghum crop, rarely seen in Queensland five years ago, has a place upon nearly every farm, while lucerne, setaria, maize, and the native grasses are commonly used as hay, not destined for the Brisbane market, but for use on the farms where they grow. Soon our dairy farmers will be feeding ensilage to better cattle suitably housed and then the dairy resources of the Colony will be made more than ever apparent.

The educational character of the Travelling Dairy cannot be overlooked. For instance, our farmers have been taught that cleanliness is as essential in their dairy shed as in the home, that good butter cannot be made when milk is placed in the same room with soap, kerosene oil and salt fish, that the dairy is not the place for salting meat and hides and at the same time carrying on cheesemaking operations. Removal of unhealthy cows of cancer and tuberculosis is needed.

The factory situation

During the year 1891-92 the Under-Secretary, Peter McLean, made reference to the climatic problems in Queensland of preventing milk from becoming sour, and said:

Any remedy that would prevent milk turning sour will be of great value. A discovery has been made in France for sterilising milk generally known under the name of pasteurising, which will keep milk sweet and wholesome for long periods. This is accomplished by heating the milk up to 155°F for a few minutes, and then cooling rapidly. Steps have been taken through the Agent-General to obtain full particulars of the system which will probably be of immense service to Queensland.

In 1895 McLean noted that with the number of factories now established and working, and the number of separators in private hands, it was probable that with anything like a fair season production would far exceed consumption, so that an outside market had to be found for the surplus butter and cheese. He cited the need for cold storage, a quality product and regularity of supply to compete with the butter already exported from New Zealand, Victoria and New South Wales. John Mahon also canvassed for better transport from farm to factory, refrigeration, a high-quality article, less moisture and working, uniformity, and the use of riper cream to develop aroma.

Butter export

Before 1895 the Department had communicated with the local agents for the British-India Steam Navigation Company on the provision of cold storage in their steamers for the shipment of high-quality butter to London-it was no use attempting to force an inferior commodity upon the London market. The export of butter from Queensland beyond the Australasian Colonies had not been attempted in any but small quantities before 1895, the stumbling block being the difficulty of obtaining cold storage, and the fact that production did not nearly equal the demand.

During the 1894-95 year Mahon visited factories, refrigerating chambers and some of the best dairies in New South Wales and Victoria to enquire into the export of butter, cheese, pork and poultry. On 16 January 1895 he visited Brisbane to classify butter for export under the provisions of The Meat and Dairy Produce Encouragement Act of 1893 but rejected the consignment. In the following month (February-the hottest time of the year in Queensland) he examined another batch of 4 tons 17 cwt and passed it for export. The butter left Brisbane on SS *Banffshire* on 3 February and reached London in May, the voyage taking 104 days. Another shipment of 5 tons went on the *Nairnshire* ten days later

and arrived in London ten days earlier than that on the *Banffshire*. Both shipments arrived in excellent condition. The cost of shipping was 1d per lb gross weight.

A shipment of 11 tons of cheese was made in 1896, and in 1897 a further shipment of 63 tons of classified and Government-branded butter aboard the *Jumna* arrived in London in excellent condition. Queensland butter had found a place on the "home" market in England.

Livestock and meat

Livestock

Little has been said about the Department of Agriculture's role in the livestock industries before 1897, mainly because the Department of Stock was a branch of the Colonial (Home) Secretary's Department until that year.

Early legislation dealt with the problems of scab and catarrh in sheep. Strict inspection of live sheep, destruction of those severely affected, dressing of minor cases and control of movement by inspectors appointed under the Act finally overcame the problems, and in 1887 there was no scab disease in sheep in any of the Colonies. George Appel was appointed the first Scab Inspector in 1855. Patrick Robertson Gordon was appointed Chief Inspector of Sheep in the Colonial Secretary's Department on 14 February 1868, and also Registrar of Brands in 1872; he was made an Inspector of Meat following the implementation of The Livestock and Meat Export Act of 1895, and on 9 September 1896 also became Chief Inspector of Stock in the Home Secretary's Department. On 1 July 1897 Gordon and the other officers appointed under the above Acts were transferred to an independent branch in the Department of Agriculture. (See Chapter 3.)

On 10 May 1864 a Select Committee of Parliament, chaired by J. de Lacy Moffat, was asked to determine what steps could be taken to suppress and eradicate pleuropneumonia in the northern districts of the Colony. The Commission found that the disease had been introduced through cattle from neighbouring Colonies. It recommended the prohibition of imports of horned cattle from those areas and the destruction of beasts with unmistakeable signs of disease. It suggested compensation for those whose cattle had been destroyed under Clause 5 of the Diseased Stock Act. In each district associations should be formed for the protection of farmers, with inspectors' expenses subsidised by the Government. (*Qd Parl. Papers*, 1864, pp. 1069-1090)

In 1875, the Queensland Government appointed a board, of which Gordon was a member, to enquire into the causes of diseases in livestock and also the plants of Queensland. In 1887 Gordon was co-author with F. Manson Bailey of an illustrated booklet, *Plants Reputed Poisonous and Injurious to Stock*, published by the Government Printer.

During September and October 1886 a conference of chief inspectors of stock, veterinary surgeons and stockbreeders of the Australian Colonies was held in Sydney. The Queensland delegates were P. R. Gordon, Chief Inspector of Sheep, and the Hon. H. C. Wood, M.L.C., stockowner. The conference dealt with anthrax (splenic apoplexy, blackleg), cancer,

tuberculosis, scrofula, glanders, farcy, hoose, pleuropneumonia, sheep catarrh, entozoa, sheep scab, foreign diseases, hog cholera, introduction of animals by sea, destruction of noxious animals, travelling stock, destruction of noxious weeds and branding and marking of animals. (*Journal of the Legislative Council*, Vol. 37, Pt III, 1887, pp. 959-1058)

1866 Legislative Assembly New South Wales

SCAB IN SHEEP

(Report from Chief Inspector of Sheep) Chief Inspector of Sheep to Secretary for Lands

Department of Lands, Sydney, 14th July, 1866

Origin of the Disease,

The infection of the flocks on the Namoi and Bogan in which scab was first discovered, has been traced beyond doubt to some culls of fat flocks taken there from Sydney and Maitland in the end of 1862. These culls must have been infected by some of the Victorian sheep, which were then largely imported [to N.S.W.] for slaughter, or by infected sheep imported for breeding purposes and sent out, as they sometimes were, to paddocks in the neighbourhood of Windsor and Richmond, where they might have come into contact with butchers' culls. The scab has for years been rife in Victoria-and in the early part of 1864 several instances were met with of breeding sheep which had been imported during the previous year from the neighbouring Colonies and from Europe, having been landed diseased.

350,000 sheep were infected, many different medicants were tried. Government compensation was 4/- per sheep. Allen's specific was a total failure. Stayes cured 6,225 out of 87,186. Arsenic and arsenic and tobacco were successful where sheep were put on to clean runs after being dipped, but if not, up to 80% died from poisoning. Finally tobacco and sulphur were successful in 93% of the cases. To prevent further infection inspectors should be stationed at ports where sheep are landed and also along the banks of the Murray where sheep may cross in dry times.

Alex Bruce, Chief Inspector of Sheep

In his report for the six months ending 30 June, Bruce said, "I have the honour to state, that the sheep throughout the Colony are now free from scab."

Gordon was thoroughly versed in the livestock situation. He was also a foundation member of the Royal Society of Queensland and had a meritorious record, being mentioned in Pugh's *Men of the Time* in 1892.

In 1888 a deputation of stockowners called on the Colonial Secretary, the Hon. B. B. Moreton, impressing on him the desirability of establishing a stock research institution. In 1890 James Tolson, the Queensland delegate to the International Stock Conference held in Melbourne, proposed a resolution that had the unanimous consent of the delegates: that an intercolonial stock institute be established in Sydney, with the cost to be borne by all the Colonies, pro rata according to the number of stock in each. The idea was abandoned when Victoria and South Australia refused to join the scheme.

The Queensland Graziers and Stockbreeders Association then successfully petitioned the Government to establish its own institute before both another raid on graziers' funds by way of taxes for the Brands Act and the erection of meatworks left no funds for the institute. (*The Australian*, 1893)

On 29 November 1893 the Executive Council approved the establishment of a stock institute in Brisbane:

It is recommended that in view of the valuable results which have been obtained from bacteriological investigation into the diseases of stock carried out by scientific experts temporarily engaged by the Government for this purpose and of the benefit which must accrue to the Colony from possession of a permanent organisation for the continuance of such investigations, a Stock Institute be established in Brisbane, having for its object the discovery by means of experimental research of the nature and origin of diseases in stock and the means of their prevention. The cost of the establishment and maintenance of the Institute is to be defrayed from the Brands and Sheep Fund. (*Courier*, 1893)

Charles Joseph Pound, F.R.M.S., an expert microscopist from England who at the time was employed by the New South Wales Central Board of Health investigating diseases of stock at the Sydney Abattoir and Homebush Saleyards, was appointed Director at a salary of £400 a year. The Institute was under the Colonial Secretary's administration, the incumbent at the time being the Hon. Horace Tozer. (See also Chapter 3.)

Premises were rented in a two storey house in Turbot Street. In April 1895, an advisory council selected from the Queensland Stockbreeders Association was elected, to which the Government could refer questions affecting the pastoral interests.

The Stock Institute, along with Department of Stock, was transferred to the Department of Agriculture's jurisdiction on 1 July 1897, and in late February 1900 moved into new buildings on College Road.

The Department of Agriculture had, however, some responsibilities involving livestock prior to 1897. During their travels throughout eastern Queensland the managers of the Travelling Dairies, particularly John Mahon, had much advice to offer on the selection, breeding and feeding of dairy cattle and pigs. Pig raising was mainly allied to dairying: skim milk and whey were used as liquid nutrients, supplemented by maize grain, pumpkins, mangel wurzels, arrowroot, etc. The first bulletin issued by the Department, "Pig Raising and Pork Making with Ham and Bacon Curing", was presented as a lecture by Professor E. M. Shelton at the Agricultural Conference at Beenleigh held during 4 and 5 May 1890. It was subsequently published and widely distributed by the Department. Peter McLean, Under-Secretary, contributed "Dairy Cattle and Their Treatment". In May 1893, Professor Shelton contributed *Bulletin* No. 24, Our Stock Foods and How to Use Them.

Messrs Baynes Bros of Belmont Piggery had imported some excellent Berkshire pigs from England in 1875 and there was a demand for their stock. Watson, a Victorian expert, was appointed to the Department to instruct in ham and bacon curing in 1890 and 1891. His success is evident in the fact that in 1893 Queensland imported 6700 lb of bacon more than was exported, but by 1897 some 681 000 lb more were exported than brought into the Colony. On 9 October 1892, C. T. Allcutt was appointed Instructor in Meat Preserving, visiting and advising at several meatworks. The Meat and Dairy Produce Encouragement Act of 1893, formulated "to encourage the manufacture and exportation of meat and dairy

produce from Queensland to subscribe a portion of the capital required for the erection of suitable buildings and machinery for these purposes" and financed by a tax of 15s per 100 head of cattle and 1s 6d per 100 sheep during the years 1894-97, had a profound effect on the encouragement of meat export. This Act was administered by the Department of Agriculture.

Thus, at the end of the first decade, with recommendations from the Interstate Conference of Chief Inspectors of Stock, the firm establishment of the dairying industry, the erection of meatworks, and the founding of the Stock Institute and the Queensland Agricultural College, the stage was set for significant advances in the animal industries during the next decade.

Ham and bacon curing

To enable farmers to compete with imports, the Department engaged William Watson, a ham and bacon curer of repute in Victoria, to give instruction and practical demonstration in the art of ham and bacon curing. He was hired from June to November 1890 and visited the following centres: Toowoomba (where he instructed 35 students); Greenmount (17 students); Yengarie, north of Gympie (14 students); Warwick (13 students); Gin Gin (12 students); Goorah (10 students); Emu Vale (9 students); South Kolan (7 students); Bundaberg; Gregory; Gundiah; and Goodwood.

The results were generally good, but pigs fed molasses, as they had been at Yengarie and Bundaberg, did not yield good products and overfat pigs did not cure well for bacon. One failure was at Goorah:

The pigs were mostly fed on molasses, and most of them came from the opposite side of the river, the mode of crossing being to tie the pigs, drag them down the embankment, cross in a boat, and drag them up the embankment on the opposite side, not a proper way to bring a pig to be killed. (*An. Rept Dept Agric.*, 1890-91, p. 14)

For those who were unable to attend his demonstrations, Watson wrote a pamphlet for distribution by the Department.

Watson was re-engaged during the winter of 1891 to work in north Queensland, and visited Ingham, Halifax, Townsville, Charters Towers, Hughenden and Herberton. The fourteen Herberton farmers wrote to the Department expressing appreciation: "It is not too much to say that this gentleman during his stay at Herberton has taught us what will be invaluable in the future, and too much praise cannot be rendered him for the courteous manner in which he imparted instruction to all who wished to learn."

Meat processing and preservation

On 9 October 1892 C. T. Allcutt, selected in America by a very good friend of Professor Shelton, was appointed Instructor in Meat Preserving at a salary of £1000 per year for three years (twice that of the Under-Secretary). During his first six months he travelled 5000 miles, advising the following companies: Barcaldine Boiling Down and Meat Preserving Company; Hogarth Australian Meat Preserving Company, Oakey Creek; Queensland Meat Export and Agency Company Limited, Brisbane and Townsville; Central Queensland Meat Export Company, Lakes Creek; Dalgonally Meatworks, Normanton; Carpentaria Meat Export Company Limited, Burketown; Graziers Butchering Company, Brisbane; North Queensland Meat Export Company Limited, Alligator Creek; Torrens Creek Meat Export Company; and Hollandia Meat Company, Brisbane. He also attended meetings regarding the formation of companies at Townsville, Bowen and St Lawrence.

Allcutt carried out an experiment in conjunction with Messrs J. C. Hutton and Co. at Zillmere in curing beef, which was shipped to Holland and Antwerp as ordinary cargo. Two consignments arrived in good order and condition, and were pronounced equal to the best American cured beef. The results convinced Allcutt that with the use of refrigerating machinery in the chilling and curing rooms there was no country where Queensland meat could not be delivered in good condition. (*An. Rept Dept Agric.*, 1893-94, p. 9)

Forestry

The Department of Agriculture took a brief interest in forestry when Peter McLean visited and reported upon the progress of a kauri pine (*Agathis robusta*) nursery and plantation on Fraser Island. Two plantings were made, one in 1883 on a sandy bank of Bogimbah Creek, which because of lack of moisture remained quite stunted. A second planting in the following year, under the direction of a Mr McDowall, with the trees in lanes 8 to 10 feet apart, did better, but natural regrowth from old kauri plantations outgrew the planted specimens when these were cleared around their base.

In October 1889 McLean wrote:

I wish to point out clearly, and lay special stress upon the fact, that trees are continuously growing as a natural process of reproduction in nearly all of our forests where any quantity of timber has been cut down much better, in my estimation, than would result from artificial means and which could be developed at comparatively small costs to the State in comparison with entering upon an extensive system of reafforestation.

Altogether 71 550 young kauri pines were planted in lanes and cleared between them, and 26 154 naturally occurring plants were also cleared. Aborigines were used to clear the undergrowth and in 1891, when Ronald Mitchell was Crown Land Ranger, the Department of Agriculture paid £65 to his son, Alexander Mitchell, to tend the plantation. Young Kauri pines were shipped to the Government of New Guinea in May of that year.

The services of Alexander Mitchell were dispensed with in 1896 and the work of reafforestation was handed over to the Aborigines on a reserve proclaimed under the Home Secretary's Department.

Marketing

In a developing colony so far removed from the world's markets Queensland farmers had great difficulty in selecting enterprises that would return them a profit. The Government was equally concerned. The squatters had reason to protect their land and industries because wool, hides, tallow and horns provided the bulk of the exports and the wealth of Queensland from the 1860s to the 1880s. Dairying was gradually built up until there was enough butter and cheese to export on to a reasonably favourable market and sugar gradually gained entry to

overseas markets. So the Department took a very active part in testing foreign markets. Peter McLean, the Under-Secretary, wrote in his 1890-91 annual report:

Farmers are not as a rule in a position to test foreign markets with any produce suitable for export beyond the confines of Queensland. I would therefore submit that it would be quite within the scope of this Department were authority given to forward from time to time, trial shipments of new products to foreign markets, should they be of a nature likely to open up new industries.

This policy was put into practice during the first decade and shipments of dairy products, fruit, fibres, timber, arrowroot, tobacco and wines were sent through the Agent-General or direct to manufacturers in England and some other European countries to test the market; exhibits were placed in international exhibitions so that the products of the Colony might arouse the interest of likely purchasers. Coupled with the actual quality required in the various items were the important problems of packaging and transport, with special emphasis on long-distance survival.

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FROM BEFORE PRE-FEDERATION TO AFTER WORLD WAR I, 1897-1919

Administrative and legislative actions

The expansion of the Department of Agriculture from a staff of two in June 1887 to a staff of 112 permanent employees, as well as gardeners, ploughmen, labourers and casual hands, in June 1898 indicated the substantial need for agricultural services throughout the State.

The Honourable Andrew Joseph Thynne, M.L.C., had been allotted the portfolio of Postmaster-General and Secretary for Agriculture in the Ministry of the Hon. Hugh Muir Nelson, K.C.M.G., on 6 May 1896 and within a few weeks had selected the site for the Queensland Agricultural College at Gatton.

On 20 May all business connected with the administration of the Department of Agriculture, the Botanic Gardens, the Meat and Dairy Produce Encouragement Act, and duties connected with Agricultural and Pastoral Societies were transferred from the Department of Public Lands to the Secretary for Agriculture.

Thynne held the dual portfolios until 31 March 1897 when he became the first full-time Minister for Agriculture; on the same day Johannes Christian Brünnich was appointed the first Agricultural Chemist in the Department. Thynne was to continue in office as Minister for Agriculture until 2 March 1898, when he was succeeded by the Member for Mackay in the Legislative Assembly, the Honourable James Vincent Chataway.

In his annual report for 1897 Peter McLean, the Under-Secretary, wrote:

The past year has been the busiest in the history of the Department and many new departures have been made, among which may be mentioned the transfer of the Stock Department, the inception of the operations under The Plant Diseases Act of 1896, the establishment of the Agricultural College and the State Farms at Westbrook and Hermitage, the commencement of a pure bred dairy herd, the International Exhibition, the advertisement of Queensland in Germany by means of the display of samples of our products at the Museums and in a similar manner in Great Britain and Ireland, and the publication of a monthly journal in the place of the issue of bulletins at irregular intervals, the Agricultural Conference held at Gatton...and the Intercolonial Fruit Conference. In addition the ordinary work consequent upon the establishment of a separate Ministerial portfolio has much increased. (*An. Rept Dept Agric.*, 1897-98, p. 24)

He was to add:

The Department has been working at a disadvantage owing to the officers being in different buildings and the need for further office accommodation has been sorely felt. The promised additions to the present buildings will enable the whole work of the Department (with the exception of the Stock Institute) to be carried on under one roof, and so greatly lighten labour and facilitate operations. (*An. Rept Dept Agric.*, 1897-98)

Patrick Robertson Gordon had been appointed Chief Inspector of Sheep in the Home Secretary's Department on 14 February 1868, mainly to tackle the problems of sheep scab and sheep catarrh under The Diseases in Sheep Acts of 1867. To his administration were added The Brands Act of 1872, The Native Birds Protection Act of 1877, and its Amendment Act of 1884, The Marsupials Destruction Act of 1877 and 1881, its Continuation Act of 1884 and 1895, The Stock Returns Act of 1893, The Livestock and Meat Export Act of 1895 and The Diseases in Stock Act of 1896, under which he was appointed Chief Inspector of Stock.

Gordon and his staff were transferred on 1 July 1897 from the Colonial Secretary's Department to the Minister for Agriculture. Gordon took with him nineteen inspectors, of whom four were qualified veterinary surgeons. Most of his inspectors were inspectors under at least three of the Acts being administered. The veterinary surgeons were essentially inspectors under the Livestock and Meat Export Act with the assistance of other inspectors. The whole of the State was thus serviced.

The editor of the Queensland Agricultural Journal paid tribute to Gordon thus:

In his youth he received his first training in the office of a solicitor or writer to the signet, in Aberdeen, and afterwards took great interest in matters dealing with stock of all kinds, which training was to stand him in good stead when, later on, he left the old country and settled in Victoria, where he became a station owner and manager. Subsequently he went to New South Wales, and was appointed metropolitan inspector of stock under the late Alexander Bruce. He assisted Mr. Bruce in stamping out the scab disease in sheep in New South Wales. In 1867 Mr. Gordon came to Brisbane, where he received the appointment of Chief Inspector of Stock. In that year he assisted to draft The Diseases in Sheep Act of 1867, and subsequent amendments. He was also the originator of The Brands Act of 1872, and, having had experience of the working of the Brands Act in New South Wales, he framed the Queensland '72 Act, which is, without doubt, the best system in Australasia, if not in the world. In Mr. Gordon's early days, there were no Parliamentary Draftsmen, and therefore, the framing of the Stock Acts, &c., devolved greatly on him, and his earlier experience in a lawyer's office greatly aided him in this, and similar work. He was, in conjunction with the late John Fenwick and Gresley Lukin, the originator of the present thriving institution, the Queensland National Agricultural and Industrial Association. Versatile in his accomplishments, he was one of the founders and chief supporters of the Brisbane Musical Union. He played several instruments, amongst them the drum tympani, and if the drums went astray, he took a score and sang in the chorus. In all expositions, such as the Indian and Colonial and others to which Queensland exhibits were sent, he was a leading factor in advancing the State's interests. He and Mr. Bruce were originators of the Annual Conference of Chief Inspectors of Stock of Australasia, conferences which were held alternately in the different States, with a view to establishing uniformity in all matters connected with the movements, diseases, &c., of stock. Mr. Gordon was always an advocate of a Stock Institute on the lines of the Pasteur Institute, to which all matters connected with stock should be submitted. In this, however, he was not supported by the other States, but he succeeded in founding the original Stock Institution, which was located in a temporary building in Turbot Street, Brisbane, of which Mr. J. C. Pound [sic] (now Director of the Yeerongpilly Institute) was appointed director.

Those who were intimate with him will remember him as a good raconteur, reciter, and comic singer, his favourite comic song being "The Lively Flea." Mr. Gordon was always a strong advocate for introducing new blood into the flocks and herds, horses, and swine in the State. He compiled, and issued at one time, "The Drovers' Guide," which embodied the best parts of the various Acts he assisted in framing. (*QAJ*, Oct. 1915, p. 206)

The Stock Institute, under the charge of C. J. Pound with a staff of three assistants and the quarantine keeper, was also transferred to the Department in Brisbane. Pound was first appointed Government Bacteriologist on 2 December 1893 at £400 per year, rising to £500

per year on 1 July 1897 when he joined the Department, bringing the Stock Institute under the Stock Branch.

The two branches, Agriculture and Stock, remained separate and distinct until the end of 1903. The Stock Branch was under the control of the Chief Inspector of Stock except in such matters as required the authority of the Head of the Department. P. R. Gordon retired as Chief Inspector of Stock on 30 June 1903, on six months' leave of absence on half pay to 1 January 1904. On this date the two branches combined to become the Department of Agriculture and Stock under the new Acting Under-Secretary, E. G. E. Scriven, who was confirmed in this senior position six months later, on 1 July 1904. He was to remain Under-Secretary until his retirement on 31 December 1924.

Ministers for Agriculture, 1897-1919

The Hon. A.J. Thynne

The Honourable Andrew Joseph Thynne, as the first full-time Minister for Agriculture, conceived and supervised the transition within the Department. He relinquished his portfolio on 2 March 1898, but not before he had appointed several men who were to become key figures in Queensland agriculture: A. H. Benson, the first fruit expert; F. C. Wills, the Department's first artist and photographer; Major A. J. Boyd, Editor of the *Queensland Agricultural Journal*; Professor E. M. Shelton, the first principal of the Queensland Agricultural College; John Mahon, dairy instructor; two assistants to Mahon, R. W. Winks and Charles McGrath; J. F. Bailey, assistant botanist; R. S. Nevill, tobacco expert; and two full-time inspectors under the new Diseases in Plants Act, James Henderson and Daniel Jones. In October 1897 a fruit farm at Redland Bay was leased for three years from L. G. Gorrie to carry out pest control and fertiliser experiments under the direction of A. H. Benson. On 1 January 1898 E. H. Rainford was appointed viticulturist, and on 12 February 1898 the Gindie State Farm was established, with Alexander Watt as manager.

These appointees, together with the existing staff Under-Secretary Peter McLean, Chief Clerk E. G. E. Scriven, Colonial Botanist F. Manson Bailey, Entomologist Henry Tryon, Chief Inspector of Stock P. R. Gordon, Director of the Stock Institute C. J. Pound and Secretary of the Meat and Dairy Produce Encouragement Fund W. C. Green, and their staff formed a substantial nucleus with which the Department could proceed into its second decade.

The Hon. J. V. Chataway

The Honourable James Vincent Chataway (Member for Mackay) became Secretary for Agriculture on 2 March 1898. He was born in September 1852, the son of the Rev. James Chataway, Rector of Rotherwick, Hampshire, England. He was educated at Winchester College and in consequence of ill health from over-study, he came to Australia in 1873. He engaged in various pursuits connected with mining, pastoral and agricultural industries and for some time was part-proprietor of the *Mackay Mercury*, entering Parliament in 1893.

Chataway had a rare faculty for organisation. He held the Agriculture portfolio in the T. J. Byrnes and J. R. Dickson Ministries, combining it with the portfolio of Public Lands from 12 October 1898 to 28 March 1899, forfeiting it for only seven days to Herbert Freemont Hardacre in December 1899, then continuing as Minister for Agriculture in the Philp Ministry until his death on 12 April 1901. He lived to see Federation.

Chataway had a rewarding three years in the portfolio. He had attended the first agricultural conference at Gatton College under the chairmanship of his predecessor and had been so impressed by its success that he happily supervised further conferences at Rockhampton in 1898, Mackay in 1899 and Warwick in 1900. The Warwick conference, attended by 114 representatives from farmers' associations and show societies throughout Queensland, continued for four days and was regarded as so important that its proceedings were published in a special edition of the *Queensland Agricultural Journal*. Chataway was active in establishing the Sugar Experiment Station at Mackay, in asking Dr Walter Maxwell to report on the scientific needs of the Queensland sugar industry, in the passage of The Sugar Experiment Stations Act of 1900, and in the appointment of Dr Maxwell as the first Director of the Bureau of Sugar Experiment Stations. The establishment of the Biggenden State Farm and the Texas Tobacco Experiment Station, and the transfer of the Stock Institute from its unsatisfactory building in Turbot Street to a new building in College Road and its transfer to the Home Secretary's Department as the Bacteriological Institute also happened during Chataway's Ministry.

Chataway had the unenviable task of conducting an enquiry into Professor Shelton's administration of the Queensland Agricultural College, subsequently accepting Shelton's resignation and installing John Mahon as his successor. He attended the enquiry himself and then helped to smooth the way over a delicate situation to establish Mahon as the new principal.

He piloted the Marsupial Proof Fencing Act through Parliament and also The Slaughtering Act of 1898, which brought all slaughterhouses throughout the State into a sanitary condition and provided good-quality meat for local consumption. He promoted Peter McLean from the under-secretaryship to the position of Agricultural Adviser, bringing in P. J. McDermott as Under-Secretary.

Referring to Chataway's death, his successor, the Hon. David Hay Dalrymple (also an Englishman and Member for Mackay), said:

In April this year, the State and the Department suffered an irreparable loss by the death of my predecessor. Both as a representative of the people and as a Minister of the Crown, Mr. Chataway had carved for himself honourable distinction, as was evidenced by the respectful and affectionate references to him in Parliament during the current session, and the unanimous and enthusiastic appreciation of his services to agriculture expressed at the recent conference of farmers at Bundaberg. It must be mournfully confessed that like others of our public men of late, he shortened a life invaluable to the State by devoting himself too assiduously, in defiance of medical advice to public affairs. (*An. Rept Dept Agric.*, 1900-01)

The Hon. D. H. Dalrymple

David Hay Dalrymple was born in Newbury, England, in December 1840. He was educated at the Independent College, Taunton, and also attended lectures at the Bristol

Medical School. He came to Melbourne in 1862, to Rockhampton (Queensland) in 1863, and then to Mackay, where he engaged in business as a chemist and druggist. He was interested in local affairs and had served on several occasions as Mayor of Mackay.

At the time of his election as Minister for Agriculture Dalrymple was engaged in pastoral pursuits as a member of the firm Dalrymple and Murray Hamilton and was returned at the 1888 election by a considerable majority as Junior Member for Mackay and colleague of M. Hume Black. He was re-elected at the general election of 1893, and again in 1896. In 1895 he became Secretary for Public Instruction in the Nelson Ministry, and later became Secretary for Public Lands in the Dickson Ministry. Shortly after Chataway's death, he took over the Agriculture portfolio, retaining the position of Acting Minister for Mines during the absence in South Africa of the Hon. Robert Philp. (*QAJ*, 1901, Vol. 8, p. 399)

Dalrymple saw the formation of the Chamber of Agriculture emanating from the Bundaberg Farmers Conference, the passage of The Agricultural Bank Act of 1901 and the Vote for Loans for Co-operative Agricultural Production. He held the Agriculture portfolio during the most severe drought in Queensland's history; with limited finance and poor seasonal conditions innovations were almost at a standstill, as drought strategies called for undivided attention. Many meatworks were closed; fourteen sugar mills did not crush, the area from Mackay north providing 90 per cent of the total cane crop; the wheat crops were poor, and seed wheat had to be obtained from South Australia for the new season's plantings.

However, work proceeded with the establishment of a sugar experiment station at Bundaberg, opened in August 1901; there was some advance in fruit production and the Viticulturist, Rainford, had shown that *Rupestris* stocks were satisfactory for Queensland wine production, the *Riparia* stocks proving a failure.

The annual reports of the Department for the years 1900 to 1903 were not presented by the Under-Secretary to the Minister for Agriculture. The 1900-01 report was presented (in summary form) by the Minister for Agriculture, the Hon. D. H. Dalrymple, to the Lieutenant-Governor, Sir Samuel Walter Griffith, followed by reports of sections under the signatures of the section heads. The 1901-02 report was presented by the Hon. D. H. Dalrymple to the Governor, Sir Herbert Charles Chermside, and detailed reports of the sections were reproduced in the *Queensland Agricultural Journal*. The 1902-03 report was furnished by the new Minister, the Hon. Digby Denham, to Sir Herbert Charles Chermside. The 1903-04 report reverted to the pre-1901 format, being presented by the new Under-Secretary, E. G. E. Scriven, to the Minister, followed by detailed reports of the various sections under the signatures of the section sections under the signatures of the sections under the signatures of the sections were report to the pre-1901 format, being presented by the new Under-Secretary, E. G. E. Scriven, to the Minister, followed by detailed reports of the various sections under the signatures of the section heads.

Queensland Chamber of Agriculture

At a meeting of the council of the Logan Farming and Industrial Association on 16 July 1900, the following resolution was passed:

That in the opinion of this meeting of the council of the Logan Farming and Industrial Association: "That owing to the assured federation of the Australasian colonies and the possible effects on the producing interests of pastoralists, planters, farmers, dairymen and others, it would be to the best interests of the agricultural industries of this colony if steps
were taken to establish a central council or chamber of industries, to assist, protect, and safeguard the various industries, and to further in a greater degree the objects for which such societies and associations are now formed throughout Queensland."

This was moved by F. W. Peek, seconded by A. Kleinschmidt, and carried unanimously. It was also resolved that a copy of this resolution be printed and forwarded to the Minister for Agriculture, asking his assistance in the carrying out of the objects of the resolution. (*QAJ*, October 1900, Vol. 9, p. 309)

At the agricultural conference at Bundaberg in July 1901 Peek again brought the matter forward. The Queensland Chamber of Agriculture was set up and the first council meeting was held on 4 October 1901 in the rooms of the National Association Courier Buildings, Brisbane. The Hon. A. J. Thynne accepted the presidency, with Peek as acting secretary. By June 1902 there were thirteen affiliated societies and the first year's business included the question of excessive shipping freight charges for fruit from Bowen; differential freight rates on Queensland Railways; the carriage of wheat to port at rates similar to those of other States; the testing of weighbridges, and the issuing of certificates of correct weights; Federal tariffs; better control of retail and wholesale markets; pillage of fruit in transit; and the shipping and receiving of perishable products. Concessions granted by the respective authorities showed the potential advantage to producers in affiliating with the Chamber. (*An. Rept Dept Agric.*, 1901-02, p. 6)

The Agricultural Bank Act of 1901

The Agricultural Bank Act of 1901, assented to on 31 December 1901, established the Agricultural Bank of Queensland for the purpose of promoting the occupation, cultivation and improvement of the agricultural lands of Queensland. Three trustees administered the bank as a body corporate with perpetual succession and a common seal. The Government, on the recommendation of the trustees, was empowered to appoint a manager and thereafter to appoint inspectors, valuers and other necessary officers.

The moneys with which to carry out the administration of the bank were to be raised by debentures plus appropriation by Parliament, not exceeding in total £250 000 and kept in a trust account at the Treasury.

The manager, with the approval of the trustees, was empowered to make advances to farmers on the prescribed security for the purpose of making improvements on their holdings, not exceeding thirteen shillings in the pound on the estimated value of the improvements, not exceeding £800 per applicant and advances of amount not exceeding £200 to have priority over those of a greater amount. Inspectors were appointed to report upon applications and to inspect the improvements from time to time. Advances were to be secured by first mortgage. Interest was 5 per cent payable on 1 January and 1 July each year for the first five years, and thereafter the advance had to be repaid over twenty years.

The Act came into force in April 1902. Sir Hugh Nelson, E. Deshon and H. L. E. Ruthning were appointed trustees, with Sir Hugh Nelson as chairman. The initial work of the trustees, to be completed by June 1902, was the issue of regulations prescribing the operations under the Act; the acceptance of applications and conditional approval of a proportion thereof after obtaining reports thereon from such land commissioners and

crown land bailiffs and rangers as had been appointed valuators and inspectors under the Act; and the establishment of an office in the Treasury Buildings.

In this preliminary work the clerical assistance of W. C. Green, secretary to the board administering The Meat and Dairy Produce Encouragement Acts, 1893 to 1901, was gratefully acknowledged. (*An. Rept Dept Agric.*, 1901-02, p. 7)

James Evan Burstall was appointed secretary and acting manager on 12 December 1902 at a salary of £225 per year.

The Meat and Dairy Produce Encouragement Acts, 1893 to 1901

In September 1903, W. Chas. Green, secretary to the Board administering the Act, gave a summary of receipts and expenditure from the inception of the Fund in December 1893 to 30 June 1903. The organisations that had been assisted from the Meat and Dairy Funds respectively are shown in the Department's annual report for 1900-01 (pp 69-70).

In 1903-04 a butter factory was erected at Ayr by the Ayr Co-operative Dairy Company with assistance from the Fund.

This factory, although on a small scale, marks the extension of the dairy industry on up to date lines in what may be termed the tropics proper and no doubt was instrumental in turning the attention of southern dairymen to the suitability of our northern coastal district lands for dairying, which has resulted in a factory being commenced at Cairns, which will embrace the Mareeba and Atherton districts as well as the Cairns district in its sphere of operations. This factory is not receiving financial assistance from the fund. (Green, W. C. *An. Rept Dept Agric.*, 1903-04, p. 79)

The Rockhampton butter factory erected in 1904-05 did not require assistance.

During 1904-05, the Mackay butter factory interests were taken over by a co-operative company composed of local dairymen. The Trelawny condensed milk factory was repossessed and its security was transferred to the Cressbrook Dairy Company. The Mackay meatworks were also repossessed by the Board.

The Vote for Loans for Co-operative Agricultural Production

This vote provided for loans in aid of co-operative agricultural production and was administered by the Department, along with The Meat and Dairy Produce Encouragement Act of 1893. Charles Green was secretary and Robert Ferguson was the surveyor for the Board, which handled both enterprises.

In the years 1900 to 1902 advances were made to the Queensland Farmers Co-operative Dairy Company Limited for their butter factory at Booval. During 1902-03, £1370 was advanced to the Dalby Farmers Flour Milling Company for the erection of a mill of a capacity of three bags of flour per hour and a grain store; to the Roma Co-operative Milling Company Ltd for a flour mill, grain store and flour store; to the Bundaberg Co-operative Dairy Company for its butter factory; and to the Maryborough Co-operative Dairy Company Ltd for a butter factory at Kingaroy. During 1906-07 a loan of £600 was made to the Wide Bay Co-operative Dairy Company Limited for its Gympie butter factory, which it had purchased from the Silverwood Dairy Factory Company Limited (Gatton). These advances brought to £8584 the total advanced to June 1907.

During 1907-08 a further advance of $\pounds750$ was paid to the Kingaroy Butter Factory, making the total advance from the fund $\pounds9334$.

On 1 August 1906, Robert Ferguson, the Board's Surveyor since 1894, died and his place was taken by Arthur Morry, formerly an inspector in the Works Department.

The Hon. D. F. Denham

Digby Frank Denham was born on 25 January 1859 at Langport, Somerset, England, and was educated at the Langport Grammar School. In 1881 he joined his mother in mercantile business in South Australia and in 1886 established Denham Bros., grain and produce merchants, in Brisbane, Sydney, Rockhampton and on the Darling Downs. In 1893, with J. C. Hutton, Denham built many southern Queensland dairy factories. He was chairman of directors of the New Swanbank Collieries, Bundamba, and chairman of Stephens Divisional Board.

Denham was M.L.A. for Oxley from 3 July 1902 to 22 May 1915. He was Home Secretary and Minister for Agriculture from 17 September 1903 to 27 April 1904 and Secretary for Agriculture and Public Works from 27 April 1904 to 19 January 1906 within the Morgan Ministry; Secretary for Agriculture and Railways from 19 January 1906 to 19 November 1907 in the Kidston Ministry; Home Secretary again from 19 November 1907 to 18 February 1908; Secretary for Public Lands from 29 October 1908 to 7 February 1911; and Premier and Chief Secretary from 7 February 1911 to 1 June 1915. (Waterson, 1972)

Thus he was Minister for Agriculture for what was then a record term of four years and two months. Among the many progressive moves introduced by Denham as Minister for Agriculture were the amalgamation of the Agriculture and Stock Branches to form the Department of Agriculture and Stock, and the passage of The Dairy Produce Acts, 1904 to 1905, which improved dairy hygiene and made Queensland the first State to enforce butter grading, The Marsupial Boards Act of 1905, The Native Animals Protection Act of 1906, The Special Agricultural Selections Act of 1905, The Shearers and Sugar Workers Accommodation Act of 1905 and The Fertiliser Act of 1905. The Bacteriological Institute was brought once more under the Department of Agriculture and Stock. Denham saw to the establishment of the Roma and Warren State Farms and the redirection of Gindie State Farm to concentrate on stud livestock breeding, the acceptance of apprentices at the Hermitage State Farm, and the initiation of egg-laying competitions at Queensland Agricultural College, and organised a Government subsidy to match the local bonus on the collection of the damaging sugarcane grubs.

Denham promoted E. G. E. Scriven to the position of Under-Secretary of the newly created Department of Agriculture and Stock on 1 July 1904. He (Denham) appointed George Sutherland Thomson as Government Dairy Expert, especially to frame the Dairy Produce Act, and Matthew Fern as the first Poultry Instructor, or travelling lecturer, on 1 January 1904. He recruited Dr S. Dodd from South Africa to work specifically on tick fever and sent him to America with William Collins of Beaudesert to investigate this disease; appointed Howard Newport as Instructor in Tropical Agriculture, based in Cairns; sent the Entomologist, the Agricultural Chemist and the Chief Inspector of Stock to separate specialist interstate conferences; and gained publicity for the Department through public exhibitions and a daily three- or four- column article in the newspaper giving the progress of agriculture in the State.

Retirement of Peter McLean

Peter McLean, the first Under-Secretary of the Department, was appointed Agricultural Adviser on 1 July 1899 at a salary of £600 per year, his first salary increase since his starting salary of £500 in 1887. He was succeeded by Peter Joseph McDermott on 1 May 1900. McLean retired from the public service on 31 December 1903, being granted six months' leave of absence on half pay from 1 January 1904. "By his severance, the State has lost the services of one who was unremitting in his efforts to further agriculture in Queensland." (Scriven, E. G. E., *Rep. Dep. Agric. Stk.*, 1904-05, p. 1)

P. J. McDermott, McLean's successor, did not stay very long, moving to the Chief Secretary's Department on 1 January 1904.

E. G. E. Scriven, Under-Secretary, 1904 to 1924

On 1 July 1904 E. G. E. Scriven, Clerk of the Department of Agriculture at its foundation in 1887, became Under-Secretary of the newly amalgamated Branches of Agriculture and Stock, renamed the Department of Agriculture and Stock. He acted in that capacity from 1 January 1904, with the salary of his new position at £450 per year, rising in 1906 to £550 per year. He was to remain Under-Secretary until his retirement in December 1924. Scriven exerted an enduring influence over the period covered in this chapter.

Shearers and Sugar Workers Accommodation Act of 1905

The Shearers and Sugar Workers Accommodation Act of 1905 was assented to on 9 November 1905 and came into force on 1 January 1906 to regulate accommodation at shearing sheds, sugar plantations and sugar works in a district where not less than nine shearers or sugar workers were engaged. Proper and sufficient accommodation as prescribed was to be made available. Inspectors were appointed (members of the Police Force or Inspectors under The Factories and Shop Acts of 1900). The Department of Agriculture appointed two qualified inspectors in those districts where sheep predominated and which required more attention than could be given by the other officers of the Department who had the work of inspector Wood at Cunnamulla. Between January and August 1906 one hundred and seventy-six shearing sheds and sugar works were visited and reported on.

Special agricultural selections

The Special Agricultural Selection Act of 1905 was passed to assist those who wished to become farmers but had not the means to make a start. The Lands Department listed lands that might be suitable and these were inspected and reported on by the Agricultural Inspector of the Department of Agriculture, H. C. Quodling. It was difficult to obtain areas of land on which those for whose benefit the Act was intended could be reasonably expected to make a

living, but the Ideraway land near Gayndah was finally selected to be the first site of the experiment. Some 450 applications were received and selection was made by ballot.

The first contingent left Brisbane in July 1906, but it was not until June 1907 that all 23 elections were occupied. Of the 75 families interviewed, six were invited to join in the group selection. Of these, 22 refused the invitation after applying, nine accepted and then declined and seven left the group after joining. The members of the group were very fortunate: rent of their land had been paid, money had been advanced for rations, clothing, tools and other necessities were provided and an overseer, Mr Barber, was appointed to direct and guide them. However, some felt no need to work hard. There were wide differences between these families and the true selector, the latter working hard and making do without murmuring. Some were not satisfied and meetings and agitations started.

Each selector could borrow £80 for clothing and rations and £60 for tools, implements and stock. Money did not change hands, only orders. The cream the selectors produced was to be sent to Maryborough. Bulls and cows were purchased and sold at cost and members had to agree on receiving them that when five cows were in milk (later the number increased to ten) they would cease to receive rations and clothing. Redwater decimated the hundred heifers purchased.

In July 1906 the group was allotted 4391 acres of virgin land taken from a cattle station. The twenty-three families included 23 men, 23 women and 128 children. The total livestock included 22 horses, 111 cattle, 15 pigs and 20 poultry. The total cost to the Government was \pounds 4445, or \pounds 193 for each family.

The majority had no practical experience and initiative and the wives lacked knowledge of dairying. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1906-07, p. 37) By September 1908, the average expenditure per family had risen to £300 and advances ceased, as the selectors were considered capable of making a success of their mission. In retrospect, it was considered that personal interviews were a much better means of selection than ballot, and the rationing period was reduced and more money devoted to purchase of stock to give a quicker return.

Melbourne Exhibition, 1907

In early 1907, the Department was represented at the Exhibition of the Australian Natives Association in Melbourne, along with the Mines and Forestry Departments. An "Intelligence Officer" accompanied the exhibits. The Melbourne *Argus* reported, "It is impossible to be within the Exhibition doors two minutes before the magnificent exhibit of the Queensland Government makes you hurry back to look at it more closely".

The Prime Minister stated, "The Queensland exhibit would take some beating." Fresh fruit from Port Douglas, Cairns, Innisfail (Geraldton), the Near North Coast and Stanthorpe were available each day. Thirty-nine schools were given specimens of sugarcane, coconuts, wool and cotton, literature was distributed and the officer in charge of the Queensland Court lectured on Queensland life, its products and possibilities, illustrated with "limelight news" delivered daily. (*Rep. Dep. Agric. Stk*, 1906-07, p. 7)

The Hon. T. O'Sullivan

Thomas O'Sullivan was born in Ipswich on 15 December 1856 and educated at Ipswich State and St Mary's Schools. In 1873 he was articled to C. E. Chubb and in 1875 his articles were assigned to R. Little, Brisbane; from 1878 to 1885 he had a solicitor's practice in Ipswich; and in 1886 he partnered C. B. Lilley in Ipswich and Brisbane, then in Brisbane alone. In 1900 he became a barrister, in 1911 a King's Counsel, in 1915 a District Court Judge, Land Appeal Court, and Chairman of the Sugar Cane Prices Board. From 1921 to 1926 he was a Justice in the Supreme Court of Queensland.

He was M.L.A. for Warwick from 10 February 1906 to 5 February 1908, and a Member of the Legislative Council from 24 September 1903 to 25 January 1906 and 18 February 1908 to 9 December 1915. He was Representative of the Government in the Legislative Council from 24 September 1903 to 19 January 1906, Minister for Public Works from 19 January 1906 to 6 February 1907, Minister for Public Works and Agriculture from 6 February to 19 November 1907 in the Kidston Ministry, and Minister for Agriculture from 18 February to 29 October 1908 in the Philp Ministry. He was Attorney-General from 29 October 1901 to 1 June 1915.

During O'Sullivan's first Ministry arrangements were made at a Premier's Conference for Mr Froggatt, the Government Entomologist in New South Wales, to investigate the fruit fly overseas. The cost of the trip was shared between the four States, Victoria, South Australia, New South Wales and Queensland. O'Sullivan also was involved with A. H. Benson in having bananas intended for export to southern markets covered with netting for three weeks before shipping to prevent infestation with fruit fly, and citrus intended for export picked at least seven days before being packed.

The Hon. W. Stephens

William Stephens was born in South Brisbane in 1857 and educated at South Brisbane State School and Brisbane Grammar School. For three years he worked in a mercantile office and in 1877 took over his father's mercantile business. He was a director of the Imperial Deposit Bank, the Brisbane Milling Company, the Kingston Butter Company and the South Queensland Co-operative Dairy Company, and owned Merrimac Dairy Farms at Nerang. He was Alderman for South Brisbane and Mayor in 1888-89, 1899 and 1901, a member of the Nerang Shire Council from 1883 to 1925, president of the Metropolitan Transit Board, and vice-president of the National Agricultural and Industrial Association and the Nerang Pastoral and Agricultural Association.

Stephens was Member for Woolloongabba from 12 May 1888 to 28 March 1896, and for South Brisbane from 21 April 1896 to 27 August 1904 and 18 May 1907 to 5 February 1908. He was a Member of the Legislative Council from 1 July 1912 to 23 March 1922 and Minister for Public Instruction and Agriculture in the Philp Ministry from 19 November 1907 to 18 February 1908. His Ministerial role in Agriculture was too short for him to contribute materially to the progress of the Department.

The Hon. W. T. Paget

Walter Truman Paget was born at Hagley, Worcester, England, on 7 February 1854. He arrived in Queensland in 1872 with his brother and selected land at Nindaroo, Mackay, engaging in mixed farming till 1882. From 1882 to 1902 he ran a sugar plant and mill, managing the mill. In 1903 he acquired 7000 acres at Habana, running a farm and butter factory. In 1915 he bought a farm at Mooloolah. He was a member of the Pioneer Divisional Board and later its chairman, from 1885 to 1889, president of the Mackay Harbour Board, and a member of the Railway League, the Anti-Bounty League and the Hospital Board. He was M.L.A. for Mackay from 11 May 1901 to 22 May 1915, Secretary for Railways and Agriculture from 29 October 1908 to 7 February 1911, then Secretary for Railways from 7 February 1911 to 6 April 1915. He was a member of the Royal Commission on Canefields Labour in 1906 (Waterson, 1972). He moved to establish the Stock Experiment Station at Yeerongpilly in 1908 on 56 acres of land. Paget died at his home at Mooloolah on 23 December 1930.

Paget introduced The Rabbit Boards Acts Revival and Continuation Act of 1909 to be read as one with The Rabbit Boards Acts, 1896 to 1905; The Margarine Act of 1910, formulated to protect the butter industry against false advertisement and sale; and The Meat and Dairy Produce Encouragement Acts Amendment Act of 1910, transferring money from the Meat and Dairy Fund to a Meat and Dairy Trust Fund, from which aid could be given to the chilled meat industry or to any industry to get rid of surplus stock or grants be made to the Diseases in Stock Fund.

He appointed Arthur Ernest James Charles King Graham as Dairy Expert from 1 November 1908, Francis Keogh as Assistant in the Chemical Laboratory from 30 July 1909, Adam McGown, M.R.C.V.S., as Veterinary Inspector from 2 September 1909, Henry William Mobsby as Artist and Photographer in the Department from 13 January 1910 (he had worked for the Department on a casual basis since 1899), two assistants to the Government Bacteriologist, and Charles Ross as Instructor in Fruit Culture from 21 July 1910, to succeed A. H. Benson.

On the resignation of Dr Maxwell as Director of the Bureau of Sugar Experiment Stations, E. G. E. Scriven, Under-Secretary, was made also Director of the Bureau on 1 October 1910. On the same date Dr A. J. Gibson was appointed General Superintendent, based at Mackay; L. C. McCready became Chemist, in charge at Mackay; J. Pringle became Assistant Chemist at the Bundaberg Sugar Experiment Station; and M. B. Davis and N. H. Christenson became Assistant Chemists, based at Brisbane.

The Margarine Act of 1910

The Margarine Act of 1910 (assented to 13 December 1910) provided for the annual licensing of factories for the manufacture of margarine for a fee of one pound per year, within three months of the commencement of the Act. After one month from the commencement of the Act it was unlawful to sell margarine except under licence for a shopkeeper named therein, the licence fee being ten shillings per annum. Applications for a licence had to be lodged, on the prescribed form, with the Clerk of Petty Sessions. Factories had to declare their marks, which had to be registered. Selling without a licence incurred a penalty of five pounds. Margarine, both locally produced and imported, had to

contain for every 1000 parts of margarine at least one part of the dry starch *Canna edulis* (Queensland arrowroot) and with every 100 parts of margarine at least five parts of sesame oil (the oil of *Sesamum indicum* or *S. orientale*) or such other substance which the Minister should approve.

All dairy inspectors were deemed inspectors under the Margarine Act and had powers of entry and examination and, if necessary, could have the margarine analysed by the analyst. The inspector could condemn produce and such could not be sold. Margarine packages were to be clearly and truthfully labelled "Margarine". Regulations regarding preservatives could be framed. All fees, penalties and other moneys received would be paid into a trust account, from which the administrative costs of the Act were recouped.

The Hon. J. Tolmie

James Tolmie was born on 23 July 1862 at Registon, Moreton Bay, Queensland. He never married. Educated at the South Toowoomba State School, in 1876 he was a grocer's assistant, in 1877 a pupil teacher at South Toowoomba, and then a State School teacher at Fortitude Valley, Greenmount, Wetalla and Gowrie Creek. In 1894, with S. C. W. Robinson, he purchased the *Darling Downs Gazette*, which he sold in 1922. He was a troopship major from 1915 to 1917, and later a captain in the 4th Queensland Regiment. He was an alderman in Toowoomba and a director of the Darling Downs Building Society.

Tolmie was Member for Drayton and Toowoomba from 22 June 1901 to 18 May 1907 and 2 October 1909 to 26 April 1912, and Member for Toowoomba from 27 April 1912 to 16 March 1918. He was Minister for Agriculture and Stock from 7 February 1911 to 11 December 1912, Minister for Public Lands from 11 December 1912 to 1 June 1915, and Leader of the Opposition from 1915 to 1918.

He presented The Marsupial Boards Act Amendment Act of 1910, adding the word "fox" to the definition of "dingo" under the Act, and The Native Animals Protection Act Amendment Act of 1910, prohibiting the use of cyanide of potassium for killing animals; The Dairy Produce Acts Amendment Act of 1911, abolishing fees payable on the registration of dairies under The Dairy Product Act of 1904; and The Sugar Works Act of 1911, which allowed owners or occupiers of cane land to apply as a corporation for the construction of sugar works upon a suitable approved site, giving details of land on which cane would be grown, the block reserved for a township, routes of tramways, sites of wharf, all considered around a mill area. Under this Act, the Government would then create a sugar works area, a Board of Advice would be appointed, the capital cost of the sugar works would be lent by the Treasurer for a period of twenty-one years at an interest rate of 4 per cent per annum, and repayment of capital cost to the Treasury would commence after the first two years and continue yearly till repaid.

Tolmie introduced The Fruit Cases Act of 1912 to regulate the size and description of cases used in the sale and export of fruit, assented to on 7 December 1912 to come into force on 1 July 1913. All cases packed in Queensland were to be new or clean, and all export cases must be new. All cases had to be branded with the name and address of the

packer, with a guarantee as to the volume of the contents. Inspectors under The Diseases in Plants Act of 1896 policed the Act.

A few days after Tolmie's appointment as Minister for Agriculture he announced the appointment of Ludvig Frederick Andersen and Richard Moore to be the first dairy herd testers in the Department from 10 February 1911. George Booth Brooks and William Grierson Brown (the first sheep and wool expert) were appointed instructors in agriculture from 7 April 1911 and Alexander Purdon became an inspector and valuator under The Agricultural Bank Acts, 1901 to 1905. (See below also.) He also appointed several representatives of marsupial boards and rangers for the preservation of native birds in 1911, and several inspectors under The Shearers and Sugar Workers Accommodation Act of 1905.

On 27 June 1912 Alan Parkhurst Dodd, who was later to play a major part in launching the Cactoblastis caterpillar against the prickly pear pest, was appointed assistant entomologist under The Sugar Experiment Stations Act of 1900.

On 14 November 1912 John Brown, Bachelor of Science in Agriculture and holder of the National Diploma in Agriculture from the University of Glasgow, was appointed principal of the Queensland Agricultural College at Gatton. With the establishment of the Queensland University in 1911 James Tolmie, who as an ex-schoolteacher was interested in advancing education, appointed two State School inspectors and two University staff members to report on "the exact educational value of the College", initiating a change in policy for the institution. (See Chapter 4.)

Under The Dairy Produce Acts Amendment Act of 1911, the Under-Secretary, E. G. E. Scriven, became in addition Chief Inspector of Dairies. The Chief Clerk, the Deputy Chief and the Government Veterinary Surgeons, A. H. Cory, A. McGown, C. L. O'Gorman and G. Tucker, became Veterinary Inspectors. A. E. J. C. K. Graham became Dairy Expert, R. W. Winks became Senior Grading Inspector, J. H. Wilson, C. H. E. Heers and E. J. Harding became Grading Inspectors, and twenty-five dairy inspectors were listed.

The Kairi State Farm was established under Tolmie's administration. The Agricultural Bank Acts Amendment Act of 1911 was assented to on 22 December 1911 and with The Agricultural Bank Acts, 1901 to 1905 became The Agricultural Bank Act (Consolidated) of 1911, to take effect from 1 January 1912. It provided for a full-time managing director of the bank who would also be one of the trustees. The trustees could be paid travelling allowances etc. up to £157 10s 0d per year; they could hold office for two years but were eligible for re-election. The managing director held his office during the pleasure of the Crown. Alterations were made to terms of advances but no advance could exceed twelve shillings in the pound on the value of the holding and improvements. Regulations were extended to include keeping the land free from noxious weeds and plants (particularly prickly pear, Chinee Apple, Noogoora burr and Bathurst burr), keeping fences in repair, keeping all buildings insured, paying all taxes, fulfilling all lease terms etc. Gilson Fox Lesley Foxton was appointed managing director of the Agricultural Bank on 1 January 1912 at a salary of £500 per year. The original trustees Messrs Deshon, McLean and Ruthning resigned on 1 June 1911, but McLean was reappointed on 1 January 1912, along with N. J. W. Nielsen, a new trustee.

The Hon. J. White

John White was born on 9 November 1853 at Dumbarton, Scotland, where he was educated. He gained commercial experience and arrived in Queensland in 1883, partnering G. J. Young in Bundaberg in a merchant firm, which he took over in 1897, and floating the Bundaberg Foundry Company. In 1900 he floated Carricks Limited, a wholesale furniture and sawmilling company. He was a director of the Waterloo Sugar Mill and Bundaberg Insurance Company, chairman of the Bundaberg Harbour Board, and a member of the Chamber of Commerce, the Bundaberg Co-operative Insurance Company and the Bundaberg Mercantile Association. He was Member for Musgrave from 4 April 1903 to 27 August 1904 and from 18 May 1907 to 22 May 1915. He was Secretary for Agriculture and Stock from 1 December 1912 to 1 June 1915. He was a member of the Philpite and Farmers Union. (Waterson, 1972)

White handled The Marsupial Proof Fencing Act Amendment Act of 1913, to include dingoes under the definition of marsupials, to extend the provisions of the Act to all lands held from the Crown and to alter the terms of loans for wire netting and appliances; The Pure Seeds Act of 1913, to regulate the sale of pure seeds for planting or sowing, taking effect from 1 January 1914, and its Amendment Act of 1914 to limit foreign ingredients in seeds; The Sugar Growers Act of 1913, providing for the prompt payment to sugar cane suppliers of a part of the value of the cane; The Sugar Growers Employees Act of 1913, ensuring due administration of The Sugar Growers Act of 1913 by making temporary provision with respect to wages and conditions of employment in the sugar industry until such matters had been dealt with by awards under The Industrial Peace Act of 1913 to prohibit the employment of certain forms of labour in the production of sugar, and for other incidental purposes.

The Meat Supply for Imperial Uses Act of 1914 was assented to on 12 August 1914 and came into force immediately, "administered by the Chief Secretary, commissioning all stock and meat in Queensland to be held for the purposes of and for the disposal of His Majesty's Imperial Government in aid of the supplies for His Majesty's armies in the present war". Prices were fixed by a board of control. White also presented The Fertiliser Act of 1914, to come into operation on 1 January 1915, amending the law relating to the sale of fertilisers under The Fertiliser Act of 1908, which was repealed; The Co-operative Agricultural Production Act of 1914 and The Co-operative Sugar Works Act of 1914 to provide advances to co-operatives in aid of construction, updating the original vote for loans for co-operative agricultural production, operative since 1901; and the Wheat Extension Scheme to make advances for the sowing of the 1915 wheat crop, which resulted in a 50 per cent increase in the area sown to wheat. (*QAJ*, 4 (new series), August 1915, p. 54)

A regional pathology branch for animal research and treatment was established at Oonoonba, Townsville, and opened on 25 April 1914, under the control of G. Tucker, M.R.C.V.S.

The Co-operative Agricultural Production Act of 1914, assented to on 23 December 1914, provided for advances in aid of co-operative enterprises in connection with the manufacture and storage of primary products of agriculture. Any co-operative could make application to the Minister for Agriculture and if approved money was advanced annually,

not exceeding in total more than half the cost of the works and not until half of the capital had been supplied by the shareholders. Advances could be made against work already constructed if approved by both Houses of Parliament. The advance was made against the security of the mortgage. The advance was deemed to be a loan over sixteen years at an interest rate of four per cent per annum, with an initial two-year period of grace and then repayment of interest and capital at the rate of £9 9s 4d per £100 borrowed, payable each year in advance on 1 July.

The Co-operative Sugar Works Act of 1914 was assented to on 23 December 1914 and came into force on 1 January 1915. It was designed to assist the establishment and management of co-operative sugar works. Owners or occupiers of sugar-growing 1 and could apply to the Government for an advance to construct or purchase sugar works. Owners agreed to grow cane and become shareholders. Full particulars and a deposit were required and a valuer had to provide a report in a prescribed format. A company had to be formed and registered. The co-operative could grow cane under The Sugar Cultivation Act of 1913 and employ people under the provisions of The Industrial Peace Act of 1912. The Co-operative could make advances against cane received. The capital cost of the works was deemed a loan for 21 years at an interest rate of four per cent, with two years interest-free and then repayment of principal and interest at £7 12s 4d per £100 advanced on 1 July each year. Profits had to be published in the *Government Gazette* and any deficits would be made up by a levy on shareholders. Each sugar works was to appoint a board of advice, with three members appointed by the Governor-in-Council and two by shareholders.

During his Ministry, John White appointed Frederick Freutel Coleman as expert under and for the purposes of The Pure Seeds Act of 1913. On 17 December 1914 he accepted John Brown's resignation as principal of the Queensland Agricultural College and appointed G. B. Brooks as acting principal.

The Hon. W. Lennon

William Lennon was born in 1849 in Dublin, Ireland, and arrived in Melbourne, where he was educated, in 1854. From 1870 to 1874 he was a clerk in the Victorian Mines Department. In 1874 he became a clerk in the Bank of Australasia and opened the Townsville Branch in 1881, then was transferred to Sydney as a sub-inspector in 1885. He returned to Townsville as manager for Burns Philp in 1886. In 1896 he had his own mercantile firm in Townsville and was a director of the Bank of North Queensland and the Townsville Gas Company. He was a member of the Thuringowa Shire Council and of the Townsville Harbour Board, School of Arts, Grammar School and Chamber of Commerce.

Lennon was Member for Herbert from 18 May 1907 to 21 February 1920, a Member of the Legislative Council from 18 August 1920 to 23 March 1922, Minister for Agriculture and Stock from 1 June 1915 to 9 September 1919 in the Ryan Ministry, Speaker from 9 September 1919 to 9 January 1920, President of the Legislative Council from 18 August 1920 to 23 March 1922, and Lieutenant-Governor of Queensland from 1920 to 1929.

As Minister for Agriculture and Stock Lennon introduced The Diseases in Stock Act of 1915 to consolidate many of the Acts dealing with stock diseases, including The Diseases

in Sheep Act of 1867, The Diseases in Sheep Act of 1867 Amendment Act, The Diseases in Sheep Act of 1867 Further Amendment Act, The Brands Act of 1872, The Brands Act of 1872 Amendment Act, The Diseases in Sheep Act Amendment Act of 1890, The Diseases in Stock Act of 1896, The Diseases in Stock Act Amendment Act of 1898, and The Brands Acts Amendment Act of 1914. It required a person to pass examinations to qualify as a stock inspector. Lennon also introduced The Brands Act of 1915 to consolidate the seven previous Brands Acts and portions of the Diseases in Sheep Acts; The Agricultural Bank Act (Consolidated) Amendment Act of 1915; The Local Cane Prices Boards Confirmation Act of 1915; The Regulation of Sugar Cane Prices Act of 1915, when the Government acquired all the raw sugar from the 1915 crop because of the war and partial failure of the crop; The Brands Act Amendment Act of 1916; The Diseases in Plants Act of 1916 to supersede The Diseases in Plants Act of 1896, which introduced registration of orchards and nurseries; The Fertiliser Act Amendment Act of 1916; The Fruit Cases Act Amendment Act of 1916; The Regulation of Sugar Cane Prices Act Amendment Act of 1917; The Farm Produce Agents Act of 1917, to provide for licensing of farm produce agents at a fee of 20 shillings per year and for a register to be kept; The Dingo and Marsupial Destruction Act of 1918 repealing The Marsupial Boards Act, 1905 to 1910 and transferring all moneys of the Marsupial Funds to the Dingo Fund of the Dingo Board; and The Co-operative Agricultural Production and Advances to Farmers Acts, 1914 to 1919, to extend the provisions to enable advances to be made to farmers for special purposes.

Cleansing areas for tick control were proclaimed at Coolangatta, Helidon, Warwick and Miles.

On 30 June 1915 a Proclamation was made by Sir Pope Alexander Cooper, Chief Justice of the State of Queensland, on behalf of His Excellency Sir Hamilton John Goold-Adams, the Governor, and signed by T. J. Ryan, Premier, declaring that owing to the continued existence of the war and the unexpected partial failure of the sugar crop during the 1915 season, all raw sugar from the 1915 crop of sugarcane then in existence at any mill or other place in Queensland and hereafter during 1915 was to be held for the purposes and be kept for disposal of His Majesty's Government of the State of Queensland, free from all encumbrances, and giving possession of it to the Chief Secretary. Payment for this sugar was to be determined. At the next session of Parliament on 4 August 1915, The Sugar Acquisition Act of 1915, to be administered by the Treasurer, was assented to. This ratified and confirmed the above Proclamation.

The State Produce Agency Act of 1917, assented to on 7 December 1917, permitted the Governor-in-Council to establish, maintain and conduct, in the manner prescribed, at any place or places within the State, a State Produce Agency within and under the Department of Agriculture. The business would include receiving, storing, selling and distributing produce as agent for the producer or owner. From moneys appropriated by Parliament the Minister could establish, provide and maintain cold stores, depots, fruit- and vegetable-canning factories, and grain silos and other buildings and premises for the storage and sale of produce and, under The Public Land Resumption Act of 1906, acquire land for such business. The Minister could make advances out of funds appropriated by Parliament for that purpose, at the prescribed rate of interest, to consignors of produce. Officers could be appointed as necessary under the Act. Strict accounts were to be kept and examined by the Auditor-General and presented to Parliament annually. A fair and

reasonable commission could be charged. Terms of sale were to be cash on delivery. The Auditor-General would make a yearly estimate of profit, which would be distributed as a refund of surplus commission, amongst the consignors of produce in proportion to the amount of commission charged. The Act in no way conferred a monopoly on the State Produce Agency.

Although Lennon, as Minister for Agriculture, was not directly involved in The Discharged Soldiers Settlement Act of 1917 read in conjunction with The Lands Act of 1910, his officers were to be involved in assisting with the implementation of the settlement of returned soldiers.

The new broom brought into the legislative influence in the Department of Agriculture and Stock by Lennon's activities in consolidating the Diseases in Stock Acts, the Brands Act, the Agricultural Bank Act, the Diseases in Plants Act, the Fertiliser Act and the new Sugar, Fruit Cases, Farm Produce and State Produce Agency Acts, coupled with enlistments for active service, retirements and resignations, called for much reorganisation of existing staff and the appointment of new permanent staff and temporary staff to replace those enlisted. Significant appointments made are listed below.

17.6.1915

John Legg, B.V.Sc.(Melb), was appointed Government Veterinary Surgeon and Veterinary Inspector of Livestock and Meat, Stock, Sheep, Slaughterhouses and Dairies.

24.6.1915

Alexander Wynne was appointed Assistant Instructor in Sheep and Wool, on probation, confirmed 24 December 1915.

30.7.1915

Cuthbert Potts, B.A., was appointed Principal of the Queensland Agricultural College.

Arthur Talbot Jefferis, B.Sc., was appointed Science Master and Housemaster, vice W. C. Ellard, Queensland Agricultural College.

8.7.1915

Charles E. Gill, D.V.S., was appointed to be temporary Government Veterinary Surgeon and Veterinary Inspector of Livestock and Meat, Stock, Sheep, Slaughterhouses and Dairies.

John Frederick Bailey was made Director of the Botanic Gardens, also to be Government Botanist.

1.8.1915

Arthur Henry Cory, M.R.C.V.S., Government Veterinary Surgeon, Brisbane, became Chief Inspector of Stock with Veterinary Supervision over the Stock Experiment Station, and Yeerongpilly, also Chief Inspector of Sheep and Slaughterhouses. George Tucker, Government Veterinary Surgeon, Townsville, became Northern Deputy Chief Inspector of Stock and Director, Stock Experiment Station, Townsville, and Northern District Inspector of Sheep and Slaughterhouses.

Harold Cecil Quodling became Director of Agriculture.

Alexander Robert Henry was appointed Secretary of the Central Sugar Cane Prices Board.

17.8.1915

Charles Edward Wood was appointed Working Manager, State Nursery, Kamerunga.

26.8.1915

Atkinson Robert Wilkin became Instructor in Cheesemaking.

Richard Patrick Montfort Short was appointed Registrar of Brands.

1.9.1915

Albert Henry Benson was recalled from Tasmania to be Director of Fruit Culture and S. C. Voller was made Assistant Instructor.

14.10.1915

Arthur Ernest James Charles King Graham was made Chief Dairy Expert.

6.4.1916

Herbert Scott Iliff became Deputy Registrar of Brands, one of some variations made in April 1916 to senior positions under The Diseases in Stock Act of 1915.

3.11.1916

F. F. Coleman was made Inspector under the Pure Seeds Act and Francis Keogh was made Assistant Chemist; both also were made Inspectors under the Fertilisers Act.

12.1.1917

Drummond Macpherson, Manager of Kairi State Farm, was made Northern Instructor in Agriculture and Edward Chaloner Olive, Cream Inspector at Maryborough, replaced him at Kairi.

26.1.1917

Stanley Speer, M.R.C.V.S., was appointed Government Veterinary Surgeon and Veterinary Inspector of Livestock and Meat, Stock, Slaughterhouses and Dairies, on probation.

15.2.1917

John Beard was appointed Poultry Instructor and George Sidney Foreman was appointed Junior Assistant, Chemistry Laboratory, followed by Oliver St John Kent as a Junior Assistant on 21 February 1917.

15.3.1917

Robert Matthew Knight Snell became Instructor in Cheesemaking, vice A. R. Wilkin, resigned.

1.4.1917

Cyril Tenison White was made Acting Government Botanist.

M. Harwood was appointed Poultry Instructor at the Queensland Agricultural College.

21.5.1917

Professor James Franklin Illingworth became Entomologist under The Sugar Experiment Stations Act of 1900.

1.7.1917

Edmund Jarvis was transferred to become Assistant Entomologist, Bureau of Sugar Experiment Stations.

30.11.1917

The Secretary for Agriculture, the Chief Inspector of Stock and George Edward Bunning were appointed to an advisory board under The Diseases in Stock Act of 1915 for the purpose of the better control and eradication of the cattle tick (*Ixodes bovis*) in the State of Queensland.

14.1.1918

Alexander Arsene Girault was appointed Assistant Entomologist, Bureau of Sugar Experiment Stations.

1.2.1918

William Edward Howes was made Manager of the State Produce Agency under The State Produce Agency Act of 1917.

19.9.1918

James Mitchell, William Leslie and William Joseph Ross became Assistant Instructors in Fruit Culture.

7.11.1918

Elliott Henry Gurney was appointed Senior Analyst, Chemistry Laboratory, and St George Thorn was appointed Assistant Bacteriologist, Stock Experiment Station.

5.12.1918

Alfred Wells was made Auctioneer and Traveller with the State Produce Agency.

21.12.1918

Alexander James McKenzie, F.O.V.C., Canada, was appointed Government Veterinary Surgeon and Veterinary Inspector of Livestock, and Meat, Stock, Slaughterhouses and Dairies.

1.1.1919

Frank Joseph Scott Wise (later to become Administrator, Northern Territory) was appointed Field Assistant in Agriculture, Northern Division.

Daniel Jones was appointed Instructor in Cotton Growing for six months.

21.2.1919

Norman Arthur Robert Pollock was appointed Northern Instructor in Agriculture on six months probation, vice D. Macpherson, resigned, confirmed 21.8.1919.

Charles McKeon, Field Assistant (1.5.1918), became Agricultural Assistant under The Pure Seeds Act, 1913 to 14.

26.6.1919

Valentine Stratford Rawson was appointed Assistant Analyst in the Agricultural Chemistry Laboratory and Salvatore Scerri was appointed Assistant Instructor in Fruit Culture.

The Hon. W. N. Gillies

William Neal Gillies was born on 28 October 1868 at Allynbrook, Hunter River, New South Wales, where he was educated at the State School. In 1882 he began farming on the Richmond River, then grew sugarcane at Tweed Heads. He was President of the New South Wales Sugar Growers Defence League. In 1911, with a New South Wales group, he selected land on the Atherton Tableland. In 1925 he was a member of the Queensland Board of Trade and Arbitration, of the Anti Alien League and of the Tintenbar Shire Council.

Gillies was Member for Eacham from April 1918 to 24 October 1925, and Minister without portfolio from 26 April 1918 to 9 September 1919, Minister for Agriculture and Stock from 9 September 1919 to 26 February 1925 in the Theodore Ministry, and Premier, Chief Secretary and Treasurer from 26 February to 22 October 1925.

Shortly after his accession to the Ministry for Agriculture Gillies had The Stock Foods Act of 1919 assented to on 17 November to regulate the sale of stock foods. He was to be involved in a good deal more legislation during his tenure of office. The Stock Foods Act of 1919 was effective from 1 January 1920. It required every wholesale seller of stock foods to submit to the Under-Secretary a fair sample of each product he sold, plus a

specimen copy of the invoice certificate relating to such food, directions for its use and the label to be affixed to the package, showing the trade mark, weight and minimum chemical analyses of crude protein, crude fat and maximum crude fibre, types of grain etc. used. The retailer had to affix his own label also. Regulations also covered hay and chaff. A Departmental officer could inspect, sample and have the material analysed, and penalties were provided for breaches of the Regulations.

New staff appointments made to the end of December 1919 by Gillies included the following:

28.3.1919

William Stewart Hartley, to be Dairy Instructor.

25.9.1919

Leslie Wylde Ball to be Assistant Experimentalist, Roma State Farm.

15.11.1919

Robert Joseph Holdsworth, Assistant under the Pure Seeds Act, and Fritz B. Coleman (on 27 November 1919), later to be Standards Officer.

27.11.1919

Alexander McDonald Armstrong, B.Agr.Sc., Science Master, Queensland Agricultural College, vice A.T. Jefferis, resigned, and Horace Tillott Deighton, Inspector of Stock, Winton, to be Officer-in-Charge, Tick Cleansing Area, Miles.

Many more staff appointments were to be made in the 1920s.

State farms and botanic gardens

State farms

At the end of the Department's first decade only the Westbrook and Hermitage State Farms were in operation.

Westbrook State Farm

Westbrook State Farm continued its general purpose function until the 1903-04 year, when a portion of the farm was excised to provide for a reformatory for boys. The cereal experiments were then transferred to Hermitage and it was decided to confine Westbrook to fruit, vegetables and economic plants, fodder plants, grasses and pedigreed corn (maize). Twenty acres of orchard had been established, with the newly appointed viticulturist, E. H. Rainford, in charge of the vineyard and S. C. Voller caring for the stone and pome fruit and vegetables. Henri Tardent was transferred to become foundation manager of the Biggenden State Farm on 1 August 1898 and H. C. Quodling replaced him at Westbrook until January

1901, when C. A. Ross became manager. James Mitchell succeeded Ross as manager of Westbrook on 20 August 1910.

During 1900-01 some eight tons of grapes from Westbrook's vineyard were sold. Rainford introduced "record boxes" at the vines for visitors' information, illustrating systems of pruning and a series of photographs showing the progress of the treated vines year by year. Pruning demonstrations were given during visits of schoolchildren. During 1903-04 heavy rain affected the grape crop, and in 1904-05 hail damaged the crop. New vines were planted during 1905-06 on the contour (the first soil-erosion protection on the Downs), with rows roughly running east to west. That year the vines were very vigorous and 20 000 cuttings were distributed to growers. During 1909-10 Rainford issued a catalogue of high-class grapes. However, in 1910-11 late frosts ruined the crop.

Westbrook State Farm was closed at the end of the 1911-12 financial year. However, the vineyard section had been a success and many good varieties of Vitis (grapes) were by then scattered throughout Queensland; they had come from Westbrook, which had received the best varieties imported from around the world. The effect of Federation on the wine-making industry in Queensland had been to prevent proper use being made of the first-class wine varieties that were imported, but were it possible to arrive at a balance sheet of the results from the farm through the distribution of vines throughout Queensland, the balance would be largely in favour of Westbrook. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1911-12, p. 4)

The general orchard, of 1176 trees, included 241 varieties of stone and pome fruit. Pruning trials were conducted (one finding was that pruning apricots could delay maturity of the fruit by one week) and trials were made with cyaniding and resin wash for insect control. Fruit fly was a serious problem and experiments were conducted over three years in "dwarfing" fruit trees so that they could be covered with netting against fruit fly attack. No results were finally published.

Westbrook's crop and vegetable section included an extremely wide range of fodder plants, grain crops and vegetables and some pasture species. The farm records mention a crop of 20 tons per acre from Jerusalem artichokes (pigs were turned into this crop to complete the harvest), that a lot of castor oil seed was lost by shattering, a crop of 20 tons per acre from mangel wurzels, and the best crop of swede turnips seen on the Downs.

Paspalum was fairly drought- and frost-resistant, but Toowoomba canary grass (*Phalaris tuberosa*, then *P. commutata*) emerged as the best perennial winter grass on the Downs. It was to become a major temperate species for Australia. *Dolichos lablab* was a remarkably heavy yielder.

Experiments were done in the eradication of prickly pear. A contract was let in November 1898 to clear 200 acres in the creek paddock at a cost of 15s per acre, with the contractor given the option of burning the pear or burying it in holes made by plough and scoop and covering it with two feet of soil (the top of the pear was to be one foot below the surface). This method proved successful and more economical than burning. (Quodling, H. C., *An. Rept Dept Agric.*, 1898-99) Splitting the stem of the pear and poisoning with Dixon's pear exterminator (active constituent not given) was successful, as was singeing the pear, chaffing it and feeding it to cattle.

Fertiliser experiments with wheat and maize were laid out, but results generally were affected by weather rather than by man-made treatments.

At the end of the 1911-12 financial year the Westbrook State Farm was closed and handed over to the reformatory for boys that had been established upon the original area purchased for state farm purposes from the estate of Sir T. Jennings. The original plan had been for general farming with the addition of fruit growing, and at the outset an endeavour was made to make the farm profitable, but when the produce appeared in the markets the farming community voiced objections and the idea was abandoned. Later the encroachment of the Reformatory so reduced the area that could be used profitably that the work was practically confined to viticulture, orchard work and maize growing; in these branches it can be said that good work was done, particularly in the vineyard and in the distribution of maize.

Hermitage State Farm

The foundation manager of Hermitage State Farm, C. Ross, took up duty on 23 June 1897, just before the end of the Department's first decade. In the first year 20 acres were subsoiled, ploughed and planted with fruit trees to test the value of plums, peaches, apricots and pears for drying and canning. Olive trees were planted, a vineyard of table and raisin grapes was established, and 35 acres of stud wheats, oats and barley were sown.

During 1899-1900 J. C. Brünnich, the Agricultural Chemist, analysed 22 samples of soil with a view to establishing fertiliser experiments. Experiments laid down as a result included applications to wheat of gas lime and stone lime, superphosphate, kainit, sulphate of potash and nitrate of soda. However, because of heavy thunderstorms and very severe late frosts on 2, 3 and 4 October 1899 the crops were useless for experimental purposes and barely enough stud wheat seed was saved for continued planting. Of the forty varieties sown, ten showed some frost resistance.

A nomenclature collection of 400 selected wheats and hybrids was sown and only 140 were harvested. Most of Farrar's hybrids survived and 200 new hybrids from Farrar were received to continue planting.

Sixteen varieties of potatoes, twelve of beans, eight of watermelons, seven of rockmelons, six of squash, five of tomatoes, three of cabbage, and five of cauliflower were sown.

Farm exhibits were presented at the Brisbane, Warwick and Allora Shows. Staff and students from the Queensland Agricultural College visited the farm on 12 May 1900, as did agricultural delegates on 8 June, while Ross was manager.

Severe frosts again damaged the wheat and vines on 29 and 30 September 1900.

H. C. Quodling arrived as manager on 1 January 1901, exchanging places with Ross, who moved to Westbrook.

During 1901-02 drought affected all crops. The wheat fertiliser experiments were nullified by drought and black rust, and a late frost on 29 October affected the fruit.

During 1903-04 there was extensive testing of wheat, including testing for bunt resistance of varieties for William Farrar in New South Wales.

A conference of state farm managers was held to determine each farm's area of expertise and to eliminate overlapping. Hermitage was allotted experimental work with crops for home use and selected wheat seed for distribution. Selected seed was to be made available to farmers, chosen by agricultural or farmers' societies, who must return double the quantity of pure seed of each variety from the resulting crops. Amby, Hodgson, Wallumbilla, Pittsworth, and the Northern and Eastern Downs associations cooperated, and a system of inspection was arranged, with some small substations on farms arranged for special tests. In addition, some South Australian wheat, more Farrar's hybrids and some special wheat (Russian Utca, Corn wheat and Hard mediah) from Thos. Kennedy of Allora were sown.

A new direction came with Quodling's decision to sow small plots of native grasses because "the gradual disappearance of some of the most valuable native grasses from continuous stocking in enclosed areas is a matter of national concern".

In the orchard the fruit fly was again bad, and it was decided to grub out the vineyard.

Preparations were made for pens for stud pigs being imported from England, paddocks for a nucleus of sheep from Gindie State Farm and rams from the Queensland Agricultural College to start fat lamb raising experiments, and housing for one breed of poultry.

During the year 1904-05, the wheat fertiliser trial was completed with little response. There was an indication of a slight but insignificant response to potash.

By courtesy of the Scottish Australian Investment Company the Department was able to carry out cereal experiments on Bungeworgorai near Roma and, as a subsidiary to this, trials on the farms of a Mr Fallon at Mitchell and H. P. Molony at Yeulba.

Berkshire pigs from Lord Carnarvon's stud near Glasgow and Middle Yorkshires from the famous Holywell Manor stud in Huntingdon arrived and it was decided that the boars would be available for service locally at a nominal fee.

On 1 January 1905 Alex Martin succeeded Quodling as manager. Quodling became Agricultural Adviser after McLean's retirement.

It was decided during 1905-06 that arrangements would be made to train as farm apprentices ten boys from sixteen to eighteen years of age who, because of their circumstances, were unable to receive the advantage of a college course. The boys were to be apprenticed for three years, receiving nothing for their services for the first year, £1 per month for the second and £2 per month for the third, board and lodging being provided. Accommodation was provided and four apprentices started; by the third and succeeding years their number had increased to ten. The programme continued till the 1912-13 year, when only one apprentice remained.

Fodder crops commanded a good deal of attention and silage was usually made when material was available. Mazzagua (a dry-season maize from northern Nigeria) was introduced and sown on 19 October 1905. It had reached a height of 11 feet by the end of February, with a base 4 2 inches in circumference. Frost affected seed production but the maize yielded 53 tons of green material per acre and 27 tons per acre in 1909-10. It could be stood over in the field.

In 1905, W. B. Slade of Glengallan presented fifty purebred Glengallan stud merino ewes to the Government so that the strain could be retained in absolute purity. The Glengallan flock was founded by John Deucher and had been kept for the previous thirty-five years under Slade's supervision. The ewes were to be kept at Hermitage and Slade would provide rams from time to time.

J. Liverseed replaced Martin as manager on 1 April 1907.

Some milking shorthorn cattle were introduced to provide milk and butter for the apprentices, and Clydesdale mares were bought at the Maryvale dispersal sale for breeding. Yorkshire and Berkshire pigs were in strong demand and a lot of seed wheat was distributed during 1907-08.

During 1909-10 a new piggery, a hayshed, stalls and loose boxes for horses and an implement shed were provided. Several *Phalaris* grasses did well in winter, especially Toowoomba canary grass (now being called *Phalaris nodosa*), which had proved to adapt well to the heavy black soils.

In 1910-11 Sweet grass (*Chloris virgata*) was lauded for its rapid growth and succulence and it was predicted that it would prove a good summer grass for the district. Unfortunately, it was to become a problem weed in lucerne fields later, especially in the Lockyer Valley.

The year 1911-12 was a bad year for farming and there was little feed and stored fodder by the end of June 1912. In July seven samples of wheat from John J. Melville of Clacton-on-Sea, England, were planted. These seeds had been treated by Melville's process to hasten the maturity of the resultant crop, but owing to the bad season no crop was obtained. This failure led to moves to close the farm after the 1912 harvest. Another bad year followed in 1912-13 and the programme was confined to pure seed production. Growers were beginning to buy seed from seedsmen instead of from Hermitage. Mazzagua was still showing its drought-resistant properties and yielded 16 tons per acre with inter-row cultivation.

In the 1913-14 annual report, the Under-Secretary, Scriven, said the farm would concentrate on wheat breeding and crossbred lambs, hoping the Killarney Valley farmers would take up the latter. The lesson learnt in wheat growing that year was the value of systematic cultivation for the conservation of moisture in the period between the removal of one crop and the sowing of the next.

The 1914-15 year was so dry that the cattle herd was mostly disposed of. Feed had to be obtained from the Queensland Agricultural College and the few cattle remaining were fed chaffed prickly pear with a little wheaten chaff mixed in it. The manager said: "I cannot

recommend this class of feeding though they have survived the past three months on it and still appear healthy!" Pigs were in poor demand owing to the high price of grain. Prickly pear feeding was continued as the drought extended into 1916, and 50 ewes and ten lambs were sent to take part in prickly pear feeding experiments at Wallumbilla. Crossbred lambs sold well at the Enoggera Saleyards.

The closure of Hermitage was held in abeyance and cropping continued with the minimum of expenses. The 1917-18 wheat crop failed, owing to the late season and rust, but Sudan grass and sorghum did well. A lot of Hermitage-raised seed was sold and fat lambs were marketed in late 1917. Drought struck again in 1918-19: although sorghum crops yielded well and fat lambs were sold, consideration was given to leasing the farm to the Commonwealth Government for a term of years for use as a recuperation centre for returned soldiers. The drought did not break until 1920, in early winter. Lambs and ewes fed off failed crops and lambs were sold at Newmarket. Sheep continued to do well, and with a return to a good season in 1921-22 a large number of wheat, barley and oats varieties were tested. Seed was distributed for co-operative testing of 130 crossbred wheats for rust resistance.

Biggenden State Farm

Biggenden State Farm was established in 1898 in the Burnett district, close to the Biggenden township and railway station on the Murgon — Gayndah railway line. It was a small farm, initially 83 acres of dark basaltic soil, with some heavy clay, but during 1907-08 another 120 acres were purchased. The farm was established to test crops that might be suitable for this newly settled district, part of the original Degilbo run.

On 1 August 1898 Henri Tardent was transferred from Westbrook State Farm to be Biggenden's foundation manager.

One acre of experimental vineyard, four acres of experimental orchard containing 200 trees, and various crops and grasses totalling 17 acres were planted, some 400 species in all. (*QAJ*, December 1900, p. 485) E. H. Rainford, the Viticulturist, planted and directed the vineyard, while S. C. Voller planned the orchard. The aims of the farm were to improve crops by seed selection, cultivation and introduction of fodders and roots for dairying and pig raising, grasses, sweet potato improvement and cotton growing.

On 1 May 1901 G. B. Brooks was transferred from Kamerunga to become manager. On 1 October 1904 he became farm foreman at the Queensland Agricultural College and Drummond Macpherson succeeded him at Biggenden.

It was soon obvious that the farm was not of sufficient area to take a lead in a dairying district, but pigs, dairy cattle, turkeys and fowls were obtained to provide a pool of livestock for sale to the new local dairymen. Grape cuttings were also in high demand.

Provision was made for apprentices (improvers) to be trained and a small dairy was started with the purchase of the additional 120 acres. Fodder crops for grazing, hay and ensilage and root crops such as mangel wurzels became important resources for the dairymen. Demonstrations were aimed at increasing their use in the district and show exhibits supplemented these efforts. A rotation of maize, sorghum, cowpeas, wheat, mangel wurzels and field peas was set in train.

However, the farm was too small for experimental work of any scale and there were soil problems. It closed at the end of the financial year on 30 June 1912, having fulfilled some of its aims as a leader in an entirely new agricultural area.

Gindie State Farm

Gindie State Farm was established on 12 February 1898 with Alexander Watt, a farmer and sugar planter from the Logan district, as manager. It comprised an area of 8611 acres of the resumed half of Fernlees Station on the Emerald-Springsure branch railway line. Mainly black soil downs of basaltic origin, the farm was watered by the Nogoa River, Mosquito and Gindie Creeks and other creeks and lagoons, and wells provided small water supplies.

This farm was to give special attention to wheat growing and other branches of general farming and the Under-Secretary, McLean, declared that it would give a great impetus to the settlement of an agricultural community in central Queensland.

I look forward with confidence to the future operations of this farm, and it will be the aim and endeavour of the Department to show, by a proper system of cultivation, that the dry spells said to prevail in the Central district are not so inimical to successful farming operations as many people at the present time think. Similar difficulties have been surmounted in other countries, and I can see no reason why like effects should not prevail here (McLean, P., *An. Rept Dept Agric.*, 1897-98)

After attending the 1898 Pastoral and Agricultural Conference at Rockhampton, the Hon. J. V. Chataway (Minister for Agriculture), P. McLean, and Mr Lamb, a delegate from Warwick and a prominent Darling Downs wheat farmer, inspected the farm. All expressed the opinion that it could be demonstrated that wheat would be satisfactorily and profitably grown in central Queensland. (*QAJ*, 1898, p. 451)

The first manager of the farm, Robert Jarrott from Laidley, was appointed on 5 August 1898. His first annual report gave a strong hint of the problems caused by weather in this marginal area. A little over 4 ha of maize planted in September, 2.4 ha of panicum planted in October and 1.2 ha of cowpeas all failed because of lack of rain. Three later sowings of maize, however, gave a fair crop, and some of it was sold for seed. Some other crops performed well.

Nine varieties of millet were planted in October, all of which did well. The amber cane and broom millet were exceedingly fine crops. The seeds of these millets were saved for the next season's operations.

A trial crop of 7 acres of lucerne was sown on 10 February but did not come up until 2 March, at which time there was a sufficient fall of rain to germinate the seed. After it was well up it made remarkable growth and on 22 April a cutting of about five tons was taken off, which was considered very satisfactory.

Sowing of wheat began on 15 March and continued at intervals as weather permitted until June. The 63 acres of wheat and barley planted included 23 varieties of stud wheat. In his first report, Jarrott wrote that the wheat was looking as well as possible, especially about 300 acres of the earlier plots that were drilled in.

In his second annual report, for 1899-1900, Jarrott could report better results. Some 1.18 tons of maize grain were harvested, despite the depredations of caterpillars (probably *Heliothis armigera*) at the silking stage; three good cuttings of lucerne hay were made, though on the shallow soils there was little growth in the hot months; just over 8 tons of panicum hay were made; 0.2 ha of swede turnips and 5 tons of pumpkins were produced and sold; and over a hectare of cowpeas were made into hay, which demonstrated the drought tolerance of this crop at the time. Twenty-four hectares of wheat yielded 25.5 tons of grain, although some lodged in a heavy wind storm, and 1.5 ha each of malting barley and Canadian field peas did well. However, 12 ha of maize sown in December 1899 failed to germinate. Four hectares were planted to fruit trees and three hectares were prepared for a vineyard which was planted in the following year. (*An. Rept Dept Agric.*, 1899-1900)

By the time Jarrott wrote his third report (1900-01), the hints of 1898 were a reality. Crops of wheat, oats, barley, rye and field peas failed for grain, although some were cut for hay and some were grazed. The next year, 1901-02, was worse: only 225 mm of rain were recorded. All crops failed, the remaining vines were transferred to the Westbrook State Farm, and the only produce consisted of beautiful vegetables irrigated from the farm homestead well. The drought continued into 1903: all the cattle and farm horses were sent to the Dee River for agistment and the sheep were sold. A few showers gave some growth to maize and setaria, which were cut for fodder. Some hope for the wheat crop was entertained but the drought took its toll. Rain in September 1903 allowed some broom millet, sorghum and maize to be planted. Some broom millet brush was marketed and a small stack of silage was built from the maize. A small area of cotton did not bloom, and grasshoppers destroyed a later sowing of maize and cowpeas. Some 23 ha of new season's wheat and 0.5 ha of oats were sown on very wet land on 1 May 1904, but because of low winter rain these were cut for hay, which proved to be a lucky event as a mouse plague in October devastated the country. In late 1904 maize, cotton, castor beans, broom corn, sorghum and cowpeas were planted. The cotton germination was poor, but the plants that grew carried a heavy crop of bolls, although bollworms played havoc with them. Dry hot weather affected the castor beans, maize, broom corn and sorghum, and another grasshopper plague annihilated the castor beans but did not touch the cowpeas. (Jarrott, R., Rep. Dep. Agric. Stk, 1904-05, pp. 56-58)

Thus in its first seven years, Gindie State Farm suffered extreme drought, heatwaves, grasshopper and mice plagues, bollworm attack on the cotton and, mentioned several times in the annual reports, weed trouble, especially with Fat hen (*Chenopodium album*). There was only one favourable season.

Although the farm was in operation from 1898 to 1932, there is little need for a full record of cropping. Although the annual reports were not very detailed in some years, the following facts emerged:

Wheat growing for hay was successful on well-prepared fallowed land at least two out of every three years.

Maize growing for grain was hazardous, but for ensilage was successful one year in every two.

Sorghum growing, when tried, was successful two years out of every three, the sorghum being used mostly for silage.

Cowpeas were useful for fodder and hay, and showed some drought tolerance.

The performance of cotton was uneven, and bollworms affected the few crops grown.

Dryland lucerne was successful only occasionally, but it was found that irrigation of a small area for stud stock feeding was worthwhile.

Barley and oats performed similarly to wheat, but the oats crop was not successful for grain; both crops were used for green feed or hay.

Severe droughts, as well as short dry periods, seriously interfered with farm performance, and conservation of fodder (as hay or silage) proved a sound venture.

Grasshopper plagues occurred frequently. In one period (from 1903 to 1915) attacks occurred in eight out of the twelve years with six consecutive yearly occurrences.

Mice plagues occurred irregularly, two being recorded in the thirty-five years of records.

Corn earworm (*Heliothis armigera*) was occasionally a problem in maize, and ladybirds on pumpkins were severe.

Weeds, especially Fat hen *(Chenopodium album)*, were often troublesome. Heatwaves seriously affected crop establishment and the early stages of growth.

The loose self-mulching soils of the open downs were hard to consolidate in the preparation of a seedbed.

The Gindie State Farm was closed in 1932, along with several other State enterprises, by the Moore Government. The State was in the throes of the Great Depression, and cultivation in remote areas was difficult. The farm had recently moved more towards stud livestock and there was competition from private breeders for the market.

The Gindie Farm demonstrated in a small way that, given adequate rainfall, a wide variety of crops could be grown on the fertile black soils of the Central Highlands. It demonstrated the sound integration of cropping with livestock, and the need for the conservation of fodder (as hay and silage) to cope with the inevitable droughts. The physical and biological hazards of cropping were also apparent: the difficulty of seedbed preparation in the loose, self-mulching soils, the need for moisture conservation and the necessity to plant while soil moisture was sufficient to ensure germination. The problem of heatwaves was highlighted, and the irregular, but certain invasions of corn earworm, bollworm and ladybirds on susceptible crops and the devastation caused by plagues of grasshoppers and mice became all too clear. The use of horsepower limited the area that could be handled and slowed land preparation and planting; these problems have since been largely overcome by mechanisation. (Skerman, P. J., "Cultivation in Western Queensland", *North Australia Research Bulletin*, No. 2, 1978, pp. 14-23)

Gindie State Farm carried livestock from the outset. A small dairy herd of Ayrshires and milking shorthorns supplied cream to the Capella Butter Factory during 1905-6; some merino sheep and beef shorthorn cattle were kept; and in 1907 some Berkshire sows were procured in pig and the boars from the litters were distributed. Crossbred lambs were sold locally, but they were too heavy to be classed as commercial fat lambs and it was thought that the rainfall was too unreliable to undertake commercial production.

Horses were needed for cultivation and to ride. On 30 June 1908 the livestock on hand included 1055 sheep (and lambs), 306 cattle, 21 pigs, 17 horses, 40 bronzewing turkeys and 25 fowls. Gradually, it was found that keeping stud beef shorthorns, stud animals would be the best procedure to follow for Gindie. Stud beef shorthorns were brought from the "Belltrees" stud in New South Wales and bulls were imported from overseas. Suffolk Punch stallions and mares were imported from England, and stud sheep from Nalpa in South Australia and some of Wanganella blood from New South Wales. The surplus were sold locally for breeding and commercial stock were sold for slaughter. However, the 1916 drought was so severe that the horses, cattle and sheep had to be sent away to agistment.

In 1909-10 ticks appeared in large numbers and during 1910-11 Redwater killed a lot of cattle, including the two stud shorthorn bulls, which had to be replaced, and the best of the bullocks. A dip and yards had to be erected, and inoculation against tick fever was introduced.

In the same year sheep blowflies were troublesome and the sheep were dressed with Stockholm tar thinned with oil, turpentine or kerosene. This outbreak led to the appointment of an instructor in sheep and wool, W. G. Brown. He was stationed at Emerald to handle central Queensland and began experiments on blowfly control at Gindie State Farm in 1913. In 1916 he decided that trapping flies would be a useful adjunct to dipping sheep, and the Healy, Higgins and Destruo fly traps were distributed, Brown preferring the Destruo. The Gindie sheep were kept free from fly by dipping and trapping, but the neighbours' sheep were infested and there was a general dearth of interest on the part of the graziers.

Robert Jarrott retired on 13 June 1914 and was succeeded as manager of Gindie State Farm by H. P. Burnage.

Roma State Farm

During 1904 H. C. Quodling, then manager of Hermitage State Farm at Warwick, carried out some cereal growing experiments in the Maranoa. The results were promising and in 1905, by courtesy of the Scottish Australian Investment Company, the Department, represented by Quodling, who was now Agricultural Adviser, was able to carry out extensive experiments in the cultivation of cereals at Bungeworgorai, near Roma, on Mount Abundance Station.

General farming had begun in the Roma district, including wheat growing, and although the climatic conditions were erratic grain quality was good. It was believed that the district could become one of the granaries of Queensland but experimental work was needed to confirm this. Consequently, in January 1906 the Department took control of the "Police Paddock", which at the time was overrun with prickly pear and other weeds, as an experimental area. Richard Ernest Soutter, a foundation student at Gatton College in 1897, was appointed manager at Bungeworgorai. He was the son of William Soutter, who had been manager of the Queensland Acclimatisation Society's gardens and, in 1898, Inspector of State Farms. Richard Soutter commenced his public service career at the Westbrook State Farm. He was to become Queensland's greatest wheat breeder before he retired from the Department in 1948.

In the first year 100 acres were stumped and cleared and planted with grain but rust destroyed about 75 per cent of the crop. A vineyard and an orchard of stone fruit were planted and in the following year some 20 olive trees (of five varieties) were obtained from South Australia.

Some of the farm had a sandy loam surface soil with a very hard clay subsoil and the typical vegetation was a woodland of box (*Eucalpytus populnea*), a shallow but extensive lateral rooter. Soutter soon found, as many a farmer has since, that the trees robbed the adjacent crop of moisture and sought permission to ringbark them. Another day of truth arrived when parrots and cockatoos attacked the ripening maize. Soutter planted Kaffir corn (sorghum) beside the maize, which successfully lured the parrots but not the cockatoos away from the maize. The usual summer crops of sorghum, maize, pumpkins, melons, millets, cowpeas and cotton were planted, as well as some introduced and native grasses including *Astrebla elymoides* (Curly or Weeping Mitchell grass), which yielded 31 tons per acre of green material (1 ton per acre of hay). "This is one of the best Western grasses and owing to the amount of grain produced by it in some districts the depasturing of horses on it by `grassfed' horses for race meetings is prohibited." (Soutter, R.E., *Rep. Dep. Agric. Stk*, 1907-08)

An Ayrshire dairy herd was started in 1908.

Professor Campbell's method of scientific soil culture fallowing was tested from 1907 to 1909, but it proved unsuitable for the soils of this farm, owing to the high loss of soil from erosion during the summer months. It was, however, to prove vital in other wheat-growing areas with heavy black soil.

Special emphasis was placed on hybridising wheats. The current "Fife" wheats matured too late for the Roma area, the hard "Durum" wheats did not yield well and the beards (awns) were a problem. Soutter decided that a suitable variety would have either a short straw or a medium-long straw with very little flag, which would mature quickly. The shorter-strawed varieties would probably be preferable as they would require less moisture, have less surface evaporation (transpiration), would resist wind better and hence would shed less grain, and would be less likely to be flattened by storms; above all, they would have rust resistance. Soutter set about breeding a selection of wheats and distributed seed to widely separated areas. By 1910 he was able to say that of the five best varieties for the district, three had emanated from the state farm, and the average local yields had doubled.

The problem of black oats as a weed in wheat manifested itself in 1910. Birds often caused damage to grapes and fruit as well as to the maize. The 1911-12 year was a dry one, and cattle had to be sent to agistment at the rate of 4d per head per week, horses were in bad shape and there was little demand for pigs, which survived by eating watermelons and pie

melons. However, Rhodes grass and Gama grass (*Tripsacum dactyloides*) survived the dry weather well. In 1913 the Under-Secretary reported that the dairying and pig-raising enterprises were attracting little interest locally and that stud cattle and pigs had to be sold outside the district. Only one stud bull was sold during 1913-14, and the following year some of the cattle were sent to the Queensland Agricultural College and the pigs were all disposed of.

The farm then concentrated on wheat breeding, testing and distributing, as well as having some interest in grapes, lemons and olives. Selection work was started on Sudan grass and cowpeas, both hardy crops, the former for grazing, the latter for hay and green manure in a rotation. The 1913 wheat yield increases were the result of the previous cowpea crop.

In June 1914 Scriven was able to write:

The valuable and important work at the State Farm, Roma, having for its object the improvement and acclimatisation of wheat for cultivation and the production of new varieties by breeding is necessarily of long duration...but the work already accomplished by Mr.R. E. Soutter is slowly but surely being recognised by the farming community who are manifesting a decidedly better opinion of what they can learn here and finding that it is possible for someone other than themselves to know more of the subject than they do.

The lesson of the year was entirely in favour of systematic cultivation for the conservation of moisture during the period between the removal of one crop and the sowing of the next.

In 1914 the olive trees were coming into bearing and Scriven felt that steps would soon have to be taken to express oil for marketing.

The year 1915-16 was a drought year and all crops failed. Soutter stressed the need to conserve wheat straw and "cocky chaff" (the chaff blown from the seed head on threshing) for drought feeding.

On the breaking of the drought a large amount of seed wheat was distributed. The early wheats were proving the best as they escaped rust and the bleaching associated with summer storms at harvest. The Agricultural Instructor, A. E. Gibson, began wheat experiments throughout the various wheat districts during 1916-17 using the "ear to row" technique. Roma-bred wheats continued to dominate Queensland sowings well into the twentieth century.

Progress had also been made in producing a low-prussic-acid variety of Sudan grass, in fixing the types of cowpea and in breeding grapes. During the early 1920s milling tests on Soutter's wheat by the Agricultural Chemist, J. C. Brünnich, revealed their excellent milling qualities and the Queensland Wheat Board cooperated to ensure purity of types.

Warren State Farm

Accompanied by the Agricultural Inspector (H. C. Quodling), Thomas Jones arrived at Warren on 1 November 1907 to take over the state farm as manager and pitched a tent for himself and his wife. The farm was selected in mostly box tree (*Eucalyptus populnea*) country near Neerkol Creek, west of Rockhampton, and was intended to service both people farming such country and those in the newly opened brigalow scrub country around

Kalapa, Etna Creek and elsewhere. The Under-Secretary noted in 1914 that the holders of the forest country still depended upon grazing and raising livestock, although their land was capable of producing all crops suited to that locality.

The farm was set up mainly as a dairying and pig-raising venture and a horse-breeding establishment as mechanised agriculture was still many years away. A Clydesdale stud was one of the first established, along with Ayrshire cattle by the end of 1908.

The manager's house, men's quarters, stables (chaff room and seven stalls), implement shed, dip, milking shed and concrete silo and blacksmith's shop were erected during the 1908-09 financial year. Pigs were introduced and fodder and vegetable crops were grown. During 1909-10 pig and calf pens were erected. All the livestock sections provided prize winners at local shows and there was a demand for purebred stock and the service of the Clydesdale stallion. The manager, Jones, judged at many shows. Rhodes grass had been introduced to the scrub lands and was proving an excellent grass, while Para grass did well in the swamps and on the edges of lagoons around Rockhampton. In 1910-11 a special train from Mt Morgan brought 120 visitors and land prices had increased from £3 to £9 an acre since the establishment of the farm.

There was particular emphasis at Warren on forage crops for hay and silage, especially sorghum and millets, but it was difficult to persuade local farmers to adopt fodder conservation. The farm was not allowed to enter the market in competition with the local farmers, "which is a pity as such publicity should encourage farmers to visit the farm and learn". (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1912-13)

Jones visited Europe on a stock-buying mission during 1913-14, leaving R. B. Tennant in charge, and returned on 14 August 1914.

Sudan grass and Rhodes grass proved the best of the forage grasses. By 1915 Jones had decided that dairying was not suited to the area as the farmers were struggling to pay adequate prices for stud stock, and recommended switching to dual-purpose Shorthorns. He found the farm was unsuitably placed and few visitors attended. Jones was transferred to be manager of the Westbrook Reformatory under the Home Secretary's Department during 1916-17 and H. C. Quodling took over the supervision of Warren State Farm, with H. C. Colledge locally working it. He decided to concentrate on the breeding of stud Ayrshire cattle and Berkshire pigs for distribution. A new feeding shed and dairy were built and the Ayrshires were subjected to the Advanced Register test. In 1920 Quodling stated: "It is quite evident in this district that grain sorghums are destined to play a very important part in cropping arrangements when grain is required for feeding horses, cattle, pigs and poultry." (*Rep. Dep. Agric. Stk*, 1919-20, p. 57) This statement proved prophetic for central west Queensland.

During 1919-20, Quodling wrote: "Attention was paid to prickly pear destruction by means of an improved pear poison (Roberts) distributed with an atomiser. This system is most effective so far, and a distinct advance on any method previously tried." The poison was a mixture of arsenic pentoxide and concentrated sulphuric acid and was devastating also on clothes. It was to be the most effective treatment for scattered and approachable pear until the advent of the *Cactoblastis cactorum* caterpillar in the mid 1920s.

In April 1920 W. H. Bechtel was appointed manager of the farm in place of Colledge, who resumed dairy inspection at Gayndah. Unfortunately Bechtel was badly gored by a bull, which left him permanently lame.

Kairi State Farm

Drummond Macpherson took over the managership of Kairi State Farm on 1 November 1911 after managing the Biggenden State Farm for some years. Kairi was set up to provide for the instruction of new settlers in dairying and pig raising in the wet tropical rainforest areas of the Atherton Tableland. It followed the general pattern of the earlier state farms, initially growing several crops and generally concentrating on dairying and pig raising to give a lead in a new district, so the farm buildings consisted of the manager's house, men's quarters, dairy, pigsties and dip. The farm was laid out as a model design for local dairymen to copy, even if less expensive buildings were intended.

Macpherson found fifty acres of rainforest already felled and burnt. Initially a lot of Rhodes grass was sown on the new burn ahead of stumping, and by June 1914 some 342 acres of rainforest had been felled and burnt. Of this 226 acres were sown to Rhodes grass, which was ousting paspalum in favour with dairymen. The Rhodes grass was stocked with bullocks pending the establishment of a stud dairy herd of Jerseys and Ayrshires purchased in Australia and Guernseys and Holsteins from England. A Suffolk Punch stallion was also located on the farm. Pigs were obtained from the Queensland Agricultural College.

Maize was initially hand-planted between the stumps with a walking stick planter, and a small nursery of sugarcane was established. By June 1915, some 400 acres had been cleared, of which 330 acres were grassed.

The 1915-16 year saw no wet season and several cattle died as a result of eating the beans of the Moreton Bay chestnut tree.

All state farms came under the supervision of H. C. Quodling, Director of Agriculture, in 1916. The Under-Secretary observed that it was to be regretted that the rich scrub (rainforest) lands had been selected for the farm, because the real work of education on the Tableland was in the forest land, which "from a State point of view, should be made valuable to the degree that it will entice settlers who will make use of such land and devote it to agriculture instead of using it as it is now mostly used, for the purpose of grazing". (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1916-17) (This was to come later, under tobacco, peanuts and rice.)

During the 1917-18 year 350 acres were brushed and sown to paspalum. Twin reinforced silos were erected and filled with green fodder, including 40 tons of sugarcane the first ensilage of this crop in Queensland.

A serious occurrence was the invasion of swine fever; all the pigs and buildings were destroyed and new pens were built.

During 1913-14 a co-operative dairy factory was established at Atherton and during 1919-20 preparations were made for a new bacon factory at Biboohra (Mareeba). The state

farm dairy cattle were yielding well and were submitted to the herd-testing scheme. Some twenty-two milking shorthorn heifers and two bulls were purchased from the famous Darbalara stud in New South Wales.

A soldier-settlement area was created in the locality and about 500 acres were resumed to provide for additional soldiers' blocks during the 1920-21 year.

Kikuyu grass imported from Rhodesia was showing great promise on the rich volcanic scrub soils and Quodling predicted in 1921 that it would prove an acquisition to stock owners on the Tableland.

Kamerunga State Nursery

With the transfer of the Mackay State Nursery to become a sugar experiment station, the Kamerunga State Nursery became the sole source of tropical crops and pastures. It continued to import and test varieties of tropical plants and to distribute material widely, both within Australia (mostly in Queensland) and overseas. The nursery was also called upon to prepare non-competitive exhibits for agricultural shows and to provide material for the Agent-General in London to show what Queensland could produce.

Ebenezer Cowley, Kamerunga's foundation manager, died suddenly on 8 February 1899 and was succeeded by Howard Newport, the recently appointed instructor in coffee culture. On 25 June 1899 G. B. Brooks was transferred from the Mackay State Nursery to Kamerunga as overseer.

These two officers prepared a comprehensive exhibit of material from Kamerunga for the Townsville Show in 1900 and both were in attendance to explain the exhibits. Newport explained that the nursery was intended primarily for experiments in the cultivation of economic products with a view to ascertaining the species most suitable for the colony's soil and climate. The editor of the *Queensland Agricultural Journal* wrote: "Judging by the contents of the nicely arranged stall, the Cairns Nursery is likely to prove of decided benefit to North Queensland." The exhibit included plants in their natural state, next to products made from them. Ten different fibres, forty-three varieties of sugarcane, five varieties of rubber and the fodder tree Algaroba bean attracted a good deal of attention.

The heavy demand for show exhibits occupied an inordinate amount of time in preparation, transport and supervision, as did the collection and despatch of requested plants, nature studies in schools and the entertainment of visitors, correspondence and meteorological records.

The Farmers Conference in Cairns in May 1905 resolved:

That this conference is deeply thankful to Mr. Newport for his inestimable paper on "Auxiliary Tropical Products" which clearly proves the justification of the establishment of the institution which he so ably manages and the conference also trusts that the Government may extend such institutions wherever it may deem it necessary.

However, by 1909 the Under-Secretary, E. G. E. Scriven, was to suggest that although the nursery was unique in Queensland either the staff would have to be increased or the work reduced to staff capacity.

While the nursery continued to receive selective introductions, it concentrated on two major crops, coffee and rubber, which are dealt with separately. It still continued to grow the wide range of crops mentioned in Chapter 2, with a little more attention to vanilla when a plot of five acres was fenced in to make a new vanillery in 1911. There was much pilfering of vanilla as a result.

In 1914 the Under-Secretary revealed that although the nursery area was large, there was insufficient land for expansion. The nursery was situated in a district where the principal interest was sugar and farmers had little interest in tropical crops, the nursery was in the wrong place. However, Scriven said closure would require serious consideration as so many valuable trees and other material existed there and it would be expensive to replace them.

In 1914 Newport was placed in charge of the Botanic Gardens at Rabaul by the Commonwealth Government. C. E. Woods took over at Kamerunga, but was to leave shortly as he had been appointed Instructor in Tropical Agriculture to the Tongan Government.

Demonstration plots were established on outside farms, probably to preserve some material: a one-acre vanilla plot on Dr Reid's farm at Babinda, 950 coconuts planted at the Townsville Stock Experiment Station by Newport, an experimental banana plot on "Rylesmere", C. J. Hudson's farm at Smithfield, and a small banana experimental plot at Upper Trebonne School near Ingham, under the supervision of R. G. Wilson, headmaster.

At this time, Mr Matzat at Rock Point intended to produce copra from his coconut palms and Joseph Campbell, Kamma, sold cottonseed cake to Messrs Kitchen and Sons for soapmaking.

A. H. Benson (formerly Instructor in Fruit Culture, from 1896 to 1910) returned to the Department in 1916 and in conjunction with the northern Instructor in Fruit Culture, G. Williams, inspected Kamerunga. After some cleaning up, they left the property in the hands of a caretaker. They declared its site unsuitable and said that any future nursery might well be established at the Aboriginals Branch of the Home Secretary's Department at the Hull River Settlement. The caretaker was planting coconuts, and caring for mangoes and ornamental palms.

Botanic gardens

During 1900-01 a new bandstand and an aviary were built in the Brisbane Botanic Gardens by the Works Department and instrumental promenade concerts were held on Saturday afternoons, the band being provided by the Municipal Council. The average public attendance was 3000 people.

Labour problems developed. When Philip MacMahon took over the Gardens in 1889, the institution was managed by a board of seven trustees, with a head gardener and an overseer. In 1901 MacMahon handled the whole organisation. He used casual unemployed labourers but these were taken for prickly pear eradication, and MacMahon suggested that the birds and animals should be disposed of.

In 1905 MacMahon compiled *Commercial Timbers of Queensland*, making special reference to timbers suitable for railway sleepers and bridge work, for the information of those with whom Queensland might do business. The heads of the railway systems of the different countries were presented with copies, together with the names and addresses of timber firms dealing in railway requirements. Soon after, MacMahon was transferred to the Lands Department as Director of Forestry. He was succeeded in the Gardens as Director on 2 November 1905 by J. F. Bailey, under the title Director, Botanic Gardens and Government Domain, at a salary of $\pounds 225$ per year.

Bailey was replaced on 21 November 1905 by Cyril Tenison White (grandson of F. M. Bailey), at the salary of £26 per year. A year later White's classification was changed, to Pupil Assistant to the Botanist, at £90 per year. On 1 July 1911, under the same title, his remuneration was £100 per year.

E. W. Bick became head gardener at Government House (Fernberg) in place of B. Ivor, who resigned to start a nursery.

Since 1898 Bailey had given weekly botany lectures and taken students on excursions at the Queensland Agricultural College. He also laid down a flower garden in the north-west corner known as the Queen's Gardens (later moved to its present site at the western end of the William, Elizabeth and George Streets block). The gardens were open at all times, even at night, and no interference with plants resulted. Bailey suggested all the Departmentally supervised gardens, such as Musgrave Park, Queen's Gardens, Maryborough etc., be opened at night under adequate lighting. The Brisbane gardens were opened and lit at night from 8 August to 7 May. Many plants were distributed and advice was given on street planting at Warwick and Sandgate in 1908.

A river wall was constructed, band concerts were promoted and native companions and carpet snakes were added to the zoological collection; new economic plants — cocoa, Brazil nut, cassava, Kola nut, hybrid cotton and rubber were added to the collection. The domain under the Director's care was used by University students for football and cricket, but with the children's playground added, there was not enough room.

In 1913 E. W. Bick was transferred to the head office staff as Botanical Collector. He became Director in 1916, when J. F. Bailey was appointed Director of the Adelaide Gardens.

Before Bailey left he received from British Guiana some Tonquin beans (*Dipteryx* odorata) and distributed them to growers in north Queensland. There was a ready demand for the beans, which were used extensively for flavouring tobacco. (*Rep. Dep. Agric. Stk*, 1914-15, pp. 133-134)

In 1916 dredging operations by the Harbours and Rivers Department excised several acres from the Gardens. With this went some fine weeping fig trees and bunya pines, the latter planted by Walter Hill, the first curator, in 1856.

One of Bick's early jobs was to accompany C. T. White to Roma and Woolgar to investigate stock poisoning. Notes on the Wax flower (*Hoya australis*) and the Heartleaf

Poison bush (*Gastrolobium grandiflorum*) were published in "Notes by the Government Botanist, No. 1".

During 1919-20 a Caladium rockery was extended in the bushhouse; the riverbank slope was grassed with Couch grass; a line of Washingtonia and Phoenix palms was planted at the base of the bank from the ferry at the Domain to the baths at the Edward Street entrance; a circle of Royal palms was added and Erythrina trees were planted along the Alice Street boundary. Bick also visited Adelaide, Ballarat, Geelong, Melbourne and Sydney Gardens to obtain new material.

Government (Colonial) Botanist

In April 1898 F. M. Bailey was invited to accompany His Excellency the Governor, Lord Lamington, and his party to New Guinea where he made observations on the local flora and prepared a list of additional fungi and blights. From this visit he was able to compile a publication entitled *Flora of Queensland and New Guinea* and he also published *Bulletin* XV, Algae. He was also consulted frequently about plants, and added specimens to the Museum.

In 1899 Bailey visited the Darling Downs for an exhibit to be presented at the Exhibition at Earl's Court, London, and prepared a catalogue of indigenous weeds to be printed in London for this exhibition. In company with Mr Quinnell he checked poisonous plants at Nerang. Later at Springsure, his son and assistant, J. F. Bailey, made a survey to detect poisonous plants. J. F. Bailey also undertook a trip to the Gulf of Carpentaria on a special collecting trip during the year 1900-01.

At Federation Queensland was no longer a Colony and the title "Government Botanist" was conferred on F. M. Bailey.

Bailey kept a careful watch for new weeds and poisonous plants and in 1901 reported "another weed which has made its first appearance in the vicinity of Brisbane during the year will, should it obtain a footing on the Darling Downs, prove a troublesome pest". This was prophetic, as the new weed was Climbing Buckwheat (*Polygonum convolvulus*), a current Downs pest.

In December 1902 the sixth and final volume of the *Queensland Flora* was completed and issued. F. M. Bailey wrote of it that he had "received very flattering notices in botanical publications and by fellow botanists both within and beyond the Commonwealth". He also wrote: "I have kept the expenses of the library down to the sum (£10) which was allowed for carrying on periodicals, a sum altogether too small for the work. When first appointed £50 per annum was allowed...and I trust that a like sum may soon be again allowed for carrying on this much needed work."

In 1903, the Museum as a sub-Department was transferred from the Department of Public Instruction to the Department of Agriculture and Stock. By June 1904 a collection of over 600 native timbers was held with a plank book-block and veneer of each one in the Museum of Economic Botany.

Bailey named two weeds that demanded attention: *Jatropha gossypifolia* (the Cottonleaf Physic nut of Brazil), he said it was overrunning the township of Townsville and "no doubt we shall shortly hear of it poisoning cattle as it is one of a very poisonous family" and *Acanthospermum hispidum*, or Starburr, a South American weed, recently introduced and now spreading around Townsville. "This if not destroyed, we may soon find it a pest in pastures." There was no doubt that Bailey was a "voice crying in the wilderness", as the latter did become a pest.

The introduction of nature study classes in Queensland State schools during 1904-05 resulted in a great deal of correspondence from teachers of botany seeking information. Through the kindness of F. E. Clotten, who supplied funds for the purpose, a general index for the *Queensland Flora* was printed to make the work complete. Bailey also expressed gratitude to the hundreds of people who had sent in specimens, as he had not been given a collector, as was the practice in the other States. His allocation for a library continued at £10 per year, which led him to declare: "Books are of the greatest importance to a botanist: indeed, he can no more work without them than a ploughman can plough without a plough!"

In December 1905 Bailey received new specimens from Tryon and Young's expedition to Percy Island and he decided to publish privately *The Weeds and Suspected Poisonous Plants of Queensland*, issued in parts and completed in March 1907.

Bailey appealed to teachers and schoolchildren doing nature study to send him the common names of plants in their districts as "up to the present, very few of our indigenous plants possess such names...and the vernacular names given by children were in many instances far more suitable than those given by their elders".

In 1907, the Museum was transferred from the Department of Agriculture and Stock to the Chief Secretary's Department. (Mack, G., *The Queensland Museum*, 1855-1955: *Memoirs of the Queensland Museum*, 1956, Vol. 13, Pt. 2)

In 1908 F. M. Bailey updated his *Catalogue of the Indigenous and Naturalised Plants of Queensland* and in 1909 had his *A New and Complete Catalogue of Queensland Flora* ready for the printer. At first it was not to have illustrations, but, as Bailey wrote: "Our Premier, Hon. William Kidston, however, considered such necessary, and authorised a liberal number to be prepared for the book. I am greatly pleased with the idea, and am sure it will be appreciated by all who may use the book." (Bailey, F. M., *Rep. Dep. Agric. Stk*, 1909-10, p. 74)

After 1909-10 the Government Botanist's report disappeared from the Department's annual reports until the 1916-17 year, though "Contributions to the Flora of Queensland" continued in the *Queensland Agricultural Journal* until F.M. Bailey's death in July 1915, with his last contributions on the orders Juncaceae, Hepaticae and Fungi.

Bailey died at his home at Kangaroo Point after a brief illness. He was 88 years old, having being born at London on 8 March 1827. A very fine tribute was paid to him in the *Queensland Agricultural Journal* of August 1915, on pages 84 to 86.

J. F. Bailey was appointed to succeed his father as Government Botanist and his grandson, Cyril T. White, became Assistant Botanist. The new team combined to produce a series of "Illustrated Notes on the Weeds of Queensland". No. 1 appeared in the October 1915 issue of the *Journal*, but soon afterwards J. F. Bailey was appointed Director of the Botanic Gardens in Adelaide.

With Bailey's resignation as Director of the Botanic Gardens and Government Botanist, the appointments were separated, C. T. White becoming Acting Government Botanist on 1 April 1917 and E. W. Bick becoming Director of the Botanic Gardens. During the 1916-17 year Bailey and White published two bulletins in a new series, "Contributions to the Queensland Flora". White also travelled extensively throughout the State, adding to the botanical collections and combining with F. Smith, B.Sc., in research on cyanogenetic glucosides in Queensland flora. He made a plea for feeding experiments with plants suspected of being poisonous to be conducted at the Yeerongpilly Stock Experiment Station.

During 1918-19 C. T. White spent five weeks in Papua as the guest of the Lieutenant-Governor, the Hon. J. H. P. Murray, collecting specimens. In December 1918 he made collections in the Lamington National Park, and in April 1919 he collected grasses in central Queensland and poisonous plants around Kilcoy. In the same month, he was appointed a member of the Committee of the Bureau of Science and Industry to draw up a complete survey of weed pests of the Commonwealth. His was to be a very busy but rewarding professional life.

Crop production and pasture production

Grain growing

Wheat

In the 1890s, as a result of his lecturing tour throughout the State, Professor Shelton forecast that the open Mitchell grass downs around Barcaldine would become an important wheat-growing area, but said more experiments would be needed near a bore.

High-quality water for irrigation was obtained from a deeper aquifer and commercial wheat growing under irrigation was started with successful crops on W. H. Campbell's property, "Jaccondoll", at "Coreena" on black soil plains and on several "desert" soil properties, the Rockhampton Milling Company buying the grain. However, in 1904 the Rockhampton Milling Company announced that it was closing its flour mill because the removal of the duty on flour purchased in southern States meant it could not compete with flour imported from Adelaide.

A group of Barcaldine farmers decided to form a company and sold shares with this aim. As sufficient money was not obtained they approached the Government through the Minister for Agriculture, the Hon. Digby Denham, for a loan. The Minister asked about the extent, stability and profitability of the local wheat industry and in March 1906 he visited Barcaldine and proposed three methods of Government finance: firstly, if the company could fulfil its obligations, the Government would advance 50 per cent of the cost; secondly, a Shire Council guarantee, if that was legal; or thirdly, a Government loan, as
was being offered to build central sugar mills. This latter method would require amending legislation and the selectors would be required to mortgage their holdings to the Government. None of these plans was acceptable so wheat grain production disappeared from the Barcaldine district and a move was made to produce oaten hay. (Skerman, P. J., "Cultivation in Western Queensland", *North Australia Research Bulletin* No. 2, 1978, pp. 88-90)

A good deal of the history of the Department's role in wheat growing will be found in the section of this chapter dealing with the state farms, particularly Hermitage and Roma. Authors differ as to who founded the first flour mill in Queensland: in 1898 Hagenbach claimed that Messrs Charles Clark and Co. erected the Ellinthorpe Mill, which later passed to the Dominion Milling Company, which installed steam roller machinery; Twine, also in 1898, claimed Joseph Fleming at Ipswich erected the first mill on the Bremer River. (*QAJ*, 1898, Vol. 3, pp. 392)

In 1898, Hagenbach wrote in the Journal:

The future of the wheat industry is encouraging. In this connection a word of recognition is due to the Department of Agriculture for efforts made in the past which it is hoped will be continued in the future to find varieties possessing rust resisting qualities and otherwise adapted to our soils and climate. There is one variety of wheat that I hope will be a leading line in all wheat growing on the Downs. That is "Budd's Early".

Following promising reports by the Department, many Victorian farmers purchased land in central Queensland (around Emerald) to grow wheat in 1898.

Peter McLean noted the loss of grain in the stacks that year: during heavy thunderstorms rain permeated the stacks of wheat harvested by the reaper and binder and stacked awaiting the arrival of the threshing machines. He advocated erection of shedding of galvanised iron over the stacks to protect them until they were threshed, and also co-operative purchase of threshing machines to speed up the operation as the number of threshing machines was rather limited in any district. (McLean, P., *An. Rept Dept Agric.*, 1897-98)

Owing to the prolonged drought the 1902 wheat harvest was taken from only 1800 acres, which yielded an average of only 3.28 bushels per acre. The State being thus practically destitute of seed for the next year's sowing, it was decided that the Department should procure the best seed available from South Australia and sell it at cost price to the farmers, with 5 per cent added for terms. As Agricultural Adviser, Peter McLean visited all districts and met with farmers to ascertain the quantity and varieties to be bought, then he and W. D. Lamb of Yangan visited South Australia and bought the seed. General satisfaction with the result was expressed at the Maryborough Farmers Conference. The resolution read: "A vote of thanks be accorded to the Department of Agriculture for the supply of seed wheat, etc. to the farmers, and also for the care and energy its officers have displayed in its choice and distribution." The Railway Department granted freight concessions, and 1636 farmers received an average of 31.7 bushels each of seed, distributed by Messrs Redmond and Co., Toowoomba malting house, at 4d per bushel including insurance. (Denham, D., *An. Rept Dept Agric.*, 1902-03)

In 1908 another low wheat yield was experienced 8.41 bushels per acre and in 1916 a very bad wheat year again forced purchase of seed wheat from South Australia. This time the Agricultural Instructor, A. E. Gibson, purchased 63 690 bushels in South Australia and 836

bushels in New South Wales, the costs for his services being 3s 5d per bushel. The wheat was cleaned in plant leased from Messrs William Jones and Sons, Maltsters of Toowoomba. (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1915-16, p. 71)

Advances were also made to farmers in 1916 to clear, plough and generally prepare land for wheat, the cost of the advance being paid when the proceeds of the crop eventuated up to the last day of the year.

An Interstate Conference of Ministers for Agriculture in 1913 recommended continuation of selection and hybridisation of wheat at the Roma State Farm under R. E. Soutter. The president of the Chamber of Commerce in Toowoomba admitted that the wheats distributed from Hermitage and Roma State Farms had so changed the quality of the wheat offered for sale to flour mills that the flour made from it was now equal to the flour made from wheats introduced from the south. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1913-14, p. 3)

Wheat trials were extended further afield during 1913 14, with plots at Goondiwindi, Kaimkillenbun, Nanango, Gayndah and Pittsworth, with fertiliser trials included at Inglewood, Gayndah and Wallumbilla. Some new varieties were imported from Canada, India and South Australia. Amongst the Indian wheats was Pusa 12, which was given favourable commendation by the Imperial Economic Botanist in India for grain quality over a wide range of soils in 1914. The Pusa wheats were to become important in Queensland wheat breeding.

After the drought of 1916, the 1917 crop of 2 463 181 bushels was the largest harvested from Queensland, but 4 000 000 bushels were needed for domestic consumption. However, the crop was hard to sell as millers wanted prime hard wheat, and much of the crop could not be sold through the Southern Australian Wheat Pool as the growers at Warwick, Killarney, Allora and Pittsworth had rejected the Wheat Pool in 1916. Also, the southern States excluded Queensland from the Wheat Pool because of its low production and so Queensland could not sell either prime-quality wheat or seconds.

Maize

In the first volume of the *Queensland Agricultural Journal* in 1897, Major A. J. Boyd, the Editor, wrote:

Many enterprising farmers from the southern colonies have of late arrived in Queensland, some of whom in addition to taking up wheat lands in the west, also purchased homesteads on the coast. These gentlemen are at once face to face with conditions of climate and cultivation to which they are strangers. One Victorian who has made his home in Queensland lately under these circumstances said "Wheat growing I have been brought up to, I know how to manage on the western country but here, in this scrub land, is where I am at sea. Here is where I want instruction, in clearing, in growing maize, sugar cane, arrowroot, pineapples, etc. and here is where the value of your Department of Agriculture comes in.

In 1896 Queensland grew 115 715 acres of maize to produce 3 065 955 bushels, or an average yield of 271 bushels per acre; one-third of this was on the Darling Downs. By 1906 Howard Newport, the Instructor in Tropical Agriculture, could report that maize growing was increasing in the north but was still done by hand-planting between stumps and hand-husking and shelling - there was a need to mechanise. From latitude 21°S

(Mackay) 18 283 acres were under crop in 1908: 10 324 acres under maize, 3581 under bananas, 848 under citrus, 677 under hay and green fodder, 595 acres given to gardens and orchards, 508 acres to sweet potatoes, 479 to English potatoes, 286 to pumpkins and melons, 171 to coffee and 124 to pineapples - all apart from sugarcane.

The quality of the maize grain was poor, and R. S. Nevill, the Tobacco Expert (from USA), advised:

In selecting seed corn, care should be taken to select unmixed cobs, all of the same variety from stalks bearing at least two cobs, well filled at both ends, 91/2 to 101/2 inches long with at least sixteen rows of grain, only grain from the mid section of each cob being planted with fully two inches from each end being rejected. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1907-08, p. 23)

During 1913-14 the best varieties from USA were imported and stud plots were established at Lamington, Rathdowney, Memerambi, Coolabunia, Crows Nest, Inglewood and Peranga. In 1913 the average yield per acre on the Atherton Tableland was 39.14 bushels and in the Moreton district it was 21.07 bushels.

In 1914 a corn (maize) growing competition was inaugurated to encourage an interest in the improvement of maize cultivation. It was thought that this would be best attained by securing, as a preliminary, the cooperation of schoolchildren in the farming districts. The competition was open to all under the age of eighteen years who were resident in Queensland. Each student was to cultivate one-tenth of an acre with seed supplied by the Department, the same variety to each district. There were 296 entries, including 85 from the Wide Bay and Burnett and 61 from the Moreton District. Prizes of £5, £2 and £1 were offered for district competitions, and the winners competed for prizes of £10, £5 and £3 in the subsequent State championship. The principal of the Queensland Agricultural College judged the entries. The competitions continued for five years. Notable yields obtained were 151.4 bushels per acre by Miss N. Pickering of Eumundi (1919-20); 138.5 bushels by Miss S. Mark, Yatala (1919-20); A. Gon Chee, Killarney, 133.6 bushels (irrigated); T. A. Smoothey, a 13-year-old boy from Crows Nest, 107.8 bushels per acre. The State average yield in 1918 was 26 bushels per acre. (*Rep. Dep. Agric. Stk*, 1915 to 1920)

A maize-improvement scheme was initiated in 1915 by the field staff, with special plots located widely and selected seed sold to farmers. For financially embarrassed new settlers in scrub areas, the Department procured commercially pure seed and supplied one hundred farmers. H. C. Quodling, the Director of Agriculture, also set up better maize experiments introducing "ear to row" tests, and found yield differences from 42 to 79.7 bushels per acre in varieties under similar conditions.

By 1917 the Atherton Tableland led the State in maize production; Killarney, on the southern Downs, was second, with only one-quarter the production of the north. A great fillip was given to maize growing by the resumption of several thousand acres of rich scrub land near Tolga and the displacement of Chinese growers by returned soldiers.

It was found that the northern maize was being harvested with too much moisture and southern buyers paid less for maize of high moisture content. Consideration was given to grading, drying and storage of maize, and enquiries were made into the bulk handling of wheat in New South Wales and its adaptation to Queensland maize. Quodling also began enquiries into the production of maize starch, glucose maize oil and other products. The Department placed a moisture-testing meter at the Kairi State Farm to check farmers' samples. With the limited northern market for maize it was necessary to store excess local production and ease it on to the southern markets.

Rice

In 1890 mention was made in the annual report of the Under-Secretary for Agriculture of the position of rice-growing in Queensland:

This [rice] is becoming a staple grain crop in North Queensland, the area for 1898 showing an increase of 418 acres over 1897, that for the former year being 863 acres, with a yield of 38 133 bushels, or an average of 44.19 bushels to the acre, as against 29.19 for 1897. Hitherto, rice had been in the experimental stage, having been grown in many parts of the State, and had fluctuated in area as success or non-success had been met with. It was, however, in 1897 settling down to be the property of the Northern District, and it is to that part that the future supply may be looked for, and it behoves the farmers to be careful to grow the variety to suit the market, for, of all grains, rice is most subject to prejudice and favouritism. It is the grain that, in the largest quantities, comes into the hands of the consumer in the form that is mostly allied to the original state, and so is dependent upon the fancies of the consumers for the variety which shall command the highest price.

From the figures of the Registrar-General, in 1899 Queensland produced 14 per cent of its annual rice consumption. The statistics were: production (estimated at the rate of 162 lb of paddy to 100 lb of clean rice) 1 318 176 lb of clean rice, and imports 8 235 564 lb, with a value of £49 456. The main district for rice was Cairns, which produced 82 per cent of the total yield, 708 acres being cropped for 33 540 bushels, or an average of 47.30 bushels per acre.

Only one year later the cultivation of rice had fallen to 319 acres, producing 9275 bushels, an average of 29.08 bushels per acre, and 9 000 000 lb of rice was imported into Australia. (QAJ, Nov. 1919, p. 253)

The decline in acreage was believed to result from the Chinese growers, who dominated rice growing in the north, finding that banana growing demanded less work and gave better returns than rice, and from the southern growers' experience of losses during the 1901-02 drought, after which they took to growing sugar, arrowroot, maize and potatoes. Upland rice would probably have given them adequate results.

In the early 1900s the largest local planter of rice was Claus Lars of Pimpama Island. He grew Chinese and Japanese varieties and erected a mill to treat the paddy, but his varieties were unsuitable and after a few years he ceased to manufacture. Some farmers continued to grow rice for horse feed. The highest average yield of rice in Queensland was 89.59 bushels per acre in 1908, while in the Pimpama district it often exceeded 40 bushels per acre. (*QAJ*, 1916, Vol. 5, p. 224)

During 1912–13 a perennial rice was discovered in Senegal. The Department of Agriculture, through the Agent-General in London, obtained some seed, which was sown by C. E. Wood at Kamerunga State Farm. It produced a very small quantity of seed with very few panicles. Spots appeared on the leaves and samples were sent to the Government

Plant Pathologist for identification. The seed was long-bearded, with the grain very lean and not likely to be of use for human consumption, although Wood thought it would be a useful supplementary fodder grass. (*QAJ*, 2 Aug. 1914, pp. 155 157) Its scientific name was mentioned. It may possibly have been the pantropical ricegrass, *Leersia hexandra*, now common in coastal swamps.

In 1915 the area under rice in Queensland had dwindled to 3 acres, producing 66 bushels of grain (paddy), the smallest average yield since 1911. Before 1916 J. F. Keane of Carbeen, Mareeba, always had a crop of rice and enthusiastically advocated its cultivation on a commercial scale. In 1916 he obtained a yield of more than 40 bushels of paddy to the acre. An experimental sowing of 3 oz resulted in a crop of 5 bushels, and local interest was aroused. The Department, in order to afford every opportunity for farmers to again take up rice growing, in December 1917 purchased the rice mill, huller, and polisher that had been worked successfully in about 1909 by W. Heck, who owned a sugar mill on Pimpama Island. Its capacity was half a ton of dressed rice per day. The machinery was sent on loan to treat the produce of several growers around Tolga, where N. A. R. Pollock was interested in the industry, supported by H. C. Quodling, Inspector of Agriculture. The Department distributed a large quantity of seed of the Upland or Mountain variety. There was a large market available in Papua. (QAJ, 1917, Vol. 8, p. 287) Early crops on the Atherton Tableland mostly failed for grain but were cut for hay, the chaff from which brought £16 per ton. These grain matured growers were offered £24 per ton f.o.b. Cairns for "paddy". The 1919 crop, though not as good as the previous season's, was quite equal to the imported rice. In September of that year F. W. Peek of Loganholme, by invitation, wrote a detailed article on rice growing.

Sorghum

During 1915-16 demonstration and seed propagation plots of some twenty different grain and fodder sorghum varieties, including dwarf grain types, were planted at various centres throughout Queensland. It was realised that sorghum could replace maize for grain and fodder in areas too dry for maize. The Planters' Friend (Imphee) variety of fodder sorghum yielded 32.7 tons of green fodder per acre at Rathdowney and at Mt Larcom a dwarf sorghum yielded 5³/₄ tons of grain to the acre.

Millet

Red and white French millet (*Panicum miliaceum*) was introduced in 1918 when the canary seed crop failed and found a ready market. Quodling reported: "The move on the part of the Department to introduce a new commercial crop will focus attention in the future on this class of millet and save sending money out of the country for a commodity which can readily be produced here." (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1918-19, p. 55)

Root crops

English potatoes

Potato growing had been a major standby for small crop farmers since Separation, especially among Chinese growers in north and western Queensland. During 1909-10 an

Irish blight (*Phytophthora infestans*) epiphytotic spread quickly throughout Australia, and in Queensland it spread from the border to Bundaberg and west to the Main Range. It was identified by Henry Tryon and a Departmental spraying plant was sent into the affected districts to give demonstrations in the control of the disease so farmers would be prepared for the next occurrence. Very strict supervision was kept over all imports and no potatoes were allowed to be sent north without inspection and issue of a clean certificate. All field inspectors were requisitioned to assist in policing the outbreak.

During 1915-16 some forty imported varieties of potatoes from the Queensland Agricultural College were grown at Stanthorpe for seed purposes.

Cassava

In 1904 G. B. Brooks planted cassava at the Biggenden State Farm, primarily as a source of pig food. Cuttings of a Brazilian variety were imported and planted along with material obtained in Queensland. Newport also planted the crop at Kamerunga, using "bitter" and "sweet" varieties. The yield was fifteen tons per acre of roots from an eighteen-month-old crop. The roots were boiled and fed to pigs.

Some plants were raised from seed, but the main crop was established by cuttings. Henry Tryon, the Government Entomologist and Vegetable Pathologist, ever alert, found some cuttings from South America harboured a destructive beetle borer of the family Cryptorhynchidae and he promptly destroyed them; "the exclusion of this pest was especially fortunate, in view of the prospective importance of cassava growing to the tropical portions of the State". (Tryon, H., *Rep. Dep. Agric. Stk*, 1904-05 p. 133)

Fibre crops

Cotton

In the December 1900 issue of the *Queensland Agricultural Journal*, Major A. J. Boyd gave a detailed statistical picture of the rise, progress, decline and fall of the Queensland cotton industry up to that date. He then gave an account of cotton culture and analysed the economics of the venture. He felt that the cotton industry could be revived. Finally, he said, "Having now placed the matter clearly before our readers, we shall await with interest the revival and development of the cotton industry in Queensland. It must be borne in mind that we do not advise farmers to grow cotton, we merely ask them to consider, having the figures before them, whether it will pay them to revive an industry which provided light and remunerative work for their families, which had a sure market, and which consequently added materially to the comfort of the farmers' homes."

In discussing the demise of the cotton industry before the 1902 drought the Instructor in Cotton Culture, Daniel Jones, said from his experience with the late Queensland Cotton Manufacturing Company he was satisfied that, given ordinarily favourable circumstances such as financial assistance and tariff protection, Queensland could cater for the demands of the new Federation in the matter of the ordinary domestic requirements of cotton goods. A 5 per cent duty on textiles in competition with the world was too severe a handicap for our little enterprise. We were never at fault in the quality of goods manufactured. (Jones, D., *QAJ*, 1907, pp. 116-122)

The third revival of the Queensland cotton industry could be dated from the end of the drought of 1902, although isolated growers had begun to plant the crop a little earlier. Peter McLean, now Agricultural Adviser, obtained a large quantity of seed lying in the premises of the Queensland Cotton Company Limited at Ipswich and distributed it mainly to growers along the Central Railway Line. In 1903 only three acres were grown.

At the same time the British Cotton Growing Association was anxious to extend cotton-growing in its colonies, due to the shortage of cotton from America owing, amongst other causes, to disasters in Galveston, the vastly increased demand for the staple by the American home manufacturers and the high ruling prices for wool. At the instigation of the British Cotton Growing Association, J. Bottomley visited Queensland to enquire into the possibilities of cotton growing here. Daniel Jones was made available to accompany him to Beenleigh, Nerang, Beaudesert, Boonah, Ipswich, Lowood, Marburg, Rosewood, Laidley, Helidon, Toowoomba, Dalby, Roma, Charleville, Mitchell, Wallumbilla and districts along the North Coast railway. Before leaving for Fiji, Bottomley said: "The way has been prepared for the revival of the cotton industry, mutually beneficial to the Manchester merchant and the Queensland cotton grower." Daniel Jones reported: "From the evidence disclosed with regard to conditions of soil and climate Queensland is well suited for the immediate settlement of thousands of cotton growers who, in a short time, can make a good living from the industry so...steps have been taken to obtain three tons of suitable cotton seed from U.S.A. and on arrival in August (1904) will be sold to growers at actual cost. The U.S.A. Department of Agriculture officers will supervise the selection of seed." McLean forecast that though cotton would not become a staple industry it would be an important subsidiary crop. Cotton was now a different crop to market: only lint had been required in the 1860s, but now the seed and oil could be sold. (An. Rept Dept Agric., 1903-04, p. 20)

In 1904 cotton seed was supplied to Westbrook, Hermitage and Biggenden State Farms and to the Kamerunga Nursery; varieties included Christopher, Russell, Jones Big Boll, Parkers, Culpepper, Trent, Caravonica, Kidney, Truilt, Braddy, Doughty, Seabrook and Fijian Hybrid. Bottomley examined the Biggenden crop in the field and was satisfied with the quality, selecting Russell and Jones Big Boll as the best of the Upland varieties. The Sea Island varieties Seabrook and Fijian Hybrid developed large bushes but were late in bearing and probably would be too late for the Biggenden season. However, at Kamerunga all the varieties did well and the Sea Island types responded well to pruning. Caravonica, Christopher, Russells Big Boll, Truilts Big Boll, McLean, Kidney, Matafife and Lewis Prize were the best.

With the resurgence of cotton growing, Henry Tryon reported the occurrence of several insect pests: scale insect (*Lecanium nigrum*), moth (*Dichocrocis punctiferalis*), boll borer (*Earias fabia*), cotton stainers (*Dysdercus sidae* and *D. cingulatus*), false chinch bug (*Oxycarenus frenchii*) and Banksian shield bug (*Tectocoris banksii*). However, all seed imported from USA was free from pests.

To handle the 1905 crop of 113 008 lb of seed cotton from 171 acres, the Department, by courtesy of the Queensland National Bank, took over the premises of the old Ipswich Cotton Company and put the equipment in order, powering it with a portable engine from Hermitage State Farm. It ginned cotton for growers from a wide area, from the Maranoa and Mitchell districts in the west to the Central and Atherton districts in the north. By the end of August

1906 the lint had been sold to southern buyers at a satisfactory price and the Department was able to return to the growers an average of 14/5d per pound of seed cotton.

In 1906 an old saw gin was erected at Kamerunga to handle small farmers' cotton and in 1907 the gin was lent to the Yarrabah Mission to treat its crop. Messrs Kitchen and Sons set up a ginning mill and in 1907 treated more than 85 000 lb of raw cotton, and Messrs Joyce Brothers of Sydney bought the Ipswich Cotton Mills.

Imports into Australia at this time (1906-07) were raw cotton 1 049 306 lb (value £20 962); piece cotton (value £300 000); cotton waste (value £35 770); flannelettes (value £234 382); and candle and lamp wicks (value £6840).

Daniel Jones recommended Tools Improved, Russells Big Boll, Griffin and Sea Island cotton for coastal districts.

In 1907 the Commonwealth Government passed a Bounties Act under which ginned cotton and cotton seed supplied to an oil factory were eligible for a bounty of 10 per cent of the market value of the product. The bounty was to apply for a period of eight years, but it was extended to 1920. (Rimmer, W. G., *Australian Cotton Grower*, Vol. I, April 1980)

Dr David Thomatis, a Cairns grower, produced three hybrids of Sea Island cotton and Upland types, which appeared to be of high quality and well-adapted to Queensland soils. His Caravonica wool type was greatly admired in the Queensland Court of the Franco-British Exhibition in 1908. Here it was agreed that Queensland was capable of producing good types of Upland, Sea Island and Hybrid cottons, and that growers should produce high-class cottons of good lustre, great strength and good length of staple rather than compete with American short-staple Upland types. (Benson, A. H., *Rep. Dep. Agric. Stk*, 1908-09, p. 9)

In 1913 some new varieties were imported from Texas, USA, and from Egypt. However, the industry was to receive a severe check

... through the refusal of the Commonwealth Government to give protection to a class of goods (sacking and stockingette covers for bananas) manufactured by Messrs. Joyce Bros. at their mill at Ipswich - a firm who by their enterprise and fair dealing with the farmers have done much to establish this industry as a by-product of the farm, but who for the reason given, have been obliged to close their mills (in 1912) where they manufactured material that in no wise interfered with the principle of cheap cotton goods for the use of the people generally. Now the Commonwealth Government is in communication with the British Cotton Growers Association in England to send out someone to advise them on cotton growing in Australia! (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1912 13, p. 14)

In 1913 the Queensland Government provided an advance of $1\frac{1}{2}$ per lb on seed cotton produced. Successive years saw the advance gradually increase by about $\frac{1}{4}$ d per year until it reached $5\frac{1}{2}$ d per lb in 1922. Before 1922 the advance had little effect on production: in 1913 the value of the crops was £65 000; in 1920 it was only £1000 but with the higher advance in 1922 it reached £86 000. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1921-22, p. 10)

During 1915 Joseph Campbell of "Gossypium Park" Estates, Kamma, produced cottonseed oil from his crop and sold it for soap manufacture to Messrs Kitchen and Sons for £36 per ton. The cottonseed cake (10 tons were produced) was sold wholesale at £12 per ton. He had only a small mill. (Wood, C. E., *Rep. Kamerunga State Nursery*, 1915)

In an endeavour to prevent the total abandonment of the industry the Department, with the closure of Joyce Brothers Mills, undertook to receive ginned cotton and sell the cotton grown, more or less on the co-operative principle. An advance of 1¹/₂d per lb was paid for seed cotton, increased to 1³/₄d in 1916, and when the ginned cotton was sold, the balance was distributed among the growers, after the actual cost of the necessary operations had been deducted. It also agreed to supply seed cotton for the next season, free of cost, delivered to the nearest railway station.

In 1916 ginned cotton in hand from the 1915 and 1916 crops amounted to 12 409 lb, which represented 36 083 lb of cotton in the seed. Of that total, 6853 lb of Sea Island was received from a grower in Papua. The ginned cotton was sold to Messrs McDonnell and East of George Street, Brisbane, who used it for local manufactures, and the growers received in all 2.54d per lb for their seed cotton, which at that value compared "very favourably if it is not more profitable than the cultivation of maize". (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1916-17, pp. 20-21)

In 1919 the Federal Government guaranteed a minimum value for seed cotton of 4d per lb on the farm for the 1920 crop, but this was superseded by the State guarantee of 5¹/₂d per lb until 30 June 1922 on the farm for seed cotton of good quality consigned to the Department for treatment.

The growth of the cotton industry to 1922 was summarised in the annual reports of the Department for 1916-17 and 1921-22.

The cotton industry was to gain new impetus in the 1920s.

Sisal hemp

Sisal hemp, a fibre crop, attracted a good deal of attention in the early twentieth century. In 1905 the Under-Secretary stated that the cultivation of sisal was firmly established in areas where the temperature did not fall below 40°F and the soil was formed on limestone. Expansion took place in the Burnett district and the early plantations were ready to cut in 1907. The Department and private planters had supplied nearly half a million plants to intending growers and a fair export trade had been done with New Guinea, the Solomon Islands and Fiji, as well as a little trade with New South Wales. The making of scutching machines for small plantations was initiated by a Brisbane engineering firm. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1906-07, p. 17)

During 1907-08 some 45 000 plants and bulbils were distributed from Kamerunga nursery in the Cairns district. In 1918 G. B. Brooks, the Instructor in Agriculture, reported that one ton of sisal hemp fibre per month was being prepared from a privately owned plantation at Bajool and that the industry could be extended with advantage.

Sugarcane

Local committees were formed during 1897 to fight the depredations of the sugarcane grub *Lepidiota squamulata* (*caudata*) in a systematic attack on the pest, and were subsidised to

the extent of 17s 1¹/₂d in the pound by a £1500 grant in aid to the Johnstone River, Herbert River and Mackay Committees. In that year there was about a 20 per cent increase in production over 1896, and the Under-Secretary warned the mills that they would soon have to find overseas markets as Australian requirements were rapidly being met. There was a heavy demand for planting material from the state nursery at Mackay. The total number of refineries and factories at work in 1897, including mills for crushing cane, was 81, distributed as follows: Brisbane Police District, 1; Bundaberg, 26; Mackay, 12; Maryborough, 6; Rockhampton, 1; and sundry places, 35.

The Spanish-American War appeared to offer openings for marketing sugar. The operations of the Sugar Works Guarantee Act were transferred from the Department of Public Works to the Department of Agriculture in 1898.

During March 1899, the sugarcane borer, identified by Henry Tryon, was found in sugarcane at the Kamerunga Nursery, and the cane was destroyed under instructions from the manager, Howard Newport.

Mackay Sugar Experiment Station

By 1894, the industry was dissatisfied with the nurseries because of the lack of scientific investigation into soils and cane varieties and an agitation developed for sugar experiment stations and laboratories along the lines of certain overseas sugar cane producing countries.

Both Henry Tryon, Government Entomologist and Pathologist, and J. C. Brunnich, Agricultural Chemist, were warm supporters of the scheme and official notice of the industry's requirements was indicated by a statement by the then Minister for Agriculture, the Hon. A. J. Thynne, M.L.C., that he proposed to add a laboratory to the State Nursery at Mackay. This was erected in 1898 in accordance with plans drawn up by J. C. Brunnich. A. A. Ramsay, later Chemist to the New South Wales Department of Agriculture, was the first Chemist in Charge.

This development appeased only temporarily the growers' oft-repeated requests for full scale sugar experiment stations, and in the next year, it was announced that the State Nursery would be done away with and the site used on a more satisfactory basis as a Sugar Experiment Station. At the same time, sugar growers approached the Government to invite Dr. Walter Maxwell, then Director of the Sugar Experiment Station of the Hawaiian Sugar Planters Association to visit Queensland to advise on the industry, the initial steps being taken by the Bundaberg Planters and Farmers Association. Dr. Maxwell was accordingly invited by the Government to undertake an examination of the industry and he arrived in Queensland on 9 December 1899. (King, N. J., 50 *Years of Scientific Progress, Bureau of Sugar Experiment Stations*, 1950)

As a result of his report on the sugar industry and on the need to establish sugar experiment stations, the Queensland Cabinet in March 1900 wrote to Dr Maxwell asking him to transfer his services to this State and offering him the position of Director of Sugar Experiment Stations at a salary of £3000 per annum. (King, 1950) This money was paid to Dr Maxwell as Controller of Central Sugar Mills in 1905.

In him, Queensland has secured the greatest specialist of his class in the world, and it is believed that whatever ills may have befallen the Queensland Sugar Industry through unskilful husbandry and antiquated methods will soon be removed if his teachings are accepted and acted upon. (Dalrymple, D. H., *An. Rept Dept Agric.*, 1900-01, p. 4)

Tradition has it that after his return to Hawaii Maxwell was asked if he would accept the new Queensland position, and if so, at what salary. He cabled back "three thousand", meaning dollars, but it was interpreted here as meaning pounds. At any rate, he was appointed at £3000 a year, while his second in charge received £125 a year. (Bell, A. F., *The Story of the Sugar Industry in Queensland*, Univ. of Qld - The John Thomson Lecture for 1955, Brisbane, 1956)

The Sugar Experiment Stations Act of 1900, passed in December 1900, provided inter alia for the establishment and control of sugar experiment stations, the appointment of a director and the creation of a sugar fund at the Treasury. This fund, out of which were paid all the expenses incurred by the Governor-in-Council, the Minister or the Director in the execution of the Act, was provided by an annual levy per ton of sugarcane received at a sugar works, the assessment being paid and borne by the owner of the sugar works and the grower of the cane in equal proportions. These contributions were matched by the Treasury on a pound-for-pound basis. The Act also required an annual report to Parliament from the director, covering the activities of the Bureau.

In June 1901 Henry Tryon reported the occurrence of sugarcane wireworms at Mackay - a pest that was to continue to be a problem - and in 1903 the presence of Margarodes or Earth Pearls at Bundaberg.

On 30 June 1901, the Secretary for Agriculture, the Hon. D. H. Dalrymple, stated that about one-fifth of Queensland's cultivated land was under sugarcane and three-fourths of our agricultural exports must be credited to sugar. The Registrar-General's figures for 1900 showed that the capital invested in sugar in Queensland was £2 815 076, the value of the product was £1 188 693, mills numbered 66, and 3105 white persons were employed therein. The total sum advanced under the Sugar Works Guarantee Act to date was £498 000. Of this amount £11 459 had been paid, leaving £487 341 still due. (*An. Rept Dept Agric.*, 1900-01, p. 4)

In the drought year of 1902 only 44 of the 66 mills in Queensland crushed cane, and 140 000 tons of cane were used for fodder instead of being crushed for sugar. The drought improved the yield of sugar from the cane that survived to be crushed, only 8.30 tons of cane being needed to yield a ton of sugar compared with 9.42 tons in 1898, 9.54 in 1899, 9.44 in 1900 and 9.76 in 1901. The Mackay district produced more than half the cane grown, while the Ayr district, irrigating 4070 acres of its 4344 acres of cane land, gave the highest yields of cane per acre for the second year in succession.

The Government Inspector and Valuator under the Sugar Works Guarantee Act, R. W. M. McCulloch, in 1901 urged more mills to undertake chemical analyses of cane, as the want of chemical control was one of the greatest barriers to efficiency. Before this time only four central mills undertook chemical analyses. The sugar season of 1904-05 first saw the quality of sugar, as ascertained by polariscope, taken into account at the suggestion of Dr Maxwell. Hitherto the weight and not the quality had been recorded by the mills. A sugar content of 94 net titre (N.T.) was adopted as the standard. (Weedon, T., *Rep. Govt Stat. Agric. & Past. Statistics*, 1904)

Dr Maxwell suggested that three experiment stations be established, one at Musgrave, one at Mackay and one at Bundaberg, the latter to be headquarters. On his appointment the existing station and laboratory at Mackay were put into use and the main laboratory and headquarters on the banks of the Burnett River at Bundaberg were started, to be opened in August 1901. A new station was set up in 1910. H. T. Easterby was Assistant Director in

charge of the Mackay Sugar Experiment Station from the beginning of operations, while the first chemists engaged at the central laboratory were Firman Thompson, who returned to the United States in 1902, Dr A. J. Gibson, G. R. Patten and A. E. Anderson (a foundation diplomate from Gatton College). A. R. Henry, who later became secretary to the Central Sugar Cane Prices Board, was secretary to the Bureau at the time. Between 1900 and 1909 this remained the administrative headquarters and laboratory of the Bureau, while the Mackay station was used for basic investigational work on variety testing, manurial trials, cultivation experiments etc. (King, 1950)

A system of canegrowers' substations was inaugurated, stretching from Mossman to Nerang, and these served for the conduct of experimental trials on a wide range of subjects under varying soil and climatic conditions.

Dr Maxwell severed his connection with the Bureau in March 1909. The Bureau of Sugar Experiment Stations now came, for the first time, into direct relationship with the Department of Agriculture and Stock when the Under-Secretary, Scriven, was appointed also Director of the Bureau. Scriven declared that henceforth the work of the Bureau would be entirely commercial. The Bureau would extend experimental work by the establishment of stations at Bundaberg and Cairns in addition to Mackay with subsidiary plots upon private holdings, introduce new varieties and propagate seedling canes of the better varieties, cultivate subsidiary crops and encourage their production in addition to sugarcane, provide chemical help towards improvement in sugar manufacture in the central and other mills and educate canegrowers in plain language devoid of scientific phrases.

The Mackay Station would be the main station; those at Bundaberg and Cairns would be smaller and not under scientific management, although chemists would be sent from Brisbane and Mackay as required seasonally.

Easterby resigned in 1910 to take up a position with the beet-sugar industry in Victoria and was succeeded by Dr A. J. Gibson, who served for twenty-one months as General Superintendent. Easterby returned to the Bureau to become General Superintendent in 1912 and remained until his death in 1932. (King, 1950)

To implement Scriven's education programme, two instructors in sugarcane culture, one for the southern area and one for the northern area, and an entomologist, A. A. Girault, were appointed in 1911. Girault's appointment, at the request of the growers, to investigate the white grub of the greyback cane beetle was the modest beginning of the entomological division of the Bureau, which moved to Meringa from Gordonvale in 1917. It consisted then of Dr J. F. Illingworth, E. Jarvis, A. A. Girault and A. P. Dodd. (King, 1950) Girault resigned in May 1919.

The 1912-13 year was a bad one for canegrowers - drought restricted yields and in August 1912 the Federal Government increased the wages to be paid to field hands by some 40 per cent, without giving an extra rebate or protection to growers. In that year the Department commissioned T. H. Wells of Childers to proceed to New Guinea and make a further collection of Papuan varieties. He visited mountainous areas of New Guinea and collected 158 varieties, leaving a duplicate set at the Experiment Farm at Hombron Bluff. Only 59 varieties germinated at Mackay, but as Wells had had the foresight to leave a duplicate set in New Guinea these canes were tested at Bundaberg and Mackay during the next few years.

Federation and Commonwealth intervention

The Commonwealth of Australia came into being on the first day of January 1901. The Colony of Queensland became a State and the Commonwealth Government began to play a large part in the control of the sugar industry. The first change brought about by Federation was that the sugar markets of the various States were now free to Queensland, and a protective duty of $\pounds 6$ per ton was imposed by the Commonwealth Parliament on all foreign cane sugar, while, as the beet sugar bogey was even then powerful, the duty in its case amounted to $\pounds 10$ per ton.

The Prime Minister, Edmund Barton, commissioned Dr Maxwell to report on the sugar industry in Queensland and New South Wales, especially with regard to white labour. Dr Maxwell applauded the formation of central sugar mills and the placing of the industry in the hands of individual farmers and felt that the industry could be made to survive on white labour alone, with some financial assistance.

The first Act of the Commonwealth Parliament was for the regulation, restriction and eventual prohibition of Pacific Islands (kanaka) labour, culminating in the repatriation of all island labour (except in special cases) by the end of 1906. To encourage canegrowers to use only white labour the Commonwealth passed the Excise Tariff Act 1902 and in July 1903 an Act to provide a bounty on sugar to be paid to growers using white labour only. The Sugar Bounty Act 1905 and the Excise Tariff Act 1905 increased Government aid. In 1910 the Commonwealth fixed the rate of wages and conditions of employment. A Royal Commission set up in 1911 to inquire into matters relating to the sugar industry recommended that "the bounty and excise be abolished provided that the Commonwealth Government by co-operation with the States or otherwise, take whatever steps may be necessary to promote the white labour policy and to ensure the maintenance of a living wage in the sugar industry generally". This was agreed to and the Acts to repeal the excise duty on sugar and the Sugar Bounty Act 1905-12 were passed, providing the abolition should commence on a day to be fixed by Proclamation. In July 1913 the Proclamation was issued and the excise and bounty regulations that had governed the sugar industry since 1902 became a thing of the past. (Easterby, H. T., The Queensland Sugar Industry, Govt Printer, Brisbane, 1933)

State Legislation passed in 1913 included the following Acts:

- 1. The Sugar Growers Act of 1913, providing for the prompt payment to sugarcane suppliers of a part of the value of the cane determined by districts;
- 2. The Sugar Growers Employees Act of 1913, making temporary provision with respect to the rates of wages and conditions of employment in the sugar industry until such matters were dealt with by Awards under The Industrial Peace Act of 1912.
- 3. The Sugar Cultivation Act of 1913, prohibiting certain labour in the production of sugar cane and introducing a dictation test directed by the Secretary for Agriculture.

During 1913-14 new areas were brought under cane for the recently completed Inkerman Mill in the Burdekin and for the central mill being erected by the Queensland Government at Babinda. In late 1913 the Department purchased 45 acres on the deep red soils of the

Woongarra district for a new Bundaberg sugar experiment station. The station was established and farmers were entitled to have their sugarcane, soil and irrigation waters analysed free of charge. Bundaberg was the headquarters of the Bureau from August 1912, but before long the General Superintendent transferred his office to Brisbane, which has since been the administrative headquarters.

The Co-operative Sugar Works Act of 1914 came into force on 1 January 1915. It provided for the establishment and management of co-operative sugar works by owners or occupiers of cane land, who would become shareholders. The capital cost of the loan from the Government was repayable over twenty-one years at 4 per cent interest, with two years of grace, and repayment thereafter at \pounds 7 12s 4d per year, payable on 1 July. Each sugar works would have a board of advice with five members, three appointed by the Governor-in-Council and two by shareholders. Profits were to be published in the *Government Gazette* and if there was a deficiency it was to be met by a levy on shareholders.

Meanwhile little progress had been achieved in the elimination of the cane grub. A choice piece of typical Tryonesque prose appeared in the 1915-16 report:

Depredations affected by soil frequenting Scarabeid beetle larvae or "grubs" in the sugar cane plantations - especially those of the Cairns and Johnstone River areas - have been reported as having occurred with little abatement, if any, in the virulence characteristics of past years. It has been a matter of concern to us, having a very full knowledge of the situation, and of the nature of the problem that was presented, and moreover being mindful of the very material results that had followed the compliance with our recommendations for overcoming the evil that has been secured in the Mackay district and to a less extent in that of the Mossman, a proposal was tendered to you (the Under Secretary) for supervising and directing the work of the Assistant Entomologist, Mr. E. Jarvis, who meanwhile had been seconded for temporary service in connection with the Bureau of Sugar Experiment Stations to the end that a similar positive outcome of our knowledge and experience might be availed of for the behoof of the sugar cane growers of the other districts also. It was with regret then that we learnt that our scheme designed for this purpose was not favoured, and that the interests of these planters had been subordinated to the demands of correct administrative procedure. Meanwhile the laboratory enquiries that have now been prosecuted for some years at the Mulgrave with commendable assiduity and noteworthy persistence have had no effect in minimising the loss arising from the existence of the grub pest nor, in our opinion, do they offer any promise of doing so. (Tryon, H., Rep. Dep. Agric. Stk, 1915-16, p. 46)

The Regulation of Sugar Cane Prices Act of 1915 was assented to on 6 October 1915. The Sugar Cane Growers Act of 1913 was repealed, as were some portions of The Sugar Growers Employees Act of 1913. The new Act constituted the Central Sugar Cane Prices Board, with five members: a District Court Judge as chairman; a canegrowers' representative, elected by ballot; a mill owners representative, elected by ballot; a qualified sugar chemist; and a person experienced in accountancy. A local board for each mill was formed and the area covered by the mill and its lands was declared by Order-in-Council. The local board determined prices to be paid within that mill area for a period of twelve months or till a new award was declared and forwarded these prices to the central board.

Matters considered in arranging this award were:

- 1. estimated quantity of cane to be treated at the mill
- 2. estimated commercial cane sugar (c.c.s.)

- 3. crushing capacity and mill efficiency
- 4. labour conditions
- 5. selling price of raw and refined sugar
- 6. any other local conditions
- 7. any prescribed matters.

Differing prices could be fixed. In fixing prices, the board could deduct for:

- i. burnt, frosted or diseased cane
- ii. badly topped or trashy cane
- iii. varieties to be grown, for example, varieites disapproved by the board.

Under the Act all cane containing more than 7 per cent of commercial cane sugar must be treated. Before 1 January each year each canegrower and mill owner was required to furnish the central board particulars of output. The Sugar Cane Prices Fund was established to pay all expenses of administration and the central board was empowered to levy 1d per ton of cane received at the mill, or other sum fixed from time to time. The mill owner paid monthly dues to the central board and had power to make the determined deductions from the grower's payment.

Drought in the southern districts during 1915 and early 1916 was so severe that some mills did not crush. It was also dry in the north, followed by a wet harvest, causing a low sugar content. Sugar had to be imported.

In June 1917 Dr J. F. Illingworth, Professor of Entomology at Hawaii and with experience with the Colonial Sugar Refining Company in Fiji, was appointed Entomologist and soon published one of the finest treatises yet presented to the public, "Australian Sugar Cane Beetles and their Allies". Dr Illingworth stayed until 1921, helping Edmund Jarvis who succeeded him in this work. A special entomological laboratory was built at Meringa.

The 1917 sugar crop was a record as a result of good rains and the standover crop from 1916. It yielded 307 714 tons of 94 net titre sugar, 64 877 tons more than in 1913. There were problems, with cyclones at Mackay and Innisfail, and a late start by some mills and strikes in southern States held up supplies of bags and lime and some mills closed for a period. In 1917 the South Johnstone Experiment Station was established at the foot of the Basilisk and P. H. McWalters was placed in charge, retaining the position until his retirement in 1927. Its main function was plant breeding, producing the "S.J." canes.

Tobacco

On the appointment of R. S. Nevill as Tobacco Expert on 14 October 1897, Peter McLean announced that Nevill would undertake the cultivation and curing of the plant at the Queensland Agricultural College farm on such a scale as would afford a fair test of the value of our tobacco in the English market. It was intended that a few acres of land would be cultivated, with the product cured and packed at the College and sent to London as a test lot.

A shipment of Queensland tobacco was sent to London on SS *Duke of Argyll*, which left Brisbane on 26 February 1898. It was declared by experts as coarse and deficient in flavour and they valued it at 3d to 3¹/₂d per lb. Nevill, in commenting on this result, stressed the necessity of having suitable varieties and suitable land. He prepared seedbeds at the College on two types of soil, a rich, alluvial, heavy, deep black loam on the Lockyer Creek bank, and a poor, sandy, shallow soil overlying rock on the College ridge. On the sandy soil he planted the variety "Yellow Pryor" and on the heavy loam "W. Burley". Dry weather destroyed the crops.

During 1989 and 1900 Nevill wrote extensive articles on tobacco culture for the *Queensland Agricultural Journal*.

The tobacco crop for 1898-99 was worth £2000 to Queensland but drought and blue mould in the Texas Inglewood district reduced the crop. J. C. Brünnich, the Agricultural Chemist, carried out detailed analyses of the Queensland leaf and Texas soils and declared them little different from American types. By the following year 45 per cent of tobacco consumed in Queensland was home-grown and tobacco consumption increased by 56 per cent.

In July 1900 an experimental tobacco farm was established about two miles from the Texas township, on a portion of Texas station, which was owned by the Scottish Australian Investment Company, on land leased to the Department for three years. Ninety-one acres of the new variety "Burley" were planted on 22 September and yielded 51 tons of leaf. The quality was good and Nevill declared it "would fill a demand for medium light coloured tobacco".

In September 1901 Brisbane buyers bought £18 000 worth of leaf in the Texas-Inglewood area. Twelve-horse wagons took the leaf to Brisbane in bales, through Pikedale, Tereka, Warroo and Texas stations, where the horses were changed. The stages, with one exception, were very long - 22 miles in one instance, 17 and 15 miles in others, with one rough steep section of only 9 miles.

In 1904-05 Nevill compared five varieties at Texas, "Yellow Pryor" proving the best. In 1905-06 he grew "Lacks", "Yellow Pryor" and "Yellow Orinoco".

By this time there was sufficient acclimatised seed in the country. The Department relinquished the experiment farm as soon as the season's leaf could be delivered to the buyers after 30 June 1906. It was thought that sufficient demonstration had been given and the time had arrived for giving more attention to other classes of tobacco in other parts of the State, although Nevill continued to visit Texas to advise the many settlers growing tobacco there. The Texas area was adapted for pipe or plug tobacco only, but there were vast areas of coastal lands that were capable of growing cigar tobacco of the highest quality.

During 1908 the British Australian Tobacco Company erected curing sheds and three large re-handling houses at Texas, with drying and stemming facilities, employing 20 to 30 people. The cultivation of cigar tobacco was now profitable. The incidence of the Tariff and the Bounties Act gave some stimulus to the industry.

Nevill then turned his attention to northern areas, centred on Proserpine, Bowen and Cardwell. Experimental plots were laid out at Kamerunga State Nursery and a curing shed was erected in September 1908. By 1907-08 Cardwell growers were exporting considerable quantities of cigar tobacco to the southern States at profitable prices.

The Kamerunga crop sown in October 1909 to five varieties was affected by storms and especially by insects in its young stages. Ashes, soot, lime, McDougall's insecticide, Paris Green solution and "Vaporite" were tried but had no lasting effect owing to continuing rain. Hand-picking was then resorted to, by lantern light at night (9 p.m. to midnight). Despite clean surroundings, great quantities of insects were caught and destroyed night after night. A good haul would be 150 to 200 fat slugs; the record was 275 from only two beds. Apart from caterpillars, grasshoppers and snails were also caught. A memorandum was kept till the total of slugs reached 4000, then the counting was given up. Various slug traps accounted for large numbers. Some of these slugs must have travelled immense distances! (Newport, H., *Rep. Dep. Agric. Stk*, 1909-10, p. 126)

Dry weather affected the pipe-tobacco crops at Inglewood during 1911-12 and Nevill recommended that the Department help the small growers to install irrigation. Dry weather also affected the cigar-leaf crop at Bowen. The bounty of 2d per lb did not encourage farmers because of the rigid regulations attached.

Drought years interfered with the Texas crops, although Nevill, in his retiring address (after sixteen years as Tobacco Expert), made it clear that he regarded tobacco as the most profitable of small crops and he could see no reason Queensland should not supply the whole of Australia's tobacco requirement, which was estimated at 15 million lb per year. He retired after placing the tobacco industry upon a footing that could not have been attained without the benefit of his instruction. (Scriven, E. G. E., *Rep. Dep. Agric. Stk.* 1912-13, p. 1)

From then onwards, production declined. Manufacturers were allowed to import tobacco and this restricted local production. In 1919 Scriven, the Under-Secretary, said "the main problem in the stagnation of the industry was the European community would not continue steadily at the industry which was now mainly in Chinese hands. Close attention was needed to bring the crop to a successful harvest". In 1921 Quodling (Director of Agriculture) said the industry "was languishing for want of an experienced instructor in modern methods of raising and curing the leaf". (*Rep. Dep. Agric. Stk*, 1920-21, p. 57)

Summarising the position of the industry in 1923, Scriven wrote:

The amount of unmanufactured tobacco imported into Australia in 1921-22 was 1,710,435 lb to the value of £2,178,765 and our share of the tobacco trade was 163,078 lb to the value of £12,935. Encouragement has been given and instructors have been brought from other countries. Australian leaf to the extent to 1,386,248 lb weight has been used in factories compared with 15,480,647 lb of imported leaf - and this in a continent admirably adapted for the cultivation of tobacco! Offers have been made by the Government to prepare the crops for market, advances being also offered against the sale of the crop and plant has been purchased and set up for treating the crops - but without avail! (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1922-23, p. 4)

Coffee

With the advent of the *Queensland Agricultural Journal* in 1897 as a medium for extending Departmental and other information to the public, especially to farmers, David Buchanan, Manager of the Mackay State Nursery, wrote several articles concerning the success of coffee growing in the Mackay district.

On 20 December 1898, Howard Newport was appointed Instructor in Coffee Culture at a salary of £250 per year. He had had eleven years experience in India, where he successfully managed a plantation at Melrose, Yercond, in the Madras Presidency. He also visited Ceylon, where he studied coffee culture on that island. On behalf of the Government of India and the Central Indian Planters Association, he introduced scale-eating beetles as a means of control of coffee pests, including the ladybirds *Cryptolaemus montrouzieri*, *Orcus australaseae* and *Rhizobius ventralis*. (Tryon, H., *An. Rept Dept Agric.*, 1897-98)

Newport arrived in Brisbane from India on 10 January 1899 and on 21 January travelled to Cooktown under instruction from the Under-Secretary to work his way down through the coffee-growing districts as far as Mackay and compile a report on the industry. He had covered only the Cairns district when Ebenezer Cowley, Manager of the Kamerunga Nursery, died on 8 February. A telegram from the Under-Secretary directed Newport to take over the managership of Kamerunga and also the duties of Inspector under the Plant Diseases Act, which required almost daily attendance at the Cairns wharf to declare bananas leaving for Victoria free of fruit-fly infestation. He was relieved of Kamerunga by the sub-overseer of the Mackay State Nursery, G. B. Brooks, on 25 June 1899, and an Inspector under the Plant Diseases Act was appointed to Cairns.

Newport had visited coffee growers at Hambledon, Kuranda, Myola and Atherton (43 in all, representing 200 acres of coffee), but had not been able to visit the two largest growers around Cairns - the Hon. De Molyns at Lower Russell with 75 acres and Messrs Cutten Bros. at Clump Point with 80 acres. His first impressions were that the soils and climate were suitable, but the labour problem could be vital, and so quality of produce would be all-important; he pointed to a recent report from England that prices were depressed for all except the finest coffee. Critics had blamed the quality of Queensland coffee on poor curing, but Newport was quick to add that it was also due to poor cultivation (methods, times and seasons).

Early in 1899 a small shipment of 5 cwt of coffee was sent to England and was sold at 48 shillings per cwt. The sample of beans was pronounced somewhat small, but pretty coffee, well cured and dried and comparing favourably with Central American produce. This led McLean, the Under-Secretary, to write:

We import about £7,000 worth (equal to 104, 901 lb. of raw and 52,955 lb. of roasted coffee) every year...One hundred acres in full bearing would supply the present demand in Queensland, and 500 acres under coffee would probably meet the Australasian requirements. At present there are not more than 300 acres planted, of which perhaps 50 acres are in full bearing. At the best 1 ton per acres may be gathered from trees over 4 years old.

...That Queensland is eminently suited for successful coffee-planting, no one can now doubt. The industry has grown beyond the experimental stage, and now it is only a question of good management and economical working of the plantations. Mr Newport, the Government Expert, will no doubt succeed in his work of instructing planters in the most up-to-date methods of planting and curing. There is no leaf disease here, the climate and soil are adapted to the plant,

and, if there be any difficulty, it will be in harvesting, owing to the present scarcity of pickers, but this is a matter which, like all other problems in agriculture, will settle itself as the occasion arises. (*QAJ*, Vol. 4, 1899, pp. 289-290)

The previous year, in June, the Rev. E. R. Gribble, in charge of the Aboriginal Mission Station at Yarrabah, had sent several Aboriginal boys to pick the coffee crop at Hambledon plantation (*QAJ*, Vol. 3, p. 171), but generally it was picked by contract by gangs made up of white men, women and children.

In July 1899, a packet of seeds from India forwarded to a resident in Queensland was confiscated by the Post Office in Brisbane. The consignee protested against the seizure on the grounds that the seeds in question came under the heading of "grain", against the importation of which there was no prohibition. The confiscation was made to protect the Queensland coffee industry from the ravages of the fungus *Hemileia vastatrix*, which causes coffee leaf disease and wiped out the coffee industry in Ceylon. The disease is carried especially on seeds and on charcoal in seed packing. It had spread from Ceylon to India, Mauritius, Samoa, Fiji, Java, Sumatra, New Guinea, Africa and Guatemala. Thus Queensland quarantine was effective even in those early days. (*QAJ*, Oct. 1899, pp. 408-410)

Newport continued his survey in 1900. From his headquarters at Cairns he visited all coffee-growing districts, including Cooktown, Daintree, Port Douglas, Cairns, Atherton, Myola, Oaklands, Mantaka, Kuranda, Mulgrave, Lower Russell, Clump Point, Mackay, Mount Jukes, Hampden, Rockhampton, Byfield, Yeppoon, Maryborough, Pialba, Bundaberg, Blackall Range, Coolum and Buderim.

From Cairns as far south as Townsville, Newport said kilns would be needed to dry the coffee beans. A lot of coffee was not properly dried after hulling, leading to weight losses of 30 to 35 per cent. South of Townsville air-drying was possible. Weed growth was a problem while growers were waiting for trees to bear. The main variety in use was Arabica, with a little Liberian. Several varieties of Arabica were in use.

By 1901 new machinery for pulping and drying had become available and Messrs De Molyns and Cutter of Lower Russell, Messrs Law, Smith and Co. of the Phoenix Engineering Works, Cairns, began to produce good pulping machines for up to 15 acre plantations.

G. B. Brooks was appointed Manager of the Biggenden State Farm on 1 May 1901 and John Malcolm succeeded him at Cairns.

In that year some Buderim coffee was awarded a gold medal at the Earl's Court Exhibition in London. The Cairns District Coffeegrowers Association was given permission by the Department to apply for a quality standard certificate in case the export of coffee was initiated.

At that time some 700 acres were under coffee; the beans were all sold locally at 56s cwt in the parchment and 112s cwt for clean beans. The oldest coffee trees were not more than six years old.

During the year 1903-04 Newport's time was taken up by matters outside the coffee industry, mainly inspection on the Cairns wharf under the Diseases in Plants Act, new pineapple plantings on the Cairns-Mulgrave Tramway Extension, inspection of orchards for fruit fly and and enforcing the Act regarding the wild guava pest. In the Department's annual report for 1903-04 (p. 21), Scriven wrote:

The area under coffee last year was practically the same as that of 1902 viz. 394 acres in 1903 and 396 acres in 1902, a difference of 2 acres. This industry is apparently stationary, with a downward tendency and the reason for it formed the subject of inquiry by the Agricultural Adviser when in the North. The causes assigned by those from whom enquiries were made for abandonment of plantations that had been laid down with high hope of success included:

- (a) The large area under coffee in South America, and the reduction in the value of coffee,
- (b) Inability to compete with countries where labour is more plentiful and cheaper,
- (c) Scarcity of labour,
- (d) Customs tariff.

Another reason not given...is that men of limited means and but little knowledge of coffee cultivation have spent their capital and have not been able to carry on till the plantations come into bearing in four years.

With Mr Newport's instruction he has faith in the future of the industry.

Newport's suggestions as to the causes of decline were

- 1. drop in the price of coffee at a time when our plantations were giving the first returns;
- 2. the unfavourable seasons of late years;
- 3. areas laid down to coffee under unsuitable conditions and excess of area over capital available, leading to the abandonment of many acres that had been included in the statistics;
- 4. customs tariff.

He said Queensland coffee had much improved in quality and sold through Sydney brought $7\frac{1}{2}d/lb$ or £70/ton which gives a fair return per acre.

Newport reported that uniform grading was badly needed.

During 1904-05 coffee-curing rooms were provided under the office of the State Nursery, Kamerunga. Equipment included an engine, a Smout's huller, a Peaberry separator to remove round or peaberries in two sizes, a grading machine, and a Gordon's machine, for grinding coffee into three sizes. Treatment of beans sent in from Cooktown, Atherton, Tolga, Myola, Kuranda and Babinda Creek occupied Newport's time during 1905-06. All the coffee was sold in Sydney by the Department on behalf of the growers at 7½d per lb or £70 per ton. An advance was made to farmers on receipt of the raw material and the balance, less charges, was paid upon the sale of the product.

At the Farmers Conference in May 1905 a resolution was passed: "That the Conference is of the opinion that the coffee industry requires one penny per pound further protection for its development".

Newport was ill from August 1906 to January 1907 and then absent on sick leave during the 1907-08 season; no coffee was treated at Kamerunga and the beans were returned to the growers. In that year the total area under coffee was 256 acres, only 171 acres of which were north of the 20th parallel.

Sugar was taking over from coffee, and Scriven, the Under-Secretary, pleaded with growers with large families to plant coffee as a subsidiary crop or even as windbreaks around sugar fields.

Charles Edward Wood, previously from Rugby and Downton Agricultural College, England, and with ten years' experience in tropical agriculture in Queensland, was appointed overseer of Kamerunga on 9 May 1909. In 1911 Newport was appointed Instructor in Tropical Agriculture, with his headquarters at Cairns. Thus Newport severed his connection with Kamerunga. During 1914-15 he was in charge of the Botanic Gardens at Rabaul. During his absence, his work was entrusted to Wood.

In 1915, the Department arranged with R. W. Warren of Home Hill to provide two acres to be put under coffee under the supervision of a Departmental officer. The Department was prepared to pay a portion of the preliminary expenses. Planting was to take place between January and April 1916, but the exigencies of war prevented this.

By 1917 Scriven was forced to comment:

The cost of picking in comparison with countries where labour is cheaper and more plentiful probably has some bearing on the decline of the crop, but it is probable that with both the coffee and tobacco crops the real reason is that they are too small for the Queenslander to care for. Later, when population becomes more congested, and competitors keen, some attention may be given to them. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1916-17, p. 20)

In the following year he appealed to farmers to grow coffee for their own use as the cost of harvesting the berries commercially was a handicap.

In the Department's annual report for 1918-19, Scriven noted a comment by Mr Farrar, the acknowledged authority in London on the coffee market: "his ambition is to have at one time five bags in one lot of that choice Queensland coffee...and with that quantity he would so place it that the coffee broking world would be agog with it." The coffee so praised had been grown by T. A. Bromiley of Pialba and sent to London as part of a consignment of Queensland products for the use of the Agent-General in advertising the State.

Rubber

In 1885 a Mr Waldegrove J. Thompson imported seed of Ceara rubber (*Manihot glaziovii*) from Ceylon and planted it on "Esmeralda", his plantation near Mourilyan Harbour. A severe cyclone destroyed most of the trees and the plantation was abandoned but the seeds of the trees that survived germinated and several young trees were found in 1899 under the fourteen-year-old parent trees. A plantation owned by Messrs Seymour and Allen was also destroyed.

In 1895 Ebenezer Cowley planted seeds of Ceara rubber and Para rubber (*Hevea brasiliensis*) at Kamerunga and cuttings of Rambong rubber (*Ficus elastica*) from New Guinea. Two years later, he wrote that nowhere in north Queensland did satisfactory conditions prevail for the production of *Hevea brasiliensis*.

The minimum thermometer has been known to go very low into the forties at Kamerunga, and dry weather has prevailed for about three months at a time, so that, except for curiosity, it

would not seem advisable to undertake the culture of Hevea braziliensis or any of its congeners in our Northern territories. (Cowley, E., *QAJ*, Vol. 1, 1897, p. 46)

In 1900 a suggestion was made that planters in the north who cultivated "the richest of Australian land on the banks of the rivers" should sow a few hundred seeds of Central American rubber (*Castilloa elastica*) both in the open and in the partially cleared scrub. "If the trial proved successful they would have provided a splendid asset for themselves and their posterity. If it failed, they would still have done good service by showing that rubber cultivation in North Queensland could not be carried out with any hope of success." (*QAJ*, Vol. 6, pp. 302-204)

In 1906 Newport reported considerable interest in rubber in the north. "Because of the length of time between seeding and revenue producing the next generation will benefit. Kamerunga trials show rubber to be easily and successfully grown and returns per acre are high. Ample land is available and tapping can be done by white labour." He sent seed to the New Hebrides, the Solomon Islands, Fiji and New Guinea.

In 1907 he began tapping experiments using seven different methods on the ten seven-year-old Para rubber trees for a yield of rubber estimated at £85 per acre. The demand for Para rubber seeds that year exhausted the supply and Henry Tryon, the Government Entomologist and Vegetable Pathologist, submitted a special Regulation under the Diseases in Plants Act providing for admission of seeds from the Straits Settlements under conditions that would exclude spores of Coffee Leaf fungus (*Hemileia vastatrix*).

By 1908 Newport was so enthusiastic that he predicted that rubber would shortly have a column for itself in the agricultural statistics as plantings had been considerable, many new plantations having been started by interplanting rubber amongst bananas at Cardwell, Tully River, Geraldton (Innisfail) and South Johnstone. He wrote several articles on rubber cultivation that were published in the *Queensland Agricultural Journal* and toured Ceylon and South India at his own expense, publishing his experiences on his return.

Summarising the rubber-bearing plants under investigation at Kamerunga in 1909, Newport listed the following:

Euphorbiaceae

10 trees of Para rubber (*Hevea brasiliensis*), planted 7April 1899 12 trees of Ceara rubber (*Manihot glaziovii*) Some Manicoba rubber (*Manihot* sp.) Some Jequie or Jiquie rubber (*M. dichotoma*) Some Remanso or Picauhy rubber (*M. piauhyensis*)

Moraceae

17 trees of Central American rubber (*Castilloa elastica*), planted 30 January 1901 3 mature and several young trees of Rambong or Assam rubber (*Ficus elastica*) New Guinea rubber (*Ficus rigo*) Apocyanaceae (not worth cultivating)

Ire or Lagos rubber (Funtumia elastica)

West African rubber (Tabernaemontana crassa)

Alstonia sp.

Beaumontia (*Cryptostegia*) grandiflora - a creeper later to become a pest in central and north Queensland near coastal areas.

Owing to a shortage of staff, the only tapping done was to provide specimens of sheet, or biscuit, worm, crepe, ball and block rubbers for exhibition, lectures and school museums.

So heavy was the demand for seed of Para rubber that in 1910 it was decided to plant up seven acres at 100 trees to the acre, of old experimental land on the banks of the Barron River in the coming season.

In the 1909-10 annual report (pp. 67-74), Newport wrote guardedly and at length on the possible economics of rubber production in north Queensland, suggesting rather that waste places in existing sugarcane and banana farms be planted and tapping done during otherwise slack times on the farm.

The labour best suited (to tapping) is the quick worker with light touch rather than the physical giant of great muscular power. In fact, the work of collecting and coagulating the rubber could as readily be done by women and boys as men, and is the work which could be quickly learned and readily undertaken by those whose physique or health did not enable them to compete with the worker of more robust constitution. As an industry therefore, temporary or otherwise, for the city worker, who, on account of being long accustomed to office work or sedentary employment is unfitted for strenuous physical effort.

However, he added a warning:

While the cultivation of rubber is undoubtedly a sound proposition, even with the labour obtainable in tropical Queensland, it must not be thought that tapping can be carried out as cheaply here as where labour is but a few pence per day. Nor can the difficulty that will as inevitably be met with in the large plantations, of obtaining the necessary amount of labour, be ignored; and it were better for the industry, if it is ever to be established, that these facts be squarely faced, and openly and as far as possible correctly stated, in the authorised publications of the Department, than that any misapprehension be permitted to gain credence perhaps only to be discovered years afterward.

In 1913 the price of marketable rubber had dropped materially and Newport, by now Instructor in Tropical Agriculture and based at Cairns, declared that under white labour conditions the margin of profit became very narrow. When the bonus was calculated on 10 per cent of the value without a minimum, it ceased to become an inducement, and a minimum of at least 1s per lb would be worth consideration.

The year 1910-11 was very wet, with a recording of 159.12 inches from December to April. Heavy flooding resulted and two bad cyclonic storms caused serious damage to the bushhouses and germinating houses. It was followed by the driest year on record in 1911-12. Three thousand rubber plants and 5000 Para rubber seeds were obtained by a

company starting on the Daintree River banks. On 28 October 1911 some 6175 Para rubber seeds were received from Ceylon and 2230 plants emerged.

A number of Ceara rubber plants were given to Joseph Campbell of "Gossypium Park" near Cairns for special experiments.

In 1912-13 further cyclone damage occurred and the Barron River changed its course, affecting the nursery. During 1915-16, the Government decided to close down the nursery; a caretaker was appointed to look after it and keep down weeds and grass.

Coconuts

After the coconut-planting program on the islands off north Queensland in the late 1880s and early 1890s there was a lull until 1913-14, when a number of people imported coconuts for planting in the Gulf of Carpentaria. Plantations of various sizes were also laid down at Cape Bedford, the Bloomfield River, Port Douglas, Ella Bay, Maria Creek, Cardwell, Mourilyan and Clump Point. About 37 growers north of Ingham cultivated a total of 31 acres.

During 1914-15 one thousand coconuts were planted in a demonstration plot at the Stock Experiment Station, Oonoonba, near Townsville. In addition, a Mr Matzat of Rock Point, between Port Douglas and the mouth of the Daintree River, had seven- to eight-year-old coconut trees flowering and he intended to produce copra.

Fruit

On 14 December 1896 A. H. Benson was appointed the first Instructor of Fruit Culture and by the end of the year had travelled through most of Queensland's fruit-growing areas. He then wrote a series of articles, published in the *Queensland Agricultural Journal*, dealing with fruit culture - on adaptation, soils, sites and provision of shelter, laying out an orchard, mulching, pruning, propagation, grafting, green manuring and citrus culture - followed by monthly "Orchard Notes".

The Diseases in Plants Act of 1896 was assented to and on 1 January 1897 Daniel Jones and five others were appointed Inspectors under the Act. In connection with this Act, Jones wrote:

[It] has, as its prime motive, the protection of our local fruit-growers from further contamination from outside sources, and also...the prevention of the dissemination of diseases through the ordinary channels of trade by the agency of our own producers...we...inspect and condemn diseased fruits arriving from our Northern ports by sea and from inland by rail...

The interdiction of fruits that convey such formidable enemies to the orchardist as the San José Scale, which has appeared on imported apples from California, and now is found on some types of apples sent from New South Wales, have been amply justified.

Jones pointed out that San José Scale, Codlin Moth, fruit fly, Red Scale and Pear Scab had all entered Queensland from New South Wales. (Jones, D., *QAJ*, 1899, Vol. 4, pp. 190-194)

Mangoes soon claimed Benson's attention. In 1892 a Mr Stewart of the Daintree River had succeeded in drying the mango and sent a nice sample to the Department. However, the mangoes available were often affected by a carrot or turpentine flavour and Benson warned against sending unpalatable mangoes south: "A good mango should be fibreless or nearly so, should have no pronounced unpleasant flavour and be either a luscious high flavoured fruit or a juicy, good flavoured, sprightly fruit. Large mangoes are not an advantage - a round mango of 6 to 8 oz. weight being the best size and shape for packing and carrying."

By 1901, it was said that if mangoes were not yet the most extensively grown and abundant fruit in Queensland, they soon would be. However, this was not to be. The Agent-General when visiting Queensland in 1913 advocated a trade in chutney, with mango the main ingredient. A bulk consignment was sent to London to test the market.

During the year 1899-1900, using Departmental equipment, Benson carried out extensive treatment of nearly 7000 citrus and mango trees with hydrogen cyanide gas to destroy various scale insects. The area covered extended from Mt Cotton in the south to the Burrum River in the north. Experiments to destroy other insect and fungus pests were initiated, especially against fruit fly, using cow-dung smoke, or boiling larvae in infested fruit, or fly-trapping. Benson stressed the importance of destroying the first crop of mature flies each season.

S. C. Voller was appointed Assistant Instructor in Fruit Culture on 15 February 1898, with supervision of the orchards on the state farms and fruit packing as his major interests. Fruit packing was of prime importance as Benson was advocating the opening up of new markets for fruit - oranges, pineapples and bananas in particular. On 20 July 1900 an experimental shipment of oranges from Buderim and Woombye was sent by ordinary cargo to Vancouver and opened well, bringing 3s 11.85d per case compared with the local Queensland price at the time of 2s 6d per case. To establish an export trade, Benson said that farmers should be supported by a central packing house to handle their fruit for export. The Queensland Citrus Growers Association was formed and shipped some 2000 cases of fruit to England in 1904, but the shipment failed owing to poor-quality fruit. Scriven, the Under-Secretary, sought information on the temperatures necessary to hold fruit in storage during transport to prevent deterioration. He felt that an experienced man should be sent to different markets to watch sales and learn the customs of the trade and other surrounding circumstances, such as quality of the fruit.

During 1904-05 the Adelaide Steamship Company erected a fumigating chamber on the wharf, the third chamber in addition to the Departmental one already in existence.

Not only overseas markets but also interstate markets for bananas, oranges, tomatoes and cucumbers were being studied. A new centre for banana export was established at Liverpool Creek (Innisfail) and a tram line to Mourilyan Harbour was built. Inspection at Port Douglas, operated from Cairns, was under consideration in 1905.

It was found necessary to standardise the size of the fruit cases when the Victorian Fruit Cases Act was brought into operation.

In 1906 canning of pineapples was being done by some half dozen firms whose output during the previous season had been more than 5000 cases of canned pineapples. Some pulp sent to

London by the Zillmere Canning Association gained good prices. A beginning was made also with mango chutney, and strawberry, rosella, guava and Cape gooseberry jams.

Pineapple fertiliser trials were successful.

A cyclone in January 1905 wrecked the banana crop in the Johnstone River area and Scriven wrote in June 1908:

The destruction of many hundreds of acres of banana gardens, and the fact that many of the growers (Chinese) looked upon the cyclone as a visitation of the wrath of the Supreme Being and so abandoned the cultivation of the plant for other occupations resulted in such a diminution of output that the North to some extent lost its reputation. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1907-08, p. 22)

A total north Queensland crop of 1 250 000 bunches of bananas was expected to be harvested in 1906. Some interest was being shown by white growers on smaller but better-worked plantations of 3 to 5 acres, but south Queensland growers at Buderim and along the Blackall Range supplied southern Queensland and Sydney, whilst the Innisfail to Cairns group supplied Melbourne and Adelaide by ship. However, by the following year banana cultivation had spread to new areas and in 1913 some 326 acres were planted to bananas at Innisfail (Geraldton), 542 acres at Mourilyan Harbour, 900 acres at Maria Creek and 300 acres at Tully River.

As early as 1889, Victoria had refused to receive Queensland bananas unless they were accompanied by a certificate of cleanliness. Warnings had to be translated into Chinese for proper precautions to be adopted. The 1905 cyclone so seriously set back the northern trade that Fijian bananas were accepted in the Melbourne market. In April 1905 Victoria proposed to prohibit Queensland bananas unless they were packed in crates. At a conference of Ministers for Agriculture in Melbourne, it was arranged that Turner, the Chief Inspector of Fruit in Victoria, should visit north Queensland to advise on requirements for banana marketing. Growers were shipping bananas that were green and hence of poor quality, but Turner assured them that clean fruit, even if ripe, could be shipped successfully. Scriven advised the northern growers to ship bananas that were sufficiently ripe to present a full-bodied fruit or they would lose the Victorian market to Fiji producers. Fiji had offered a subsidy to a steamship company to trade with Australia.

Meanwhile, because the Chinese growers in the north moved to new lands as fertility and hence fruit quality declined, J. C. Brünnich, the Agricultural Chemist, initiated fertiliser trials on Gill's Mourilyan plantation and on Tam Sie's Innisfail farm in 1908. These were followed by trials at Buderim Mountain, where lime, potash and chlorine were found to be deficient and lime plus muriate of potash was recommended. New varieties of bananas were being propagated at the Brisbane Botanic Gardens to attempt to improve yields.

During the 1908-09 year, A. H. Benson, the Instructor in Fruit Culture, spent six weeks in England examining markets for citrus, pineapples and possibly apples if suitable transport could be arranged. He stressed the need for Queensland to market only the choicest fruit, which should arrive in London at the right time. Citrus should arrive only during August and September in order not to coincide with consignments from the Mediterranean, West Indies or USA; apples should arrive before the landing of fruit from the southern States of Australia at the end of March; and if pineapples landed in good order, and were of good

quality, a market was available. Benson also visited Ceylon, Singapore and the Federated Malay States to enquire into the pineapple industry.

On 31 May 1910 Benson resigned to become Director of Agriculture in Tasmania, to return in 1915 as Director of Fruit Culture. Meanwhile, his place was taken by Charles Ross, previously Manager of Hermitage and Westbrook State Farms. From 1 June 1911 Ross spent three months travelling around the State's fruit districts to give instruction, especially in spraying, which was being neglected. The Interstate Conference of Ministers for Agriculture, held in Brisbane on 19 to 20 May 1914, dealt with fruit nomenclature and the problem of second-hand fruit cases, which could be used for jam distribution and then destroyed.

An Interstate Conference on Pomological Nomenclature was held in Hobart in May 1914. The problem of bitter pit in apples was being investigated by a Mr McAlpine in Victoria and Inspector Henderson at Stanthorpe collaborated with him. By now Stanthorpe was becoming an important grape centre, rivalling Roma.

The Fruit Cases Act came into force on 1 June 1915, two and a half years after it had become law. In future all fruit had to be sold in cases containing one imperial bushel or a known part of a bushel ($\frac{1}{2}$ or $\frac{1}{4}$ bushel). Pineapples were exempt and a special case was used for this fruit. All cases had to bear an inscription so that the consumer could identify their source.

In summarising fruit production in 1915, Ross referred to a large increase in fruit development, with pineapples at Mt Larcom, Beerwah and Glasshouse Mountains; bananas on the clay soils at Cooroy; citrus on the South Coast and on Tamborine Mountain; lemons at Helidon; rockmelons at Rockhampton and Bowen; strawberries, bananas, custard apples and passionfruit at Cleveland, Redland Bay, Ormiston and Wellington Point; and apples and stone fruit at Stanthorpe.

A. H. Benson rejoined the Department as Director of Fruit Culture in September 1915. By then, the banana industry had moved mainly to south-eastern Queensland, bananas being replaced by sugarcane on suitable lands in the north. Benson asked for a first-class microbiologist to assist Henry Tryon, and pointed out the need for a guarantee by merchants of the contents of organic manures and limestone under the Fertiliser Act. To assist fruitgrowers and farmers generally, the Department installed a lime-crushing plant at Gore but there was such a poor response from farmers that the plant was shut down. It was later acquired by A.C.F. and Shirleys Fertilisers Limited.

In 1917 the Queensland Fruit Canners and Jam Manufacturers Association shipped 20 000 cases of canned pineapples valued at £13 000 to the Imperial Government through the Agent-General. Pineapple jam was also sent to London but did not sell: it was a new product and it was found hard to break in to the market. Locally there was a general problem of over-production and under-consumption, as fruit was regarded as a luxury. A conference of fruitgrowers in Brisbane in October 1916 had decided that some cooperative effort was needed to stem over-production but did not know how best to go about it. With such a variable climate and uncertain transport during the war, grower cooperation was essential.

In 1918, there was a heavy demand for pineapple jam, sauces and chutneys for the troops and in Europe, and for marmalade for domestic consumption.

S. C. Voller, the Assistant Instructor in Fruit Culture, died on 30 June 1918 and it was decided to appoint a Northern and a Southern Instructor in Fruit Culture.

E. H. Rainford, the original viticulturist and later Inspector, retired and C. Ross was transferred, as Senior Fruit Instructor, to take charge of the Coominya vineyard, established to investigate varieties and culture in preparation for settlement of returned soldiers, who would require *Phylloxera*-resistant cuttings. Returned soldier settlement blocks were made available at Maroochydore for pineapple-growing. Queensland was asked by the Federal Government to supply a quarter of a million pounds of jam of the 50 million required for war purposes in 1918 and pineapples and oranges had to be shipped south for jam-making when the fruit and the sugar were available here.

Papaws were coming into favour with Queenslanders at this time and it was felt that if coastal steamers could be equipped to carry the fruit to southern markets a big demand would develop.

Shipping had been unreliable during the war years. At a local conference of North Coast fruitgrowers held at Palmwoods in November 1918, it was decided to form the combined North Coast Fruitgrowers Association, to include all associations between Caboolture and Gympie, and within six months twenty-eight societies had joined. The Association organised the regular running of fruit trains to Wallangarra and thence to Sydney and Melbourne. By 30 June 1919, 45 per cent of the Queensland's total exports was transported by rail.

At a conference of fruitgrowers held in Brisbane on 3 and 4 April 1919 the Queensland Federated Fruitgrowers Association was formed. It had delegates from six fruit-producing districts, and was to be non-trading and non-political. It asked the Minister to legislate to deal with standardisation of preparations used for the destruction of fruit pests. Mr Harvey, who invented Harvey's Fruit Fly Lure, addressed the conference. The 1919 drought and influenza epidemic affected trading, although vegetable growers who had irrigation plants did very well out of the high prices.

Viticulture

As had happened with other new technical appointees during their first months, the Under-Secretary sent E. H. Rainford, the newly appointed Viticulturist, on 1 January 1898 on a tour of the grape-growing districts of Queensland to familiarise himself with the State's varying climatic and soil conditions. Rainford reported that north Queensland was not promising for grapes because of the short winter and long vegetative period, but there was no disease present and so he thought a small vineyard of specially selected vines might be a success. He suggested planting varieties adapted to the various systems of pruning on all the state farms. He took over the supervision all the vineyards on the state farms and at the Queensland Agricultural College to discover which varieties would be suitable to the various districts. He considered the costs in Queensland would be too high to develop an

export market in wine so the best practice would be to concentrate on the home market, and urged that a heavy customs duty be placed on imported wine.

In 1899 about three acres were planted exclusively to wine grapes near the Principal's residence at the College, with the object of eventually giving practical lessons in wine-making to the College students. The vineyard contained the best varieties of French, Spanish and Portuguese grapes.

Rainford advised Queensland vignerons to aim for light dry red and white wines to meet competition from Victorian and South Australian wines of better quality. He was very critical of the wines sent from Queensland in 1899 to the Great Britain Exhibition.

Rainford attended the *Phylloxera* Conference in Melbourne in September 1899. He recommended the introduction of American resistant stocks and obtained ten varieties from America and distributed them amongst the state farms to test their behaviour in different soils. Vines imported in 1898 and planted in isolation at St Helena had done well and were free from disease and were to be sent to the Westbrook State Farm for propagating.

Soon after his arrival Rainford had begun to write a series of articles on wine-making, pruning, soils suitable for grapes, and description of individual varieties, which appeared in the *Queensland Agricultural Journal* between 1898 and 1901. He warned that with Federation would come a reduction in or abolition of duties on wines from the southern States and that Queensland wine-makers must improve quality and reduce costs to survive. (*QAJ*, Vol. 4, June 1899, p. 457)

At the Farmers Conference in Bundaberg in 1901, the Minister for Agriculture, the Hon. D. H. Dalrymple, said, "Some of our vignerons appreciate the assistance given them by the Viticulturist, one wine maker having written to the Department to the effect that £500 a year had been put into his pocket by Mr. Rainford's services."

There was a big demand for cuttings from the state farms.

Problems with grape production in Queensland included droughts, hot winds, frosts and hail. One of the difficulties Rainford found for wine-makers in the State was the abnormal amount of albuminous, peptic and gumming matters in Queensland musts, causing proneness to bacterial invasion, especially in white wines. He suggested that a state experimental vineyard be established, with a properly equipped cellar for vignerons to visit. He also felt that a Wine Adulteration Act was needed as there were a lot of "fictitious wines" being sold, for example, fermented cane sugar and water, dyed and scented. Rainford advocated better packing of grapes, preferably in granulated cork, and said that cork trees should grow well in the granite detritus at Stanthorpe. (Rainford, E. H., *An. Rept Dept Agric.*, 1900-01, pp. 21-22)

The vineyard planted at Gindie State Farm was seriously affected by drought and in 1901-02 the surviving vines were transferred to Westbrook State Farm as Rainford was of the opinion that Gindie was not suitable for such crops. The Hermitage vineyard did not do well and was grubbed out during 1903-04.

On 1 December 1903 the Hon. Digby Denham announced that the services of Edward Henry Rainford, Viticulturist, would be dispensed with as from 31 December 1903. In 1907 he became a Fruit Inspector at Bowen, retiring during the 1917-18 year. The supervision of the remaining vineyards then came under the jurisdiction of the Instructor in Fruit Culture.

The vineyard established at Roma State Farm in about 1906 gave some promise of successful production but in 1907 was affected by Anthracnose (black spot). Marauding birds destroyed the 1909-10, 1910-11, 1912 and 1914-15 crops, while wet weather and uneven ripening were often problems.

In 1913 Mr Castella, Viticulturist to the Victorian Department of Agriculture, inspected Queensland vineyards. He found *Phylloxera* at Enoggera, but elsewhere the vines were free from this problem.

In 1916 Charles Ross published a list of recommended early varieties of table grapes, including fourteen varieties amongst which Black Hamburg and Royal Ascot were numbered. He also recommended seven varieties of wine grapes, cuttings of which could be obtained for 6s per 100 from the Roma State Farm. Black Hamburg and Royal Ascot varieties were also included in this group.

During the 1916-17 year A. H. Benson, the Senior Instructor in Fruit Culture, established an experimental vineyard at Coominya devoted initially to the production of stocks upon which to work selected grapes. These stocks were resistant to *Phylloxera* and had some tolerance to Anthracnose (black spot) and *Oidium*.

Table and wine grapes were also planted. Ross, Instructor in Fruit Culture, was placed in charge. These vines did well initially and in 1916-17 Benson stated:

This vineyard will eventually prove of great value to the State as it will not only be a source from which cuttings of many varieties of grapes may be obtained true to name, and resistant Stocks purchased but it will show the best types of grapes to grow for our local markets and the resistance or liability of such grapes to disease. Further the vineyard will be of value in determining the best methods of pruning to be applied to the different varieties of grapes, as well as the best means to be adopted to keep down pests, both insect and fungous. (Benson, A. H., *Rep. Dep. Agric. Stk*, 1916-17, p. 69)

Ross was later able to recommend grape varieties for south-east Queensland. A list of the varieties of grapes in the vineyard and their suitability was published in the *Queensland Agricultural Journal* in May 1919. However, in 1920 Benson admitted that growing of grapes on the coast was uncertain, owing to fungal attacks. Hailstorms also caused damage.

In June 1922, the experimental vineyard at Coominya was closed as many of the varieties being tested there had proved totally unsuitable for growing in coastal areas. Also many of the vines had not recovered from a serious attack of downy mildew. Of the eight varieties of resistant stocks at Coominya, six had proved more or less resistant to downy mildew. It was decided to give commercial varieties trials elsewhere.

R. E. Soutter, the Mananager of Roma State Farm, tried his hand at grape breeding in the early 1920s with some interesting results.

Fodder conservation

A special effort was made by the Department to encourage the storage of fodder as silage prior to World War I. Experiments in silo construction using various materials were made at the Queensland Agricultural College and at Hermitage, Roma and Biggenden State Farms. Fodder crops for silage were demonstrated at Mundubbera, Baking Board, Jackson, Wallumbilla and Miles.

During the 1913-14 year H. C. Quodling, Director of Agriculture, canvassed fifty dairying districts covering 400 miles of coastline and as far west as Mitchell and Inglewood; he demonstrated the method of making stack silage at Dugandan, Engelsburg (Kalbar), Brookfield, Peranga, Inglewood, Dulacca, Blythesdale, Hodgson, Goomeri, Gayndah, Miriam Vale and Mackay, and published a pamphlet on the subject.

The year 1916 was a bad drought year and, in conjunction with the Chief Dairy Expert, Quodling formulated a plan in which head office staff and twenty dairy inspectors cooperated with farmers to get ten acres of maize planted for silage on each farm. However, although fourteen localities were selected, the poor season produced only three crops. G. B. Brooks, the Agriculture Instructor, was able to have fifty stack silos erected in the Burnett area.

In 1917 the scheme was pursued and all the available dairy inspectors were brought to the Queensland Agricultural College at Gatton for a course of instruction in fodder conservation.

Pastures

The first Colonial Botanist, F. Manson Bailey, placed great emphasis on the preservation of Queensland's native grasses and early pastoral work on the state farms, especially Hermitage, centred on this objective.

H. M. Williams of "Florida", Wollongbar, New South Wales had sent John Mahon, Principal of Gatton College, 5 lb of *Paspalum dilatatum* seed for experimental purposes. This grass proved so successful that it was widely distributed throughout the State. (*QAJ*, Vol. 2, 1898, pp. 259-261) (See also Chapter 4.) It was later joined by Rhodes grass, which found favour in slightly drier areas and in the early days of settlement on the Atherton Tableland while the soils were still well-supplied with nitrogen from rotting vegetation. In his annual report for 1914-15 Scriven reported that, in addition to 981-218 acres under cultivation in 1914, there were 290-147 acres under permanent artificially sown pasture, for the greater part probably sown with paspalum and Rhodes grasses.

At a conference of agricultural scientists in Melbourne under the auspices of the Commonwealth Bureau of Science and Industry, from 9 to 16 November 1917, it was moved by H. C. Quodling and carried unanimously that the conference recommend the establishment of an organisation to deal with the collection, propagation, improvement and cultivation in suitable areas of the most promising indigenous grasses and fodder plants. A

special committee was formed and C. T. White was appointed the Queensland representative. The Chairman was E. Breakwell, the New South Wales Government Agrostologist. Exchanges of seed took place. (White, C. T., *Rep. Dep. Agric. Stk*, 1917-18, p. 75)

During 1919-20 White received twenty roots of Kikuyu grass (*Pennisetum clandestinum*) from Breakwell. He distributed these around Queensland and the grass proved especially suitable for the Atherton Tableland, where it soon ousted Rhodes grass.

An interesting and important event occurred during the 1913-14 year when Veterinary Surgeon George Tucker submitted a sample of a leguminous "weed" (*Stylosanthes humilis*), then identified as S. *macronata*, to the Agricultural Chemist for analysis. It was collected from the Townsville Quarantine Reserve and was widespread around Townsville. It was said that cows did very well feeding almost exclusively on this "weed". Analyses showed the sample contained 15.70 per cent crude protein in the dry matter. It made good hay and Scriven in 1917 said it should "receive the attention of dairy men".

Crop protection

Henry Tryon, the Departmental Entomologist appointed in 1894, continued to report annually on the occurrence of insects and diseases found damaging a broad spectrum of plant and animal life. These were listed in successive annual reports of the Department. He also wrote numerous articles for the *Queensland Agricultural Journal* and published bulletins dealing with important insects. Having played a major part in introducing the Diseases in Plants Act, he continued to warn of the dangers of new diseases and pests being introduced and becoming established in Queensland. He urged farmers to report any new injurious insect or disease as soon as they had observed it, as any delay could cause serious losses to agriculture. He also noted the importance of the preservation of insectivorous birds and in 1919 was President of the Queensland Gould League of Bird Lovers.

Between 23 August and 11 November 1897 Tryon paid a protracted visit to north Queensland to make a thorough study of the sugarcanes he had imported previously from New Guinea, to ascertain the position with regard to the canegrub menace, and to ascertain what pests and diseases were present in the coffee plantations.

During 1897-98, Tryon and A. H. Benson, Instructor in Fruit Culture, conducted experiments with insecticides. When entomology was included in the curriculum of the Queensland Agricultural College Tryon was to be involved in the teaching, but pressure of work prevented this. However, in early 1900 he did give six lectures to a class of fifteen students.

Practical results of Tryon's recommendation to collect larvae and pupae of the canegrub and destroy some of its feeding trees were being publicised. At the Agricultural Conference at Mackay on 26 to 29 July 1899, W. T. Paget (later Minister for Agriculture) of "Nindaroo" said:

In 1894, we had the assistance of the Agricultural Department and thanks to the exertions of Mr. Chataway (Minister for Agriculture) Mr. H. Tryon, the Government Entomologist, visited the district and personally I may say I am indebted to Mr. Tryon for teaching me how to tackle the grub...in five years...we have reduced the destruction of cane from many thousands of tons

of cane per annum to practically nothing and we have reduced the catch of beetles from 8000 lb to 800 lb.

Funds for the beetle collection came from voluntary subscriptions subsidised by a special grant of a Government subsidy. (*An. Rept Dept Agric.*, 1898-99, p. 38)

During the 1899-1900 year, Henry Tryon, with the assistance of C. J. Wills, artist to the Department, began to organise pictorial illustrations of insects of agronomic interest and their depredations, as well as of plant diseases generally. In the following year, Tryon was relieved of his duties as an inspector under The Diseases in Plants Act of 1896, but was kept busy as a referee for cases beyond the knowledge of the inspectors. He began to make a collection of stuffed insectivorous birds for exhibition, together with a collection of useful and injurious insects. A summary of his 1901-02 year revealed also that he had supplied reports relating to 64 distinct kinds of pernicious insects attacking more than thirty kinds of economic plants; and in the field of vegetable pathology, 28 kinds of parasitic disease affecting 20 botanical species. (Dalrymple, D.H., *An. Rept Dept Agric.*, 1900-01, p. 5) A collection of 110 species of insectivorous birds of southern Queensland was prepared for public presentation in 136 glass cases. The collector and taxidermist was T. Batchelor.

In the 1902-03 year Tryon was officially appointed to the dual position of Entomologist and Vegetable Pathologist. During 1903-04, bean fly (stem maggot of beans, *Agromyza phaseoli*) was reported as rampant. A special cactus mealy bug (*Pseudococcus*) imported from Ceylon to attack prickly pear failed to survive the journey, and consideration was given to using the cochineal insect for this purpose. A grasshopper plague occurred on the Downs and a visit to the Isis district by Tryon produced two parasites locally containing the grasshopper plague, a mite (*Podopolipus*) and a wasp (*Scelis*), which led to some publicity.At this time a "locust fungus" imported from South Africa and being cultivated by C. E. French, an entomologist in Victoria, was hailed as a possible counter to grasshopper plagues, and C. J. Pound, the Government Bacteriologist, subcultured the fungus *Mucor racemosus*. But Tryon said any success against grasshoppers was due to the parasite mite *Podopolipus* and not to the fungus.

During 1904-05 Tryon tested the effect of temperature on the fruit fly maggot in fruit in transit. Ordinary cold storage rendered the larvae dormant only, but with temperatures approaching freezing point for 14 days they succumbed.

In 1904 the members of the Toowoomba Agricultural and Horticultural Society congratulated the Department on its interest in insectivorous birds but asked it to take immediate steps to exterminate the sparrow, and to ensure that no harmful animal or bird be brought into the State.

In 1906 Tryon drew up a list of requirements for the introduction of a parasite to combat an injurious insect (for example, the fruit fly, which was raging at the time).

1. The parasite must be one whose inherent rate of increase is high, and its parasitic habit must involve the destruction or suspension of reproduction of its host.

- 2. The insect whose destruction is contemplated through the agency of the parasite must constitute its exclusive or well-nigh exclusive food, and must be freely accessible to its attacks.
- 3. The climatic conditions of the parasite's new home must not be detrimental to its existence and development.
- 4. The parasite must be introduced without previous, simultaneous or subsequent introduction of its own natural enemies (hyperparasites especially) being effected.
- 5. The country to which the parasite's introduction is effected must not already possess any insect in its fauna that will, as a parasite, attack it, or contain other formidable form of natural enemy. (*Rep. Dep. Agric. Stk*, 1905-06, p. 67)

Tryon attended an Entomologists Conference in Sydney in August 1906, where discussions were held on injurious insects, pests and diseases of potatoes and fruit, parasites of injurious insects, predators, interstate inspection, treatment of fruit containers, treatment of fruit scale, destruction of condemned fruit, fumigation, *Phylloxera*, codlin moth and fruit fly.

At a conference of State Premiers during 1907 it was agreed that Froggatt, the New South Wales Entomologist, should be sent to the various countries infested by fruit fly and that his expenses would be paid, per capita, by the States of Victoria, South Australia, New South Wales and Queensland. Froggatt left on his mission in July 1907 furnished, as far as Queensland was concerned, with instructions from the Minister.

By 1907 considerable progress had been made in the control of the sugarcane grub *Lepidoderima albohirtum* by stool injection of carbon bisulphide to support the collection of larvae and beetles which Tryon advocated. On 6 August 1908 it was estimated that the annual loss of cane by grub damage was £40 000 to £50 000.

Tryon was given an assistant, Edmund Jarvis. Tryon had declined an offer of appointment to the Papuan Public Service as he felt he still had work to accomplish in Queensland.In 1911, the problem of rats in the canefields attracted Tryon's attention. The Queensland Silk Culture Association was formed in that year, also.

An important event in 1912 was that Dr A. Breinl, Director of the School of Tropical Medicine in Townsville, on his return from an expedition to the Northern Territory submitted some flies to Tryon, who identified them as *Lyperosia exigua* (the buffalo fly), which could carry the trypanosome of "surra" in horses. The buffalo fly was later to extend its range southwards and cause considerable damage to the cattle industry. At this time also, cattle poisoning by sawfly larvae was reported.In 1913 Tryon was apparently quite frustrated at the lack of action taken by farmers on the advice of specialists. He complained:

There are many people who have a sort of contemptuous kindliness for the Entomologist, and look upon him as an amicable butterfly hunter, but acquaintance with the inner work of the calling shows the importance of it, for by following the teachings of this branch, much anxiety and loss of money can be saved. Take the present outbreak of Irish blight as an example. [Tryon was both entomologist and vegetable pathologist at the time.] At the previous outbreak this Department published an excellent pamphlet by the Entomologist [himself] upon this subject and also went further in equipping a staff of men who travelled through the affected districts and showed the farmers how to save their crops by spraying them at the proper time. But how many farmers are at this day equipped with a spraying plant, and how many of them saved their crops, valued at hundreds and thousands of Pounds, by following the advice of the Entomologist?!!

Tryon pleaded also for more staff. During 1912-13 he was engaged on work with the Prickly Pear Commission and the Assistant Entomologist, Edmund Jarvis, took over his duties. In the following year some attention was given to biological control of insects. Girault, the Entomologist to the Sugar Bureau, tried inoculation of grasshoppers with D'Herelles' *Coccobacillus acridrorum*, a specific bacterium discovered by D'Herelles in Argentina. Tryon reported on the nutgrass mealybug (*Antonina purpurea australis*), now attacking true grasses in Queensland, and on the lantana-seed-destroying fly maggot (*Agromyza lantanae*), introduced from Honolulu in 1914 and liberated by Jarvis to attack lantana. He was awaiting results of the *Podopolipus* attack on grasshoppers, the parasite *Ceromasia lixophage* of the sugarcane weevil borer, and the predator *Plaesius javanus* of the banana weevil borer. Tryon also advocated stricter quarantine against black wart disease of potatoes in Europe, citrus canker in Florida, peach moth in New Zealand, all timber-destroying insects in furniture and importation of plants from British India.

Although the Bureau of Sugar Experiment Stations was a branch of the Department of Agriculture and Stock for many years, work on sugarcane pests was undertaken by the Bureau's own entomological staff. The first appointee to its staff was A. A. Girault, who was stationed in north Queensland from 1911 to 1914, when he returned to the United States. (Veitch, R., "The History of Entomology in Queensland", *J. Entom. Soc. Qld*, Vol. 1, 1962, pp. 5-15)

In 1915 the Assistant Entomologist in the Department, Edmund Jarvis, was transferred to the Bureau to investigate the control of the grub pest, work that was considered urgent. He remained with the Bureau for the rest of his career.

In 1916 the banana beetle borer (*Cosmopolites sordidus*) was discovered as far south as Cooroy in young banana suckers that had come from Mourilyan in north Queensland; at Stoker's Siding on the Tweed River, New South Wales; and at Redland Bay. Tryon recommended cessation of distribution of planting material from Mourilyan and deplored the lack of growers' reports on early discoveries of disease: "Thus have growers shown themselves blind to the interests of their industry."

In March/April 1914, the lantana fly (*Agromyza* sp., native of Mexico), was introduced from Hawaii and placed on lantana. Lantana fruit attacked by the fly fails to produce fertile seed. However, drought prevented the lantana from seeding. Hubert Jarvis, seconded as Assistant Entomologist, went to Hawaii on 2 February 1917: he studied the life history of the fly and made collections of pupae in Hawaii and Fiji. Only those brought in cold storage survived the journey to Brisbane, arriving on 12 March. The emerging flies were liberated at Toowong, South Brisbane, Sandgate and Mooloolah. Jarvis then went to Cairns and liberated colonies at Cairns and Gordonvale (20 to 24 March) and at Mackay (26 March). In October 1917, they were reported to be well established at Cairns. In Brisbane cold weather defoliated the lantana and the insect population was reduced. In 1919 Tryon reported its presence from the Mossman River in the north through coastal Queensland and New South Wales to Sydney.

By the 1918-19 year, Harvey's fruit fly lure was processed and publicised and the Agricultural Chemist, J. C. Brünnich, helped to emulsify the lure. Tryon and A. H. Benson, the Instructor in Fruit Culture, tested it in citrus orchards on the North Coast. They found it attracted a fruit fly specific to *Solanum* spp. They suggested using trap trees such as the Red American Cherry Plum to allow the fruit fly to lay its eggs and then destroying the maggots before they pupated, collecting the infested fruit daily.

Only brief mention can be made of significant developments and the record of the arrival or discovery of new insects that Tryon brought to public notice between 1897 and the First World War. Full details will be found in Departmental publications. Tryon continued to build up a reference collection each year, but with pressure of work he was allowed to purchase special insects and this factor - along with generous donations from private donors, mainly Dr T. E. Bancroft, Dr J. Turner, R. Illidge and F. P. Dodd - helped to augment the collection rapidly. (*An. Rept Dept Agric.*, 1897, p. 38) Tryon retired as Government Entomologist in December 1925 but his services as Temporary Pathologist were retained until June 1929. He prepared no fewer than 93 entomological articles for publication. (Veitch, 1967)

Prickly pear

Mention has been made of the advance of the pest prickly pear in Chapter 2.

In 1901 the Crown offered a reward of \pounds 5000 for the discovery of an effective method of destroying prickly pear. This was increased to \pounds 10 000 in 1907. In 1910, in the Local Authorities Act, prickly pear was declared a noxious weed.

The first really definite action in the campaign against prickly pear was taken on 11th May, 1911 when the Queensland Government constituted the Board of Advice on Prickly Pear Destruction comprising Professor B. D. Steele (Chairman), Messrs Henry Tryon (Entomologist, Department of Agriculture and Stock), J. B. Henderson (Government Analyst), J. F. Bailey (Director, Botanic Gardens), Professor A. J. Gibson and Dr. T.Harvey Johnston (Queensland University). (Mann, J., *Cacti Naturalised in Australia and Their Control*, Govt. Printer, Brisbane, 1970)

This was followed by the appointment, in 1912, of the Queensland Prickly Pear Travelling Commission (Dr T. Harvey Johnston and Henry Tryon, with C. W. Holland of the Lands Department as Secretary). This Commission spent two years visiting almost every country in the world where cacti were either indigenous or naturalised, investigating the natural enemies of the plants. On returning to Queensland in 1914 the Commissioners recommended that some of the natural enemies they had observed to be important factors in holding prickly pear in check in the Americas be introduced into Australia. They had already sent over the cochineal insects *Dactylopius ceylonicus* and *D. greenii* from India, Ceylon and South Africa, and they brought back *Cactoblastis cactorum* from the Botanic Gardens at La Plata, Argentina. It was found that they would feed on the common pear (*Opuntia inermis*), but an attempt to rear these larvae to maturity failed. With the disbandment of the Board of Advice and the constitution of the Commonwealth Prickly Pear Board, the biological control of prickly pear passed out of the hands of the
Queensland Department of Agriculture through its representative, Henry Tryon. Ironically, it was the *Cactoblastis cactorum* caterpillar, which Tryon had failed to acclimatise, that ultimately brought about the major destruction of the prickly pear under the direction of A. P. Dodd and John Mann of the Queensland Lands Department.

Weeds

The history of the dissemination of weeds in Australia clearly shows that most of the more serious weeds were imported from overseas. The importance of Noogoora burr in cotton seed from America is one outstanding Queensland example.

During the 1907–08 year the Chatsworth Farmers Association (Gympie) asked that all imported farm seeds "be inspected on landing in Brisbane to see that they are free from weed seeds and other foreign matter, a lot of seed planted in that district lately having been infested and it is hard to eradicate these pests when once established". In commenting on this, Scriven, the Under-Secretary, expressed the need to regulate seed sales, insisting on trueness to type. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1907–08, p. 9)

The Pure Seeds Act, 1913 to 1914 came into force on 1 January 1915 under the administration of the Agricultural Chemist. Nearly half of the parcels of seed examined were condemned, showing the need for the Act. If it had been enacted earlier, several noxious weeds would not have obtained a footing. Farmers said they could not sell seed under the Act, but they could if it was cleaned and graded. The seed also had to be labelled accurately.

F. F. Coleman was appointed Inspector and Expert under the Pure Seeds Act. By 1918 the Pure Seeds Act was working smoothly and all concerned were cooperating. Seed testing was increasing but Scriven felt that vendors should be registered.

A seed farm was established at Stanthorpe.

As the result of the 1919 drought the Government arranged for seed supplies for planting on the Darling Downs. The premises at Willowburn of the Downs Produce and Grading Company at Willowburn and the cleaning and grading plant were leased and put under the charge of the Northern Instructor in Agriculture (N. A. R. Pollock) to ensure that cleaned graded seed would be distributed. The scheme did not receive the support expected. Altogether, 35 744 bushels of wheat and 15 377 bushels of malting barley were purchased, but only about half of the wheat and one-seventh of the barley were taken up, the remainder being sold to the best advantage. (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1918-19, p. 55)

The Agricultural Chemist

Johannes Christian Brünnich was manager of the Colonial Sugar Refining Company's mill at Homebush, Mackay, in 1896. On 31 March 1897 he was appointed Agricultural Chemist

for the Department and also Lecturer in Chemistry at the Queensland Agricultural College, at a salary of £350 per year. He suggested to the Minister that in order to save money the first laboratory should be built at the College and he resided there till 1 July 1899, when he was transferred to the head office in Brisbane.

However, on 25 February 1898 Brünnich received instructions to investigate, in company with J. B. Henderson, the Hydraulic Engineer, the complaint made by the Maryborough Corporation against pollution of their water supply by the Mount Bauple Sugar Mill. Brünnich and Henderson recommended purification of the mill's waste waters before they were discharged into Tinana Creek. Similar complaints were made against the Moreton Central Mill at Nambour and it was suggested it run its waste waters into the creek at a point reached by the tides. (Brünnich, J. C., *An. Rept Dept Agric.*, 1898, p. 22)

In the same year Brünnich prepared a set of plans and chemicals for a laboratory at the Sugar Experiment Station. In December 1899 Brünnich accompanied the new Director of the Sugar Experiment Stations on a two-month visit to the sugar districts.

Brünnich's first year at the laboratory in Brisbane was occupied with analytical work - analysis of tobacco for Nevill, of native pastures compared with *Paspalum dilatatum* and of wattle tanning barks. Messrs Webster and Co. made small donations of fertilisers with which farmers could experiment under Brünnich's direction. Accompanied by Peter McLean, he visited Hermitage and Westbrook State Farms to design fertiliser experiments.

For six months at the end of 1904 Brünnich was transferred temporarily to the Bureau of Central Sugar Mills as Supervising Chemist, leaving his assistant, Frank Smith, to take charge of the Agricultural Chemist's laboratory. Analyses of a wide range of materials were carried out. Hydrocyanic acid was found in sweet potato vines, which killed pigs. Queensland arrowroot (*Canna edulis*) flour, disdained on the United Kingdom market, was found to be the equal of the accepted West Indian arrowroot (*Maranta arundinacea*). A detailed examination of a wide range of Queensland butters for export was carried out. All the results of the above analyses were published.

The Fertilisers Act of 1905 came into force on 1 January 1906. It required all dealers to register, providing their names, places of business, distinctive names and brands of fertiliser sold, and where they could be inspected. A fee of 2s 6d per brand or not more than 5s per establishment per year was levied to cover the cost of administration. The seller had to give an invoice certificate to the buyer stating the percentage of nitrogen, phosphorus and potash in the fertiliser and in what form. This constituted a warranty. All bags of fertiliser were to be labelled, the label indicating the guaranteed chemical analysis of the mixture and the chemical form of the ingredients. For organic manures, where variability of content is normal, a minimum content of ingredient was required to be guaranteed, and the percentage of coarse and fine material. Inspectors would sample bags and have the contents checked by the Agricultural Chemist as true to label. False claims could lead to prosecution. Inspectors under the Diseases in Stock Act, the Diseases in Plants Act and the Dairy Produce Act were deemed to be inspectors under the Fertilisers Act.

Brünnich attended a conference in Sydney in August 1906 at which State Agricultural Chemists discussed soil analyses, fertiliser adulteration, field and plot experiments, making

glassware, the Kjeldahl determination of nitrogen, and post-mortem analyses. The Association of Official Agricultural Chemists was formed at the conference.

Dr Walter Maxwell undertook supervision of the chemistry branch on his arrival in November 1900 and Brünnich was assigned "Feed Stuffs and Products", while the chemical laboratories at the sugar experiment station at Bundaberg handled inorganic chemistry, including examination of rocks, soils, waters, manures, and similar materials.

Brünnich settled into his Brisbane laboratory with his equipment during 1901-02 and carried out analyses of wines, cheese, butter, grasses, tanning liquors, wattle barks, honey, Moreton Bay chestnut seeds and seeds of *Strychnos lucida*. He reported the results in the *Queensland Agricultural Journal*. He also worked out a satisfactory dipping mixture for ticks, and examined grape musts, grape marc, and a range of leguminous seeds for the Mackay Experiment Station, maize cobs for drought feeding, bottle-tree pith and other materials likely to assist in the current drought-feeding programme. He examined exhausted pineapple soils and starches from cassava at Mackay and Kamerunga; the latter were of very good quality. In 1902-03 Brünnich analysed new wheat varieties brought into Queensland after the drought, fodder crops, grasses and sugarcane, and studied the problem of sorghum poisoning caused by hydrocyanic acid.

After reporting the activities of the chemistry branch for two years, Dr Maxwell handed it back to Brünnich to report on the 1903-04 year's work. He continued his analyses of maize and wheat varieties and showed that sorghum poisoning increased under nitrogen fertilisation and decreased with maturity. Analyses of pineapple plants and soils revealed to Brünnich that one field can carry a green crop of 300 tons per acre, of which 252 tons is water, and that the 48 tons of dry matter contain half a ton each of nitrogen and potash and a quarter of a ton of phosphorus acid. Tanning bark from mangroves showed higher tannic acid than that from wattles. Brünnich also made analyses of the oil content of peanuts and cotton seed.

Another interstate conference was held in Melbourne in 1902 to discuss uniformity of legislation in labelling, description and methods of analysis of fertilisers; in fixing standards; and in legislation governing stock foods. A Bill covering all pest destroyers and fixing standards was prepared.

During 1905-06, the chemical laboratory was shifted into the building vacated by the Government Analyst, giving more space for apparatus and machinery, including a small experimental flour mill. Two more cadets were added to the staff. The chemical staff were now J. C. Brünnich, Agricultural Chemist; Frank Smith, B.Sc., Assistant Chemist; three cadet assistants; and a laboratory attendant. These improvements stepped up the number of wheat analyses and assessments of milling quality, analyses of fodders and indigenous grasses, improved grasses especially *Paspalum dilatatum* and *Chloris gayana* (Rhodes grass) - sweet potato vines, green manure crops, waters, leathers and dipping fluids.

During 1906-07 a series of manurial experiments on pineapples was initiated (this was done in conjunction with A. H. Benson); soil analyses were made of pineapple soils; twenty-six analyses of fertilisers on sale were made to check the provisions of the Fertiliser Act; dairy glassware was checked; and water, butter and milk analyses were made. In the absence of the Dairy Expert that year, Brünnich conducted the examinations in milk and

cream testing. He also made analyses of tobacco for the Tobacco Expert, made analyses of leather to fix standards for leather for export under the Commonwealth Commerce Act, and checked 173 dipping fluids.

During 1907-08, in addition to current work, analyses were made of whey and cheeses, salt and parchment papers used in butter-making and in butter-packing, hops, malt and barleys (for a Queensland maltster), and exhausted banana soils. Manurial experiments for tomatoes were laid out at Bowen, in association with Inspector E. H. Rainford.

Referring to analyses of the exhausted soils on Buderim Mountain after growing bananas, Brünnich remarked:

The value of our soils analyses would be very much increased if we had more complete data about the origin of soils. The geological maps alone are in this respect only of comparatively little use and they should be supplemented by drift maps. I have already made recommendations that a soil survey on a small scale be started in Queensland, by taking different districts in turn, collecting soil samples for analyses and obtaining at the same time a geological description of the localities by a competent geologist. (*Rep. Dep. Agric. Stk*, 1909-10, p. 44)

Potash and chlorine were found to be deficient and muriate of potash was recommended as a fertiliser ingredient.

A significant set of analyses made in the same year were those for soil moisture conservation in plots on Roma State Farm. Uncultivated land stored little of the December - January rainfall; in the cultivated land from the previous wheat crop, moisture retention was better. Land cultivated and packed and fallowed for twenty months under the Campbell system of cultivation and land worked as a bare fallow without packing gave remarkably good moisture conservation. Both systems caused moisture to be conserved in the top layers and almost completely prevented loss by evaporation during the months of dry weather. Brünnich remarked, "These results should be particularly noted by our farmers and teach them a valuable lesson." (*Rep. Dep. Agric. Stk*, 1909-10, p. 44)

In a pineapple manurial experiment at Nundah it was found that high acidity, low lime and poor drainage were the main problems.

In the 1910-11 year Brünnich undertook an examination of mangrove bark and other tanning materials; and analyses of viscera and stomach contents for the presence of poisons, chiefly strychnine and arsenic, and samples of native fuchsia (*Eremophila maculata*), which caused losses in sheep (hydrocyanic acid was found to be the toxic substance). These analyses were additional to his usual program.

During 1911–12 soil analyses were practically doubled as the Department took control of the sugar experiment stations and commenced soil analyses of the sugar districts, starting with the Marburg and Maroochy areas. Brünnich made an interesting observation on the typical "Wallum" country, north of Maryborough, which although of poor and acid nature, would improve on cultivation and would "undoubtedly be utilised for agricultural purposes as soon as good land is getting scarcer". (*Rep. Dep. Agric. Stk*, 1911–12, p. 58)

The Margarine Act of 1910 required sampling and analyses to be made of margarine, especially for sesame oil and starch, and during 1911–12 Brünnich added margarine to his list of products to be checked.

He also tried making silage from prickly pear. "A strong fermentation and production of slime took place after a few days, the mass giving out an unbearable smell. At the end of eight months, the sample was in the form of a slimy pulp which was greedily eaten by pigs, but cows and horses would not touch it, although the smell now was not at all disagreeable." Analyses revealed only 0.084 per cent total nitrogen and Brünnich concluded, "The food value is, therefore, extremely small, the food being particularly deficient in nitrogen".

During 1912–13 the soils of the Stanthorpe district were analysed and A. T. Jefferies, B.Sc., was appointed Assistant Chemist to assist with the increased workload.

At the Interstate Conference of Ministers of Agriculture in 1914 it was resolved that all States should pass legislation on standardising of fungicides and insecticides and that the chemists of the various States should recommend the necessary standards.

Queensland limestones and lime deposits were analysed during 1913–14 and the results were published in the March 1914 issue of the *Queensland Agricultural Journal*. Good deposits of pure limestone were found in many districts.

A sample of the "leguminous weed", *Stylosanthes humilis (mucronata)* forwarded from Townsville by G. Tucker, M.R.C.V.S., was proved to be of high feeding value - "this accounts for the reported fact that cows do well feeding almost exclusively on this weed".

During 1914–15 The Pure Seeds Act, 1913 to 1914 came into operation. F. F. Coleman was appointed Inspector and Expert under the Act and seed testing became part of the Agricultural Chemist's duties. Practically one-third of the seed samples on sale in ten major towns in Queensland and tested by Coleman were condemned in the first year. Experience showed that some standards for special seeds, such as couch grass, paspalum, parsnip and carrot, would have to be lowered insofar as minimum germination percentage was concerned.

Further suspected and poisonous plants were analysed, and special analyses were made of vanilla beans from Kamerunga and coconuts and copra from north Queensland. A high-nitrate water from Kingsthorpe, with a content of 170 grains of saltpetre to the gallon, was found to be poisoning pigs.

During 1915–16 the Chemical Laboratory worked at half strength. Frank Smith was put in charge of the Prickly Pear Feeding Station at Wallumbilla, Patten spent two months in sugar mills, Pringle was transferred to the Bundaberg Sugar Experiment Station, and Keogh spent a good deal of time on analytical work at the Stock Experiment Station, Townsville. However, Arthur Frank Bell, later to become Under-Secretary and Director of the Bureau of Sugar Experiment Stations, started work in March 1916 as cadet assistant in the chemical laboratory. New investigations made during that year included the lime requirement of soils and the nitrate nitrogen in soils at varying seasons of the year.

During 1917–18 three more cadets were appointed, O. St J. Kent (later Director, Dairy Research), Foreman and H. W. Kerr (later to become Director, Bureau of Sugar Experiment Stations); C. R. von Stieglitz joined the A.I.F.; and J. L. Foran was transferred to be chemist in charge of the Mackay Sugar Experiment Station.

The Fertilisers Act of 1914 was amended to include "crude" fertilisers, such as sheep manure, bat guano, and agricultural lime. It was necessary to take legal proceedings no less than twenty times against sellers of low-grade seed.

With the acquisition of a large Hearson's Low Temperature Incubator and the use of ice and electricity, seed testing could be done by F. F. Coleman at all times of the year. The pamphlet "Complete Fertilisers for Farm and Orchard" was revised.

The results of the prickly pear feeding experiments carried out at Wallumbilla by Frank Smith, B.Sc., F.I.C., Assistant Chemist, were concluded and a popular bulletin was published. "Prickly pear is a wholesome but not palatable feed for cattle and sheep, is not a maintenance feed and has to be supplemented with high protein concentrates, it must be chaffed. The value of any locality claimed as good prickly pear pasture is due to an abundance of edible shrubs and herbage. Prime condition can rarely if ever be obtained in cattle fed on prickly pear as roughage."

During 1918–19 the branch was short-handed owing to enlistments. In December 1918 V. S. Rawson, M.S.E.A.C., was appointed Assistant Chemist; it was believed "his special knowledge of agricultural experimental work" would be of great service to the Department. (Brünnich, J. C., *Rep. Dep. Agric. Stk*, 1918–19, p. 29)

Soil analyses and soil fertility and analyses of dipping fluids, waters, dairy products, fertilisers and stock foods occupied the time available during the year, and also during 1919–20.

The animal industries

Legislative Acts before 1897

On 29 April 1863 the Legislative Assembly passed a Bill to further provide against the introduction of scab and other diseases of sheep. The Impounding Act of 1863 gave power to the Governor-in-Council to erect public pounds, making provision for keeping diseased animals separate from healthy. The Justices in Petty Session Districts could appoint poundkeepers who would provide adequate security that they would perform their duties and pay over any fees received by them. The poundkeepers were gazetted. They had to keep adequate books, which could be inspected, of all impounded cattle. They were also to keep a register of brands. Each poundkeeper could demand fees - for the first head of horses, cattle, goats or ovine, 6d per head, and for each additional one 3d; for the first sheep 4d, and for additional ones 1d each. Rates for droving could be determined from a schedule. The poundkeeper had to notify the owners and be recompensed 1s plus cost of stamp per letter and also cost of advertising. Unclaimed

animals were sold on three days per month. Unbranded cattle were sold outright. Animals trespassing could incur claims on the owner by the owner of the land being trespassed. There were sundry other provisions.

Following the passage of The Diseases in Sheep Act of 1867, assented to on 28 December of that year, Patrick Robertson Gordon was appointed on 14 February 1868 as Chief Inspector of Sheep in the Colonial Secretary's Department. The State was divided into twenty-four sheep districts and five Sheep Directors were appointed for each district. These were selected by owners or supervisors of flocks in excess of 10 000 sheep, and received no payment but were entitled to travelling expenses. The Sheep Directors nominated suitable non-owners and non-dealers with a knowledge of scab disease to be Inspectors under the Act with the approval of the Governor-in-Council. The Inspectors were responsible to the Chief Inspector of Sheep and were mainly concerned with the elimination of sheep scab disease and contagious catarrh of sheep, but they could control the movements of travelling sheep, quarantine certain areas infected with scab, destroy infected sheep or dress lightly affected sheep, and generally curtail disease. The costs of these operations were paid from a fund into which owners paid ten shillings per 1000 sheep. By 1887 the scab disease had been eliminated.

The Brands Act of 1872 came into force on 6 July 1872. It proclaimed the Chief Inspector of Sheep to be also Chief Inspector of Brands, and his Inspectors also supervised brands. All brands were to be registered and to consist of not more than two letters and one numeral, or of two signs or characters and one numeral representing running or consecutive numbers to be fixed in a position the Minister decided. Every owner was to use the same brand for horses (not less than $1\frac{1}{2}$ inches) and cattle (not less than $2\frac{1}{2}$ inches). The Chief Inspector of Brands was also to be the Registrar of Brands. Each owner was given a certificate of registration; a monthly list of brands registered was published in the *Government Gazette*, and a *Brands Directory* was published yearly. Brand positions numbered 1 to 6 and the owner of the brand in the latest position was deemed to be the owner. A fee was charged for registration, and a fee charged for owners of more than fifty head of stock was paid into the Brands Act Fund. Poundkeepers kept a copy of the *Directory* and when stock were impounded the owner was notified; when he claimed the stock he paid a poundage fee.

The Sheep Brands Act of 1876 provided for all sheep over the age of six months to be branded with a duly registered brand. The Act operated only in proclaimed districts and took effect from 1 January 1877. An annual list of brands was to be published. A sheep "brand" was any legible fire brand permanently impressed upon the nose, face or horn, or any brand permanently impressed by means of Indian or other ink on the ear, or any pitch paint or tar brand impressed on the wool or any part of the body of any sheep. The Inspectors in the various Sheep and Brand Districts were appointed Deputy Registrars under the Act, acting under the direction of the Registrar.

The Native Birds Protection Act of 1877, assented to on 10 August 1877, operated from 1 October to 1 March in each year. Any person found guilty of killing any of the birds listed in the Schedule was subject to a fine of not less than one pound or more than five pounds or imprisonment for up to three months. It initially came into force in the districts of East Moreton, West Moreton, Darling Downs, Wide Bay and Burnett and Port Curtis, with power to add. Protected birds included wild ducks, plains turkey or bustard, wild

geese, bronzewing and all other wild pigeons, quail, scrub turkey, plover, cranes, emus, brolgas or native companions, black swans, kookaburras or laughing jackasses, doves, magpies, magpie lark or peewit, land rails, rifle bird, regent bird, curlews, pheasants, ibis, lyre bird, mopoke, wagtail, satin bird, bower bird, cuckoos, woodpeckers, robins, wrens, finches, larks and water rails.

The Native Birds Protection Act Amendment Act of 1884 permitted the Government to proclaim crown lands as reserves for the protection and preservation of native birds, to put up notices and to appoint rangers to ensure the Act was strictly applied. Fines for abusing the Act could range from not less than £1 to no more than £5.

The Marsupials Destruction Act of 1877, assented to on 5 November 1877 and proclaimed in certain districts by the Governor-in-Council, provided for a Board of the Sheep Directors appointed under The Diseases in Sheep Act of 1867 plus three cattle owners elected by the cattle owners of the district for each district proclaimed. The boards paid a bonus fixed by the board on scalps of kangaroos and wallaroos killed within the district, at not more than 9d each, and on scalps of wallaby and pademelon at not more than 3d each. The fund to pay for these bonuses and general administration by the Board was raised by a levy on every hundred sheep and twenty head of cattle depastured in the district and paid to the Clerk of Petty Sessions by the owner, all moneys ultimately being paid to the Colonial Treasurer, who credited each district separately.

The Marsupials Destruction Act of 1881 came into force on 1 January 1882. It provided for a board of five members elected annually from owners in each district who owned more than 500 cattle or 2500 sheep (on 1 January each year each owner was to provide a list of his sheep, cattle and horses to the Chief Inspector of Sheep). A levy of 1s to 5s per 20 cattle and horses or 100 sheep made up a fund from which the board granted certificates and paid a bonus for scalps of kangaroos and wallaroos (8d each) and wallabies and pademelons (4d each) destroyed within the district.

The Marsupials Destruction Act Continuation Act of 1884 continued the 1881 Act until 1 December 1885.

The Stock Returns Act of 1893 required each owner to furnish a return of stock on his holding on 1 January each year within one month thereafter to the local Clerk of Petty Sessions and travelling stock wherever they were on 1 January. The Clerk of Petty Sessions sent monthly reports to the Registrar-General. Inspectors under the Act could count the stock if necessary.

The Livestock and Meat Export Act of 1895 was assented to on 23 December 1895 and came into force on 1 January 1896. It was designed to ensure that livestock and meat exported had been properly inspected and that certificates had been issued declaring them to be free of disease. In the case of meat, there was also to be a declaration by the consignor that the meat had been inspected by an inspector and declared free from disease. The Act also provided for registration and inspection of meatworks, exporters, brands, tags and labels and inspection of vessels. It provided for punishment for false certificates and for wilfully mixing meat. It called for branding and numbering of livestock found to be sound and free from disease, and for disposal of diseased stock. It also made provision to protect stock from suffering before, during and after shipping by requiring provision of

satisfactory accommodation, food and water during the voyage. Collection of fees was required to carry out the provisions of the Act. Inspectors of livestock and inspectors of meat, not necessarily different persons, were to be appointed and assigned to districts, each such person to make a declaration under The Oath Acts of 1867.

New staff were added to the Department to administer this new Act. In 1905 the Under-Secretary wrote:

It is very satisfactory to state that the meat companies work cordially with the Department and do all in their power to assist in seeing that the stock killed are duly inspected and treated in accordance with the regulations. To each portion of the carcass passed for export is affixed an official tag and to each case of preserved meat is attached an official label setting out in each instance that same has been passed by a Government inspector. Each tag and label are numbered, the numbers of which are recorded and thus the export article can be traced. In addition to the above, a Government certificate is issued and a sworn declaration from the exporter is retained by the Department, setting out that the goods exported are those for which the inspector's certificate is issued.

The Marsupials Destruction Act of 1895, proclaimed on 1 January 1896, provided for the issue of permits to scalpers to operate within a district. Owners, managers or employees or persons permitted by the owner to operate were exempt. Annual returns were to be provided by the Board to the Minister. Dingoes were included in the Act and bonuses payable under the Act could be increased by permission of the Minister. A dingo was described under the Act as a "dingo or half bred dingo or any undomesticated dog generally known as a wild dog inhabiting the bush and apparently having no owner and being under no control". It remained in force until 31 December 1918, except for the period 1 March 1891 to the end of 1895.

The Diseases in Stock Act of 1896 was assented to on 22 July 1896 to prevent the introduction and spread of diseases in stock; it provided for the appointment of a Chief Inspector of Stock and such other inspectors and officers as were deemed necessary for the due and effectual execution of the Act. Until the appointment of a Chief Inspector of Stock, the Chief Inspector of Sheep (P. R. Gordon) appointed under the provisions of The Diseases in Sheep Act of 1867 would perform the duties of and be deemed to be the Chief Inspector of Stock. Under the Act, a Board of Stock Commissioners of not more than five members, and of which the Chief Inspector of Stock was to be an ex officio member and chairman with a vote and a casting vote, was to be appointed. This Board, with the consent of the Minister, could establish and carry on a laboratory for the investigation of varus and diseases in stock generally. The Board would also hold periodic examinations of candidates for permanent appointment as Inspectors under the Act. The Diseases in Stock Fund was to be established at the Treasury to cover the expenses incurred by the Governor-in-Council, the Board and the Minister in the execution of the Act. The Minister each year would make a levy not exceeding 2s 6d on every one hundred head of cattle returned under The Stock Returns Act of 1893, exception being to those owners with less than 50 head of cattle and horses. The Governor-in-Council was empowered to generally restrict stock movements to ensure the health of stock and among other things, to declare infected areas, establish guarantine stations, construct dips and charge them and enforce dipping of tick-infested cattle, destroy cattle infected with pleuropneumonia, and deal with offences under the Act.

As Chief Inspector of Sheep, P. R. Gordon administered all of the above Acts from the Home Secretary's Department. On 9 September 1896 Gordon was appointed Chief

Inspector of Stock by Sir Horace Tozer, Colonial Secretary. James Patrick Orr was made Secretary of the Board of Stock Commissioners, and nineteen inspectors of stock were appointed, including three who were also to be inspectors of sheep and brands—all within the Home Secretary's Department. The transfer of the branch of the Chief Inspector of Stock to the Department of Agriculture on 1 July 1897 brought with it the administration of the foregoing Acts and the staff of inspectors associated therewith.

It was an inauspicious start as the drought of 1897 killed 2 828 500 sheep, or 14 per cent of the State flock. The Mitchell, Leichhardt, Warrego and Maranoa districts were the most affected.

Subsequent Acts affecting stock matters to 1919

The Marsupial Boards Act of 1897, which came into force on 1 January 1898, superseded The Marsupials Destruction Act of 1895. It had power to create districts and special districts. Boards were elected by owners on the basis of herd size, one vote for owners of 100 to 1000 cattle, or sheep equivalent, two votes for those with 2000 to 5000 head, and three votes for those with over 5000 head. Special districts comprised smaller herds. Five sheep were deemed to be equivalent to one head of cattle. Each board was elected biennially and could make by-laws for the destruction of marsupials (wallabies, kangaroos or wallaroos, pademelons, bandicoots or kangaroo rats) and dingoes if it wished. The Board could require any owner or manager to take effective measures to destroy any marsupials or dingoes on his holding. Bonuses for scalps were to range from 4d to 8d for a wallaby, 6d to 1s for a kangaroo or wallaroo, 2d to 4d for a pademelon, bandicoot or kangaroo rat, not exceeding ten shillings for a dingo.

The Marsupial Boards Act of 1897 Amendment Act of 1901 made a few changes. Dingoes were added officially to the list. The definition of scalp in relation to marsupials was amended to read "with respect to marsupials, means and includes a strip of skin down the face, with both ears and both nostrils attached". Minor adjustments were made to levies and bonuses. To provide for dingo pups the bonus was altered to "not less than one shilling for the scalp of a dingo, irrespective of age".

The Marsupials Boards Act of 1905 came into force on the expiry of the former Act on 1 January 1905.

The Marsupial Proof Fencing Act of 1898, assented to on 22 December 1898, declared that

...the Governor can constitute any part of Queensland previously infested with marsupials as an Infested Area and may by Order-in-Council alter the boundaries of an Infested Area or abolish the same. The owner of land within this area can apply to the Land Commissioner to have wirenetting provided free of cost delivered to the nearest railway station. The Minister notifies the owner of the cost delivered at the railway station who shall execute in favour of the Minister the mortgage on the land or other charge, or the owner can obtain the wirenetting on his own account at a suitable price and his costs be defrayed by the Minister. The owner is expected to maintain the fence.

A marsupial was defined as any wallaby, kangaroo, wallaroo, pademelon, bandicoot or kangaroo rat.

The Marsupial Proof Fencing Act, 1898 to 1913, assented to on 14 November 1913, added dingo to the definition of marsupial.

The Slaughtering Act of 1898 dealt with meat treated for home consumption as contrasted with the meat for export. It provided for regulations governing the design and sanitation of butchers' shops, and the necessary surveillance to ensure that high-quality meat of different grades was offered to the public. Inspectors were appointed under the Act, generally in addition to other inspectorial duties.

Reporting on the Act in 1900 P. R. Gordon stated: "The Brisbane district being placed under its operation, the supervision was entrusted to me from June to August. The inspectors subsequently appointed, received their training from me, first at the Brisbane Technical College in Animal Anatomy and Physiology, and secondly in the inspection of meat at the various meatworks." In the following year he was able to say that from the monthly reports of the inspectors it was apparent that in all the centres in which the Act had been brought into operation there had been a decided improvement in the sanitary condition of slaughterhouses, and that the knowledge that all diseased animals would be condemned had made all buyers of cattle more careful than formerly in the selection of their purchases.

In his annual report for 1904-05, Scriven, the Under-Secretary, wrote of the Native Birds Protection Act:

During 1904–5 the administration of this Act has been transferred to this Department. This Act, excellent in its intention and force, is, by reason of the want of interest displayed in its provisions by the public, other than by lovers of game, somewhat difficult of administration. The area of this State is so large that to advocate the employment of people to supervise the carrying out of the Act is without reason, and consequently, excepting in those places where there are persons who are lovers of our native birds, or gun clubs directly interested, the Act is practically a dead letter. It is to be regretted that there is not more enthusiasm shown in preserving the native birds, many of which serve a useful purpose in the destruction of insect pests. But the fact is patent and beyond argument that, around our towns and places of settlement the native birds have seriously diminished, to which the ease with which young people of this State can acquire firearms, and the absolute absence of the operation of any law with regard to carrying them, are largely responsible. It is advocated that some restriction, in the interests of the native birds of Queensland, especially those that are of value as destroyers of pests, should be placed upon this facility for shooting.

The Department, at some trouble and expense, is making a collection of birds that may be placed in the category of the friends of the farmer, but of what use is the instruction at the service of those who may wish to learn if the wholesale destruction that is now allowed to go by default is permitted to continue unchecked? What is everybody's business is nobody's business and the public will take no interest in protecting what is of value to them. It is time that restrictions should be placed upon those who have not the sense or knowledge of discrimination. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1904–05, p. 20)

The Native Animals Protection Act of 1906, assented to on 19 December 1906, provided for a closed season from 1 November to 30 April in the following year and a penalty not exceeding two pounds for killing, capturing or injuring the native bear (koala), the opossum, tree kangaroo, wombat, platypus (or duck mole), echidna (or hedgehog) or the flying squirrel (opossum mouse). Later in 1907 the Act was amended to wholly protect the tree kangaroo, wombat, platypus, echidna and flying squirrel, and there was pressure to include the koala. The Marsupials Destruction Act, which was in existence from 1877 to 31 December 1918, except for the period from 1 March 1891 to the end of 1895 during which no legislation was in operation, gave place on the first day of 1919 to the Dingo and Marsupial Destruction Act, under which the payment of subsidy by the Government for the destruction of marsupials entirely disappeared in favour of limiting the subsidy to the destruction of dingoes and foxes. During the years of the Marsupials Destruction Act, bonus for destruction was paid by the Marsupials Boards upon 7 935 175 kangaroos and wallaroos, 17 041 685 wallabies, 1 197 799 bandicoots, pademelons and kangaroo rats, and 517 489 dingoes and foxes. To attain this destruction a total bonus of £759 845 was paid, of which the Government contributed by way of subsidy £299 382, or roughly one-third.

Yet, notwithstanding the enormous destruction and the favourable market for skins for some years past, the pests—if such they may be termed—have not, excepting kangaroos and wallaroos, become so diminished as to prevent objections to the withdrawal of subsidy from marsupials. The dingoes and foxes, on the other hand, have increased alarmingly and to such an extent that sheepowners have cried out loudly at the apathy of the cattleowners in the work of destruction, the losses of sheep by dingoes and foxes in 1917 being set down at 229,740 head or 9.56 per cent of the whole number.

Under the Acts that have expired there was much territory that was not covered by the operation of a Board, and it was obvious, if the new Act was to be successful in the destruction of dingoes and foxes, that the whole State should be covered, so that there should be no secure breeding-grounds. This has been done, or is in the process of being carried out, and as a result there will be seven new Boards which have been named—The East Moreton, Wide Bay, Gogango, Bowen, Kennedy, Cook and Burke, and some of the old Boards have undergone an adjustment of boundaries or absorption with other Boards. Some exception has been taken to the bonus for foxes being, at the minimum, the same as for dingoes upon the grounds of the value of their skins and that they are not so dangerous or as numerous. The first reason is true, and cases are known where people have been caught breeding foxes for the sake of the bonus and the value of the skins, but there is no doubt that the sooner they are exterminated, the better it will be for the stockholders and farmers: and the high bonus will accomplish that end much quicker than a low bonus.

These Acts were administered by the Department.

Reports of the Chief Inspector of Stock

The annual report of the Chief Inspector of Stock (P. R. Gordon) initially dealt rather succinctly with seven areas of interest: (1) Diseases in Sheep Acts; (2) Diseases in Stock Acts; (3) Horses; (4) Brands; (5) Marsupial Boards Act; (6) Live Stock and Meat Export Act in three divisions—(a) Southern Division (in 1901 by W. C. Quinnell, M.R.C.V.S.), (b) Central Division (H. O'Boyle, M.R.C.V.S.) and (c) Northern Division (B. O. Meek, M.R.C.V.S.); and (7) The Slaughter Act of 1898.

The reports under the first three areas of interest usually commenced with figures from the Registrar-General's returns under The Stock Returns Act of 1893, giving the population of sheep, cattle and horses each year in comparison with those of the previous year and the reasons for the differences. At Federation in 1901 sheep in Queensland numbered 10 030 971, with the largest concentration in descending order in the Mitchell, Darling Downs, Warrego, Burke, Gregory North and Leichhardt Pastoral Districts, each grazing more than one million head. The introduction of sheep from southern States numbered 297 628, of which 6629 came by sea, the remainder by border crossings. The reverse trade totalled 277 738 sheep, of which only 31 went by sea. The number of sheep preserved at

various meat-preserving works was 128 443, of which 92 430 were frozen, 35 373 canned, 500 used for extract and 150 boiled.

In the Diseases in Stock Act report the total number of cattle in that year was 3 772 707; the main areas involved, in descending numbers, were the pastoral districts of Burke, Leichhardt, Kennedy, Moreton, Burnett, Darling Downs, Port Curtis and Cook, each holding over 200 000 head, with the Burke district depasturing 768 497 head. At that time no separate figures were issued for dairy cattle.

Imports of cattle numbered 32 429, of which 32 224 came across the border, while exports to southern States numbered 74 066, of which 73 342 crossed the border. In all cases it can be seen that there was a need for some border inspection.

The number of cattle operated on at the various meat-curing establishments was 175 385, of which 113 375 were frozen, 46 194 were canned, 14 509 were used for extract, 1170 were boiled and 56 were manufactured into permission (a concentrated food used by explorers, which consists of powdered, dried strips of meat mixed with dried fruits and vegetables).

Establishment of the Stock Experiment Stations at Yeerongpilly and at Oonoonba, Townsville

By 1909 the need for sufficient space to accommodate large animals for experimental purposes had become urgent: 56 acres of land at Yeerongpilly were selected by Dr Dodd and acquired and the Stock Experiment Station was established. Sydney Dodd, M.R.C.V.S. (later Dr Dodd), was placed in charge, with the title Principal Veterinary Surgeon and Bacteriologist. In relation to this, the annual report of the Queensland Department of Agriculture and Stock, 1909–10, states: "Queensland may congratulate itself upon being the first State to possess a thoroughly equipped Station to deal with the epizootic diseases in stock, and research work in connection therewith."

With the resignation of Dr Dodd on 31 March 1910, C. J. Pound was transferred from the Bacteriological Institute and took charge. His title was "Government Bacteriologist". A. H. Cory, M.R.C.V.S., was made responsible for the supervision of veterinary work at the station.

In addition to headquarters at Yeerongpilly, a regional laboratory was established at Oonoonba, Townsville, on 25 April 1914 under the control of George Tucker, M.R.C.V.S., to provide a service from Mackay northwards.

The need for veterinary surgeons in private practice

In 1919 the Under-Secretary expressed the need for veterinary surgeons in private practice. Judging from the number and type of specimens of diseases that were being forwarded for examination, he felt the time had passed when everyone could be his own surgeon. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1918–19, p. 12).

Livestock slaughtering and the meat trade

Livestock saleyards

The first saleyard operated in the Metropolitan Area was at Oxley; it was conducted by Fenwick & Co. With the growth of the city it became necessary to seek a site more centrally situated, that is, closer to the points of slaughter and railheads. A twenty-five acre site at Newmarket was selected, between the present Newmarket Hotel and the Newmarket Railway Station, and the Newmarket Saleyards began operations in 1877 with very small yardings of stock. The last sale held in the yards before their transfer to Cannon Hill was on 19 November 1931. A total of 1 948 863 cattle, 201 144 calves, 12 780 657 sheep, 184 988 pigs and 7996 horses were sold through these yards during the 54 years of operation. (Hooker, E.H., 1969)

Meatworks' supplies of stock

In the rural areas of Queensland the larger meatworks bought their cattle through buyers, who visited the cattle stations and took charge of the beasts from the paddocks. Supervision was provided en route and losses were of the order of 4 per cent or less.

The "Monkira" bullock

The *Queensland Agricultural Journal* drew on another journal to provide an interesting article on giant cattle.

The *Sydney Stock and Station Journal* has an opportune note of a "Mammoth Ox", of the P7Y brand, which is no doubt the heaviest bullock ever seen in Australia. He was bred by Messrs. Smith, Debney, and Co. at Monkira, Diamantina River, Queensland, and was exhibited at the Adelaide Royal Society's Exhibition in 1883 obtaining champion prize. His live weight was 3,043 lb., and when dressed he turned the scale at 1,992 lb. At the same time two other shorthorns bearing the P7Y brand were exhibited, and weighed, alive, 2,845 lb. and 2,570 lb. respectively. The trio walked about 700 miles with a mob of fat cattle to Adelaide. (*QAJ*, Vol. 4, 1899, p. 430)

Meatworks and meat inspection

Numerous meatworks were erected with the help of advances under The Meat and Dairy Produce Encouragement Act of 1893, and The Livestock and Meat Export Act of 1895 demanded that all livestock and meat exported should be inspected. The meatworks inspected under the latter Act during 1897–1900 are listed in the following table.

Company	Location	Inspected	Inspector	Livestock
				treated
Queensland Meat Export and Agency Company	Eagle Farm	1897-98-99-1900	W. C. Quinnell, M.R.C.V.S.	bullocks, cows, sheep
Graziers Meat Export Company (Messrs Baynes Bros 1898)	Queensport	1897-98-99-1900	W. C. Quinnell	bullocks, cows, sheep, pigs, calves
Hogarth Australian Meat Preserving Company Ltd	Oakey Creek	1897-98-99-1900	W. C. Quinnell	sheep
Queensland Chilling and	Redbank	1898-99	W. C. Quinnell	bullocks, cows,

Export Company Ltd				sheep, pigs
Howes Brothers	Oxley	1897-99	W. C. Quinnell	pigs
J. C. Hutton	Zillmere	1897-98	W. C. Quinnell	pigs
Uhlmann Brothers	Mooraree	1898-99-1900	W. C. Quinnell	bullocks, calves, sheep, pigs
F.O. Hedge and Co.	Belmont	1900	W. C. Quinnell	sheep, pigs, calves, bullocks, cows
Lakes Creek	Rockhampton	1897-1900	A. W. Barnes, M.R.C.V.S.	cattle, sheep
Gavial Creek	Rockhampton	1898-1900		cattle
Ross River	Townsville	1897-1900	. C. A. Calvert, F.R.C.V.S.	cattle, sheep
Bowen	Bowen	1897-1900	B.O. Meek, M.R.C.V.S	cattle
Gladstone	Gladstone	1897-7900	John Riordan (1897) James Standen, M.R.C.V.S. (1898)	Cattle, sheep
Broadsound	Broadsound	1897-1900	G. R. Holt	bullock, cows
Sellheim	Sellheim	1897-1900	H. H. M. Croft	cattle
Mackay	Mackay	1898	Colin Austin	cattle
Alligator Creek	Townsville	1900	Henry O'Boyle, M.R.C.V.S.	cattle
Hughenden	Hughenden	1899-1900	P. F. Harvey	bullock, cows
Burketown	Burketown	1899-1900	F. H. Myddleton	bullock, cows

Each animal was subject to an ante-mortem and post-mortem inspection by qualified Government inspectors, who affixed to the carcass a numbered tag from which it could be ascertained in any part of the world who had inspected the carcass. All cases of tinned meat were likewise inspected and a certificate was pasted on each case and each tin instead of a tag used on a carcass. This practice drew praise from overseas buyers. (Scriven, E. G. E., *An. Rept Dept Agric.*, 1903–04 p. 4)

The actual meatworks in operation in 1897 and the stock treated were listed in the Department's annual report for 1897-98 (pp. 72 and 74).

Meat exports

In 1898 the Honourable J. V. Chataway stated:

I am hoping the wasteful system under which we now export annually a quarter of a million head of cattle into New South Wales will eventually be abolished. At present our stock leave our stations half or threequarter fat. On the way to market however, they lose all that fat and start again in New South Wales as really store stock. That waste is a loss to the industry which in some way or other ought to be saved. New South Wales at the present time is dealing with probably the most valuable part of the bullock. We get no return for the hides, the horns, the hooves, the tallow and all the other by-products we send over on the hoof but I am hopeful that these losses will be stopped. (Chataway, J. V., *QAJ*, Vol. 3, 1898, p. 7)

To place Queensland dairy farmers on a footing of something like equality with their southern rivals, Chataway made an arrangement with the Adelaide Steamship Company: in return for a subsidy of £4500 in all, the company undertook to provide sufficient space in one of its ships and during the three following butter seasons carried frozen cargo to Sydney weekly for transshipment to outgoing mail steamers. The venture was not an unqualified success, and cannot be said to have wholly pleased anybody concerned with it.

It was manifest that all parties had overrated the quantity of produce that would be available for the export contract. The season opened with a shipment of 26 tons of meat and 55 tons of butter, and if this could have been maintained all would have been well. But the shipments fell away, until one steamer carried only 6 tons of butter and 14 tons of meat. Ultimately the company refused to cool the vessel down when a fair amount of cargo was not tendered. In the second season no produce was carried at all and the company decided not to run the boat unless a minimum freight of £80 per trip was guaranteed, the charges under the agreement being £1 10s a ton for the butter and 1/4d per lb for meat. In the third season arrangements were more satisfactory. The Company again charged £80 as a minimum freight, which the Department and the butter exporters agreed to guarantee. Exporters undertook to pay the accumulated shortages until they amounted to £460, after which the Department was to become responsible. Had circumstances proved as favourable as they promised to be when the revised agreement was made, the Department would not have been called to pay but again expectations were not realised and the Department's liability amounted to £736. The service cost the State £5236. The following particulars respecting the shipments may be of interest:

	1899–1900	1900–1901	1901–1902
Butter shipped	486 tons	Nil	198 tons
Meat shipped	105 tons	Nil	80 tons
Total value of freight	£974	Nil	£483
Average freight per trip	£57		£23

(Dalrymple, D. H., An. Rept Dept Agric., 1901–02, p. 10)

In 1901 the Honourable D. H. Dalrymple was able to write:

The favour with which our meats have been received in South Africa and the large quantities shipped thither, as well as to Japan, Philippines, China, Hong Kong and Singapore have increased prices of cattle and sheep. The meat export trade is now on a very firm basis: and the quality of Queensland canned meat is such that they are now preferred to any others in Africa, the Mediterranean and the East. (Dalrymple, D. H., *QAJ*, Vol. 9, 1901, p. 4)

German prohibition of Queensland meat

In 1900 the *Queensland Agricultural Journal* featured an article from *the Queensland Grazier*.

The Germans are good colonists all the time, and they do not agree with the new legislation in Germany, which will prevent us sending our canned meat there. During the month a number of leading Germans in Brisbane held a meeting, and amongst those present were—Messrs. Rost (Rost, Sterling, and Co.), G. Muller (Muller and Woolfrey), Phillippi, Sachs (Sachs and Co.), C. Angel, Pastor Maier, Pastor Becker, Kelbe (Deutscher Australische Post), Monsel and Lischke (Queensland Herald), Puttlitz (Nord Australische Zeitung), and many others.

Dr. E. Hirschfield took the chair, and made a ripping speech, pointing out that during the last two years Queensland has sent 85,000 cases of tinned meat to Germany, and objecting, in the interest of both parties, to the trade being squashed. Then they passed the following resolution:—"That this meeting is of opinion that the Germans in Queensland should take steps to remove the restriction imposed by the recent legislation in Germany against the importation of canned meats." Then they formed a committee, and forked out £12 on the spot, to start a fund to enable them to shake up the Germans all over the colony, and get signatures, and then send a petition to the Emperor, or to his Government. The German in Queensland is all right. (*QAJ*, Vol. 7, 1900, pp. 381–382)

The Commerce Act

During 1905–06 the Minister for Trade and Customs called a meeting of State representatives to discuss the Commerce Act export section. E. G. E. Scriven, Under-Secretary, Captain Hutton (representing the meat industry), Mr Sinclair (for the dairy industry) and Mr Chave (for the fruit industry) attended but withdrew. In no uncertain terms the State representatives expressed to the Chairman of the Conference on the Commerce Bill their objection to any Commonwealth interference with Queensland's exporting system.

Meat for war supplies

In 1907 the War Office of the United Kingdom sent Major Long, D.S.O., to visit Queensland meatworks. He reported satisfaction with what he saw and the War Office forwarded specifications for cases of tinned meat for the supply of British and other troops. The Department was able to persuade the War Office to adopt the existing specifications with minor adjustments.

Major Gallagher of the United States Army followed, coming from the Philippines to enquire into the meat trade. The renovation of slaughteryards and other improvements had upgraded the quality of Queensland meat on offer. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1906–07, pp. 3, 11)

Shipment of chilled meat

An attempt was being made by Queensland meat companies to compete with the monopoly held by North and South America, particularly by Argentina, in the carriage of chilled meat. A trial shipment, arranged by the Queensland Meat Export and Agency Company and Messrs J. Cooke and Son, was shipped by SS *Marathon* on 3 September 1909; according to the London *Times*, importers there were much impressed with the product and for the first time in its history the United States Beef Trust would have to face, on the English market, competition of a substantial kind from Australia. The trial shipment was followed by others, but as only one ship was fitted for experimental purposes, further development was necessarily slow. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1909–10, p. 17) The meat in question was chilled at the Redbank Meatworks by what was known as the Linley process. A second shipment took a fortnight longer, owing to a coal strike. (Weedon, T., *Rep. Govt Stat.*, 1909, p. 141)

Public abattoirs

In 1911 and again in 1912 the Under-Secretary drew attention to the need for public abattoirs in Brisbane. Thirty-two slaughterhouses were situated within ten miles of the General Post Office and inspectors had difficulty in coping with inspections. The Metropolitan Area consumed one-fifth of all the cattle, sheep and pigs killed in the State and two-thirds of the calves and lambs. Brisbane needed two abattoirs—one for North and one for South Brisbane. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1911–12, p. 24)

Royal Commission on the meat industry

A Royal Commission was appointed on 20 July 1912 to enquire into the alleged deterioration in beef cattle, the facilities for treatment and marketing of meat at home and abroad, and the necessity for establishing abattoirs or meatworks. Its members were W. H. Campbell, G. E. Bunning and W. W. Hood. The Commission found that the standard of export beef had been maintained. However, it discussed the insanitary facilities for inspecting and slaughtering stock; listed the existing cold stores and meatworks in Queensland that it deemed to be sufficient for the State's needs; and recommended public abattoirs for the Brisbane Metropolitan Area. Here all meat for local and overseas consumption would be inspected and graded in the one central location.

The Commission suggested the production of crossbred sheep and lambs as alternatives to beef, and listed the rates of overseas and local consumption of meat and the prices available to the Queensland producer, exporter and consumer. A minor report added that facilities for cold storage would have to be established in conjunction with public abattoirs. (*Qd Parl. Papers*, 1913, Vol. 2, pp. 671–1406—quoted by Borchardt, D. H., 1978, in *Checklist of Royal Commissions Select Committees of Parliament and Boards of Enquiry*, Bundoora, La Trobe University Library)

	1906	1910	1913	1914
Sirloin roast	41⁄2	41⁄2	41⁄2	5 ³ ⁄4
Rump steak	61⁄2	6	61⁄2	73⁄4
Beef sausages	4	31/2	4	4¼
Leg mutton	41⁄2	41⁄2	41⁄2	4¼
Leg pork	7	7	71⁄2	87/8

Local prices of meat, Brisbane, 1906–1914 (pence per lb)

Consumption of meat per capita, Queensland

1900	268 lb.	1911	279 lb
1901	247 lb.	1913	212 lb.
1902	198 lb. (drought year)	1914	210 lb.
1903	189 lb. (meat scarce)	1915	186lb. (war year)
1904	208 lb.		

Stock diseases and parasites

Cattle ticks and tick fever

The cattle tick, *Boophilus microplus*, was probably introduced at Darwin (Northern Territory), then known as Palmerston, in August 1872, with *Bos indicus* cattle, probably Ongole (eight cows and four bulls), brought on the *Investigator* from Indonesia by the company that built the Overland Telegraph line from Darwin to Adelaide. They were for slaughter, but some of the animals unfortunately escaped. The survivors of these escaped animals were taken to the Adelaide River where they mixed with station cattle of European (*Bos taurus*) breeds. (Gilruth, J. A., *Proc. Roy. Soc. Vict.*, Vol. 25, 1912, p. 15) Letts (Letts, G. A., "Early livestock introductions to the 'Top-end' of the Northern Territory", *Aus. Vet. J.*, Vol. 38, 1962, pp. 282–287) gave a detailed account of the early introduction of cattle and buffaloes from the Indonesian area quoting Earl. (Earl, G. W., *Enterprise in Tropical Australia*, Madden and Malcolm, London, 1846, and *Handbook of Tropical Australia*, Penang, 1863) Earl listed introductions in 1824 to Melville Island, in 1827 to Raffles Bay and in 1840 to Port Essington, all from Koepang, as well as other introductions.

The ticks spread quickly from the Northern Territory westwards to Western Australia, and eastwards, entering Queensland in 1891 and reaching Burketown in 1894. Boiling-down works were established at Burketown and these drew cattle from the Northern Territory as well as from the Gulf country in Queensland. Before 1894 the introduction of the tick "was not regarded in serious light by cattle owners" until heavy losses began to occur from a fever, somehow associated with the tick and called tick fever.

The losses due to tick infestation can be of two types. A heavy tick load causes "tick worry", where dermatitis and the loss of blood extracted by ticks, particularly maturing females, cause animals to become listless and rapidly lose condition. Continued re-infestation leads to grave anaemia and exhaustion and the animals may die. (Seddon, H. R., *Diseases of Domestic Animals in Australia* Part 3 :Tick and Mite Infestations, Dept. of Public Health, Canberra, 1951) The second type is the development of tick fever caused by protozoan parasites, *Babesia bigemina* or *B. argentina* (unknown in Australia in 1894), transmitted by the cattle tick.

P. R. Gordon, Queensland Director of Sheep, said in 1899:

Coming upon us, as the ticks did, without our having any previous knowledge of them, or their effects on stock, we were unable to discriminate between the mortality occasioned by tick fever and anaemia (the latter the result of gross infestation and now popularly known as "tick poverty" and "tick worry"). There appears to be little doubt that, before dipping was so extensively resorted to, a large percentage of deaths attributed to tick fever were due to anaemia, the result of parasitism.

During 1894, C. J. Pound, Director of the newly established Stock Institute, visited the Gulf district of Queensland to enquire into the nature and cause of tick fever. He described organisms as seen in smears stained with methylene blue and declared that the investigation showed very conclusively "that the micro-organism is the actual cause" of the

disease and "that it is readily transmitted by ticks", although at that time he had conducted no experiments to prove this. Pound found that there was almost complete destruction of serviceable bulls on a number of north Queensland cattle stations by tick fever, when graziers bought bulls from southern Queensland and northern New South Wales. (Pound, C. J., *An. Rept Dept. Agric.*, 1897-98, p. 82)

With the recognition in 1894 of the seriousness of redwater (babesiosis) in cattle in the Gulf country and its association with the tick, the whole of the Gulf country and the part of Cape York Peninsula west of the 144th meridian (just west of Hughenden) and north of the 21st parallel of south latitude were placed in quarantine in October of that year as a result of action taken by A. Bruce, Chief Inspector of Stock, New South Wales, and P. R. Gordon, Chief Inspector of Sheep, Queensland. As the boundary of this area, which was referred to as the 1894 line, was merely an unfenced geographical line it could not be enforced and it is therefore not surprising that the following year the tick was found to have spread east of it. The works at Burketown were closed in 1894 and stock from tick-infested areas were directed to meatworks at Townsville and Rockhampton, so by 1896 stock routes to Cairns, Townsville and Barcaldine had become infested.

In 1897 John Mahon, Manager of Travelling Dairy No. 2, reported that the ravages of tick fever in the northern parts of the Colony had reduced the output of dairy produce to nil; but for that and the dry season in the southern parts, Queensland would have exported, instead of £6000 worth of butter, six times that amount. (*An. Rept Dept Agric.*, 1896-97, p. 39)

In November 1895 a new quarantine line (the 1895 line), generally following the 21st parallel (Mackay – Hughenden – Mackinlay), was proclaimed. Infested animals were now required to be dipped in oil dips before leaving the area. Though inspectors were employed, this line, which was also merely a geographical unfenced patrolled line, could not be held and by the middle of 1896 ticks reached the Winton – Longreach – Barcaldine and Rockhampton districts. In August 1896 a new line, which in its eastern part generally followed the 24th parallel and thence moved north-west to join the 1895 line near Mackinlay, with an absolute quarantine at Rockhampton, was set up. This line, the 1896 line, has also been referred to as the "Conference Line". (Seddon 1951) The 1896 line was again altered in 1897 to place it further south. In 1898 a line south from Emerald to the New South Wales border was established so that cattle from clean country west of it could pass into New South Wales without dipping.

However, late in 1898 the tick appeared near Brisbane, some 300 miles south of the 1896 line, and to meet this situation four lines were set up:

- (a) Schedule O line (the Logan Line);
- (b) Schedule N line (to replace the 1896 line);
- (c) Schedule K line (from Walloon to Gladstone);
- (d) Schedule M line (Barakula to Maryland, including the Eastern Darling Downs).

Thus Queensland was divided into seven areas, each subject to its own restrictions.

By September–October 1895, as "no experimental evidence had been advanced that ticks were the agents by which the disease (in Queensland) was communicated", at Hughenden, where he was investigating tick fever, Dr Sidney Hunt (later Government Pathologist in

Queensland) infested a six-month-old calf with larval ticks, the progeny of females gathered from cattle in which the disease was prevalent. The animal developed the disease, proving the organism was transmitted by ticks. It recovered after twelve days. Before August 1896 Hunt had shown that "the disease was readily communicable to healthy susceptible cattle by injection of blood from an animal suffering from the disease". (Gordon, P. R., 1897, in a printed statement) (Seddon, 1951)

Dr E. R. Wynne, reporting experiments conducted at Hughenden in 1896, showed a drawing of parasites in a blood smear. This actually was the first illustration of the Australian parasite *Babesia bigemina*.

A commission whose members were Dr J. Sidney Hunt and William Collins of "Mundoolun", Beaudesert, was sent to the United States in 1895 to enquire into Texas fever there. Hunt took blood smears with him from cattle in his Hughenden experiments and from these Dr Salmon, chief of the Bureau of Animal Industry at Washington, USA, declared that the tick fever of Queensland was identical with Texas fever of America.

Following the Intercolonial Stock Conference in Sydney in August 1896 nearly 300 "specifics" for the cure of tick fever were received and examined in the laboratory. Where necessary, they were subsequently tested on cattle affected with the disease by either E. T. Hancock, Inspector of Stock at Mackay, or Veterinary Inspector B. O. Meek of Bowen. None was found useful against the disease.

With the knowledge that the tick fever was transmitted by ticks and that the blood from a recovered animal could, after six weeks, impart immunity to a susceptible animal, Pound arranged with William Collins to have some bulls he had purchased in New South Wales inoculated in Brisbane before sending them to Inkerman Station on the Burdekin. Experiments conducted on Collins' property, "Mundoolun", and at "Glendowey", Hughenden, a property owned by R. Gray and managed by A. W. Ferguson, and privately by Robert Archer at Gracemere, Rockhampton, proved the success of inoculation. In experiments at Hughenden, ten bullocks were inoculated but "unfortunately two of these bullocks escaped into the bush the next day, and all that is known about them is that they were seen alive and apparently well some weeks afterwards". (*QAJ*, Vol. 1, 1897, pp. 104-106)

Animals that had recovered from tick fever on Inkerman Station were secured for the Indooroopilly Station in February 1897. Pound found that a trocar and cannula was suitable for collecting blood for inoculation, and a hypodermic needle was best for injecting the defibrinated blood from recovered animals into the clean animals to be inoculated. The inoculation of animals with blood drawn from animals that had recovered from tick fever was tested on a large scale at "Mundoolun". Then thirty-five inoculated animals and twenty-two uninoculated animals were sent to Inkerman, where ticks were plentiful. Within three weeks of arrival the twenty-two control animals were sick and 40 per cent succumbed, while all the animals that had been injected with more than 5 cc of blood remained healthy when exposed to gross tick infestation. Quiet handling was necessary after inoculation until the cattle had fully recovered from the fever produced by inoculation. With calves and steers, mortality after inoculation was minimal. Pound also showed that blood from recovered or fevered animals did not contain any toxic or anti-toxic properties. (*QAJ*, Vol. 1, 1897, pp. 473–477)

The tick fever parasites transmitted through the larval ticks as they spread through northern Australia inflicted enormous losses, some sixty to eighty per cent of cattle dying from the disease. By December 1899, Gordon, Chief Inspector of Stock, reported that cattle in the northern areas through which the tick had first passed were now immune to the disease because of acquired immunity.

The first ticks to occur at the Indooroopilly Experiment Station paddocks were on the road along which hundreds of cattle passed from the Enoggera saleyards to the slaughteryards at Moggill; they were discovered on 14 December 1898.

On 2 February 1898, Dr James Sidney Hunt, L.R.C.P.Ed., M.R.C.S.Eng., was appointed Government Pathologist. During 1898, C. J. Pound, Director of the Stock Institute, and Sidney Hunt visited districts in southern and central Queensland instructing owners of cattle in the method of inoculation and the stock inspectors in the mode of defibrinating blood from animals recovered from tick fever and on the use of the hypodermic needle. It was felt that additional agents should be appointed and instructed by the Institute to help spread the information.

Because of extensive interest in the tick, Pound made a collection illustrative of the life history of the various species of ticks (identified by Henry Tryon, Entomologist) that were found attached and peculiar to our native and domestic animals. It was found that a 3 per cent formalin solution would preserve ticks in as nearly as possible their natural colour. He also prepared an extensive series of lantern photographic transparencies illustrating the complete life history of the cattle tick, the micro-organisms of tick fever in various stages of development, tick-infested cattle, country favourable and unfavourable to tick life, maps showing the geographical distribution of the cattle tick, and a series of photographs illustrating in detail the various preventive inoculation experiments. With this equipment, Pound delivered more than fifty lectures in towns and at stations throughout the pastoral districts and gave demonstrations to stock owners and local stock inspectors on inoculation techniques. He also inoculated from 20 to 100 calves to become "bleeders" to supply blood for subsequent inoculations. On the request of the Minister for Agriculture he delivered lectures on tick fever to Dairy Conference delegates at Hawkesbury College (New South Wales) and to stockowners at the Chamber of Commerce in Sydney.

In 1898 Dr Sidney Hunt gave a brief summary of the results of protective inoculation of cattle against tick fever. He found:

- 1. that cattle that had suffered from the disease in infected localities eventually became immune;
- 2. that the blood of such immune or other recovered animals was capable of setting up a comparatively mild attack of the fever, when infected into susceptible cattle; and
- 3. that immunity also followed the fever thus artificially produced.

The fever produced by the injection of blood of recovered animals generally sufficed to protect cattle from subsequent fatal attacks or, at least, to diminish greatly the mortality rate. The defibrinated blood of animals recovered from an artificially induced attack of moderate intensity was in most cases sufficiently active for inoculation purposes. A dose of

5 cc (mL) of such blood gave satisfactory results for inoculation of the general run of the herd, but with valuable stud bulls a subsequent inoculation of a 10 cc dose was a safe precautionary measure. (Pound, C. J., *An. Rept Dept Agric.*, 1897–98, pp. 78–89)

The period of incubation from inoculation to the first appearance of fever was from 10 to 17 days and the fever lasted as a rule for 3 to 7 days. A temperature of $105^{\circ}F$ (40.5°C) after inoculation indicated a mild attack of the fever, $106^{\circ}F$ indicated a moderate attack, $107^{\circ}F$ indicated a severe attack, and $108^{\circ}F$ (42.2°C) and upwards meant a very severe, often fatal, attack.

The cattle tick in some localities did not carry the micro-organism of tick fever, and was therefore, as regards that disease, not pathogenic. The blood of cattle infested by such ticks had no protective value when used for inoculation purposes. (*An. Rept. Dept Agric.*, 1897-98, pp. 87–88)

In the first volume of the *Queensland Agricultural Journal* (July to December 1897), C. J. Pound presented the first microphotograph in colour of the tick fever organisms (p. 258) and also gave full directions for preventive inoculation for tick fever with illustrations (pp. 334–336—revised in January 1908). In Volume 2, March 1898, Dr Sidney Hunt gave—in much greater detail—the history of tick fever, its world occurrence, causative organism (a Protozoan, then named *Pyrosoma bigeminum*, later *Piroplasma bigeminum*) and its relationships, with colour plates of its reproductive forms. (*QAJ*, Vol. 2, March 1898, pp. 211–220)

On 27 October 1899 the Minister for Agriculture, the Hon. J. V. Chataway, authorised Gordon, Chief Inspector of Stock, to carry out experiments with various dipping fluids to find a solution that would kill ticks on cattle. He tried Christian's Dip, recommended by Dr Hunt, and Little's Poisonous Dip at "Tantitha", Bundaberg. A dip of 2000 gallons capacity was constructed at the Department's Indooroopilly Quarantine (Experimental) Grounds, where Little's Poisonous Dip, Hide Poison (a tobacco-sulphur mixture, used for sheep scab) and Quibell's Dip were tested. The tests showed that arsenic was the only successful ingredient. (*QAJ*, Vol. 7, October 1900, pp. 387–388)

Gordon recommended that cattle be immersed in the dip for at least 40 seconds. He also observed that insectivorous birds, the Peewit or Australian magpie-lark (*Grallina cyanoleuca*) and the Willie Wagtail (*Rhipidura leucophrys*), devoured many ticks and that ants would attack and demolish them. In December 1900 he was able to report:

Although it cannot yet be said that any known dips will destroy all ticks on cattle so that after dipping they may with safety be passed on to clean pasture without risk of setting up fresh centres of infestment, with two dippings at intervals of eight to ten days, and assuming that the medicaments have been properly prepared and carefully applied under official supervision, the danger would be very remote, provided the dipping were made on the extreme edge of the infested country (the idea behind the "cleansing area" dips soon to be introduced). Dipping prevents the maturing of female ticks, and renders fully developed ticks sterile, thus greatly checking the increase of the pest.

In the June, August, September and November 1901 issues of the *Queensland Agricultural Journal* the multilingual editor, Major A. J. Boyd, published a detailed account, illustrated with excellent colour plates, of the "Tristeza" disease of cattle in the Argentine Republic written by M. Lignieres, who claimed it to be identical with Texas fever and caused by

Piroplasma bigeminum. It was popularly known as "Bovine Malaria". (*QAJ*, Vol. 8, 1901, pp. 455–477, Vol. 9, 1901, pp. 252–275, 339–354, 503–504)

Experiments in dipping with various medicaments were continued during the year, and were reported to have had a large measure of success. By permission, J. C. Brünnich, the Analytical Chemist, undertook the preparation of a dip, based on that most generally in use, and popularly known as "Christian's Dip". Brünnich's formula was:

Arsenic 8 lb Caustic Soda 4½ lb Tallow 8 lb Best Stockholm tar 2½ gallons Water 400 gallons

The instructions for preparing the dip are given below:

- (a) Half-fill with water a 5 gallon drum, add 2 lb of caustic soda and boil. Then add slowly 8 lb of arsenic. Add cold water in small quantities to prevent boiling over, until the drum is full.
- (b) Boil 100 gallons of water in a 400 gallon tank, add 2½ lb of caustic soda then 8 lb of tallow and boil quickly. Add slowly in a thin stream 2½ gallons of Stockholm tar. When the whole of the tar has been added, boil for thirty to forty minutes, then add the solution prepared above. Gradually fill the tank with water and keep the mixture boiling until the tank is filled.

The dip was tested by Brünnich in the presence of the Moreton District Inspector, and was found most effective. Because of the use of caustic instead of common soda as in Christian's Dip, the time occupied in boiling was greatly reduced. A large number of dairymen and others in southern and central Queensland preferred to use Erkenbrach's Dip, commercially known as "Skin Poison", which they stated they had found very effective; it was easily prepared, required no boiling, and did not injure the skin. (*An. Rept Dept Agric.*, 1900–01, p. 17) Brünnich's dip was known as the "Departmental Dip".

In the following years stock inspectors travelled the tick-infested areas urging cattle owners to construct dips, and to ensure arsenic in the dipping fluid was at the correct strength.

The need for authoritative identification of ticks for the Stock Branch of the Department was met by the Entomologist, Henry Tryon, who set about establishing a reference collection of Queensland Ixodidae (the tick family), with detailed instructions relating to mode of occurrence, method of collecting, etc. for the information of parties who might help with the collection.

A dog tick, *Rhipicephalus sanguineus*, hitherto unrecorded from Australia, was identified as an external parasite affecting both cattle and dogs in the Brisbane district, and as affecting only dogs at Burketown and Bowen.

The ordinary cattle tick, *Boophilus microplus*, was identified as a tick maturing on horses at Mount Crosby and on cattle and sheep at Bundaberg.

Note—it is due to me to here recognise the skill manifested by some of the stock inspectors in detecting the occurrence of these parasites when as yet only they have attained the minute larval and nymph conditions and which on more than one occasion has doubtless saved country still unvisited by these animal parasites from infestation by them, Mr. A. Beck's proficiency in this direction being especially commendable. The ticks thus procured have in many cases been referred to this office for identification and for an estimate of their approximate age, the matter referred to is, therefore, one of which it has special cognisance. (Tryon, H., *Rep. Dep. Agric. Stk*, 1905–06, p. 36)

Tryon worked out the detailed life history of the Queensland cattle tick.

Under the Diseases in Stock Acts all dips for public purposes were required to be analysed by the Departmental Chemist at least once every six months, for which a fee, merely sufficient to cover the cost of such analysis, was charged. (*Rep. Dep. Agric. Stk*, 1904–05, p. 19)

An interesting note appeared in the *Queensland Agricultural Journal* for March 1899, where D. E. Salmon recorded that the first person to build a vat and to dip cattle (for Texas fever) was R. J. Kleberg of Santa Gertrudis Ranch, Texas. He placed his dipping vat and his ticky cattle at the disposal of the Bureau of Animal Industry, Washington, for further experimentation.

During 1902, tick fever appeared in virulent form in cattle travelled from districts in which they had for years been immune, both from natural and artificial inoculation. This raised the question of gaining permanent immunity of cattle from tick fever. The Local Authorities Act of 1902 gave power to local authorities to insist on the regular dipping of infested stock.

Many dips were being erected by private enterprise, using plans supplied by the Department plus specifications for preparing the Departmental mixture for dipping fluid. A reasonable charge for dipping was made and the cost of erection was quickly repaid.

On 10 March 1905 New South Wales stock restrictions required the quarantine of horses for up to four months before they were moved from the Darling Downs to New South Wales. J. P. Orr, the Deputy Chief Inspector of Stock, was sent to New South Wales to discuss the restriction and as a result it was modified to three dippings at seven-day intervals at Warwick, Stanthorpe and the border, in that order. Quarantining of cattle, however, had to be done until such time as New South Wales was prepared to relax the restriction, as that State was anxious to prevent the southern march of the cattle tick.

One of the early problems in the tick investigations was finding out how and when the ticks acquired their disease-producing powers. Hunt and Pound finally decided that ticks contract the micro-organism of the fever from inoculated cattle, showing that if inoculation were to be practised, the whole herd must be treated. (*An. Rept Dept Agric.*, 1898–99, p. 92)

The Department had great difficulty in inducing owners in the southern coastal districts to adopt inoculation, and it was not until permission had been given for employees of the Department to carry out the operation free of charge that it was generally adopted. The success of inoculation showed that the method was out of the experimental stage by 1899.

A. W. Barnes, Veterinary Surgeon at Rockhampton, was the first to demonstrate the fact that blood for inoculation can be carried long distances, thus eliminating the necessity of transferring calves (bleeders) to set up new centres of blood. By the end of 1898 it was evident that control of the tick was the major job ahead and inspectors were moved from the centres of the tick areas to the circumference. Gordon was forced to remark:

It may not be considered out of place for me to refer here to the fact that we are battling with a disease and state of things which did not originate in this colony, and that Queensland has had to fight the disease singlehanded at great cost to the Government and very severe losses to the cattle owners through interference with their particular markets. Especially is this felt where severe restrictions have been placed on the movement of stock by the Government of the colony from which the disease and ticks were extended to this colony. The total outlay by this Government in connection with the tick trouble has up to date been £44,017.1.4d and the details of which are as follows

Salaries of Inspectors, Patrols, Assistants to Ex	£21,846.18.11	
Tanks, dips and yards, etc.	£4,076.17.6	
Expended on oils	£4,967 0.1	9,043.17.7
Stock Board		416.17. 0
Dr. Hunt and Mr. Collins, expenses to America		1,541.11. 0
Dr. Hunt's experiments to date		8,129. 5. 2
Moiety of Stock Institute outlay		3,034.11. 8
		£44,017. 1.4

West and south of the quarantine line the inspection of stock has been well carried out and the system of compulsory notice of intention to travel has not only delayed the spread of the ticks, but has proved a valuable check on stock stealing. (T. H. Shepherd, Rep. Staff Inspector, *An. Rept Dept Agric.*, 1898-99, p. 96)

Using the initial Inkerman steer or other steers and heifers inoculated with his blood, either directly or indirectly, up to the twenty-third generation, Pound supplied over 6000 oz (that is, 371 gallons) of blood, sufficient to inoculate 30 000 head of cattle belonging to stock breeders, graziers and dairymen in the thirteen months up to June 1898. He found that it was inadvisable to take more than 60 oz of blood at one operation, after which the animal should have at least three weeks' rest before another supply of blood was taken. All donors must have passed the tuberculin test.

Pound also found that under natural conditions of tick fever, and by means of protective inoculation, calves of immune mothers were in some cases born immune.

In the case of dairy cattle, where arsenic might find its way into the milk, Pound recommended omitting the arsenic from Christian's Dip and mixing 8 gallons of Stockholm tar, 3 lb of washing soda and 400 gallons of water.

On 1 July 1899 Pound was appointed Government Bacteriologist at the Stock Institute at Normanby, at a salary of £500 per year. In February 1901 the Stock Institute was transferred from the Department of Agriculture to the Home Secretary's Department and research on tick fever was temporarily stopped. Pound was appointed Bacteriological Expert under The Health Act of 1900, within the Health Department.

On 21 September 1907 Dr S. Dodd, D.V.Sc.(Melb.), F.R.C.V.S., was appointed Principal Veterinary Surgeon and Bacteriologist at the Bacteriological Institute for three years, at a

salary of £800 per year. He travelled to Queensland via the United States of America, where he enquired into the eradication of cattle ticks. He requested the establishment of a stock experiment station at Yeerongpilly "for the better prosecution of the work on tick fever for which he was engaged". He was to introduce citrate solution instead of feathers to defibrinate blood, and trypan red and trypan blue to treat redwater, and he discovered that there were really two tick-borne diseases affecting cattle in Queensland.

During 1906–07, when the Stock Institute was transferred back to the Agriculture and Stock Department as the Bacteriological Institute, tick research was resumed. In the more closely settled districts, three additional stock inspectors well-versed in inoculation techniques were appointed.

In 1909 Dr Dodd referred to the problem of straying animals. He said it was hardly reasonable to expect a stock owner to keep his cattle clean and so lose their immunity while his neighbour did nothing and was always a source of danger to the former.

Scriven, the Under-Secretary, urged the Local Authorities in tick-infested areas to clear the roads of straying cattle.

During 1909–10 the Federal Farmers Council Conference held at Ipswich proposed that, as an experiment, the West Moreton Shire Council take over tick control in its area in an effort to eradicate the tick. Additional by-laws were framed under the Local Authorities Act, giving shire councils full control over all diseased stock upon roads and reserves; the shires now had as much power as the inspectors under the Diseases in Stock Acts. Departmental inspectors were asked to assess the results and they found that of the twenty-seven shires, nineteen were doing nothing to prevent stock straying or feeding on roads, and the other eight shires were doing only a little. Local interests caused the failure of the scheme. (*Rep. Dep. Agric. Stk*, 1909–10, pp. 3–4) In his annual report for 1916–17, Scriven suggested the power given to local authorities to deal with diseases should be taken from them and vested in the Department because of the lack of results.

Dodd resigned on 30 April 1910 after serving for only two years and four months. C. J. Pound was restored as Bacteriologist and took up residence at the Stock Experiment Station at Yeerongpilly, confining his work to the animal side only; the Stock Institute at Normanby was transferred to the Health Department for bacteriological and other work.

From 1910 Pound, as Government Bacteriologist, was involved in the preparation and sale of "bleeders" and the sale and distribution of blood for inoculation against tick fever. A "bleeder" was released from the Stock Experiment Station, Yeerongpilly only when:

- 1. its immunity to tick fever had been proved;
- 2. its blood could be guaranteed to produce a reaction when injected into susceptible cattle;
- 3. it had been proved by the tuberculin test to be free from tuberculosis;
- 4. it had been vaccinated against blackleg and subsequently tested for immunity against this disease.

Experiments with subcutaneous and intravenous injection of trypan blue, methylene blue, soamin, atoxyl, methyl-arsenate of soda and orsudan were conducted. Trypan blue showed promise.

During 1912–13 some 33 083 head of cattle were inoculated for tick fever, 30 bleeders were sold and 72 stud animals were held and inoculated. Pound was absent for seven months as a member of the New South Wales Royal Commission that visited the United States to enquire into the procedure adopted for fighting the tick fever. A. H. Cory took charge in his absence, helped by the Assistant to the Government Bacteriologist, H. St G. Thorn.

Pound noted that the time was drawing near when general inoculation work would cease because animals had acquired immunity naturally or by inoculation. He suggested that a start be made to accomplish total eradication, beginning with the island of St Helena, to be followed by the Queensland Agricultural College, the state farms, Goodna Hospital and Dunwich. (Pound, C. J., *Rep. Dep. Agric. Stk*, 1912–13, p. 92)

On 9 February 1912 the Hon. J. George Appel, Home Secretary, declared the cattle tick (*Ixodes bovis*, now *Boophilus microplus*) to be a pest within The Local Authorities Acts, 1902 to 1910 and the Area of the Eastern Downs Tick Board to be a locality affected by the said pest. On 25 March 1915, by Order-in-Council under The Local Authorities Acts, 1902 to 1913 a joint local authority constituted by the union of the Councils of the City of Toowoomba, Town of Newtown, and Shires of Allora, Cambooya, Clifton, Drayton, Highfields, Jondaryan, Middle Ridge, Millmerran, Pittsworth and Rosalie, under the name the Eastern Downs Tick Board, was declared for the prevention and destruction of the cattle tick pest (*Ixodes bovis*) within its area. A joint board to manage and control this joint local authority was constituted to consist of two members each from the Council of the City of Toowoomba and the Shire of Jondaryan, and one member from each of the other shires Acts, 1902 to 1913 relating to the prevention and destruction of pests, and the Home Secretary was given the oversight of the authority.

On 5 March 1912 the Department received a letter from Munro Hull of Eumundi claiming that he had tick-resistant cattle. A. H. Cory, Government Veterinary Surgeon, visited his farm on 29 April, 29 July and 6 December 1912, to observe the tick infestation. On his last visit, at Hull's suggestion, Cory purchased two cows, "Clover" and "Tinkerbell", for experimentation at the Yeerongpilly Stock Experiment Station. After exhaustive experiments at Yeerongpilly during 1913–14, Pound concluded: "According to Mr. Hull, the peculiarity of `Clover' and `Tinkerbell' which is spoken of in different terms as immunity, tick proof, tick resisting, tick killing, is transmitted by contact, vaccination and heredity. The numerous experiments carried out at Yeerongpilly prove conclusively that each of these claims is without foundation." (Pound, C. J., *Rep. Dep. Agric. Stk*, 1913–14, pp. 111–112)

On 25 April 1914 the Oonoonba Stock Experiment and Quarantine Station was opened near Townsville. It started on only 16 acres of land but during 1913–14 land was acquired from the adjacent recreation reserve to raise the area to 205 acres. The land was bounded by the Ross River and the main northern railway line. It was near the shipping wharves and imported stock were trucked at the wharf and conveyed by train to the experiment station, where a private siding was provided for unloading. The transfer of a portion of the

recreation reserve to the Stock Department was conditional on the land being cleared and kept free from noxious weeds such as Chinee apple (*Zinzyphus jujube*), lantana and prickly pear. George Tucker, Government Veterinary Surgeon, Northern District, was in charge of the station. Stock owners soon took advantage of the new station, having imported stock immunised against tick fever before they left for their properties.

In October 1914 a start was made on enforcement of regular dipping within ten miles of the eastern boundary of the country controlled by the Eastern Downs Tick Board, that is, the country around Helidon. This work was undertaken with a twofold object, namely to guard the fringe of the Downs at that point to prevent infested cattle from penetrating into the clean country and to ascertain the effect of regular dipping and cleansing in a closely settled district of Queensland. Three inspectors were engaged and between 1 October 1914 and 30 June 1915 they made 1859 visits to holdings, inspected 46 991 head of cattle and caused 28 965 head to be dipped or otherwise cleansed. If this trial were successful, it was proposed the area be extended a further ten miles eastwards. The result was a great difference in the appearance and health of the stock, but it was felt that if supervision were withdrawn the regularity of dipping would lapse.

In a similar manner supervision was being exercised over stock within ten miles of the border at Tweed Heads (the Tallebudgera–Coolangatta Cleansing Area). From these two trial areas it was concluded that the areas could not be extended by withdrawing inspectors and transferring them to the new area: additional inspectors would have to be appointed. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1914–15, p. 14)

During the 1915 drought numbers of Downs sheep were agisted on the coast and in January 1916 some sheep had fully matured cattle ticks on them: on removal these laid eggs, which hatched. These larval ticks were transferred to a steer and three weeks later 131 fully matured ticks were removed. The steer had no temperature rise, and on examination no tick fever organisms were discovered in the ticks, proving that pathogenic ticks that develop on an unnatural host at once lose their disease-transmitting character. (Pound, C. J., *Rep. Dep. Agric. Stk*, 1915–16, p. 89)

During 1915–16 The Diseases in Stock Acts, 1896 to 1898 and the Diseases in Sheep Acts were rescinded and, together with certain provisions of the Brands Act, were embodied in The Diseases in Stock Act of 1915. Under this new Act it became necessary for every owner of either a public or a private dip to register the dip and to have the dipping fluid analysed twice a year—in the periods February to April and September to November—by the Agricultural Chemist at Brisbane or the Assistant Agricultural Chemist at Townsville. A list of officially registered dipping concentrates was obtainable from the Chief Inspector of Stock and would be published annually in the *Government Gazette*. Only qualified veterinary surgeons could inoculate stock, except for owners inoculating their own stock against pleuropneumonia, Texas fever or blackleg. A recognised certificate of competency for appointments of inspectors of stock was provided for. Because of the problems of inspecting cattle, consideration was given to establishing lines of demarcation between tick-infested or suspicious areas and clean areas.

A special report issued in 1917 by the Executive Committee of the Commonwealth Advisory Council of Science and Industry stated that the total loss to Queensland through the tick pest was estimated at $\pounds 7\ 000\ 000$, while the annual loss at that period was about

£400 000. Hides depreciate from tick damage and the loss to Queensland alone was estimated at £140 000 per year. (Pound, C. J., *Rep. Dep. Agric. Stk*, 1916–17)

To eradicate the tick pest, Pound advocated dipping or spraying each animal once every fourteen days at regular intervals in a standard arsenical solution, watering cattle within 4 to 5 hours of dipping to prevent them drinking the solution, and allowing them to drain 3 to 5 minutes in the draining pen so that the solution did not drip on the pastures.

By 30 June 1917 the Eastern Downs Tick Board had ten dips in operation and three more under construction; a Government dip was erected at Julia Creek, and the Warwick Cleansing Area was added to those at Helidon and Tallebudgera.

The South Burnett Cleansing Area was proclaimed in October 1917 to protect the northern Downs and in the first year 182 770 cattle were dipped. On 7 December 1917 the Hon. William Lennon, Minister for Agriculture and Stock, announced that the Secretary for Agriculture and Stock (himself), the Chief Inspector of Stock (A. H. Cory) and George Edward Bunning had been appointed as a Board, under The Diseases in Stock Act of 1915, for the purpose of the better control and eradication of the cattle tick (*Ixodes bovis*) in the State of Queensland. (*Qd Govt Gazette*, 8 December 1917)

Sixteen additional inspectors were appointed to the Departmental staff and during the next two years Government dips were provided at crossing places on the Northern Railway at Prairie, Richmond, Hughenden, Kajabbi and Cloncurry to treat cattle moving in from the Gulf; dips were also provided to treat cattle moving from the lower Cape York Peninsula to the Biboohra meatworks near Mareeba; in consultation with Dr Gilruth, Administrator of the Northern Territory, it was agreed that cattle moving from the Northern Territory into Queensland would be treated at several dips; and numerous private dips were erected on properties. So great was the need for inspection of cattle and so large was the area to be covered by each inspector that motorcycles were provided to inspectors to expedite their surveillance.

The Miles-Chinchilla Cleansing Area was established by the Board and during its first year (1918–19) 43 859 cattle were dipped.

There was reluctance on the part of some owners to cooperate with the Board initially but they gradually realised that considerable benefits could accrue to them if they joined in.

Tuberculosis

Tuberculosis was widespread throughout the world in the nineteenth century. In 1882 Robert Koch isolated and cultivated the causative bacillus on nutritive media. This led to the introduction of tuberculin testing as a diagnostic agent for the presence of tuberculosis, often not suspected until other animals had been infected. C. J. Pound, Director of the Stock Institute, prepared tuberculin. Believing that more public awareness of tuberculosis, its manner of spread, its diagnosis by the tuberculin test and post-mortem appearances should be aroused, he wrote a pamphlet entitled "Tuberculin, Its History, Preparation and Use" and distributed it widely. He also delivered numerous lectures illustrated by lantern slides and accompanied by demonstrations wherever possible. The veterinarians operating under The Livestock and Meat Export Act of 1895 at export meatworks, examining carcasses going overseas, were in a good position to gauge the extent of tuberculosis in slaughter animals and their reports showed that tuberculosis was the most frequent cause of rejection of carcasses of cattle. In March 1897, Veterinary Surgeon W. C. Quinnell discovered pig carcasses infected with tuberculosis and Pound said this was not uncommon in pigs which had been fed offal from tubercular cattle. These findings emphasised the need for veterinary inspection, and Pound stressed the necessity for the establishment of public abattoirs, where cattle for local consumption could be killed and the meat inspected rather than in small butchering premises. This was brought about under The Slaughtering Act of 1898. At the initiation of their work in declared areas, the slaughtering inspectors were instructed to explain carefully to the slaughtermen the requirements under the Act. A staff inspector supervised the inspectors under the various Stock Acts, the first incumbent in 1898 being F. H. Shepherd. During 1903–04 the whole State came under the Act.

In 1897 Pound had difficulty in persuading small dairy farmers around Brisbane to have their cows tested. They offered excuses: they didn't want to know if their cows were tubercular, asked if compensation would be paid to the full value of cattle destroyed as reactors (under the Act) and so on. Pound pointed out that the best advertisement they could have would be to advertise their herds as guaranteed free from tuberculosis. In that year 280 stud and dairy cattle were tested. Where tuberculin was supplied by the Institute the applicant was requested to return for record purposes a list of the temperatures recorded during the reaction, and if the animal died, notes on post-mortem findings or specimens. (Pound, C. J., *An. Rept Dept Agric.*, 1897-98, p. 84)

In his annual report as Dairy Instructor for the year 1898, John Mahon reported a marked increase in the incidence of tuberculosis in dairy herds and estimated that 20 per cent of Queensland's dairy herds were infected.

Pound tested the herds on St Helena and at the asylums at Goodna, Toowoomba and Ipswich. At St Helena Penal Establishment he found nine of the sixty-eight cattle in the dairy herd infected. He proceeded to eliminate the disease in the above institutions, re-testing the herds every six months. These institutions were under the control of the Home Secretary's Department. As a result of this activity the demand for tuberculin from the Stock Institute (the only laboratory in the Southern Hemisphere where it was being prepared) increased.

It is interesting and important to note that Pound was the first to show that tuberculosis could be transmitted by inoculation with pleuropneumonia inoculation where the "pleuro" serum had been drawn from a tubercular animal. From this time onwards Pound suggested that all virus for pleuropneumonia inoculation be obtained from the Stock Institute, where tuberculin testing ruled out the possibility of infection from this source.

In his 1900–01 report, W. C. Quinnell intimated that the recommendation of the Royal Commission on Tuberculosis had been adopted: "In view of the greater tendency to generalisation of tuberculosis in the pig, we consider that the presence of tubercular deposit in any degree should involve seizure of the whole carcass and organs."

The 1901 drought caused some meatworks and freezing and canning establishments to close, but an extensive freezing establishment was opened near Mooraree (Murrarie) during the year ending June 1901 and extensive works were also completed at Redbank on the Brisbane River.

During 1901–03, Robert Ferguson, surveyor for the Meat and Dairy Produce Encouragement Board, made a detailed inspection of slaughterhouses around Brisbane and at Ipswich, Toowoomba, Warwick, Dalby, Roma, Charleville, Gympie, Maryborough, Bundaberg and Gladstone. He reported that, with very few exceptions, the present slaughterhouses were very defective in their sanitary arrangements—an opinion endorsed by Veterinary Inspector Tucker, who superintended the slaughtering of meat for the Brisbane district. Ferguson furnished a set of plans and specifications for buildings and fittings of an inexpensive nature for butchering premises as a guide to slaughtermen, architects and builders. These were published in the 1902–03 annual report. (Ferguson, R., *An. Rept Dept Agric.*, 1902–03, pp. 75–78)

By June 1908 carcasses condemned at slaughterhouses because of tuberculosis infection amounted to 0.68 per cent of bullocks and 4.6 per cent of cows. In 1911 the figures were 0.54 per cent, 0.56 per cent and 0.6 per cent for pigs.

The use of dairy cows that were condemned by inspection for milk but that were kept by farmers to rear calves was a cause for concern. Tuberculosis in pigs had been traced to their being fed fresh and separated milk from infected cows, consuming offal from infected carcasses, and in some cases eating grain that had passed out in infected faeces. The Department made a veterinary surgeon available at no cost to the owner to test any herd for tuberculosis, on the understanding that animals that reacted must be isolated from the remainder of the herd until destroyed. Very few owners responded.

The herds at St Helena Penal Establishment and at the Dalby Sanatorium were free of the disease by 1908. During 1910–11 the dairy herd at the Queensland Agricultural College was tested. Pound recommended that there be a compulsory campaign against tuberculosis, like that under way in USA, Canada, Argentina and five European countries.

Additional regulations under The Dairy Produce Act of 1904 provided for the testing of all milking herds supplying the populous centres, commencing with the metropolitan area, but lack of veterinary surgeons delayed its implementation. The report of the subcommittee appointed by the Queensland Committee of the Advising Council of Science and Industry stated:

It can reasonably be assumed that there is a death rate amongst cows and calves of 3 per cent annually from the effects of tuberculosis in the dairy herds of Queensland and this moderate computation, estimating the average value of the cows and calves at £5 per head, brings the annual loss to 11,742 head at £5, totalling £58,170. Losses in pigs were estimated at 14,000 head at £2 or £28,000 per year. (*Rep. Dep. Agric. Stk*, 1916–17, p. 85)

By 1918 all the additional State herds tested in the Prisons Department, Queensland Agricultural College, Ipswich Mental Hospital and the Military Hospital at Stanthorpe were free of tuberculosis.

Blackleg

On 30 June 1898 the Director of the Stock Institute, C. J. Pound, reported the prevalence of symptomatic anthrax, more commonly known as blackleg, in Queensland coastal districts. He confirmed the presence of the causative bacilli from carcasses and believed that filtered cultures of the bacillus as recommended by Roux and Chamberland could produce immunity. He stated that "with our present imperfect accommodation it would be impossible to guarantee the purity on a large scale of cultures of the `blackleg' bacillus", and added, "until the necessary facilities are afforded I cannot possibly proceed with this urgent enquiry". Animals affected were mostly calves and yearlings from three months of age up to two years. (*An. Rept Dept Agric.*, 1897–98, pp. 83–84)

By 1905 two or three forms of vaccines were on the market and the burning of carcasses infected with the bacilli was strongly recommended.

In 1908 Veterinary Surgeon Tucker surveyed stock owners to ascertain the effectiveness of vaccines being used. From this information he gathered that the vaccines in use were too weak and failed to confer sufficient immunity against the natural disease, and suggested the Department prepare a reliable vaccine of a reasonable cost.

In 1909 the Stock Experiment Station at Yeerongpilly was established and Dr S. Dodd prepared a double vaccine for use against blackleg, which was ready for use in December 1909. A single vaccine was also available, but the Department recommended the double vaccine involving two inoculations, first with the No. 1 vaccine and later with No. 2 vaccine. This subsequently proved very effective. (Pound, C. J., *Rep. Dep. Agric. Stk*, 1912–13, p. 87)

In his 1914–15 and 1915–16 annual reports the Deputy Chief Inspector of Stock based in Townsville, George Tucker, M.R.C.V.S., deplored the fact that the stock laws still allowed a man to purchase blackleg vaccine and infect as much clean country as he liked.

In 1911, 1755 calves were vaccinated against blackleg; in 1918 the total was 19 253. Blackleg was present from the Tweed River to Bowen and as far west as Roma. Pound stressed the necessity to vaccinate, and said any carcasses of animals that had died from blackleg should be destroyed by fire or buried at a minimum depth of six feet. (Pound, C. J., *Rep. Dep. Agric. Stk*, 1917–18, p. 70).

Swine fever

Swine fever was first detected in England in 1862, and in Ohio in America, under the name "Hog cholera", in 1833. It is caused by a virus. During the summer of 1895 Major A. H. Cory, M.R.C.V.S., visited a great number of swine fever cases and suspected cases in various districts in the west of England. (Cory, A. H., *QAJ*, Vol. 7, Sept. 1900, p. 279)

In July 1912 swine fever broke out in the yards around Brisbane. The prompt and thorough action then taken in destroying all pigs in affected areas, the pulling-down and burning of sties where thorough disinfection was doubtful, and three months' quarantine of premises according to the conditions ended in satisfactory control. (Cory, A. H., *Rep. Dep. Agric. Stk*, 1912–13, p. 29) During 1917–18 two outbreaks of swine fever were recorded, one in

Brisbane and one in north Queensland, where all the pigs on the Kairi State Farm were slaughtered. New sties were erected on a new site and the stud pig herd was replaced. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1917–18, p. 9)

Contagious abortion (brucellosis)

In December 1905 Cory drew attention to the highly contagious nature of contagious abortion (brucellosis). This disease was dangerous not only because of the loss of milk and progeny but also because subsequent sterility often occurred. Cory mentioned that Drs Bang and Stribolt of Copenhagen had isolated a bacillus that might cause it but said this had not then been confirmed. (It was later confirmed.) Cory recommended isolation of the affected cow, destruction of the foetus and appendages by burning, disinfection of the calving area and irrigating the womb with carbolic acid solution (*QAJ*, Vol. 16, Dec. 1905, pp. 249–250) Later a corrosive sublimate solution replaced carbolic acid. In June 1906 Dr Sydney Dodd, Principal Veterinary Surgeon and Bacteriologist, published a detailed article dealing with the contagious disease. (*QAJ*, Vol. 22, June 1909, pp. 317-319) Scriven, the Under-Secretary, reported in 1911 that so far the occurrences of abortion in Queensland were not of a contagious nature. In 1914 the Department received word of a protective vaccination available in England, but this was not forthcoming in Australia till well after World War I.

Contagious mammitis (mastitis)

By 1908 only one case of contagious mammitis (mastitis) had been reported in the State, though New Zealand herds were suffering from it. During the latter part of the 1912–13 summer this disease occurred in several dairy herds in the Logan district. Investigations were set in train by Pound to prepare a vaccine to suppress the disease.

Warble fly (Hypoderma bovis)

On 24 February 1915 eight bulls were received at Yeerongpilly Stock Experiment Station to undergo inoculation for tick fever. These bulls, which had been imported from Scotland, had passed through the customary forty days' quarantine at Lytton. On 20 March a warble was detected in one of the bulls. A few days later warbles were found in all of them, and continued to appear until the end of June. The greatest number found at one time on a single animal was seven, and the total number removed from all the bulls between 20 March and 30 June was fifty-eight. Had these bulls not been destined for ticky country they would not have been consigned to Yeerongpilly and it is highly probable that the warbles would never have been detected. The larvae of the fly, which is on the wing in July, spend July to September in the oesophagus, September in the spinal canal and January to May in the subcutis and skin. With later-appearing flies this sequence can occur a month later. During development in the subcutis of the back each grub perforates the hide, the aperture being nearly a quarter of an inch in diameter. Damage to hides is severe and infected muscles must be removed after slaughter.

In 1915 losses in England due to the fly were estimated at £8 000 000 per year, and in the United States at £7 000 000 to £12 000 000. (Pound, C.J., *Rep. Dep. Agric. Stk*, 1914–15,

pp. 66–67) Pound's acute observation and timely action prevented what could have been a costly introduction.

Other diseases

In the Cooktown district in May 1886 J. Irving reported a skin disease in horses caused by a fungus, *Trichophyton furfuracea*, identified by Henry Tryon in March 1888. It had come to Australia on camels from India. (*An. Rept Dept Agric.*, 1889–90, p. 51) Losses from Zania poisoning occurred in 1897 and anthrax was reported in south coastal areas the same year. Tetanus, actinomycosis and malignant oedema were found in cattle in 1899. Diarrhoea and dysentery, commonly called "scours", were prevalent in calves in dairying areas in 1908, owing mainly to their being fed unsuitable food at irregular times and feeding with dirty utensils. Indigestion was also common. Recorded at the same time were "bottle" (parasitic anaemia), stomach worms, navel-ill and blight in calves; cancer in cattle; strangles, worms, swamp cancer, mange and blight in horses; caseous lymphadenitis in sheep; and paralysis in pigs.

Osteomalacia, or soft bone disease, was reported by Dr S. Dodd as common on coastal lands in 1909. It occurred mostly in dairy cows and heifers, especially heavy milkers. Dodd suggested it was due to a deficiency of lime salts in the bones causing them to be light and brittle. Cattle were seen to seek out bones or dead fish on the seashore. Soil analyses by the Agricultural Chemist showed a local deficiency of lime and phosphorus. Dodd also suggested that silver nitrate would be effective against infective ophthalmia (blight) in dairy cattle. (Dodd, S., *Rep. Dep. Agric. Stk*, 1908–09, p. 87)

Footrot was found on the Darling Downs during 1910–11 in sheep imported from southern States. The holdings were quarantined and the sheep treated until the disease disappeared. Other sheep problems later reported were lungworms, bots and lice and sheep maggot flies (see "Sheep and wool"). Poisonous plants continued to be identified, and pink-nose in cattle grazing between Townsville and Cooktown was traced to their eating *Lantana camara*. (Cory, A. H., *Rep. Dep. Agric. Stk*, 1910–11, pp. 24–26) During 1914–15 it was found that Crowsfoot grass (*Eleusine indica*) had caused the death of fowls and ducks. Dr Dodd drew attention to the fact that in a good many cases so-called poisonous plants were harmless under ordinary circumstances. (*Rep. Dep. Agric. Stk*, 1909–10, p. 21)

Quarantine

In March 1905 the Department totally prohibited the introduction of any stock or any carcasses from any place outside Australasia, except in the case of stock from the United Kingdom, which might be imported or introduced in accordance with existing Acts and Regulations provided that no stock other than stock from the United Kingdom were, or had been, carried by the same ship during the same or the last preceding voyage.

Stock inspectors throughout the State and also customs officers were told to exercise the greatest vigilance in seeing that this Order-in-Council was not violated. Special instructions were given to the officers in (Port) Darwin and on Thursday Island. Rinderpest was the main disease under consideration. (*Rep. Dep. Agric. Stk*, 1904–05, p. 20) It had not yet reached the Commonwealth or New Zealand.

William Henry Beck was appointed Quarantine Keeper at Lytton on 27 October 1873 and was still there in 1905. During 1916–17 this animal quarantine station was closed and added to the human quarantine station there. A new animal quarantine station was established at Colmslie. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1916–17, p. 13)

In 1905 J. P. Orr, Deputy Chief Inspector of Stock, visited New South Wales to discuss recent restrictions imposed on the interchange of stock with Queensland (because of the danger of the spread of ticks). He succeeded in having the horse regulations altered. The last New South Wales stock restrictions, imposed on 10 March 1905, provided that all horses that entered the areas in Schedules T and Z (Darling Downs) would be required to remain there for at least four months and another two months in the area known as Schedule W (Maranoa), or six months in all, and then be dipped again at the border. The new Regulations agreed to stated that:

- 1. clean horses from the Darling Downs areas T and Z would be allowed to proceed direct to New South Wales on dipping at Warwick, Stanthorpe and the border with seven days between each dipping; or
- 2. horses would be dipped at Warwick or Toowoomba, then remain two months in Schedule W (Maranoa) before crossing the border after dipping there (this was the restriction prior to March 1905); or
- 3. horses would remain six months in Schedules T, Z and W according to the March 1905 Regulations.

The New South Wales Stock Inspector at Tweed Heads was given discretionary powers to permit saddles, bridles, harness and vehicles after inspection and disinfection to cross the border. Formerly permission from the Head Office in Sydney was required. (*Rep. Dep. Agric. Stk*, 1904–05, p. 7)

In August 1906 a Stock Conference was held in Melbourne. J. P. Orr and A. H. Cory attended on behalf of Queensland. The conference dealt with the stock laws in each State: uniformity and inspection techniques. It was decided that importation of stock from India, Africa, the Philippines, Malay States, East Indian Islands and New Guinea should be completely prohibited to prevent entry of Dourine, surra, rinderpest, South African horse sickness and nagana. It was also thought undesirable to admit cattle from the Northern Hemisphere during September, October, November and December because of the danger of importing the warble fly.

Dr S. Dodd attended an Animal Overseas Quarantine Conference in Melbourne during February and March 1909 and new Federal Regulations were drawn up as a result. (*Rep. Dep. Agric. Stk*, 1908–09, p. 81)
Livestock

Dairying

With the closure of the Travelling Dairies, John Mahon, Manager of No. 2 Dairy, was appointed Dairy Instructor on 1 July 1897, with R. W. Winks (in charge of grading dairy produce) and Charles McGrath as assistants. They visited various districts, addressing farmers on the advantage of co-operative action in founding factories, and on improved production to enhance the export trade in dairy produce. Mahon pointed out the weak points in the present industry—indifferent cattle, a bad system of milking, want of aeration and improper treatment of milk, need for winter feeding and better housing. A. Macfarlane was quoted as saying, "If a cow could speak one of the first things it would probably ask for would be an improvement in the breed of farmers".

Co-operative factories were established early at Gympie, Bundaberg, Rosevale, Mackay and Capella. The Queensland Farmers Co-operative was formed in 1900 and in May 1901 began to manufacture butter, and the Maryborough Co-operative Dairy Association followed in the same year. Both were helped financially by loans from the Meat and Dairy Produce Encouragement Fund. The Downs Co-operative Dairy Association was founded in Toowoomba in 1902, and the Port Curtis Co-operative Dairy Association in 1904.

The first shipment of butter to England by the Bundaberg Dairy Company, managed by D. Gibson, was sent to Messrs Shelton and Brown, Brisbane, for transmission via Sydney in February 1899.

To improve production of dairy cattle the Department instituted three-day district milking competitions and the owner of the cow yielding the greatest average production was presented with a purebred Ayrshire bull from the Queensland Agricultural College herd, which had been imported from Victoria—a most worthy and generous innovation. Cows with adequate production records could be registered and carry a specified brand.

Dairying by the factory system was making steady progress. In 1897 Queensland exported 190 000 lb of butter more than it imported, and only 14 500 lb of cheese had to be imported, compared with 350 000 lb in 1893. During 1896–97, £54 747 worth of condensed milk was imported. Messrs McConnel and Munro of Cressbrook built a condensed milk factory and it had to be duplicated because of the demand, so a second condensed milk factory was built by Charles Sealy of the Trelawny Cheese Factory on the Eastern Downs. A Commonwealth condensed milk factory was erected early in 1901 for the A.U.S.N. Company to supply condensed milk to its boats trading north from Brisbane. (Dalrymple, D. H., *An. Rept Dept Agric.*, 1900–01)

An early problem with Australian butter was the development of "fishy" flavour, owing to improper cleansing of the cream separators. Other problems were irregular supply and the fact that too many Queensland consignments consisted of mixtures of batches manufactured on separate days. Quality was hard to assess as most of Queensland's butter was transshipped at Sydney and was credited on Customs returns to New South Wales. (*QAJ*, Vol. 7, 1900, pp. 117–120)

Ships of the Aberdeen Line first called at Brisbane in 1903 to load dairy produce for shipment direct to the United Kingdom. (Rice, 1959)

In his annual report for the year ending 30 June 1903 on the operation of the Board appointed under the provisions of The Meat and Dairy Produce Encouragement Acts, 1893 to 1901, W. Chas. Green, Secretary, referred to a financial loss incurred by a creamery and said the principal cause of the loss apart from the disastrous drought was that most dairy farmers in southern Queensland had adopted the hand separator instead of using the central creamery steam plant. This led to cream of varying degrees of ripeness arriving at a butter factory, instead of cream of a uniform degree of ripeness from a central creamery. "This will make it very difficult for the manufacturer to make an article which will compete successfully in the markets of the world." (*An. Rept Dept Agric.*, 1902–03, p. 68)

In 1904 a private butter and bacon curing factory was erected at Cairns by James Burns, based on plans and specifications submitted to the Board administering the Encouragement Acts, which stimulated the dairying industry. Stud bulls and milking strains of various breeds of cows were imported from the south, improved pastures and fodder crops were sown and several cattle dips were built. (Newport, H., *An. Rept Dept Agric.*, 1903–04, p. 65)

In the following year Newport wrote:

Dairying promises to become one of the main industries. *Paspalum dilatatum* has come to stay and experiments with rhodes grass and *Chloris virgata* are promising. The Cairns butter factory has proved a boon to many a small settler and the dairy bank scheme of the landholders, organised and inaugurated by Mr W. J. Munro where the farmers co-operatively import first class stock at lowest cost, and at the same time obtain loans for the purchase is going to be the means of overcoming one of the natural difficulties now hampering the rapid advance of the dairying industry.

Dairying on the Atherton Tableland was first carried out by a few settlers with station-bred cattle on forest land near Tolga in about 1887. The farmers made their own butter and disposed of it to miners on the Herberton mineral fields at prices ranging from 2s 6d to 3s per lb. Then scrub lands were felled by the Chinese to grow maize and it was not until 1907 that dairying on scrub lands was considered. In that year the Golden Grove Butter Factory was built south of Atherton by W. Abbott. (Payne, Campbell, and Atherton, 1931)

During the latter part of 1904, while the Victorian Butter Commission was sitting, the Austral Timber Company led an attack in the *Station Farm and Dairy*, published in Sydney, on the Queensland pine butter boxes, saying they were "not inodorous" and were much heavier than New Zealand pine boxes, which they preferred. This led the Agricultural Chemist (J. C. Brünnich) and the Dairy Expert (G. S. Thomson) to investigate this "wood taint"; their experiments proved that Queensland pine was admirably adapted to the export butter trade. The best results from the experiments were obtained from wood treated with paraffin wax and single parchment paper. (*Rep. Dep. Agric. Stk*, 1904–05, pp. 8–9)

On 1 March 1904 George Sutherland Thomson had been appointed Government Dairy Expert, on a salary of £410 per year. His chief concern was publicising material for the proposed Dairy Produce Act of 1904. The original Act was passed in 1904 and came into effect on 1 April 1905. It was the first Act governing the manufacturing side of the dairy

industry in Australia, although a Dairy Supervision Act was passed in New South Wales in 1901 to deal with control of milk and cream production on farms.

The Dairy Produce Act was introduced by the Hon. Digby Denham, Minister for Agriculture, and assented to on 17 December 1904. It provided for the registration of dairies on farms, with a fee of 3d per cow in herds of five cows and over based on March figures, with smaller herds free; regulations requiring the adequate cleansing of dairy cows' udders before milking, of dairy utensils and bails; a ban on the milking of diseased cows; notification of disease; adequate isolation of dairy production buildings (150 feet away from pigsties, sanitary conveniences and drainage sumps); use of pure water and isolation of diseased stock; the provision of adequate ventilation in buildings; no storage of noxious materials in dairy buildings; no adulteration of milk; and other matters designed to produce a clean milk and cream supply.

On the factory side, registration was also required, at a fee of £1 per factory, each factory to be subject to inspection of its buildings. Approval was given for cold stores; all produce had to be tested and graded, for interstate and export trade, and certificates of inspection had to be issued; the use of maximum amounts of butter preservatives was stipulated; and general matters of hygiene were covered.

The Government had the power to declare districts for the administration of the Act and appoint inspectors to each district. Potential inspectors had to pass a theory examination requiring a minimum of 50 per cent of the marks before passing a subsequent practical examination and thus qualifying for a certificate of competency. The inspectors appointed had to administer the Act, with powers to enforce the regulations, condemn equipment, isolate infected animals, etc., and furnish a monthly report of their activities to the Minister. All inspectors under the Dairy Produce Act were also Inspectors under the Diseases in Stock Act.

Before they could officially test milk and cream inspectors had to pass a qualifying examination to gain a certificate. The first twelve district inspectors were appointed on 10 April 1905 and Robert William Winks, previously Assistant Dairy Instructor, was appointed Grading Inspector. The Act was declared on this date to be operative in the Cities of Brisbane, Gympie, Ipswich, Maryborough, South Brisbane and Toowoomba; in the towns of Allora, Bundaberg, Dalby, Hamilton, Ithaca, Laidley, Sandgate, Toowong, Warwick and Windsor; and in sixty named Shires.

Milk and cream testing were taught at the technical and art colleges of North and South Brisbane, and at the Queensland Agricultural College at Gatton. The practice of pooling cream for butter-making was affecting quality and Thomson, the Dairy Expert, advocated compulsory grading based not only on fat content (35 per cent was the minimum accepted) but also on flavour. He also suggested short courses for factory managers during the winter to concentrate on matters affecting ripening and grading of cream, and the standardisation and official marking of glassware used in testing.

The impact of the Dairy Produce Act in stimulating dairying could be seen in the following years. There was an influx of dairy farmers from the southern States; dairying had achieved an annual value of £1 000 000 in 1907, and increased at the rate of 10 per cent during 1907–08. Inspectors reported improved techniques, and the benefits of compulsory grading of

butter for export were in evidence: Tooley Street merchants in London declared Queensland produce well up to the standard of that of the southern States and said its delivery was more reliable. Compulsory grading of cream was introduced in August 1908.

On 1 November 1908 Arthur Ernest James Charles King Graham, who had been Dairy Instructor at the Queensland Agricultural College in 1906 and later General Manager of the Queensland Farmers Co-operative Dairying Company, was appointed Dairy Expert within the Department of Agriculture and Stock at a salary of £400 per year. He advocated more frequent cream collection to prevent acidity rising above 0.6 per cent, better-quality dairy stock and much-improved winter nutrition by storage of fodder as hay or silage. A Departmental official was based in London to report on the quality of butter arriving there. The chief faults were mixing creams, short weight and fishy flavour.

Cheese production reached a record level during 1907–08, when 13 000 tons were exported to London. The quality was pronounced good but there was a need to standardise the size of the cheeses. A special inspector was appointed by the Department and assigned to cheese manufacture, the handling of milk and cheese curing.

Poor transport of milk and cream was causing concern: the produce often stood for hours in the sun awaiting pick-up or was held at the dairy far too long. Additional railway services to isolated districts had improved this situation by 1910–11, with butter factories at Roma, Miles, Chinchilla, Gayndah and Emerald reopened.

Official Departmental herd testing began in the West Moreton district with the appointment on 22 September 1910 of L. F. Andersen at a salary of £150 per year. For some years farmers' herds were recorded only when an officer was in their particular district and many herds were recorded only once during a lactation. The system was known as the farmers' sample system, whereby the farmer weighed and sampled the milk from each cow in his herd during four milkings in two days and took the samples of milk to an officer who visited the district to carry out the butter fat tests. (Rice, 1959)

Farmers wanted only cows in full milk tested at first. During the year 1910–11 one hundred and forty-eight dairy men submitted 3475 cows for testing.

In 1911 pure lactic cultures (starters) were prepared at the Yeerongpilly Experiment Station for distribution to cheese factories to improve cheese quality. There were still defects such as over-ripeness, strong aroma, loss of texture and deficient fat content in cheeses. (Winks, R. W., *Rep. Dep. Agric. Stk*, 1910–11, pp. 83-84)

During the year 1912–13 the Government erected the Central Cold Store at Roma Street, providing up-to-date facilities for the holding and inspection of export produce. This was closed when the Hamilton Cold Stores were opened in 1924.

An Interstate Conference of Ministers for Agriculture held during 1913-14 agreed on compulsory grading of butter, uniform compulsory cream grading, and the use of butter grades, "Superfine" (95–100 points) and "First grade" (90–95 points); the use of grade stamps and registered grades, with a list of butter factories and grades to be published; all cream graders and testers at butter and cheese factories must hold certificates of competency interchangeable between States; standard factory balance sheets would be kept; and butter for

export was to be shipped at a maximum temperature of 20°F and a carrying temperature of 5-10°F. Definitions of cheeses and prohibited additives were also adopted.

The severe competition to butter mounted by the manufacturers of margarine was being felt on the London market at this time. Australian regulations under The Margarine Act of 1910 banned the colouring of margarine to resemble butter, but in London colouring was allowed. This led the Department to double its efforts to improve butter quality, especially by delivering cream more quickly to the factory and taking more care in manufacture. Periodic cream inspection was introduced in factories to examine and classify individual creams, and inspectors visited the farms of suppliers of low-quality cream to help them overcome the problem. One problem had been that some factories were still paying the same rate for cream, irrespective of quality.

During 1913–14 Andersen visited numerous districts to conduct herd tests. The highest herd averaged 27.7 lb of milk per cow per day, the lowest 8.2 lb. He also tested skim milk on the farms to test the efficiency of separation, and encouraged farmers to conserve fodder.

The Ayrshire Cattle Society of Queensland established the first *Australian Herd Book* to contain an advanced register. In August 1914 provision was made to register cows under four years of age that had produced 2 lb of butter in two days, and cows over four that produced 21/2 lb. Any bull that had sired four advanced register (A.R.) cows also qualified for the register. The Jersey Cattle Society established an advanced register in 1916. The requirements for entry were for cows under three years to produce in 48 hours at least 2 lb of commercial butter, cows under 4 years 22 lb and cows over 4 years 3 lb. A sire of four A.R. daughters also qualified. The Illawarra Dairy Cattle Association established a register in 1918 and the Holstein-Friesian Cattle Club followed suit in 1920. These cows were tested by officers of the Department of Agriculture and Stock.

With the outbreak of World War I in 1914 there was a big demand for cheese for export to Great Britain for the War Office for army rations. An interesting sidelight in cheese manufacture at this time was the shortage of rennet to coagulate the milk: Graham, the Chief Dairy Expert, suggested trying pepsin, which worked very well.

During the war the Commonwealth Government fixed prices for produce for home consumption and a State Advisory Committee was appointed to arrange for butter requirements for home consumption and equal payment for all factories for local and export butter. During 1916, under the Control of Trade Act, 43 379 boxes of butter were acquired between June and October, of which 13 369 were sold in Australia and 29 010 in London. The demand for cheese was met in Queensland by the Cheese Manufacturers Association (later changed to Rural Industries Limited) and by the Butter Shippers Committee. The arrangements were made through the Agent-General at the commencement of the season, and later the Board of Trade acquired all cheese landed in Britain. In the following year, the Imperial Government bought the butter through the Commonwealth Government as its agent and the Commonwealth Government asserted authority over a butter pool under the War Precautions Act.

On 26 August 1915 Atkinson Robert Wilkin was appointed the first Instructor in Cheesemaking to service the expanding cheese industry. He resigned after some nineteen months and was replaced by Robert Matthew Knight Snell.

An extract from a letter from London dairy authority in 1917 read:

I sincerely hope you are not going to make a change in your system of grading dairy exports. During the past three years I have had an excellent opportunity of studying the question of Australian grading of butter and cheese as it applies to the British market and I firmly contend that Queensland has won the confidence of the men here. This is of the highest commercial value to your producers and it is not fully appreciated by your factories. I might add that when the sale of Australian butter and cheese to the Imperial Government was reaching finality, the thoroughness of Queensland grading was a factor that was not overlooked by the Ministry of Food. Trusting nothing will be done by your Department to lower the status of Queensland grading. It has a reputation of its own well worth protecting. (*Rep. Dep. Agric. Stk*, 1917–18, p. 14)

The dairy herds of Denmark, Holland, Belgium, Sweden, Norway, France, Germany, Italy and Liberia suffered owing to the war and this opened the opportunity for Queensland dairy farms. By 1918 Queensland provided 70 per cent of the cheese exported from Australia.

Factories had been fully equipped for pasteurisation by this time but mould in butter had turned up, caused by the use of unsuitable timber in butter boxes. Factories were advised to kiln-dry the timber and coat the boxes with paraffin.

The contract with the Imperial Government to purchase Australian butter at a fixed price for quality grades expired in August 1920. At that time, the Chief Dairy Expert, Graham, recorded that there were 16 000 dairy farmers in the State, of whom 14 000 failed to conserve sufficient fodder to maintain their dairy herds on a profitable basis throughout even a short period of drought. The year 1919 was a drought year.

The Co-operative Agricultural Production and Advances to Farmers Act, 1914 to 1919 superseded The Meat and Dairy Produce Encouragement Act of 1893, but limited loans to co-operative associations. It also assisted farmers to purchase dairy stock. This Act was repealed in 1923, but additional facilities then became available for co-operative dairy companies and dairy farmers under The Agricultural Bank Act of 1923. (Rice, 1959)

Horses

A problem much in evidence from 1880 to the end of World War I was the deterioration in the quality of horses being bred in Queensland. Ernest A. Smith (*QAJ*, Vol. 7, Aug. 1900, p. 134) attributed this decline to the low prices paid for saddle horses, the lack of culling of mares, and an increase in the number of horse breeders without money or discrimination in the selection of stallions and mares for mating. The current choice of a stallion to service the mares depended on cheapness rather than quality. A mare might be taken to a good stallion and if the offspring were a colt, he was often left entire and used to service mares at a fee much lower than that charged for the original high-class sire. The Royal National Association introduced substantial prizes for blood (thoroughbred) stallions to induce the principal studmasters to exhibit and thus publicise good stock. The use of thoroughbred stallions would improve considerably the quality of Queensland horses. Smith suggested the adoption of a system of subsidies, together with the examination and licensing of stallions, as applied in England.

There was a large demand from India and South Africa for remount horses, and from German agents acting on behalf of China. Horses shipped to these places were examined by the Government Veterinary Surgeons and the shippers were issued with certificates of soundness. During 1899–1900 some 370 horses were shipped to India; the following year the number rose to half a million being sent to India, South Africa and China. There was concern at the number of mares being exported.

In 1905 Scriven, Under-Secretary, recommended restricting sales of mares to foreign buyers; registration of stallions, with power to prevent from serving mares (for a fee) any animal that was pronounced by a veterinary surgeon to be ill-formed structurally or affected with any complaint that could be transmitted; and the establishment by the Department of a stud farm at which stallions and mares of approved breeds should be kept for the purpose of rearing stallions and mares for distribution throughout the country, under conditions that would tend to improve the breed of horses and encourage breeding by small holders, such as was the case with dairy bulls at the Queensland Agricultural College.

Clydesdale stallions were located at the College from 1900 to service the College mares and those of surrounding farmers and this practice was extended to the state farms, with Suffolk Punch stallions located at Roma and Gindie and later at Kairi.

A Bill providing for a tax on stallions was presented to Parliament in 1906 but failed to gain support.

During 1907–08 Colonel Goad, Director-General of the Remount Department of the Indian Army, came to Queensland to arrange to buy horses through an agent instead of on the open market, as breeders obtained a better price in this way. The price was £12 per head. However, Major Brown of the 3rd US Cavalry, accompanied by Veterinary Surgeon McMurdo, came and bought horses on the open market for the Philippines. Horses at the time were classified as "light horses", "draughts", "gunners" and "ponies".

In 1908 an attempt to get the Show Societies to allow a veterinary surgeon to check the soundness and quality of stallions on parade was refused. In 1909 it was allowed, and the first public examination was at Warwick in February 1909, followed by Toowoomba, Brisbane, Rockhampton and Townsville. The number of stallions in the State at this time was 6794, of which 199 had been inspected; of these, 30 were rejected as unsuitable. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1908–09, p. 31)

During 1913–14 Queensland's export trade in horses to India was worth £43 136, and to New South Wales £200 364.

In 1913 Arthur H. Cory, Government Veterinary Surgeon for the Southern District—where two other veterinary surgeons, A. McGown and C. L. O'Gorman assisted—reported that during the year 1912–13 sixty stallion parades were held and 662 stallions were inspected. Of these, 596 were approved. Two hundred and three mares were examined, with 164 passed for entry into the *Queensland Draught Horse Stud Books*. During the 1913–14 year there were only four veterinary surgeons for the whole State, to cover an area of 675 000 square miles.

In 1914–15 three Spanish donkeys were imported from Great Britain; they were quarantined at the Stock Experiment Station recently opened at Oonoonba (Townsville).

In 1915–16 Veterinary Surgeons Rudd and Legg joined the military services, and were not replaced until the following year, when Speer and Hallam were appointed. The shortage of

veterinary surgeons led Major A. H. Cory, Chief Inspector of Stock, to remark, "The advent of the University has given the opportunity for education and it is hoped that Veterinary Science will be coincident with the establishment of the Medical School." The idea was supported by the Under-Secretary, Scriven. George Tucker, Government Veterinary Surgeon for the Northern District and Officer in Charge of the Stock Experiment Station at Oonoonba, followed this up by pointing out the need for a registration system to prevent practitioners who have no qualifications trading as Veterinary Surgeons. Mr. Cory has for years been urging the necessity of legislation preventing any but qualified men practising as Surgeons". (*Rep. Dep. Agric. Stk*, 1913–14, p. 4)

There was continuing worry about the deterioration of our horses. In 1914 Scriven suggested that the problem (in connection with thoroughbred stallions) was short races—breeders were concentrating on the thoroughbred market for such races. "No race upon a public course should be allowed to be of a shorter length than one mile, and races of two miles should be encouraged." He suggested the establishment of a stud farm financed from a totaliser tax.

A Federal conference dealing with horse breeding in Australia was held in Melbourne in November 1916. From it two resolutions emanated:

- 1. That agricultural societies should be encouraged to provide competitions for stallions, mares, colts and fillies suitable for military purposes (including novice classes) and that the judges for those competitions should be persons acquainted with military requirements; soundness should be regarded as of primary importance.
- 2. That the State authorities and agricultural societies should be invited to assist breeders as to the types of horse required, and the best method of producing them.

At that time the Chamber of Commerce at Charters Towers advocated the export of horseflesh as meat for human consumption, as there had been a regular market in European countries and Great Britain traded regularly with France and Belgium. But the Federal Government refused to countenance the export and freight was difficult to arrange during the war. It was felt that the idea should have been investigated as an outlet for thousands of horses, wild (brumbies) or otherwise, which should be killed.

During 1917–18 India, USA, Japan and Holland sent Army Commissions to Australia, and particularly to Queensland, to buy remounts. A Bill was presented to Parliament during that year with provisions for inspection by a qualified board of stallions and of horses for public service, and the establishment of premium stallions, as in some overseas countries. It failed to gain assent. Thus the only success in legislation had been for the registration of stallions after examination by a Government veterinary surgeon. The agricultural societies, which asked for veterinary inspection of stallions entered for prizes, so publicised the need for this that farmers in closely settled districts were asking for the production of a certificate of freedom from hereditary diseases before engaging a stallion for the servicing of their mares.

One of the earliest horse ailments to attain publicity was "Birdsville disease". On 10 April 1886 Sergeant A. McDonald (Reg. No 413) of the Mitchell District Police Station, Birdsville, reported to Inspector F. J. Murray, Blackall:

Several of the police horses had a sort of disease that no one seemed to understand nor how to treat it. About twelve head were bad at "Rosebirth" (Armstrong and Wyatt's Station), nine at "Pandy" and a good many at "Bluff" Station and many local horses had been affected. Four of the Customs House officer's horses were severely affected and some had already died. People here say that horses that recover are never any good afterwards. Some say that they eat a poisonous plant, others that it is caused by sunstroke. Mr. Wyatt who has suffered most from it told the sergeant that it was sunstroke and that if kept quiet the horses may recover. Mr. J. Irving, M.R.C.V.S. says it is due to small worms in the intestines. (*Journal of the Legislative Council* 1886, Pt. 2, p. 1129)

The disease occurred periodically and continued to baffle scientists until 1951, when S. L. Everist, Government Botanist, and A. T. Bell, Director of Sheep Husbandry, tracked it down in the field: it was caused by horses eating Birdsville indigo, *Indigofera dominii* (*enneaphylla*). This finding was confirmed by Bell and Hall in 1952 by feeding tests, but the poisonous principle is still unknown.

Other horse diseases, reported in the 1919–20 year by Veterinary Surgeon McGown, were "Walkabout" in the Gilbert River, "Forestholme", Georgetown and Forsayth areas (later found to be the result of horses eating *Crotalaria crispata* and Chillagoe horse disease (later found to be caused by eating *Crotalaria aridicola* around Charters Towers and Chillagoe).

During the early twentieth century veterinary surgeons diagnosed several known diseases of horses and prescribed remedies. Strangles, rheumatism, erysipelas, tetanus, catarrh (or common cold), influenza, indigestion (or dyspepsia), constipation, diarrhoea, scouring, worms, cancer, swamp cancer, mange, blight and pinkeye were diseases well documented in articles in the *Queensland Agricultural Journal*.

Sheep and wool

When the enterprising pioneers of the pastoral industry in Queensland left the mother colony, New South Wales, in search of fresh fields and pastures new, they at once directed their steps towards the newly discovered Darling Downs. Bringing their flocks and their herds with them, they travelled through New England, then a settled district, and spread over the eastern portion of the Downs from Warwick to Toowoomba. The country further to the west and at a distance from the Main Range was gradually absorbed until, within a very few years, nearly the whole of what is now known as the Darling Downs was taken up and more or less stocked. The country was then purely pastoral. There was to begin with but a scanty population and it was almost universally supposed that the agricultural capabilities of the district were nil.

The Hon. William Allen of "Braeside" started a stud of black merino sheep in 1869 with stock purchased from the well-known breeders Sir Joshua Peter Bell, Sir Patrick Jennings, the Hon. J. D. Macansh, Messrs Kent and Wienholt, and C. B. Fisher. He also got some ewes from the Murrumbidgee and Billabong breeders in the Riverina. Very high prices were obtained at London wool sales in 1885 for black wool—double the price of white wool, at 1s 6d per lb. "Braeside" was run in conjunction with "Wyenbah", Allen's station on the Balonne River. Allen also had twenty Lincoln rams (three of them imported), 300 pure and grade Lincoln ewes, and 150 Lincoln wethers and weaners. (*QAJ*, Vol. 5, 1899, pp. 247–253)

When P. R. Gordon, the Chief Inspector of Sheep, and his staff in the Colonial Secretary's Department were transferred to form the Stock Branch of the Department of Agriculture in 1897 the Department began its first official involvement with sheep. The control of sheep scab and sheep catarrh diseases had been achieved under the Colonial Secretary's administration. Gordon officially took on the title of Chief Inspector of Stock in addition to Chief Inspector of Sheep, Registrar of Brands and Inspector of Meat with the transfer, and administered the Diseases in Sheep Acts, the Diseases in Stock Act, the Livestock and Meat Export Act, the Brands Act, the Sheep Brands and Marks Act, the Marsupials Destruction Act and the Impounding Acts. The Stock Institute was worked as an adjunct to the Stock branch.

The number of sheep in Queensland on 31 December 1897 was listed as 17 797 883 head, contained mainly in the pastoral districts of Mitchell (6 120 624), Warrego (3 225 495), Darling Downs (1 967 768), Burke (1 780 801), Maranoa (1 772 810) and Gregory North (1 559 783). The number of sheep imported by sea was 13 418 and overland 277 350. Those exported by sea numbered 360, and 1 113 910 went south across the border. The total number of sheep killed at the meatworks in 1897 was 992 736, of which 77 209 were frozen, 160 210 were tinned, 149 706 were extracted and 605 519 were boiled down. Together with the number of sheep exported, a total of 2 107 006 sheep were lost to Queensland.

With the exception of intestinal worms, no diseases of sheep were reported by Gordon in 1897. The Inspectors of Stock were called on mainly to regulate the branding, marking and travelling of sheep.

Joachim Samuel Hermann Schmidt, the original Natural Science Master and Secretary at the Queensland Agricultural College, Gatton, resigned on 1 April 1899 and, presumably after some study, was appointed Assistant Inspector of Meat in Brisbane on 6 September. In 1900 he wrote a series of articles for the *Queensland Agricultural Journal* dealing with the principles of sheep breeding, sheep classing and stud breeding, and woollen manufactures. These were published into mid-1901.

A small flock of sheep was procured by the Agricultural College in 1900, mainly to subdue weed growth and provide rations. Experiments in fat lamb breeding were abandoned in 1906 because of the depredations of neighbouring dogs. In 1910 a few Lincoln sheep were introduced and in 1911 a course in wool classing under James Carew was started. When John Brown became Principal in 1912 he re-introduced fat lamb raising, but his period as principal was so short that it brought little information.

The very wet 1915-16 summer produced heavy worm infestation, and the rank grasses provided little nutriment; it was felt that special forage crops and pastures were needed to finish fat lambs for market (see Chapter 4).

Sheep numbers decreased from nearly eighteen million in 1897 to just under seven and a quarter million in 1902, after a prolonged drought in 1901–02. However, after the breaking of the drought numbers again built up to nearly fifteen million sheep in 1906. When the drought broke there were heavy losses when travelling sheep were poisoned by eating *Euphorbia drummondii* and other members of the spurge family (Euphorbiaceae). The merino sheep came through the drought better than the crossbreds. Prices at this time reached 25d per lb for scoured wool (1906–07) and 14d per lb for greasy wool.

During 1905–06 W. B. Slade of "Glengallan" on the Darling Downs presented the Government with a flock of fifty pure "Glengallan" stud merino ewes in order that the strain be preserved unmixed. These ewes were located at the Hermitage State Farm (see under State Farms). Rams for mating were provided from time to time by Slade. So that adequate supervision could be maintained a Board of Advice was appointed. Its members were A. Dowling, H. Bracker, P. R. Gordon (Chief Inspector of Stock) and W. B. Slade. O. C. Slade replaced Bracker on 7 April 1911.

In 1909 the Under-Secretary, Scriven, drew attention to a new problem arising from grazing farms being opened for selection and taken up by stockmen, shearers and others who had little knowledge of marketing wool. Some thirty per cent of the State's wool clip was being offered by owners who produced only 10 to 15 bales of wool per year for marketing and the preparation of the clip was so poor that it upset the trade in the market. He suggested the Department educate the grazing farmers by sending an officer among them, to teach not wool classing but the best methods of grading and baling the different parts of the fleece. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1908–09, p. 28)

During 1910–11 sheep blowfly (maggot fly) was causing serious damage among the Gindie sheep flock and the stud sheep had to be dressed weekly with fish oil and sulphur.

William Grierson Brown was appointed Instructor in Agriculture on 7 April 1911 but acted as Sheep and Wool Expert. In April 1912 he began a series of monthly articles in the *Queensland Agricultural Journal* under the title "The Farmer's Sheep", completing the series in April 1913. He also published designs for sheep yards and spray dips.

During 1913–14 new sheep yards were built at Gindie and Brown started experiments there in dipping sheep to control the flies. In April 1914 he purchased 645 ewes, aged 18 months to 3 years, with two months' wool. A shower dip on the "Tandawanna" Bungunya model was erected and the sheep were thoroughly saturated separately with ten different makes of dips. Dipping did not prevent fly strike but it prevented infection from spreading. Crutching was adopted also as a deterrent. Only 18.4 per cent of the sheep that had been dipped were re-infested, compared with 53.57 per cent of the undipped sheep. The wool from dipped sheep realised 3d per lb more. Fly strike was most serious as ewes were lambing.

During 1916–17 Brown decided that the best approach would be to destroy the fly before it got to the sheep and tested fly traps. The Department first adopted the trap of a Mr Higgins of "Claverton Park", Cunnamulla. It caught and poisoned the flies, but it killed not only flies but also the accompanying ants, and the masses of dead flies produced more flies.

The "Destruo" trap, which caught and held flies without poisoning them, was found to be better and was subsequently adopted. On one property it had caught 64 000 flies in a fortnight. Brown found that the use of this trap plus jetting (not spraying) sheep as done at Orion Downs using a "Deming" pump with a Bordeaux nozzle and a mixture of 4 pints of Cooper's Dip to 4 gallons of water, gave good results, without the need to crutch the sheep. Actually, the longer fleece held more chemicals. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1916–17, p. 86)

Other problems with sheep at this time included the sheep nasal fly (*Oestrus ovis*) on the Darling Downs and further west; Brown suggested it be controlled by salt licks, accessible through holes in a box, which were smeared with fish oil and sulphur. He also dealt with intestinal worms in coastal areas, controlling them by an arsenic and epsom salts drench (Brown, W. G., *QAJ*, Vol. 4, July 1915, pp. 11–15), and the caecum worm (*Trichocephalus affinis*), discovered for the first time in Queensland and only the second time in Australia along the coast, and requiring four drenchings for control.

During 1916–17 the Farmers' Wool Scheme was introduced, whereby wool from small flocks of fewer than 1500 sheep was classified and sold on the owners' behalf by the Department. The wool was classified at the Technical College of the Department of Public Instruction. The owner was paid 60 per cent of the estimated value of the wool in advance, and 10s per bale was charged for classification, freight, handling, dumping, retailing and out-of-pocket expenses. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1916–17, p. 16)

The Prickly Pear Board instituted experiments at the Wallumbilla Prickly Pear Stock Feeding Experiment Station, and in May 1917 the officer in charge, F. Smith, B.Sc., F.I.C., summarised the results of feeding sheep on prickly pear thus:

It is not especially palatable to sheep but if the necessary supplements covering its nutrient deficiencies are fed, the total ration is adequate to preserve condition and grow wool. The cost of the supplements amounts only to 2d to 3d per head per week. However, sheep do not naturally eat standing pear so chopped pear plus concentrates should be considered by stockowners contemplating feeding. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1916–17, pp. 5-6)

In 1918–19, the sheep blowfly problem was delegated to a Special Board of Inquiry connected with the Commonwealth Bureau of Science and Industry sitting in Brisbane. Brown continued his experiments at "Dalmally", Roma, on its behalf, following his work at Gindie, using jetting with a poisonous dip mixture. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1919–20, p. 8)

Poultry

Poultry husbandry received very little attention from the Department in its early years. No doubt poultry keeping at the time was a small backyard or feral industry, with the birds being kept much as scavengers. Private individuals led the way in publicity and advice, the Department assisting with publications.

At the Farmers' Conference in Bundaberg in July 1892, Mrs W. H. Archer, presented a paper entitled "Rearing Poultry".

Queensland poultry were first exported to London in 1895 to Messrs Weddell and Co., who commented that Queensland could supply better turkeys, fowls, goslings and chicks than Victoria or New South Wales but that an improvement was needed in the mode of packing.

In 1898 Mrs Lance Rawson of "Hunter's Farm", Rockhampton, wrote:

I think I may say, without being accused of "blowing" (to use one of our most expressive terms) that whatever has been done for poultry in Queensland has been done by myself. For the last sixteen years, I have been doing my utmost to induce those people who have small means—selectors, farmers and even young people, to take up poultry farming with a view to

money making, and the fact that the average number of letters (containing queries to which I reply) per annum is considerably over 4,000, says something for my success. Out of this number there are over twenty young people, both boys and girls, who are earning pocket money and who are a sort of society or club in themselves under the title of Mrs. Lance Rawson's Pupils. (Rawson, L., *QAJ*, Vol. 3, 1898, pp. 110–114)

In 1896, the Department published *Bulletin* No. 8 (second series), a 44-page publication entitled "Practical Poultry Farming", written by Mrs Rawson. She quoted a verse from "The Hen Fever of Jed Watson", written by an American poet—like Jed Watson, she

Had a faith that urged him on, through all life's wastes and fens That he could build a fortune by simply raising hens And those cloud bannered palaces, reared not of stones or bricks Were built of all the unlaid eggs of all his unhatched chicks!

Mrs Rawson was to write of the poultry tick found on turkeys in the Springsure district in 1897 that it lived in cracks in the turkey houses and attacked the turkeys at night.

The Queensland Agricultural College became the Department's poultry arm after its establishment in 1897. John Mahon, the Principal, wrote an article, "A Portable Poultry House", that appeared in the *Queensland Agricultural Journal* in December 1899, and poultry yards were erected in 1900. The College was to take the lead with breeding pens and egg-laying competitions (commenced 1 July 1904) for the Department until it was transferred to the Department of Public Instruction in 1923 (see Chapter 4).

An article dealing with caponising, taken from the *Queenslander*, appeared in the *Queensland Agricultural Journal* in January 1900.

The Registrar-General in 1900 reported that the number of poultry was officially 550 609 birds, but probably double this number existed. Egg production was given at 1 601 111 dozen. The whole industry was valued at £175 000.

The first information on poultry diseases and how to treat them appeared in the March 1901 issue of the *Queensland Agricultural Journal*. It dealt with fowl cholera, bronchitis, roups, scaly legs, lice and gripes. In the October 1901 issue it was reported that Messrs Baynes Bros had a ten acre farm of Muscovy, Pekin and Aylesbury ducks, plus Buff Orpington fowls and pigeons, and a pig farm of 3000 well-bred Berkshires, at their fellmongering works at Belmont on Doboy Creek. The livestock were in the charge of William Gowes, who had been educated at Hawkesbury Agricultural College at Richmond, New South Wales.

The first poultry officer attached to the head office of the Department was Matthew Fern, who was appointed on 1 January 1904 as Poultry Lecturer at a salary of £156 per year. As was the practice with new professional employees, he was sent on a State tour to examine the poultry industry, judging at shows and visiting farms of exhibitors from Rockhampton in the north to Longreach in the west, and south to the New South Wales border. He advocated better-quality birds favouring the Orpingtons and Wyandottes as egg-laying and table birds, and Leghorns for egg production. An interesting discovery for Fern was a Mr Behan's ostrich farm at "Garfield", Jericho. In twelve months, Behan had reared fifteen young birds from three clutches from a single pair of birds, and had plucked feathers to the value of £100.

In 1905 a trial shipment of poultry, turkeys and ducks left Brisbane in February per SS *Damascus* for London, arriving at E. Weatherby's central market stall in May. The chickens were satisfactory, the turkeys were good (but had arrived in the wrong season) and the ducks were not fat enough. In March 1906 chickens and ducks arrived in good condition and prices were satisfactory.

In 1917 Under-Secretary Scriven reported that John Beard had been appointed the new Poultry Instructor after a lapse of many years. In his first few months he visited forty districts, and found there was a great need for extension work on poultry diseases. Scriven stressed the need for larger flocks as eggs were still being imported, mostly from China.

Beard had a long record as a successful breeder of most varieties of poultry. His successes in prizetaking at many agricultural shows in Queensland, and notably at the National Agricultural and Industrial Association's exhibitions at Bowen Park, were considered almost phenomenal. His services as a judge at country shows were constantly requisitioned, and in no case, as far as we know, were his judgments questioned by exhibitors. In connection with his work at the Department of Agriculture and Stock, Beard compiled a booklet dealing with all phases of the industry—a work for which his intimate knowledge of the business especially qualified him. (*QAJ*, Vol. 7, new series, March 1917, p. 139)

Drought conditions in 1919 caused poultry feed to rise in price. Maize reached 12s per bushel and eggs rose to 2s 6d per dozen. Poultry was still only a sideline and Scriven believed it could be a major industry if it were based on the results of trials conducted at the Queensland Agricultural College.

Goats

Little has been written about the early history of the goat industry in Queensland and the wide distribution of the feral goat, which has become a pest in some parts of the State. It is likely that the goat was taken to the mining areas and into the western parts of the State to provide meat and milk where dairy cattle would not thrive.

However, in 1909 Scriven wrote in his annual report concerning the Angora goat:

The breeding of this goat for the mohair has long passed the initial stage in this State. The first herd, so far as is known, was started by a Mr. McCullough of Maryborough who interested himself in the introduction of Angora and Cashmerian goats and this is becoming an industry in this State. Before 1906 there were only one or two herds. In 1906, two thousand five hundred and twelve animals were kept for the hair, in 1907—four thousand five hundred and eighty-nine and in 1908, seven thousand one hundred and ninety-eight.

Under Section 113 of the Local Authorities Act the owner or occupier on any enclosed land could destroy any goat trespassing thereon, and the Authority could compel registration of goats and the payment of a fee therefore; unregistered goats could be sold. Scriven stressed the need to separate the Angora goat from the common goat and allow the former to be classed as a commercial animal. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1908–09, p. 30)

The Queensland Agricultural Journal

In his 1889–90 annual report Peter MacLean noted that during the year the Department had published and distributed a great number of pamphlets and leaflets, amongst which were the report of the Agricultural Conference, a work on insects and fungus pests by H. Tryon, and a report on the scientific expedition to the Bellenden Kerr Ranges.

Judging from the eagerness exhibited to secure these reports and pamphlets, and the interest shown therein, I would submit that the time has now arrived when the Department might issue a quarterly bulletin containing matters of interest to agriculturists. There are constantly being developed new phases of agriculture in which those engaged therein should be kept well posted, so as to be able to successfully compete in the open market with those already in possession of new conditions. A course of instruction such as these bulletins would scatter abroad, would entail a cost of a small sum annually for publication and of labour in preparation, but the results therefrom would, I believe, be of the highest value in the development of the agriculture of the colony.

Professor Shelton, in his report of even date, pleaded that the results of experimental work done in the United States that would have likely application to Queensland should be republished and placed before Queensland farmers and the public. The research had been done at great expense in the USA, but could be made available in Queensland at the small cost of printing. He also stated that as Instructor in Agriculture he would have original information to place before Queensland farmers and suggested that a quarterly or more frequently published bulletin might meet the need.

Bulletins issued by the Department to June 1892 included:

- No. 1 Pig Raising and Pork Making with Ham and Bacon Curing, by E. M. Shelton, B.Sc.
- No. 2 Agricultural Conference at Beenleigh
- No. 3 Cultivation of Maize, by E. M. Shelton, B.Sc.
- No. 4 Botany—Contributions to Queensland Flora, by F. M. Bailey, F.L.S.
- No. 5 Canning and Preserving Fruit for the Home and Market, by E. M. Shelton, B.Sc.
- No. 6 Tobacco, Its Cultivation in Northern Queensland, by S. Lamb
- No. 7 Botany—Contributions to Queensland Flora, by F. M. Bailey, F.L.S.
- No. 8 Recent Experiments Made at American Agricultural Experiment Stations, by E. M. Shelton, B.Sc.
- No. 9 Botany—Contributions to Queensland Flora, by F. M. Bailey, F.L.S.

On the mailing list were 1600 names, the Governments of Fiji and the Gold Coast (Africa) being amongst them.

In the Legislative Assembly on 11 November 1896 J. V. Chataway said that everyone interested in agriculture knew the Agricultural Departments in New South Wales, South Australia and Tasmania each issued their own journal and that even Western Australia had a "capital little Journal published monthly". The expense could not be very great and the Department (of Agriculture) might take into consideration whether, in view of the increased importance of agriculture, something of the same kind might not be done in Queensland. (*QPD*, 11 November 1896, p. 1435) In July 1897 the *Queensland Agricultural Journal* was launched by the Minister for Agriculture, the Honourable A J. Thynne.

On 31 May 1897 Major William Alexander Jenyns Boyd was appointed foundation editor of the new journal. Boyd was born in France in 1842, educated in Europe as a student at the Lycée de Versailles and was first-prize winner in French literature at St Germain. He migrated to Queensland in 1860. Boyd was an adventurer and a practical man of many parts. In Queensland he was a farmer and operated a cotton gin at Oxley in 1867, a sugar mill and boiling house at "Ormeau", Pimpama Island, in 1869, and a 19 acre sisal hemp plantation at "Woolhara Park", Broadwater, near Mt Gravatt, which he intended to enlarge to 240 acres. In 1905 he had one of the only two sisal-scutching machines in Queensland, a "Death" machine. (The other, a Lyhmann Raspador, was imported by the Department of Agriculture.) (QAJ, Oct. 1905, pp. 205–206) Boyd was also a timber-getter. Then he became a private school master, operating from a tent, a teacher with the Board of General Education from 1867 to 1875, a journalist and proprietor of the Townsville Herald, and a major in the Garrison Army. He established the Eton Preparatory School at Milton and later moved this to Nundah. As a boys' school, the Eton High School, it was well-known and its students performed creditably in the Sydney University's public examinations. He was headmaster of the Toowoomba Grammar School from April 1888 to 1890, resigning on 22 December 1888, but under pressure he withdrew his resignation. He resigned again in January 1890 with all his staff because of his impatience with the Trustees regarding improvements and subsequent criticism from the townspeople. However, he found time to publish a book The Earth's History for Boys, or Geology in Verse. He went back to his private school and then for thirty years was editor of the Queensland Agricultural Journal, acting also as Secretary to the Queensland Agricultural College from 1 July 1898 to 1 February 1899. (Goodman, R., 1976, Toowoomba Grammar School 1875–1975: A Centenary History)

In the preface to the first issue of the *Queensland Agricultural Journal* in 1897, under the heading "To Our Readers", Boyd wrote:

To all those who have the welfare of Queensland at heart, and who therefore watch with interest the industrial progress of the colony, it must be a subject of the greatest gratification to note the steady advance of the agricultural interests throughout almost the whole of this vast and fertile territory.

A retrospect of the operations of the settlers in the agricultural and grazing districts during the past decade, and especially during the latter half thereof, must convince even the most sceptical and most pessimistic amongst our community that the tillers of the soil, and all who gain their living by industries connected directly and indirectly with farming and grazing, have at last awakened to an intelligent sense of the magnificent inheritance which is theirs in the soil, the forests, the plains, and the climate of this gem of the Australian colonies, this vast country with its illimitable resources, so long lying dormant, so long awaiting the advent of those who to-day are bringing all their energies to bear on developing these resources, and who have already succeeded in showing that the plough and the voice and the pen of the scientist are mighty levers which are operating to bring the great agricultural industries of Queensland to the front, and are making them what they should be—the most important and wealth-producing of all our industries.

It has ever been the aim of the Agricultural Department of Queensland to afford every possible aid to those engaged in agricultural pursuits.

In times past, with the limited resources at the command of those entrusted with the working of the Department, much was accomplished in the way of importing new varieties of fruits, cereals, seeds, plants, implements, &c., and by the publication of useful pamphlets bearing on matters of interest to farmers and fruit-growers. These were widely distributed, and effected their purpose fairly well.

But it remained for the Government to recognise the great importance of the industry, and to set practically to work to raise it to a high standard of efficiency. Experts have been engaged to carry their technical and practical knowledge to the very doors of the settlers. Thus all agricultural interests are being promoted and fostered by practical instruction from men of high attainments in their several vocations, and by the establishment of an Agricultural College and Experimental Farms from which it will, it is hoped, be found that much interesting and practical information will be periodically distributed throughout the colony. These institutions, especially the College, will to a great extent practically settle the question how to make country life attractive to the youth of the colony.

In order still further to assist the agriculturists, it has been determined by the Minister for Agriculture to issue this Journal, which will supersede the late spasmodic publication of special Bulletins.

Essentially of a utilitarian character, the Queensland Agricultural Journal will be devoted mainly to the publication and wide dissemination of articles of a popular educatory nature. It is not intended that it shall take the place of an agricultural newspaper, nor that it shall in any way interfere with the peculiar work of such journals.

This first number will afford a fair idea of the nature and partly of the scope of the publication, which will be issued on the first day of each month, and will be posted gratis to the addresses of members of agricultural, pastoral, and kindred societies.

A short review of the present situation of agriculture in Queensland followed, with an outline of the aims and objects of the Department and some reference to the means by which the fulfilment of these aims and objects could be promoted.

Boyd referred to the great potential of Queensland for agricultural production, the need to produce economically to stand competition in the marketplace, the hope that many would train at the Agricultural College and move into the Department as instructors in commerce, farming on their own account. The state farms would give the lead in local production. Specialists in practical fruit growing and dairying and in the sciences of botany, entomology and bacteriology, and specialists yet to be appointed in tobacco, coffee growing and winemaking would involve themselves in improving agriculture. Farmers, however, must help themselves and not lean too heavily on the Department. Without practical or effective union on the part of the farmers, they would be individually too weak to protect themselves. Local farmers uniting in district associations, sending representatives to larger associations and in turn being represented by leading agriculturists of the Colony, would give greater help to the development of the agricultural interests of Queensland than could ever be possible under current conditions. And they would also furnish a more suitable and effective channel for the spread of the collected information of the Department's staff than all their lectures or bulletins possibly could. (Boyd, A. J., OAJ, Vol. 1, 1897)

Then followed a series of articles written by the Department's technical officers: Tardent (sweet potatoes), Mahon (dairying), Benson (fruit), Tryon (insects), Cowley (rubber), Bailey (Queensland flora). In the absence of an instructor in beekeeping, an outsider, H. Stephens, was invited to contribute an article. These technical officers continued to contribute monthly articles in connection with their disciplines whenever possible. The proceedings of the biennial farmers' conferences were published in full in the early years, as the agenda was sufficiently widespread to engage full discussion amongst the delegates. A paper was read, and the collated paper plus discussion constituted the latest information about the subject. This gave the delegates a chance to talk about problems and, with the Minister for Agriculture present, provided a feedback difficult to arrange otherwise. The

journal, going into the farmers' homes, put them into the picture and provided a powerful extension medium.

Farm and garden notes gave readers adequate advice on the husbandry of crops and orchards in both the tropics and subtropics, and a little later market reports allowed farmers to gauge the markets. Queensland's meat trade with Egypt was treated by Boyd in a short article.

An announcement of the opening of the Queensland Agricultural College and advertisements for the enrolment of students appeared in the first issue and thereafter the activities of the College received full publicity. Especially was this so in connection with the monthly production records of the dairy herds, indicating the breed of the cow as well as her monthly milk production, butterfat test and commercial butter produced. This enabled farmers to check the animals from which to obtain a bull from the College, and instructed students on the selection, breeding and feeding of the College cows. Later a list of stud breeders of livestock was published periodically in the journal.

The College egg-laying competitions were recorded in detail, involving various breeds of fowls and with interstate as well as Queensland producers represented.

Finally, a section entitled "General Notes" provided entertaining and instructive reading in a wide range of subjects: how to kill cockroaches, making rosella jam, how to tan a hide, repairing a leaky tank, measuring fallen timber, treating a fistula, how to make a right angle etc. The perceptive editor felt these would be of interest and help to his wide range of readers.

With the accession of the Stock Branch in 1897, articles were contributed by P. R. Gordon, the Chief Inspector of Stock, about general stock matters. Specialist articles by C. J. Pound, Government Bacteriologist, centred mainly on tick fever and preventative inoculation, a pressing problem at the time.

At the Bundaberg Agricultural Conference, 11 to 14 June 1901, J. Wilson of Freestone Creek, Warwick, said:

I should also like to take this opportunity of congratulating the officers of the Agricultural Department on the very valuable information that this monthly Journal from time to time gives to our State producers, and the able manner in which anything likely to advance the interests of our State is put before its readers. It is a credit to the editor and all concerned. I am sure that all the readers of the Agricultural Journal, whether they like it or not, will be forced to acknowledge that in order to be able to successfully compete in the world's markets scientific farming must be adopted here the same as elsewhere. (*QAJ*, Vol. 9, July 1901, p. 22)

The journal was also praised by the Minister of the day:

In speaking of the educational resources of this Department special reference should be made to the Agricultural Journal, which occupies an honourable position among the publications of its class, as is proved by the testimonies to its worth which are received from every part of the world. Its circulation is now about 5,500 a month, and it is believed that the number of its readers is not less than 20,000. Of late has been commenced in it a series of easy lessons on agriculture, written by the editor, whose literary skill and technical knowledge need no compliment. These lessons when completed will, it is hoped, be reproduced in book form for school use. A feature which probably is peculiar to the Journal is the appearance in it of

descriptions of the latest agricultural inventions for which patent office protection has been sought. (Dalrymple, D. H., *An. Rept Dept Agric.*, 1900–01, p. 4)

In October 1902, the Hon. A. H. Dalrymple, Minister for Agriculture wrote:

The official Journal continues to justify its existence by the valuable educational work it performs and thanks for its service to agriculture are being constantly received. Such appreciation is not confined to farmers, dairymen and stock owners of this State, but is expressed from time to time by correspondents in distant parts of the world. The reading matter is usually of a high character, whether the articles are written by the Editor or by members of the Scientific Staff of the Department, or are selected by the Editor from the writings of similar authorities in other countries. From the outset it has been the aim of the Journal to disseminate such information as tends to the education of rural workers, and to the elevation of agriculture to the position of the premier industry of the State. To this end the latest and most approved methods of production are presented in the form of short instructive articles ranged under the general heads of Agriculture, Dairy, Swine, Poultry, Farming, Fruit and Vine Culture, Live Stock, Animal and Vegetable Pathology, Tropical Industries, Horticulture, Forestry, etc. Generally without in the least trenching upon the work of the local and country press, the Journal takes cognisance of all matters likely to be of value to settlers, and it is satisfactory to know that everywhere the publication has been welcomed as a most valuable addition to the rural library. Its circulation which was 59,800 in 1899-1900, and 65,295 in 1900-01, was 66,745 in 1901–02. The cost of producing and distributing it, which was £2102 in 1899–1900, and £2360 in 1900-01, was £1945 in 1901-02. (Dalrymple, D. H., An. Rept Dept Agric., 1901–02, p. 4)

During 1902–03, in order to add still more to the journal's value as a medium of information, the editor and artist visited many parts of the State in the far north, central, western and south-western districts and also the sugar districts from Nambour to Cairns. All these districts and the industries carried on therein were faithfully described and illustrated in the pages of the journal and much useful information was thus disseminated throughout the State, especially with respect to irrigation. The cost of producing the journal in 1902–03 was £1303. (Denham, D., *An. Rept Dept Agric.*, 1902–03, p. 3)

The work of the artist (photographer), H. Mobsby, improved the presentation of the articles, adding to their interest and detail. The Bingera Sugar Company at Bundaberg, where cane was being irrigated and Kanakas were employed in cane cutting and general cane work, was the subject of one visit. Bingera plantation, one of the Company's blocks, was being cut by Kanakas at the time of their visit in 1897.

In August 1902 the Editor, Major A. J. Boyd, and his photographer visited Skerman Brothers' farm, "Rockangle", Strathpine, being managed by the author's father, P. J. Skerman (Snr) as Boyd had heard of their fodder store in the 1902 drought and their mechanical aids (*QAJ*, Vol. 11, Aug. 1902, pp. 109–113), milking shed, cage cattle dip, self-opening road gate and maize stook stacker. Using the cage dip the cattle walked individually into a crush, which was closed, then a windlass dropped the cage into the dip, completely immersing the animal, which was then raised by human, horse or tractor power and released. The Department was to utilise this dip in the 1960s after the farm had been resumed and before it was submerged later in the Pine River Dam (Lake Samson).

A new series of the *Queensland Agricultural Journal* was presented with the January to June 1914 issues, which became Volume 1, New Series. However, the Editor wrote in the January issue: With this number of the Journal we commence a New Series of issue, dating practically from the 1st July, 1913, on which date the Journal completed its sixteenth year

of publication." By then the circulation was 60 000 copies a year. The annual subscription to the journal payable by bona fide farmers and by those who gained their livelihood solely by rural pursuits was one shilling, to cover the cost of postage. For schools of arts, and for persons not engaged on the land or those resident in other States of the Commonwealth or in other countries, from five shillings to ten shillings was charged per annum. Complete sets of thirty volumes to July 1913 could be obtained from the Department, bound, for £25, or in separate numbers for £10; single copies of late issues cost 6d per copy and any available issues of earlier years one shilling per copy.

For many years the Department refused to make the journal a general advertising medium, it only being intended as a vehicle for information and instruction on pastoral, agricultural, dairying, horse breeding, and other industries engaged in by country settlers. Its sphere of influence widened considerably and by 1914 the policy was modified to accept advertisements having reference solely to productions of the land or to manufactured articles needed by rural occupiers, thus not interfering in any way with the general run of advertisements in the public press. (*QAJ*, Vol. 1, New Series, January 1914, p. 3)

Until December 1916 the journal was published on the first day of the month. This date of issue became inconvenient as it was not possible to publish the latest up-to-date agricultural returns, markets, etc. for the previous month. More especially was this the case with returns from the Queensland Agricultural College connected with the egg-laying competitions, milking results for the month, sales of stock, etc. It was decided that henceforth it would be published on the tenth day of each month. This also enabled articles of immediate public interest to be published.

Despite the admission of advertisements within the pages of the journal these were slow in forthcoming. Advertisements for United Insurance and the sale of the "Bulletin" stock saddle were the only ones to appear before the end of the war, apart from Departmental notices of seed and livestock for sale.

Under the new series the format of the journal settled into a pattern, with articles under the following headings:

Agriculture—Owing to the heavy demand for cotton and the Government sponsoring of its production, a good deal of the 1915–1919 journals was taken up by this subject. Wheat, maize, castor beans, soybeans, potatoes, sweet potatoes, tobacco and oilseeds claimed attention.

The Horse—Clydesdales, Suffolk Punch, mules, sore shoulders, worms, etc.

Poultry—Egg-laying competitions at Queensland Agricultural College, ducks, ostrich-rearing, etc.

Orchard—Citrus, bananas, papaws, olives, windbreaks, explosives, pineapples, etc.

Horticulture-Narcissus, layering ornamentals, etc.

Viticulture—Written by C. A. Gattino, Charleville.

Dairying—Herd testing, Queensland Agricultural College, water for stock, feeding, prickly pear, etc.

Tropical Industries—Mainly sugarcane, sisal, rubber, cassava, copra, etc.

Botany—Queensland flora by F. M. Bailey (to 1915), weeds and poisonous plants (C. T. White).

Entomology—Mainly sugarcane grub, pumpkin beetles, bean fly, etc.

Chemistry—Complete fertilisers for farm and orchard, ccs formula (J. C. Brünnich).

Sheep and wool—Farmers' wool scheme, sheep blowfly, goats, sheep on coast, sheep dentition, etc.

Science—Water-divining, snake bite, malaria, etc.

Conferences—Poultry Conference 1919, Fruitgrowers Conference 1916, agricultural conferences, etc.

State Farms—Roma, Warren, Gindie, Kairi, etc.

R.N.A. Annual Exhibition—Details of exhibits, with photographs.

Vegetable Pathology—Diseases of plants, tomatoes, etc.

Animal Pathology—Munro Hulls' claims re cattle ticks, hog cholera (swine fever), etc.

General Notes—Various.

Answers to Correspondents—Answers to queries from readers.

Farm, Garden and Orchard Notes (South Coast, Tropical Coast, Southern and Central Areas)—Aimed one month in advance.

Market Reports—Farm produce, vegetables and fruit (Turbot St), interstate, cattle (Enoggera saleyards), London quotations.

Statistics—Rainfall in agricultural districts.

Astronomical—Times of sunrise and sunset, tides.

Departmental Material for Sale—Cattle, seed, wheat, maize, sorghum, etc.

Soldier Settlement (insert July 1917)—Land availability.

Occasionally articles of special interest were included but most of the material came from Departmental pens, the editor filling in where necessary with hints to new settlers and his "Lessons in Agriculture".

In January 1919 the editor made a plea for farmers to write about their experiences:

Many very valuable contributions have been received from pastoralists, farmers, and others giving their own experience of new methods of cultivation, of the effects of different manures, irrigation, &c., also on experiments with new products. Many good inventions and ingenious contrivances for labour-saving have thus emanated from workers on the land. Information on such and kindred subjects have been and will be welcomed by the editor. Farmers are a busy people, and are apt, after a hard day's work, to be more inclined to rest than to sit down and write. There are also some who do not like to write because they think they are not equal to writing a newspaper article. We do not ask for an elaborate article. Just give us the rough idea, and we will do the dressing-up part. There is many a gem of thought, many a brilliant idea lost to the world because the originator of it is possessed with the idea that he cannot clothe it in sufficiently fine language. If you have the good idea, never mind the language or the composition or the spelling. Leave that to us, and let your ideas be given to the world. Think how many people you may thus benefit. Every month the Department sends out several thousand copies of the Journal to various households all over the State, at the price of postage only. We may sum up the whole matter of agricultural education by the State, by saying that the objects the Department chiefly desires to promote are:- The education of both young and old in the technical and practical knowledge of Agriculture, Dairying, Poultry-raising, Stock-breeding, Fruit-growing, and kindred industries, and the formation of associations and bodies of farmers both for the attainment of objects of material importance to their welfare, and for providing an adequate means of giving expression to the general sense of that important section of the community. (QAJ, Vol. 11, January 1919, pp. 1–2)

As a preface to the *Queensland Agricultural Journal* of June 1921, under the heading "Editorial Change", appeared the following tribute:

In this issue we take official farewell of Major A. J. Boyd, F.R.G.S.Q., who has retired from the control of this Journal, under the provisions of the Public Service Act. Major Boyd has been associated with "The Queensland Agricultural Journal" as editor since its first issue in July, 1897, and in the course of the time that has since elapsed he became the friend of practically every farmer in the State. The Journal is his monument. By general consensus of opinion in literary and agricultural circles the publication, under his direction, attained a high standard...Major Boyd has been the recipient of appreciative notices of his great work in the cause of agricultural education from all parts of the Commonwealth. He carries with him into unofficial life the good wishes of all his old departmental colleagues and of all connected with Queensland rural interests which, for a quarter of a century, he served so ably.

Agricultural education

Apart from the courses conducted at the Queensland Agricultural College described in Chapter 4, the Department of Agriculture took every opportunity to involve itself locally in educational matters either officially or privately, its officers participating with the Department's blessing.

Veterinary Surgeon W. C. Quinnell, based in Brisbane and active under the Livestock and Meat Export Act, lectured in animal anatomy and physiology at the Brisbane Technical College on Tuesdays and Friday evenings from 11 July to October 1899. Holidays were utilised for practical demonstrations at various slaughtering establishments.

Thirty-nine students qualified as meat and slaughtering inspectors. He also lectured at the College on foods and their inspection to candidates seeking certificates as inspectors of

meat, dairies and other establishments connected with public health. (Quinnell, W. C., *An. Rept Dept Agric*. 1899–1900, p. 56)

At the Farmers Conference at Warwick in June 1900 F. W. Peek presented a paper entitled "Farming and Education—a Plea for Future Farmers", urging more education in elementary schools and in training schools for teachers.

Major A. J. Boyd, the well-informed and multilingual Editor of the *Queensland Agricultural Journal*, began a series of articles entitled "First Steps in Agriculture" in the journal, with Lesson 1 in the April 1901 issue. Prefacing the course, he wrote:

In the following articles I propose to explain in simple language, suitable to the minds of young boys and girls in the country, the elementary principles and practice of agriculture.

In the absence of any easy text-book on agriculture in the State schools of Queensland, these lessons may be found of some use in interesting young people in an industry which must always take first place amongst those of all countries under the sun. It is hard to say what would become of the world and its other industries if agriculture were abandoned. (Boyd, A. J., *QAJ*, 1901, p. 255)

The first stage included lessons 1 to 10, each lesson ending with a series of questions about the text. Boyd announced that the lessons would form the material for three primers. The second stage would carry the students into a higher sphere, whilst the third would deal with the subject from a more advanced standpoint.

By September 1901 Boyd had received several approving letters regarding the course, showing that many schoolteachers as well as private persons were making use of the lessons, as well as people in other parts of the British dominions. The lessons were reprinted in the *Tropical Agriculturist* of Colombo, Ceylon, for the benefit of young people in that country.

In June 1905 G. Sutherland Thomson wrote:

Although the facilities for educating the Queensland student in dairying are not equal to those at the command of the Dane, or on the same level as Victoria, the Dairy Produce Act will reach the practical mass at its outset, and remedy evils which would otherwise cost the industry both wealth and reputation. In a country like Queensland, the subject of dairying should be included in the curriculum of every State and Private School. Were the young instilled with the fundamental principles of practical dairying, the knowledge acquired would stand them in good stead in the work of the farm and lay the foundation of a more successful career in agriculture. Experience in addressing the children attending public schools has proved to me the great value such a course of instruction would have on the future of the dairying industry. (Thomson, G. S., *Rep. Dep. Agric. Stk*, 1904–05, p. 119)

During the year 1905–06, Henry Tryon, the Departmental Entomologist and Vegetable Pathologist, gave a course of nine lectures under the auspices of the Brisbane Technical College on insects, molluscs, crustacea and echinoderms. They were delivered on Saturdays and were well attended, mainly by teachers and students whose evident interest in them was much appreciated. Also, in an effort to promote nature study, Tryon's branch was instrumental with the cooperation of certain local enthusiasts in inaugurating a Field Naturalists Club, embracing many teachers amongst its members, which was intended to serve educational needs. (Tryon, H., *Rep. Dep. Agric. Stk*, 1905–06, p. 72)

In the 1906–07 year the Department of Agriculture and Stock received a vote on the Estimates whereby officers of the Department would visit schools where agricultural instruction was carried on and give advice as time permitted. The Department would purchase tools and seeds.

An apprenticeship scheme was also started at the state farms to train boys unable to go to the Agricultural College. A three-year scheme was started at Hermitage in 1906, followed by a two-year "Improvers" scheme at Biggenden. There were no lectures—just practical involvement. The boys were expected to read the theory at night. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1908–09, p. 7)

Howard Newport, the Instructor in Tropical Agriculture, gave lectures to State school teachers in mid-winter 1908 and led "object lessons" at State schools, along with public lectures at Cooktown and Townsville. During the 1909–10 year Newport was on tour for 152 days lecturing during eighteen tours at Brisbane, Cairns, Cooktown, Cardwell, Murray River, Geraldton (Innisfail), Goondi, Nelson (Gordonvale), Mareeba, Mackay and Ingham. Twenty-four public lectures and "object lessons" to schoolchildren were organised. (Newport, H., *Rep. Dep. Agric. Stk*, 1909–10, p. 66)

C. J. Pound, the Government Bacteriologist, lectured widely in his special field as he travelled around the State dealing with tick control and redwater, and especially inoculation against the latter disease. No area was too remote for his missionary zeal. He lectured the teachers at their courses at Gatton College and brought farmers to Yeerongpilly to demonstrate techniques to them. In 1918 and 1919, he lectured to returned soldiers at both Gatton College and the Stock Research Station at Yeerongpilly.

QUEENSLAND AGRICULTURAL COLLEGE

Planning and preparation

The need for an agricultural college in Queensland

In May 1874 E. W. Pechey, timber merchant and Member for a Darling Downs electorate, introduced a motion in the Queensland Parliament asserting the desirability of establishing a school of mines and a school of agriculture, the latter to be located in the "fertile wheat growing district of the Darling Downs". The Premier, Arthur Macalister, a solicitor, argued that the motion was too vague and suggested it be withdrawn and brought forward in a more practical shape. Pechey withdrew it and as he left Parliament after one term, the idea lapsed. (Black, A. W., *Organisational Genesis and Development: A Study of Australian Agricultural Colleges*, 1976, University of Queensland Press)

The establishment of Roseworthy Agricultural College in South Australia in 1881 was the first tangible move to promote agricultural education at this level in Australia and doubtless led some Queenslanders to seek a similar institution in Queensland, especially as Queensland's climate differed so markedly from that of southern Australia. The Hon. Dr W. F. Taylor said that he had been in Warwick in 1881 when this subject was first mooted. "We were all very much in favour of it and did everything we could to urge the Government to establish a College." (*QPD*, 18 Nov. 1896)

After the passing of the Victorian Agricultural College Act in 1884, Francis B. Kates, a German flour miller and Member for the Darling Downs, introduced a motion in 1886 asking that various lands be set aside for the endowment of "agricultural Colleges and University institutions". (*QPD*, 29 Nov. 1887, p. 1860) This was passed with some opposition from some pastoralist members. In May 1886 Kates, bearing letters of introduction from the Queensland Premier, Sir Samuel Griffith, visited the other Australian Colonies to obtain information on the operation of their departments of agriculture and schools of agriculture. (Black, 1976)

The despatch of Peter McLean to the southern States and New Zealand by the Hon. C. B. Dutton in the latter half of 1886 was probably the first government move towards the implementation of the idea. He reported on the establishment of Roseworthy College in South Australia in 1881, Dookie Agricultural College in Victoria in 1884 and Lincoln College in New Zealand. (*Journal of the Legislative Council*, Vol. 37, Part III, 1887, pp. 1087–1100)

In November of that year, in reply to a question from Kates, Griffith stated that because of the financial condition of the Colony the Government did not feel justified in giving immediate effect to the 1885 Parliamentary Resolution concerning the establishment of an agricultural college. (Black, 1976)

Then followed the Hon. Henry Jordan's announcement in Parliament on 29 November 1887 that the Government was obtaining the services of a professor of agriculture from the

United States, nominated and recommended by the Government there as being thoroughly competent. The request to Washington stated inter alia "the attention that has been paid by the Government of the United States to the systematic teaching of agriculture, and the great benefits that have accrued to your country from your action in this respect, induce us to think that it would be of great advantage to Queensland...if we could obtain the services of a competent man acquainted with the American methods both of instruction and practical operation". Jordan advised the House that the appointee would be under the Minister, not the Under-Secretary, and would instruct classes in agriculture and in all the sciences that were necessary for its successful practice, and in that way they would lay the foundation of agricultural schools in the Colony very economically and very successfully. (See Chapter 1.) In the ensuing debate, Mr Kellert (Stanley) said that the establishment of agricultural colleges would be of great benefit to the Colony, and added that it had been well said by one Honourable Member that they knew less about agriculture in Queensland than in any other part of the world.

On 26 July 1889 in the Legislative Assembly, Mr Groom (Drayton and Toowoomba) moved, pursuant to notice:

That this House will, at its next sitting resolve itself into a Committee of the Whole to consider the following Resolutions:

- 1. That, in view of the great importance of imparting a practical Agricultural Education to the youth of the Colony and encouraging young men to enter upon the cultivation of the soil, this House is of the opinion that the time has arrived when Agricultural Colleges, or Schools of Agricultural Training, should be established in the Northern, Southern and Central Divisions of the Colony.
- 2. That, to give effect to the foregoing Resolution, an Address be presented to the Governor, praying that His Excellency will be pleased to cause to be placed on the Supplementary Estimates for 1889-90, the sum of £22,500: £7,500 for the Northern Division, £7,500 for the Southern Division and £7,500 for the Central Division.

After some debate, Groom amended his resolution:

That, in view of the great importance of imparting a practical Agricultural Education to the youth of the Colony and encouraging young men to enter upon the cultivation of the soil, this House is of the opinion that areas of land should be set apart in various districts of the Colony as Permanent Endowments for the encouragement of agriculture.

This was put and passed.

In September 1889 Professor Shelton was appointed by the Government, through J. M. Rusk, United States Secretary of Agriculture, as Instructor in Agriculture. He began duty in Queensland on 13 February 1890, six months before completing his sixteenth year of service as Professor of Agriculture at the Kansas State Agricultural College.

In the annual report on the Department of Agriculture and Stock for the year ending 30 May 1890, made to the Secretary for Public Lands, the Hon. M. Hume Black, Peter McLean, Under-Secretary, wrote:

The arrival of Professor Shelton as Instructor in Agriculture raises the question of the establishment of Schools of Agriculture and Experimental Farms and I would call your special attention to the advisability of making special provision for this purpose as not only affording a technical but also a practical system of agricultural education for the youth of the Colony. Many European countries, recognising the truth that the prosperity of a nation is in proportion

to its production, have made liberal provision for agricultural education by direct money grants, whilst the United States of America and some of the Australian Colonies and New Zealand have set apart large tracts of land for the same purpose. It is well known to all intelligent cultivators of the soil that the productiveness of the earth is subject to the influence of natural laws, invariable and indisputable: the production, therefore, will be in proportion to the intelligence of the producers, and success will attend upon the knowledge of the action of these laws and the proper application of their principles. By the establishment of Schools of Agriculture and Experimental Farms this knowledge, so essential to the nation's greatness, is secured and a sound basis of national wealth established.

In March 1890, soon after taking up the position of Instructor in Agriculture, Professor Shelton accompanied the Under-Secretary to Melbourne to attend an interstate conference on rust in wheat and then had a quick look at Victorian agriculture. He visited Dookie Agricultural College and saw the possibility of a similar development in Queensland. In his first annual report, on 30 May 1890, Shelton stated:

It seems clear to me that Queensland has reached that stage in the growth and development of its agriculture, where an Agricultural College and Experiment Station are indispensable. We cannot afford longer to be without these means of solving systematically the multitude of questions which press upon the farmers in their daily work, and which by them are crowded upon the Department of Agriculture.

McLean, commenting on Professor Shelton's report on his visit to north Queensland, wrote: "I trust the prelude to the establishment of a School of Agriculture and Experiment Farm in the near future." (*An. Rept Dept Agric.*, 1889-90, p.3)

At the Beenleigh Farmers' Conference in 1890, E. J. Stevens, M.L.A. (Logan), said:

With regard to Agricultural Colleges and Experiment Farms, I can only say now what I have said before—I am thoroughly in favour of their establishment and shall give my hearty support to any measures of that kind. In my opinion, one College would not be sufficient. This Colony covers an immense area and different climate conditions and soils prevail and we should require three or perhaps more Experimental Farms. We can hardly have too many. (*An. Rept Dept Agric.*, 1890–91, p. 10)

On 5 August 1890, Groom asked the Secretary for Public Lands (Black) whether any reservations of crown lands had been made as endowments to agricultural colleges, in accordance with the Resolutions passed by the House in the previous session, and whether it was the intention of the Government to submit proposals to the House in the current session for the establishment of one or more agricultural colleges. Black's reply to the first question was "Not yet".

Instructions had been issued to Professor Shelton to report on suitable localities; his report would be submitted to Parliament for the purpose of giving effect to the Resolution referred to. On 12 August 1890, however, the Morehead Government was defeated and the second Griffith Ministry came to power. Black gave way to the Hon. Alfred Sandlings Cowley (Member for Herbert), who became Minister for Public Lands and Agriculture. Two months later, on 14 October 1890, Mr Jessop (Dalby) asked the new Minister, "Is it the intention of the Government to introduce a Bill this Session to provide for the Endowment of Agricultural Colleges and Experiment Farms?" His answer was "Yes".

In 1891 Professor Shelton appeared as a witness before the Commission that was enquiring into the need for a university. The Commission recommended the establishment, without delay, of an agricultural college.

The choice of a site for an agricultural college

Immediately Cowley had announced his intention on 14 October 1890 to proceed with the agricultural college, there was pressure from several Members to have it set up in their electorates. Golding pushed the claims of Herberton, Barton spoke for West Moreton, Murray for the Central Districts and Powers for the Wide Bay and Burnett, while Samuel Grimes (Oxley) extracted a promise that all agricultural districts would be considered.

During 1889 Peter McLean had travelled through the Warwick – Killarney area with the Minister for Lands (Black) and expressed the view to the Minister that that area was an excellent one in which to establish an agricultural college. In the next year, he accompanied Professor Shelton to Warwick, where Shelton gave a series of lectures in which he referred to the urgent need in Queensland for one or more experimental farms with agricultural training schools or colleges attached. They travelled from Warwick to Killarney by train with Arthur Morgan, Member for Warwick, and told him how impressed they were with the Emu Vale country, with its advantages of soil, climate and water supply for an experimental farm and training school. Morgan evidently thought about this and felt it worthwhile to approach the Hon. J. D. Macansh, M.L.C., of "Canning Downs", about the matter. The sequence of letters and other offers of land and subsequent government hesitancy are recorded in the *Queensland Parliamentary Papers*, Vol. 3, 1893, p. 957.

Two free offers of land were made.

On 1 August 1890, Morgan wrote to Macansh, stating inter alia:

I fear that, in the present state of the finances, the Government would not feel disposed to expend any considerable sum of money in the purchase of the quantity of land necessary to give effect to the scheme they have in view—land which of course must be easy of access and convenient to the centres of agricultural settlement. But knowing that you take a great interest in the progress of agriculture, and believing that you are fully impressed with the necessity for an Experiment Farm and Training School, and would be glad to assist the project, I venture to ask if you would be disposed to let the Government have a portion of the Canning Downs land along the Killarney branch line of railway, between Emu Creek and Farm Creek, for such purpose, and if so, would you make any reduction in the price? Kindly let me have an answer at your convenience. N.B. Plan not with (known to) Department of Agriculture.

In reply to Morgan, Macansh stated on 4 August: "If the Government decides upon establishing such a farm and school in this district, I will make a free gift for the purpose of 500 acres of such land in the locality you mention as, after inspection by the Government, may be considered suitable."

Later Morgan advised the Minister for Lands and Agriculture, the Hon. A. S. Cowley, that Macansh imposed no condition as to the immediate establishment of the farm or school. "Should his offer be accepted, he is prepared to hold the land and utilise it for grazing purposes at present, until the condition of the public finances permits of its being made use of by Government for the purposes for which it is offered."

The Minister asked the Under-Secretary and Professor Shelton for comments and they advised that immediate action should be taken to accept. The special advantages of the district were:

- 1. the character of the soil—the land in question appeared to leave nothing to be desired in the variety demanded for experimental undertakings, including irrigation, for the growth of cereals and grasses, and for fruit-growing and dairying;
- 2. accessibility—it was near the centre of a very rich agricultural and pastoral district and a school located here could be easily reached from any part of the Colony; and
- 3. the undeniable healthfulness of the locality, a feature essential in connection with an establishment of this kind.

The Minister asked McLean to convey his thanks to Macansh through Morgan and expressed the hope that he might visit the site soon. Nothing more was heard from the Minister till 8 June 1891, nine months later, when Morgan enquired of the present state of the matter, to which the Minister replied that the matter, inter alia, was under consideration by the Government.

At Cowley's request McLean submitted the requirements for the establishment of an agricultural college and a detailed statement of the probable expenditure for the first year. He also attached particulars of some of the agricultural colleges then in existence in the United Kingdom, United States of America, the German Empire (Prussia, Bavaria and Wurtemberg) and Japan, and in South Australia, New South Wales and Victoria. He gave detailed notes on the conduct of the Dookie Agricultural College, Victoria. McLean's submissions regarding the requirements for a college and its initial budget were made to the Minister on 25 June 1891:

In accordance with your wish, I have the honour to submit herewith the following details for the establishment of an Agricultural College and Experiment Station, suited to the present wants of the Colony. In dealing with the question of the establishment of Colleges of Agriculture and Experiment Stations, it is advisable that the subject should be considered from a practical point of view, and a comprehensive scheme submitted for their initiation. Technical and practical agricultural education should not be looked upon as of an ephemeral nature, but as that which affects the very foundation of a community, and therefore deserving of being established upon a basis that will stand for all time, and influence the rising generation to such an extent that the highest possible results will be obtained from the tuition afforded. The true principle on which such a system should be built is to place it upon such a footing as will secure successful operations amidst all the fluctuating influences to which every community is periodically subjected. All experience in this direction has proved that the most secure source whence an income can be derived for agricultural instruction is from an endowment either in money or land. The instruction afforded treating of the land and the capabilities thereof, it is natural that the income should be derived from this source, and in a colony like Queensland, with a large territory and vast possibilities, the true system for the establishment of Agricultural Colleges is an endowment of land in the three great divisions of the Colony.

Judging from the present condition of the agricultural interest, and the great need that exists for instruction in the various phases of agriculture most likely to prove of immediate benefit to the farming community, it is absolutely necessary that steps be at once taken to establish a college in the Southern portion of the Colony, where the great bulk of the tillers of the soil are at present located. To accomplish this object, parliamentary appropriation will be required to initiate a scheme and set it in full working order. It will be necessary to have a farm attached to the college, which should comprise an area of not less than 500 acres of land, a large extent of

which should be ready for immediate cultivation, so that the work of a college, in disseminating instruction in agricultural science and practice, should not be held in abeyance to the rough work of clearing and fitting up the farm. The land should be situated in some locality where the principles of irrigation could be applied; and for the convenience of pupils, the interested public, as well as for facilities in working, the farm should be situated in the immediate vicinity of railway communication. It not being at all probable that land suitable and available could be selected from vacant Crown lands, and should the Government not accept the offer of 500 acres from either the Hon. J. D. Macansh or the Messrs. Gore of Yandilla, for a site for an Agricultural College and Farm, the purchase of a suitable area will have to be considered, for which a sum of not less than £2,500 will have to be provided.

On further enquiry as to the costs of establishment, McLean submitted the following:

In accordance with your instructions, I have the honour to submit herewith a detailed statement of the probable expenditure in connection with the inception of an Agricultural College, with an addenda showing the salaries and wages of the teaching staff and farm help when the college is in full working order. For the financial year in which the commencement of the institution is determined upon, only a portion of the total amount would be required which sum would depend upon the time of the year when the land and money would be available, and the energy with which the work when entered upon would be carried out.

The annual expenditure of an Agricultural College can easily be calculated; for the teaching staff and farm help I approximately estimate it at a little over £2,000. The revenue, however, is more difficult to estimate, in fact impossible, as so much depends upon the seasons and the class of work to be turned out. If farming pure and simple is to be the basis upon which the farm is to be worked, and a sufficient area of land is provided, then the income would in all probability be sufficient to meet the expenditure. On the other hand, if the experiment work, which is one of the main functions of an Agricultural College, is to be undertaken, the returns would be likely to accrue from the students, inasmuch as the work which they would be called upon to perform upon the farm, amounting to half their time, should be considered as an equivalent for their tuition, and the only charge which they should be called upon to pay would be to meet the expenses of their board.

On 20 October 1891 Parliament voted the sum of £15 797 to the Department of Agriculture, including £5 000 for the establishment of the agricultural college. The Minister for Lands and Agriculture, Cowley, advised that he intended to establish the college, with a 500 acre farm attached, in the central part of the Colony. Professor Shelton would be in charge and every student attending would receive a thorough practical education in the art of farming.

Macansh's land on the south bank of the Condamine River was inspected by Professor Shelton and McLean in February 1892. On 27 March 1892 McLean wrote to Morgan, saying he was anxious to have the agricultural college established by 30 June and asking Morgan to ascertain if the land was still available as a gift. Morgan replied that it was still available free of cost but added, "It appears to me that the Government are not earnest in the matter".

On 30 March 1892 Macansh called on the Under-Secretary, again offering the land but asking for immediate acceptance or rejection. It had been stated in the *Courier* of 2 August 1892 that 800 to 1000 acres were needed, whereon Macansh offered the required area. On 5 December 1892 the Minister for Lands and Agriculture, Cowley, asked McLean to thank Macansh for his magnificent offer and advise him that he would shortly visit Warwick to view the land.

Francis A. Gore of Yandilla, Darling Downs, had read of Macansh's offer and commended him for it but thought the Killarney district too favoured. He advised the Minister for Lands and Agriculture on 4 December 1890 that he had written to his partners in England to see if they would agree to offering 500 acres of Yandilla for the project and the Minister sent his thanks. The English partners agreed, provided that the land be used for the stated purpose only, the offer be accepted by the Government, buildings erected and work commenced within three years from the date 5 February 1891, otherwise the gift would lapse, that all expenses of survey, boundary fences, deed fees, etc. be borne by the Government, and that the company have sole use of the land until operations were commenced, when deeds would be handed over subject to the above conditions. The land was situated near a proposed railway extension and underground water was plentiful.

In his annual report for 1891–92 Peter McLean wrote (re the agricultural college):

Although a sum of £5,000 was placed upon the Estimates for the past year for this purpose, to my regret, owing to the state of the public finances, it has not been possible to give effect to the vote. This is more to be regretted, as the necessity for such an institution becomes more apparent year by year as the Colony progresses in agriculture and the fact that many of our young men are seeking knowledge beyond the confines of Queensland which could with greater advantage to themselves be given here. The urgency for an experiment farm is clearly evidenced by the reports received from people who have been supplied by the Department with seeds for experiment. The reports of farmers living at no great distance from one another upon the same crop are very conflicting.

In the same report Professor Shelton wrote:

It has been no small disappointment to the friends of agricultural education to learn that the finances of the Colony would not permit of the immediate inauguration of the work as anticipated in the vote. This is certain. If the means of the Colony have diminished, the need for more and better knowledge of agricultural science and practice, and the systematic training of the youth therein, have not grown less pressing with the lapse of time. It suffices to say that the agriculturist has seen the difficulties and obstacles to the successful practice of his calling increase during the year, while he from lack of knowledge, in many cases remains powerless to cope with them. Insects ravage unchecked our canefields and orchards the whole length of the coast, while inland rusts and other fungus diseases consume the profits of the farmer's labours. If we could each year send out into the agricultural districts of the Colony a number of young men having the knowledge that rightly conducted schools of this sort impart we might at least cope hopefully with these "foes seen and unseen". I venture to suggest that, if the larger work of erecting buildings and equipping the School cannot now be undertaken, such preliminary work as locating the new institution and fencing and generally getting the farm in shape for future work should be begun at once. In this way the College would to a considerable extent get the benefit of the time, greater or less, that elapses before the final establishment of the institution, in the growth of those things on the farm which necessarily involve the element of time.

Apparently some notice was taken of this statement, as Professor Shelton inspected possible sites for a college during 1892 and submitted reports to the Minister, who, on 1 November 1892 during the Supply Debate in Parliament, said immediately he had time he intended to examine each site personally, with Professor Shelton and the Surveyor-General, and select the one that they considered would be the most advantageous to the Colony.

Further offers of land came from Messrs King and Sons, Gowrie, on 26 November 1892. They offered two sites, one on the railway line running through the property and served by Gowrie Creek, the other on the proposed railway line from Meringandan to Goombungee. The land was offered at £5 per acre; it was inspected by Cowley, then reduced to £4 per acre.

On 1 December 1892 the Secretary of the Chamber of Commerce in Bundaberg approached the Minister to establish the initial college in Bundaberg, which was the premier sugar district of the Colony and climatically suited to temperate and subtropical products. He was supported also by the Secretary of the local Agricultural and Pastoral Society. Cowley was to inspect this area in the following week.

On 5 December 1892 W. B. O'Connell, M.L.A. (Musgrave), wrote offering help to Cowley when he visited the Wide Bay district. The Secretary of the Wide Bay and Burnett Pastoral and Agricultural Society, Maryborough, wrote to the Minister suggesting the Degilbo lands, which had impressed Professor Shelton and McLean on an earlier visit. He added:

I may mention that several sons of agriculturists who have had successful training in the grammar and high schools here, and passed the Sydney University local examinations, have had to proceed to New South Wales to finish their agricultural training...this society was one of the first to bring under notice the great want of such an educational institution, and respectfully represented it to you and some of your colleagues during a visit to the town to open the exhibition.

On 10 November 1892 Samuel Cooper offered his farm at the Laidley railway station for sale for the purpose, supported by J. Jackson of Brisbane. The following day a letter from Mr Kates of Roma to the Minister for Lands suggested a site for a college, only six miles from Roma—it was suitable for wheat and other cereals, vines and other fruits, and had a never-failing water supply.

On 14 November 1892 Messrs Kellett and Co., Brisbane, suggested the Government should select some splendid agricultural land on the property owned by Kent and Wienholt on Lockyer Creek near Laidley. (This was later selected.) The following day W. Deacon of Allora wrote to Professor Shelton offering 422 acres on the Toowoomba – Warwick railway, three-quarters of a mile from Clifton Colliery Siding, at £4 10s 0d per acre.

Later, on 22 December 1892, J. S. Jessop, M.L.A. (Dalby), wrote to the Minister for Lands and Agriculture offering land from the town common at Dalby (now part of the Dalby Rural Training School land).

On 31 May 1893 Samuel Grimes (Oxley) asked if a site had been chosen for the college; the answer was no. To a further question from him on 20 June 1893 as to the probability of erecting the college, the Minister answered: "The Government being fully impressed with the advantages of an Agricultural College will take the necessary steps so soon as the state of the finances will admit of their doing so!"

But in the 1892–93 annual report McLean had to state:

To my great regret circumstances have not permitted the expenditure of the vote twice passed by Parliament for an Agricultural College and Experiment Farm, a circumstance which is the more unfortunate because at the present time of depression the minds of many are being directed to land settlement, the opening for the youths of our towns and cities in trades and commercial life becoming each year more limited and the parents crying out for the form of education which an agricultural college would provide. Not a few of our young men of this Colony have of late, to my knowledge, been sent to Victoria, New South Wales and America to receive that education which they ought to be able to obtain here.

Professor Shelton added:

The high hopes raised by the action of Parliament in voting two years in succession, a sum of money to be used in establishing a school of agriculture ended in disappointment. I am hopeful that, with the return of better times, Queensland people of all classes will unite in securing for the Colony, an institution which, if rightly managed, would do for the agricultural class what universities have done elsewhere for the learned and professional classes.

During the year he had undertaken a somewhat extended examination of suggested sites for the proposed agricultural college, in company with the Minister for Lands, Cowley.

On his trip to north Queensland in 1893, McLean reported: "While in Hughenden, I inspected and recommended a site to be reserved for an Agricultural College and Experiment Farm of an area of 2,371 acres. There is no surface water on the land, which is situated alongside the river, in which there is water at all seasons." Then, on his visit to Herberton, he wrote: "At Herberton, I inspected and recommended a site for an Agricultural College and Experiment Farm and hope that at no distant date both this and the site at Hughenden will be utilised for the purposes for which they are set apart." (*An. Rept Dept Agric.*,1892–93, p. 6)

Early in 1893, with a general election approaching, Cowley sent a detailed memorandum to each Minister recommending the purchase of a 1020 acre site ten miles north-west of Toowoomba (Gowrie) or, failing that, the acceptance of Macansh's offer, which had by then been increased to a total of 1000 acres. However, no further action had been taken when, following Griffith's resignation as Premier in March 1893, Cowley was replaced as Minister by A. H. Barlow, a former banker, representing the satellite electorate of Ipswich. In August 1893 McLean drew Barlow's attention to the Bill drafted in 1890. By this time, Sir Thomas McIlwraith, who had spoken against Groom's motion four years earlier, was Premier.

Because of the serious financial position after the floods of 1893 and general financial stringency, no vote for the establishment of the college was included in the 1893 estimates and the public service was reduced by 10 per cent. (F. Manson Bailey, Colonial Botanist, was retrenched for four months.)

Commenting on Tryon's discovery of potato blight in crops at Ravensbourne and Corinda in 1893, McLean said:

This instance is only one among many that can be used as a powerful argument in favour of the establishment of an Experiment Farm in connection with the Agricultural College where diseases could be studied in all their stages, and remedies in all likelihood provided, and provides evidence of the necessity here for an entomologist in connection with this Department.

In his 1893–94 annual report, McLean repeated his words of 1892–93, when no action was taken because of the depression. Professor Shelton, in his report, said:

The need of an Agricultural School or College, properly equipped, has been constantly felt...In every part of the Colony parents have come to me with the question "Where shall we send our sons that they may receive the education and training necessary to the successful prosecution of farming?" The attraction of farming would be enhanced if a central institution, having a good farm, and necessary tools, with a teaching force sufficient to give the rudiments of agricultural science, could place its privileges within easy reach of the class of young men needing them. It is often objected that one School of Agriculture cannot meet all the requirements, in this regard a country varying in climate and soil production as is the case in Queensland. To this I reply

that the principles of agriculture are the same the world over. The man who understands the fundamental practices of farming...and something of the nature of soils, their needs (and remedial measures)...will not be at a loss to apply this knowledge on the cultivation of special crops, however unfamiliar.

The heavy demand for agricultural land in the 1890s led the Government, under the Hon. Hugh Muir Nelson (Murilla), to pass The Agricultural Lands Purchases Act of 1894, whereby the Government could purchase land suitable for agriculture from the large estates of squatters, then subdivide and sell the blocks for closer settlement. The land under offer in the first place had to be reported on by the Land Board, then its suitability for agricultural purposes reported on by the Department of Agriculture (this was usually done by McLean, Professor Shelton or John Mahon), and then the local Land Commissioner or Land Agent reported on the demand for land in the district. With these reports before him, the Minister for Lands investigated the proposal, considered the terms upon which the land was offered, and either accepted or rejected it.

In the Supply Debate of 1894, the subject of agricultural colleges was raised so insistently by various representatives of agricultural electorates that Barlow promised to introduce a Schools of Agriculture Bill along the lines of the School of Mines Bill that was shortly to come before the House. When the Bill was debated in November 1894 some of the Members who had earlier advocated the establishment of agricultural colleges opposed the clauses that required any district wishing to have a college to raise a minimum of £1000 in cash or land equivalent, which the Government would then match on the basis of two pounds for every pound raised. The Government therefore did not press the Bill and it lapsed when Parliament was prorogued in the following month.

In 1895 twelve Parliamentary Members supporting the Government formed the Farmer's Representative Union and shortly afterwards published a scheme for the setting up of various experimental farms where boys could be taught "the practical work of farming". As a result of further pressure from this group, the sum of £5000 was placed on the Supplementary Estimates for this purpose. (Black, 1976)

McLean inspected and reported on the Rosewood Estate, an area of 11 000 acres between Gatton, Tarampa, and Forest Hill, with frontages to the Lockyer and Laidley Creeks, traversed by the Tarampa – Gatton and Forest Hill – Gatton roads and the Western Railway. On 23 April 1896, he requested that sections of the Estate be set aside for a school of agriculture and experiment farm. McLean and Professor Shelton had already selected the site for a 600 acre experiment farm, and it was decided to combine the two in a request for 1750 acres, the purchase of which was to receive official sanction.

The Hon. A. J. Thynne, a Brisbane solicitor and Member of the Legislative Council, became Minister for Agriculture in the Nelson Ministry on 6 May 1896, following a general election. He needed no convincing of the value of agricultural education—he had sent his son to Hawkesbury Agricultural College in New South Wales for such training. A few days after taking office he sanctioned the purchase of a further 6160 acres 2 roods by the Government from the Rosewood Estate trustees for William Kent (deceased), namely James Sargent Turner and Edward Wienholt, at a price of £3 12s 6d per acre for 1692 acres of the 1750 acres set aside. The total price paid out of Consolidated Revenue was £6380.

The remainder of the Estate was thrown open for conditional selection on 12 May 1896. Some fourteen portions were taken over for the agricultural college.

On 11 November 1896, in the Supply Debate in the State Parliament, the Minister for Public Lands (on behalf of the Hon. A. J. Thynne, Postmaster-General and Minister for Agriculture, who was a Member of the Legislative Council and had no seat in the Assembly) moved that £19 613 be granted to the Department of Agriculture: this included £900 for agricultural and horticultural societies, £500 for reserves (provincial gardens), £200 in aid of the propagation of trout and feathered game on the Darling Downs (there were few, the Minister imagined, who did not desire the streams of our uplands filled with trout!), £300 for the destruction of noxious weeds, £4000 for salaries, £4000 for the agricultural college and £2000 for the experimental and training farm. On enquiry from Mr Groom (Drayton and Toowoomba), the Minister said £1400 from the Works Estimate would provide for furnishing the college buildings, while the cost of the buildings themselves would be defrayed from the £5000 voted in the previous year. The £6000-odd for the college land would be paid by debenture as a purchase under the Agricultural Lands Purchase Act.

The ensuing debate was quite animated. The Members generally, and the Downs representatives particularly, deplored the fact that one of the free offers of land by Macansh and Gore was not accepted. All were also concerned that the Minister for Agriculture was not in the Chamber to answer questions about the choice of the site.

Although the actual reasons for choosing the site were not disclosed, from comments made they appeared to be that the site was easily accessible, and fairly close to Brisbane, where most of the Departmental experts resided; and that it consisted of three broad soil types—very fertile alluvium along Lockyer Creek, which could be irrigated; poor shallow soil on the ridge where the use of fertilisers could be demonstrated (this area provided an excellent site for buildings); and melon hole, that is, fairly moist land between the hill and the railway line where drainage could be demonstrated and which would provide excellent grazing land. Thus there was scope for experimentation and cultivation on three major soil types, to provide sound experience for the students. A local clergyman, the Rev. Thatcher, wrote condemning the site as being inundated, probably having seen it during the 1893 flood rains, which led one Member of Parliament to suggest that the land would only be suitable for a web-footed poultry run! The big rains of 1893 emphasised the need for drainage instruction, particularly in the minds of the Logan and Moreton Members, but to the author's knowledge no drainage has been implemented in the southern part of the College to this day (1982).

Samuel Grimes (Oxley), in a sensible speech, said the fundamental principles of agriculture could be taught as well at Gatton as anywhere else, and once a person had been taught those principles a little experience would enable him to grow any crop. He had no hesitation in saying the site had been well chosen. The selection of a site had been the great difficulty in the past, but the present Secretary for Agriculture (the Hon. A. J. Thynne, M.L.C.) had chosen the site soon after assuming office on 6 May 1896. In that he had shown his wisdom, because if he had waited he would have been beset with requests on all hands to select this or that site. (*Hansard*, 11 November 1896)

Joshua Thomas Bell (Dalby) asked that, now that the college site had been selected, experiment farms be located in other agricultural districts. A special plea was made by

R. H. Smith (Bowen) for a college in tropical Queensland. The Minister for Lands said that sites at Emerald (Emerald Downs run), Herberton and Hughenden had been reserved for experimental farms.

Regarding the necessity for a college, Mr Keogh (Rosewood) said, as far as farmers' sons were concerned, there would be very few of them as pupils. He believed a boy of sixteen years of age was worth £16 a year to a farmer, but the pupils were to be charged £25 a year. No doubt that seemed cheap enough, but there were few farmers in West Moreton who could afford to pay that amount for their son's education, and those who would derive the greatest benefit would be the sons of merchants and lawyers. Most of the information derived would be upon the questions of soils and machinery, and when a boy returned home his parents would not be able to find the necessary money to supply him with machinery. Mr Chataway (Mackay) said that agricultural colleges were filled all over the world, because there were many men with sons of sixteen or seventeen whom they did not know what to do with. They said the boys were no good, and they sent them to the agricultural colleges, knowing that if they did them no good they would do them no harm and might give them a taste for agriculture! N. E. T. Tooth (Burrum) said, with regard to the college, his opinion was that it would never turn out practical farmers, though it might turn out agricultural prigs.

The Shelton period

Professor Shelton described the land acquired for the college thus:

The College Land: The total area of land set aside for the use of the Agricultural College is 1,692 acres. Of this, there are about 500 acres of inferior ridge land, the remainder being level country, for the most part of excellent quality. Along the railway line, following the southern boundary, there is a narrow strip of low "melon hole" country, which will need draining before it can be brought into arable condition. Then, again, on the north-east there are a few acres of swamp, while, following the ridge above referred to, there are here and there smaller areas of low "melon hole" land. The total, however, of all this wet land is, in comparison with the good land, insignificant. It is most unfortunate for the College that nearly the wettest and most forbidding portion of the estate touches the railway line and thus is seen by every observant passer. Doubtless this fact has much to do with the unfavourable reports current concerning the College farm. I have no hesitation in saying that there are fully 1,000 acres of first-class farming land within the present limits of the College farm. Of the remaining 700 acres, 200 acres can, with ditching and proper treatment in other respects, be made nearly equal to the best of the "good land". The 400 odd acres of ridge land are mostly valuable for grazing alone, but this ridge furnishes a site for College buildings and "grounds" that can hardly be surpassed. I go thus at length into the character of the College farm, in order to correct, as far as possible, the widely current unfavourable, and mostly untruthful, reports concerning it. The College farm is suited to the growth of great crops of the great staples, particularly maize, lucerne, root crops, and various forages such as setarias and sorghums. It is most fortunate that a large amount-200 acres or more-of the best land upon the farm is capable of irrigation by gravitation. The abundant waters of the Lockyer are contiguous to this strip of country for a mile or more.

Like most of the good land of the world, the College farm will grow weeds as vigorously, and successfully as crops, and as the farm generally is what farmers call "strong" land, it is plain that crops will not be grown without work. Then we have a share of nut-grass, a weed pest which has many of the characteristics of the worst weeds known. In a few places, especially along the Lockyer, it is abundant. Generally, however, it is found in widely separated patches, and often large areas are completely free from it. But if nut-grass is a permanent nuisance to Queensland agriculture it certainly ought to have a place upon the College farm. Here, if
anywhere, the best means of coping with it ought to be made plain. (Shelton, *Rep. Q.A.C.*, 30 June 1897)

Preparation prior to the opening of the college

The building program

The responsibility for the buildings on the college site lay with the Department of Public Works. Supervision of the other improvements was undertaken by Professor Shelton from about September 1896, although his appointment as principal of the college did not take place till 25 June 1897.

The contract for the erection of seven college buildings was let to R. Roe in July 1896. These were the main building, containing two lecture rooms, a library, a study, the principal's office, a visitor's room and the secretary's office, the whole surrounded by a 12 foot verandah; two students' dormitories; a teachers' dormitory; a dining hall and kitchen including servant's quarters but with a separate laundry; the principal's house; and a house for the farm foreman. The ceremony of fixing the stump (stump-capping) of the main building was performed by the Minister for Agriculture, the Hon. A. J. Thynne, M.L.C., in the presence of a large gathering of people, on 22 August 1896. (The verandah of this building, when it was finished, overlooked nearly all the college property.)

Tenders were accepted for clearing and grubbing 232 acres shortly after the letting of the building contract. At about the same time the work of fencing off the two public highways (Forest Hill – Gatton and Glenore Grove – Gatton) that traversed the property and of filling in the numerous breaks in the boundary was carried out by contract. The first ploughing done on the college farm (32 acres) was let by contract in October 1896 and finished in the following January.

The contract period in the history of the college may be said to have come to an end on 4 January 1897 when the farm foreman, H. C. Quodling, took up duty. His appointment, at the salary of £156 per year, was confirmed on 1 July 1897. In addition to the executive duties of principal of the college, the management of the college farm, in a special degree, fell within the range of his duties. H. W. Gorrie began work as horticulturist in March 1897 (an appointment confirmed on 1 July also, when the College officially opened, also at a salary of £156 per year).

A considerable force of carpenters and labourers was employed initially on the various improvements under the principal's control. During the first six months were erected: a temporary cowshed (32×5 ft), with stalls for 16 cattle; stables and tool room (21×59 ft), having stalls for seven horses and three wagons; a wooden rectangular silo ($12 \times 16 \times 12$ ft), with an antbed floor, of a capacity of 55 tons of silage; and men's quarters ($20\frac{1}{2} \times 32$ ft), with one living room and four bedrooms.

Purchase of livestock

To meet the educational requirements of the students in ploughing, harrowing and cultivation operations generally, and to haul a considerable amount of material from the college railway siding, muster stock and carry mail to and from Gatton, Quodling selected and purchased sixteen draughthorses and three stock horses in the Toowoomba and Dalby districts at an average price of £7 per head.

The chief interest in the early days of the college was the establishment of the dairy herd. Professor Shelton decided that, at the outset, no better work could be done by the College in its direct relations with the farming community than building up a really superior herd of dairy cattle. This would be a perennial lesson to students and bring home to visiting farmers the great value of well-bred dairy cattle. Two Ayrshire bulls and eleven heifers were purchased by John Mahon, manager of Travelling Dairy No. 2, from various Victorian breeders, mainly T. A. Grant of Milton, J. W. B. Amess of Riddell's Creek, and J. T. Burnit.

Professor Shelton purchased a Friesian bull and heifer from the well-known Victorian herd of David Mitchell of Lilydale, a South Coast (Illawarra) Shorthorn bull and eleven heifers from the herd of Messrs Craig and Dudgeon of Jamberoo near Kiama, and a single Jersey heifer from the same district. These animals constituted the original dairy herd. By June 1898 another nine Jersey heifers had been selected and purchased by Mahon, mainly from the Kirkham Estate of the Hon. J. White of New South Wales, and a bull from Mrs Smart.

Acquisition of machinery

A stock of colonial, English and American machinery and tools was obtained for the initial work of the College. A number of machines new to the agricultural practices of the Colony were included, to prove instructive to local farmers and provide hints for local manufacturers, as were bench tools for twelve work-benches and a complete outfit of tools and equipment for a blacksmith's shop.

Initial farming for food and fodder

On arrival at the College the horses were put to work cross-ploughing, harrowing and planting maize on sixteen of the original thirty-two acres previously ploughed by contractors. The maize was scuffled three times and, despite the prevailing dry weather and late planting, turned out to be a reasonable crop, which because of the lateness of the planting and the need for winter fodder, was ensiled. Publicity was given to the operation as silage-making was comparatively new to Queensland and a great crowd of more than 200 people, mainly farmers and their wives from as far away as Warwick, Nanango and the North Coast, assembled at the College to watch the operations on 16 April 1897. The entire process of cutting the crop with a "Scientific Harvester", hauling it to the silo and there chaffing it and filling the silo was followed with great interest.

The material was neither weighted nor covered, but great care was taken to pack it firmly by treading, especially at the corners and sides. A month later a smaller gathering witnessed the completion of the ensiling of the crop, which at this time was more mature. Material surplus to the capacity of the silo was stripped of its cobs to feed the livestock and the remainder was made into stover. When the silage was opened three months later it was found to be in excellent condition except for some losses in the corners, and furnished the livestock—thirty cows and eleven horses—with their principal food during three months of the winter. Professor Shelton remarked that he considered the small silo perhaps the best investment made upon the College farm that year. It had enabled them "to use a great lot of late sown corn which would otherwise almost certainly have gone to waste, thus saving a great outlay for hay and grain, and ensuring a full flow of milk from the cows consuming it". He did, however, say that the relatively immature maize ensiled on 16 April did not produce as much milk when fed to cattle as silage as that from the more mature maize ensiled later.

Meanwhile, the horticulturist, Gorrie, was busy preparing the grounds around the twenty-odd acres of College buildings and establishing the vegetable garden near Lockyer Creek. Seven acres planted to potatoes failed in the dry weather, but persistent watering and intelligent care provided an abundance of vegetables.

Experimental work

Professor Shelton's wheat variety experiments in 1895 and 1896 were marred by lack of rainfall and the 1897 experiments were sown at the College in June 1897 just before its opening. Three hundred and forty-five varieties were sown and at 30 June all had germinated and shown vigorous growth.

Before the official opening the Minister for Agriculture, the Hon. A. J. Thynne, M.L.C., invited a large number of delegates from various farming centres in northern, central, western and southern Queensland to assemble in a residential conference at the Gatton Agricultural College from 10 to 12 June 1897. This was a master stroke as it brought together influential men from all over the State to meet one another in conference, to discuss agricultural problems and especially to inspect the new agricultural college, its land and facilities. The delegates were taken by train to inspect the new Hermitage State Farm near Warwick; for many this was their first look at the fertile and extensive Darling Downs.

Questioned in Parliament by Mr Grimes (Oxley) on 7 July about the cost of this special train trip to Killarney and back to Brisbane, the Minister announced the Secretary for Railways' figures. The cost of running the special train on Sunday 13 June was: traffic $\pounds 4$ 6s 3d, and locomotive $\pounds 2$ 15s 3d, exclusive of tear and wear. The fourteen employees engaged had received Sunday pay, that is, fifty per cent above ordinary pay — in all, $\pounds 6$.

Thynne chaired the conference. The organisations represented and the delegates were: Eastern Downs Horticultural and Agricultural Association (James Wilson, D. Lamb); Central Downs Agricultural and Horticultural Association (W. Deacon, G. Moulday); Border Agricultural, Horticultural, Pastoral and Mining Society, Stanthorpe (R. Hoggan, K. W. Scholz); Drayton and Toowoomba Agricultural and Horticultural Society, Toowoomba (W. R. Robinson, W. C. Peak); Wallumbilla Farmers Association (Geo. Williamson, T. W. Caswell); Logan Farmers and Industrial Association, Loganholme (A. Watt, Thomas Armstrong); Logan and Albert Agricultural and Pastoral Society, Beaudesert (W. H. Stephens, M. S. Smith); Agricultural and Pastoral Society of Southern Queensland, Beenleigh (Savage); Burpengary Farmers Association (J. A. Bourke, J. F. Fountain); United Pastoralists Association of Queensland, Brisbane (C. W. Murray); Zillmere Horticultural Society (J. Lang, H. Robinson); Lockyer Agricultural and Industrial Society, Laidley (A. Philp, Jnr, M. O'Keefe); Rosewood Farmers Club (H. M. Stephens, T. E. Coulson); Ipswich and West Moreton Agricultural and Horticultural Society, Ipswich (H. T. Hooper, P. W. Cameron); Gympie Agricultural, Mining

and Pastoral Society (S. Harding); Pialba Farmers Association (J. B. Stephens); Wide Bay and Burnett Pastoral and Agricultural Society, Maryborough (J. E. Noakes, Geo. Stuckey); Biggenden Progress Association (A. W. Baulch, J. H. Simpson); Degilbo Progress Association, Woowoonga (F. A. Griffiths, H. B. Griffiths); South Isis Planters and Farmers Association (I. H. Wells, H. Epps); North Isis Canegrowers Association (A. C. Walker, W. J. Young); Central Queensland Farmers and Selectors Association, Coowonga, Rockhampton (T. Whiteley, E. Adams); Marathon Pastoral and Agricultural Society, Longreach (J. H. McConnell); Pioneer River Farmers Association, Mackay (E. Denman, E. Swayne); and Herbert River Pastoral and Agricultural Association, Ingham, (J. Lely).

Officers of the Agricultural Department present included P. McLean (Under-Secretary for Agriculture), Professor Shelton (Instructor in Agriculture), J. C. Brünnich (Chemist), John Mahon (Dairy Expert), A. H. Benson (Fruit Expert), and A. J. Boyd (Editor, *Queensland Agricultural Journal*). Messrs J. V. Chataway, M.L.A., M. Battersby, M.L.A., P. Waller (Neusa Vale) and W. Soutter (Acclimatisation Society) were also present.

In welcoming the delegates, Thynne stated inter alia that the interests of the agriculturists of one part of the Colony were equally the interests of the agriculturists all over the rest of the Colony; the objects of the conference mainly were to discuss matters of mutual interest to the agricultural community:

It has fallen to me to hold the active administration of the Agricultural Department, and in this to give action to the wishes of Parliament and Government, and I hope from this Conference we will be able to get the material by which further to promote the interests of agriculture—my idea of the functions of the Department is that in the first place we should be able to give every agriculturist in this Colony useful information upon any subject bearing upon his business upon which enquiry is made. It is for this purpose that we have already secured the services of specialists...In this great question of agricultural education, which you now see exemplified in the establishment of this institution in the carrying on of experiments which cannot be effectively made by private individuals...or communicated to others with the same facility as through the Department...you will find the officers of the Department always ready to join and assist in every way in their power.

The conference dealt with the following papers: "Notes on Farming in the Wide Bay and Burnett Districts", "The Sugar Industry and Its Requirements", "Sugar Bounties", "Climatic Difficulties, Pests and Blights in the Northern Canefields", "Sub-drainage", "Importance of Chemistry to Agriculture" (J. C. Brünnich), "Bacon Pigs and How to Breed Them", "Farm Implements" (Professor Shelton), "Farm Servants and Farmers", "Irrigation in Queensland Agriculture", "The Cultivation of Wheat and Barley", "Breeding and Treatment of Dairy Cattle" (John Mahon), and "Farmers' Associations".

Resolutions passed by the Conference Recommendations Committee included inspection of cane weighbridges, protection of locally grown sugar against bounty-fed European beet sugar, requests for further conferences, inspection of pigs for human consumption, a proposal that drainage rights be investigated between farms, and congratulations to the Department on the selection of the College site.

Advertisement for students

With the successful conclusion of the Residential Farmers' Conference, the College was almost ready for student occupation. Professor Shelton had drawn up a prospectus for its operations, and students were sought by advertisement. The following circular appeared in the *Queensland Agricultural Journal*, Vol. 1, pp. 87–88, 1897.

(CIRCULAR NO. 1)

THE QUEENSLAND AGRICULTURAL COLLEGE, OPEN FOR THE RECEPTION OF STUDENTS, 1ST JULY, 1897.

EXAMINATION OF CANDIDATES, 30TH JUNE, 1897.

The College offers to Queensland youth a Direct Education in the Practice and Science of Farming. To carry out the intentions of the Government in this respect the School has been liberally equipped for its proposed work. This equipment (in part) embraces -

A competent staff of teachers; A Farm, consisting of 1,692 acres of land; Five Commodious Buildings; Dormitory Accommodation for 56 students; Three Breeds of Dairy Stock; Implements, Apparatus, and Library.

Plans for a Commodious Chemical Laboratory and Lecture-room have already been approved by the Minister. This building, it is expected, will be ready for the use of Students of the Second Half-year.

FEES—£25 per annum, payable half-yearly in advance, and a deposit of £1 as a guarantee against damage of buildings and furniture.

The fee covers board, washing (not to exceed ten pieces weekly), room rent, and lights. Each room is furnished with bedstead, bed, pillows, chairs and table. All other furnishings must be supplied by the Student.

LABOUR—Students work one-half of the time, a day of labour alternating with one of study.

The practical work proposed for students embraces, besides the care of Livestock and the operations included in Tillage and Harvesting, Fencing, Clearing and Grubbing, Tile-draining, and Construction of Farm Buildings.

COURSE OF STUDY

First Half-Year—

Arithmetic	Botany
English Composition	Agriculture (Lectures)
Drawing	

Second Half-Year-

Mensuration	Elementary Chemistry
English Composition	Agriculture and Horticulture (Lectures)
Drawing (Technical)	Agricultural Botany

Books and stationery are supplied by the College at actual cost price.

NON-RESIDENT STUDENTS—The Minister desires to encourage the attendance of Non-Resident Pupils, who are prepared to fulfil the College regulations in all other respects. The conditions of the admission of such Students to the privileges of the College may be learned upon application to the Principal.

Students should secure tickets to the College Station, located about one mile from the College buildings. All Passenger and Mixed Trains, except the Sydney Mail Train, stop, due notice having been given the Guard, for passengers to alight at this Station.

The Train leaving Brisbane at 6 a.m. is due at the College Station at about 9 a.m., and the Train departing from Toowoomba at 7 a.m. reaches the College Station at half-past 9 nearly.

Students travelling by the above Trains will reach the College, on the morning of the 30th of June, in time for the Examinations. The College teams will meet these Trains for Students and their effects.

Students travelling by Steamer are advised to proceed at once to the College on landing. Board and lodgings will be supplied such Students for the time that elapses to the opening of the College: provided notice of the wishes of the Student in this regard is given in advance.

For further information address-

THE PRINCIPAL,

Agricultural College,

GATTON.

The Queensland Agricultural College,

5th June, 1897

Staff

Professor E. M. Shelton had come to Queensland on 12 January 1890 as Instructor in Agriculture and travelled widely throughout the State addressing farmers on various agricultural matters, conducting wheat variety experiments and loudly proclaiming the need for an agricultural college and experiment farm. He had inspected several possible sites, alone and in company with the Under-Secretary and various Ministers, and drawn up the initial prospectus. On 25 June 1897 he was appointed Principal of the College at a salary of £750 per year—his starting salary with the Department of Agriculture. He had a staff of six men.

Johannes Christian Brünnich was both Chemist, Department of Agriculture, and Chemist, Queensland Agricultural College. Brünnich, who in 1896 was Manager of the Colonial Sugar Refining Company's mill at Homebush, Mackay, was appointed Agricultural Chemist to the Department at a salary of £350 per year and suggested a laboratory at the College would initially serve the needs of both the Department and the College.

Philip Mackenzie Pitt, English, Surveying and Mathematics Master, was appointed from 28 June 1897 at a salary of £250 per year. He remained at the College for 25 years, becoming also Secretary from 1 February 1899 and receiving an extra £50 in salary. He was given an assistant, usually a graduating student, for a short term before the student ventured into the outside world.

Joachim Samuel Hermann Schmidt was appointed Natural Science Master and Secretary from 25 June 1897 at £200 per year. He resigned on 1 April 1899 and later became a meat inspector with the Department of Agriculture.

Harold Cecil Quodling, Farm Foreman, was appointed on 4 January 1896 to prepare the farm for the first student intake, at a salary of £156 per year. On 1 August 1898 he became Manager of Westbrook State Farm and in 1901 he became Manager of Hermitage State Farm. On 1 January 1905 he took over from Peter McLean as Agricultural Inspector at the salary of £250 per year.

Hugh William Gorrie, Horticulturist, an ex-student of the agricultural classes at the Watt College, Edinburgh, and for six years in charge of the propagating and forwarding department of the Queensland Acclimatisation Society, took up duty in March 1896. In a short time he had formed a fine vegetable and fruit garden near Lockyer Creek and laid out and planted the gardens around the main building and an avenue of plane trees and pepper trees from the College hall to the railway siding. He was appointed at a salary of £156 per year. On 1 December 1898 he was appointed also a lieutenant in the Queensland Defence Force (Land), but unfortunately died on 12 February 1900, at the age of 33 years.

Robert F. N. Quinn, Superintendent, Mechanical Department, was appointed on 1 July 1898 to oversee buildings and machinery.

The College opens

The foundation students

P. M. Pitt took up duties as English and Mathematics Master on 28 June 1897 and on the opening of the College on 1 July superintended the entrance examinations. On the opening day, twenty-three young men presented themselves for admission and were duly entered as students. The numbers were rapidly augmented and before the end of the first term in December the enrolment had reached thirty-four. The foundation students came from nearly every settled portion of Queensland, both agricultural and pastoral. Their average age was a fraction over eighteen years. Nearly 90 per cent announced their intention of making farming the business of their lives.

Pitt found the young men were, with few exceptions, very backward in both English and arithmetic. The spelling of many of the candidates was decidedly bad, and their ideas on English composition were very elementary. He suggested that in future such students should be put into a "preparatory class", in which they would be required to remain for one term before commencing the regular College course. By this means all would be enabled to start their first year's work on practically the same footing.

The foundation students are listed as follows:

R. E. Soutter E. Youngman J. L. Redmond C. L. R. Jaggar W. H. C. Mayne J. H. B. Preston J. Norris A. L. Brawn R. St G. Sigley A. McKinnon W. A. McIlwraith F. G. Johnson A. C. Julius A. E. Anderson P. Hunter E. R. Rutledge W. A. Dunlop A. A. Nott W. H. Gillham G. E. L. Watson

B. F. Whitehouse G. Tate C. J. C. Philp S. Wilson D. E. Green W. Palmer N. W. Philp F. H. Palmer L. C. Stupart G. W. Jackson C. H. Culpin V. C. Pugh P. R. F. Grant E. R. Isaacs P. M. Bayley A. R. Walker H. C. Webb C. Barth A. C. Reid

Course of study and work

The underlying idea of the course of study and work followed from the inception of the College involved manual labour and class work and preparation for it, in about equal

portions of the students' time. The school was divided into two nearly equal divisions, working on alternate days in field and classroom. Every student was expected to take three studies, a rule only departed from for special reasons. In addition to the above, a system of industrials or education work was performed. On the day given to class work, the division thus occupied devoted three hours to labour, which as far as possible was made instructive and illustrative. During the initial year the industrial, because of the need for more facilities, was mainly the use of tools in carpentry. After a preliminary trial a three-year course of study was devised as follows:

First year

- First term—arithmetic; botany; English composition; drawing; industrials—farming, gardening, carpentry.
- Second term—arithmetic; botany; English composition; drawing; industrials—farming, gardening, carpentry.

Second year

- First term—agriculture (lectures), sixteen weeks; botany, six weeks; physics; elementary chemistry; mensuration; farm bookkeeping, two hours per week; industrials—farming, dairying, blacksmithing.
- Second term—horticulture; entomology; chemistry—laboratory work; technical drawing, two hours per week; industrials—farming, horticulture, dairying.

Third year

- First term—anatomy and physiology; organic chemistry—laboratory work; agricultural geology; industrials—farming, horticulture, dairying.
- Second term—agriculture and stockbreeding; bacteriology; agricultural chemistry; veterinary science; industrials—special work which, in the case of students sufficiently advanced, may embrace laboratory work and application in the field of the sciences of the course.

The editor of the *Queensland Agricultural Journal* described the daily routine for students thus:

At 6 a.m. the bell rings, and in a short time the hive is astir. Tools are served out, and all but the ploughing squad get to work at some useful employment near the house until breakfast time, 8 a.m. Meanwhile the horses have been fed and groomed, the cattle and swine attended to, and all is ready for the solid business of the day directly after the morning meal, which is substantial, well cooked, and neatly served. It should be mentioned that at 7 a.m. Mr. Shelton holds an "assembly" at which all are present, unless specially exempted. At this assembly the orders of the day are given out, and the students receive ten minutes of wholesome advice and instruction from the Principal on the subjects of morality, deportment, duties towards each other and the authorities, etc.—an excellent practice which cannot fail to have a good effect on the present and future lives of the students. (Boyd, A. J., *QAJ*, Oct. 1897, p. 275)

Boyd did not mention the evening program, namely, two and a half hours study by the students in their bedrooms each evening without supervision, using a kerosene lamp, and then to bed—a routine that was very contentious during the foundation year.

Official opening

The opening of the Queensland Agricultural College was described in the *Queensland* Agricultural Journal (Vol. 1, 1897, pp. 172–177).

The official opening of the Gatton Agricultural College took place on Friday, 9th July. At the invitation of the Minister for Agriculture (Hon. A. J. Thynne), the ceremony was performed by His Excellency the Governor (Lord Lamington). A large party of members of both Houses of the Legislature and other gentlemen visited Gatton, and lent countenance to the function. Amongst those who travelled by the special train to the College were:- His Excellency the Governor, accompanied by Captain Pelham, A. D. C., Hon. A. J. Thynne (Minister for Agriculture), Hons. P. Perkins, J. T. Smith, A. C. Gregory, J. Cowlishaw, F. T. Brentnall, W. Forrest, W. G. Power, A. H. Barlow, B. D. Morehead, J. C. Heussler, and G. W. Gray, MM.L.C.; Hon. R. Philp (Minister for Works), Hon. D. H. Dalrymple (Minister for Education), Hon. J. R. Dickson (Minister for Railways), and Messrs. Groom, Smith, Daniels, Murray, Castling, Stewart, Kidston, Battersby, King, Browne, Boles, Newell, Cribb, G. Thorn, A. J. Stephenson, Jackson, Cross, Dibley, and Bell, MM.L.A.; Mr. P. R. Gordon (Chief Inspector of Stock), Mr. A. H. Benson (fruit expert), Mr. J. Mahon (dairy expert), Mr. A. J. Boyd (editor of the Agricultural Journal), Hon. W. J. M. Larnach (New Zealand), Messrs. C. J. Pound, G. Woolnough, F. W. Ward, H. Tryon, C. A. Bernays and J. G. Anderson.

The party were met on arrival by the Under Secretary for Agriculture (Mr. Peter McLean), and Professor Shelton, and under the guidance of these gentlemen, made a thorough inspection of the College premises and the lands which so far have been worked. In consequence of the long prevalent unfavourable season the fields presented a rather parched appearance, and the little cultivation that had been attempted could hardly be taken as illustrating either the value of the methods employed or the potentialities of the land selected for the initial efforts.

The guests spent two hours inspecting the College then assembled at luncheon in the dining hall. Subsequently, at the invitation of the Minister, His Excellency the Governor and the visitors adjourned to the main lecture room, where the students were assembled and where the opening ceremony was performed.

Professor Shelton said:

Your Excellency, Mr. Thynne and Gentlemen...I should say a word to you this afternoon concerning the work of the last six months in connection with the organisation of this College... There had not then been a single acre cleared, and not a furrow had been turned up to the time of commencing operations in November last...We had not a single field, not a building upon the place except a rude hut on the banks of the Lockyer; and when we came here on the 1st of January, we had to turn our teams out and go to work with one eye regulating the work and the other on the horses for fear they would escape.

Then he outlined the building and fencing programme achieved and added:

In all our plans and calculations in respect to this school, we have proceeded with the idea foremost that the school must, as soon as possible, in all practical respects, be self-sustaining; that we must here, upon the place, grow our own potatoes, vegetables, maize, wheat and hay...We shall, I hope, soon make our own butter, and it will no doubt interest you to know that we begin killing our own beef next week.

Alluding to the twenty-four original students before him, he said:

Of the twenty-four students, exactly twenty write themselves as expecting to be farmers. Two state their intentions to be graziers. One is uncertain, while another gives a mercantile profession as his aspiration... the boys came here...meaning business...I believe in conclusion, Your Excellency and gentlemen, that among all the enterprises inaugurated in this jubilee year of Her Majesty, none will tell of greater good to the colony than this Agricultural College,

which is not merely for the development of farming, but to induce experimental work. We hope to bring forth new facts, new truths in agriculture...On behalf of myself and the pupils I welcome you to the school. I hope your stay has been a pleasant one, and that you have been enabled to see something of our hopes and aspirations.

The Hon. A. J. Thynne, supplementing Professor Shelton's remarks, said that the total expenditure to date on buildings was \pounds 5070, and the outside expenditure on purchase of machinery and stock was \pounds 3854 6s 0d, giving a total outlay under \pounds 9000.

The Department is charged with the price of the land at the rate which would have been charged for it had it been selected—something over £6,000. So that the total cost of this magnificent estate, which is now devoted to future generations in the great cause of agriculture, stands to this colony at a cost of under £15,000...Although I set great store on the necessity of advancing agricultural education, I do hope the efforts of the Government will not be limited to that branch of industry. In presenting these students to Your Excellency today, I cannot ask you to speak to them without feeling a great amount of grave anxiety as to the future these young men have to make for themselves. I look upon them as the pioneers of what I hope will became an army of agriculturists, who will in the future, instead of engaging in bloody battles, fight peaceful ones for the development of this magnificent country we have at our disposal. We who have, most of us, gone through the battle of life cannot but look with fatherly interest and goodwill upon the young men who are now commencing to pursue their course. I ask you now, Your Excellency, to declare this institution open.

His Excellency the Governor said:

Mr. Thynne, Principal Shelton, and Gentlemen,—I have indeed great pleasure in being here today, and at having had an opportunity of inspecting this institution. I think what I say will not be regarded as over-complimentary—for my opinion, I think, will be endorsed by others who like myself have come as strangers to the place—when I say that it is wonderful what has been done in the short space of time mentioned by Professor Shelton. Further, having inquired into what is the organisation and the proposed system of instruction, it seems to me to be most complete, most thorough.

I understand that every conceivable branch of agriculture will be thoroughly developed, and that training will be afforded for those anxious to undertake even the minor industries of poultry and bee keeping. It pleases me to see what comfortable, and at the same time what modest and simple, buildings have been erected for the resident students; also I observed in the various rooms that notices have been fixed indicating that, without undue severity of laws, there is to be a certain amount of disciplinary provision. I think it is interesting to know, as I understand from the Minister of Agriculture, that three days a week are to be devoted to lectures and what I might call bookwork, and three days to manual or field work. The three days in the field are, I understand, to be a financial recompense for the instruction that is given to the students on the other three days, and it is very gratifying to hear from Professor Shelton that the institution is to be self-supporting.

The most important thing of all is the magnificent area of land which is attached to these buildings—an area, I understand, far larger than is possessed by any other agricultural College in the neighbouring colonies, chiefly so because we rejoice in large areas. It is a further particular advantage that within the 1,700 acres around us you have three distinctive features of soil. First of all, you have rich land which can be easily cultivated; then the poorer land, such as these buildings have been erected upon, and which ought to afford useful lessons as to the best means of deriving profit from inferior soils; and again between us and the railway station is a marshy tract where valuable instruction may be given in systems of drainage and so on.

I think the Government of Queensland have taken a right step in bringing about the establishment of such an institution as this. I understand it is the first College in Queensland, and very rightly the inauguration of the first college in Queensland should be that connected with agriculture, upon which this country is bound to look in the future as its great mainstay and most productive industry. In these days, when we seek world-wide markets, success in competition depends upon two primary factors: one is that your goods should be of the first

quality; and another, that they should be produced at the lowest possible cost. There are the two necessary factors in regard to competition when you seek it outside of your own country. Also, there is an indirect benefit—a smaller one—which should result from such an institution as this. Where industry is stimulated in the direction of the manufacture of goods of the best quality, it gives to the general public standards of excellence, educates their tastes, and in one way and another stimulates the whole of the producers of the country.

This institution may be regarded as a centre in which may be focussed the agricultural information of the world. It is a kind of clearing house, and those who attend the lectures and are resident students, will become possessors of knowledge obtained, not only from the experimental grounds, but from the experience of men in every other civilised country. One feature, which I have already alluded to, I think is of the utmost importance. It is that the students should have some sort of discipline. They should learn habits of industry, and how wisely to distribute their hours of labour. Above all, supreme attention should be given to the development of their faculties of observation. These are all qualities absolutely essential in these days for the career of a successful farmer. Those who have merely a technical knowledge of the theories of agriculture, and go to work on plans which they have seen applied in the old country—those who engage in farming without practical experience—generally spell failure for themselves. Not that I disregard the importance of ordinary farm life. But in ordinary farm life, in modern times, you cannot acquire that scientific knowledge which is essential in these times.

As regards the scientific instruction it is proposed to give, I do not know the list of subjects; but I imagine it is intended to give the students some acquaintance with botany, entomology, natural science, and so on. It has become necessary, in order to produce satisfactory articles, to have a groundwork of scientific knowledge to go upon. This institution may be regarded as the generalisation of the agricultural knowledge of the world. It may be called a kind of reservoir in which everything that is known or ascertained in regard to a particular science may be stored. Those who go out of it will, like rivulets from some system of irrigation, carry into their own localities all they have learned and gained, and afford a healthy stimulus to their neighbours in the development of the riches of the soil.

I do not think our Anglo-Saxon race can be said to be very observant of detail. We do not take enormous or minute pains about anything we engage in. This is more generally the case where the country is young, and where there is no pressing necessity to take advantage of every opportunity that offers itself or to carefully finish every detail of the work we have in hand. That is a characteristic which cannot be gainsaid. Here, I am confident, one lesson that will be taught will be to pay the most minute attention to the treatment of every inch of ground and to see that nothing is wanted to produce to the best degree every plant which may be grown. It is only by careful attention to detail that one can command success, and perfection is only attainable after immeasurable trouble. Genius has been defined as an infinite capacity for taking pains. Whether that is a correct definition I cannot say; I only hope that from time to time there will issue from these buildings, and go into the larger world, batches of thoroughly equipped geniuses.

In this country there are to be found none of the adverse circumstances which are encountered in plenty of places elsewhere throughout the world. I have noted that such-and-such a branch of agriculture cannot be pursued without extraneous aid from the Government. I do not believe in doles or sops from the Central Government, and from what I see has been done already by the residents of Queensland—their neat homesteads, the satisfactory exhibitions of their productions, and their general contentment with their position at the present time and with their future prospects—I cannot credit that, with the industry and the energy of the inhabitants of this colony, there is any necessity, except in peculiar circumstances, to ask or invoke Government aid.

I would say that if there is one defect in Queensland it is that Nature here is almost too prodigal. In the case of individuals, as with mankind, adversity oftentimes produces success. We have instances where countries have come to the fore under the worst conditions. I think that, if, in Queensland, the advance is in the right direction, there is a great and glorious future awaiting the residents of this country.

Students, when you go out into the world it will not be to engage in warfare. You have not to subdue some unfriendly foe. Nature lays before you, for your use, her best resources. Your

enterprise is indeed a peaceful one, and the furrows you will plough here or on the bosom of the rolling downs will serve to reveal rich treasures that are hidden. Your advance in time will take place on the great Western plains, and these will blossom in your wake. Corn, wine, and plenty will spring where you have trod. I have the greatest pleasure in inaugurating an institution which I believe is fraught with the utmost promise for the future development of the riches of Queensland.

I believe Parliament has been wise in undertaking such a work as this; and I think the thanks of the country are due to those gentlemen who have organised and carried out this project.

Above all, I congratulate those who come here, as the first recruits of the great army which is to develop the lands of the colony in the future, upon the facilities which are offered to them here to prepare for a career which is one of the most beneficial that is open to mankind. With these words I beg to thank you, Professor Shelton, for the opportunity you have afforded me of being here today; and I have the utmost pleasure, with the fullest hopes of its prosperity, in declaring this Agricultural College now open.

The foundation students were certainly well provided with practical experience in "industrials", the main item of which was carpentry. R. F. N. Quinn, the officer in charge of the Mechanical Department, reported in July 1897 that the twenty-eight students enrolling had not the slightest knowledge of the use of tools, and consequently had to be taught to handle and use the simplest. By January 1898 fifty students were enrolled and with the assistance of a "journeyman" carpenter and part-time carpenter and bricklayer they took part in the first year in the erection of a five-roomed cottage, a meat store under the dining roam (including a butcher's shop), a carpenter's shop under "A" dormitory, a cottage for the farm foreman, a farm implement store under "C" dormitory, a shelter shed for bulls, a cottage for the herdsmen, and a windmill with pump and pipes for water reticulation; fixed a steam pump on Lockyer Creek and laid out 1000 feet of irrigation piping; erected a new silo; prepared plans and specifications for a new dairy; built a cool room, and also did all the painting.

H. C. Quodling, the farm foreman, under the direction of the Principal, also reported a busy first year for the students. This included further clearing of timber, including stumps, using the "Forest Devil"; building about sixteen miles of fencing, including a stockyard and pigyard; sinking a well at the northern foot of the hill, finding ample water at 47 feet; making 20 chain of roads; feeding cattle, pigs and horses; and handling a variety of crops—maize, lucerne, red kaffir corn, natal grass cut for hay, millet, teosinte, pigeon pea, grains, *Paspalum dilatatum* (brought from New South Wales by John Mahon), flax (linseed), hairy vetch, potatoes, oats, cape barley, wheat, cowpeas, castor beans and pumpkins. Cowpeas had been introduced as a result of a recommendation by Professor Shelton as a soil renovating crop, as well as for fodder. The two silos, No. 1 ($12 \times 12 \times 16$ ft) and No. 2 ($12 \times 16 \times 6$ ft) were filled with a mixture of maize, red kaffir corn, pigeon pea, teosinte and lucerne. Details of crops—sowing rate, planting distances, yields and uses—were recorded.

In the Horticultural Department, under Hugh W. Gorrie, student work was distributed over the grounds, orchard, vineyard and vegetable garden. Twenty acres of ground around the buildings were cleared and grubbed, the timber was burnt and gardens were laid out, with shrubs and ornamental trees planted. Six acres of orchard on the alluvial soil near Lockyer Creek were planted with fruit trees suitable to the district and some grapevines. Two acres of Marguerite and Pink's Prolific strawberries gave a heavy and much-appreciated crop, being watered by bucket, hand-manoeuvred by a windlass set up over the creek. The vegetable garden provided a liberal supply of cabbages and cauliflowers for College use, with the surplus sold at 5s to 6s per dozen for cauliflowers and 4s to 5s per dozen for cabbages, to farmers mainly between Gatton and Helidon.

Asparagus, onions, rhubarb and other common vegetables were grown and experimental plots of eight varieties of kidney beans, pineapples, fibre crops (sisal hemp, *Agave sisalana*, and Mauritius hemp, *Furcraea gigantea*) and twenty-four varieties of potatoes (twenty-one from Tasmania and three from Kansas, USA) were planted, including Carmen and Bismarck, which were later to become very popular in Queensland.

Gorrie recommended that a separate team of horses and set of implements be allotted to him, that a spraying plant be purchased, that a toolshed, seedroom, packing and drying shed, stables and cartshed be erected, as well as a residence for the horticulturist within the garden area to prevent pilfering. (Gorrie rode a horse to the College each day from Gatton, some four miles away, where he lived!) The stealing of melons seemed to be a common student pastime.

J. C. Brünnich, Agricultural Chemist, was appointed on 31 March 1897 as Chemist to the Department of Agriculture and to the Queensland Agricultural College, at a salary of £300 per year. As the appointment of a chemist to the Department was a new one, and pending the establishment of a laboratory for the carrying out of analytical work, he paid a visit to the agricultural laboratories in Sydney and Melbourne, and the chemists there, Messrs F. B. Guthrie and A. N. Pearson, supplied him with data and facts for his guidance in the establishment of such a laboratory. At the same time, he visited the magnificent chemical laboratories at Sydney University and paid short visits to Hawkesbury Agricultural College and to Wagga Experiment Farm. He saw that a laboratory was needed not only for the Department but also for the successful teaching of chemistry at the College.

In order to reduce expenses the Minister decided, on Brünnich's suggestion, to erect a laboratory building, which would serve both purposes, at the College. The building was completed towards the end of 1897 and the fittings were completed towards the end of May 1898. A full range of equipment, installed to carry out analytical work, included a polariscope, a furnace and a gasoline plant. The laboratory was described in detail in the *Queensland Agricultural Journal* of October 1898.

Although chemistry was not scheduled to commence until January 1898, Brünnich found it necessary to start a class of seven of the more advanced students; the main class of twenty-four students started as planned in the second term, with basic physics and chemistry.

The laboratory was ready to start analytical work in July 1898 and Brünnich prepared a schedule of fees to be paid by the public for special analyses they might request.

Reporting on the library's progress and donations to the College, Professor Shelton said:

I have great pleasure in reporting that we already have the beginnings of a library. During the year nearly 600 volumes have been obtained, including the ninth edition of the Encyclopaedia Britannica, itself a library. Our purchases of books have, aside from this, been largely agricultural and horticultural. A good many books of general scientific interest have also been secured, as well as a small number covering more general topics. These books have seen good service during the year, and have been freely consulted by teachers and students.

The reading room has been well supplied with newspapers during the year, some twenty papers having been received and filed. This room is always open to students, and I need hardly say, has been almost constantly in use during leisure hours.

Below is given a list of various gifts made to the College by interested friends during the year. Several of these donations are of such intrinsic importance and value as to merit much more than such passing notice. During the second term, Miss Munroe (Mrs. Philp), in conjunction with lady friends of Brisbane and Maryborough, raised funds sufficient to purchase a magnificent piano, which in due course was presented to the College. This instrument, manufactured by Metzler and Co., London, is a boon that is sure to be appreciated in a community, located as the College is, quite out of the reach of the ordinary diversions of Queensland life. This graceful and generous action of Mrs. Philp and her friends will be gratefully remembered by future generations of Queensland College boys.

Denham Brothers, of Brisbane, have, with great liberality and enterprise, placed in the College Dairy one of their Sharples Separators of the turbine type. This machine, furnished with boiler, tank, and all necessary piping, without cost soever to the College, is a most complete and useful dairy plant. The following is a list of the principal donations made to the College during the year, with the names of the donors:

Piano, Metzler and Co., London-Miss Munroe (Mrs. Philip) and ladies of Brisbane and Maryborough.

Sharples Separator, with boiler, tank, and piping complete—Denham Brothers, Brisbane.

Journal Chemical Society of England (16 vols.)—Edgar Hall, Tenterfield.

Coates' Herd-book, 18 vols. with catalogues, books-Mr Hull, Ingham.

Two Berkshire Pigs—W. R. Robinson, Toowoomba.

Trees, Shrubs, and Bulbs-Geo. Moulday, Allora.

Garden Seeds-Barteldes and Co., Lawrence, U.S.A.

Garden Seeds-J. Williams, Mount Gravatt.

Garden Seeds-Arthur Yates and Co., Sydney, N.S.W.

Garden Seeds—Sutton and Sons, London.

Two Dozen Trees-Curator, Botanic Gardens, Toowoomba.

Aerator and Strainer for milk-W. Dobson, Warwick.

A large collection of domestic and foreign wools has been secured, largely through the kind offices of Mr. P. R. Gordon, Chief Inspector of Stock.

The College progresses

Wheat experiments

In addition to his duties as principal, Professor Shelton continued to be interested in wheat varieties suitable for Queensland conditions. He sowed 340 varieties of wheat in experimental plots on a fertile heavy clay loam at the College in June 1897 with the main object of selecting for rust resistance. No rust occurred during the winter but in mid-September most varieties were severely affected, the least troubled being a dozen hybrids developed by William Farrer of New South Wales.

Natural Science

Natural Science studies were in the hands of Hermann Schmidt, who also acted as College secretary. From the remarks of students, he was a gifted lecturer, but his botany lectures could not be followed up by practical work in the field or in a laboratory, and he had very little time or equipment to seek out specimens for class work. There were no microscopes. This lack of practical periods was cause for complaint from the student body.

Resignation of Professor Shelton

Irked by the somewhat severe rules with regard to recreation and the use of the gift piano, and the strict regulations with regard to prolonged study in the bedrooms at night from 7.00 to 9.30 p.m. under unsatisfactory conditions, the lack of classrooms, microscopes and desks, and the lack of holidays and transport for church attendance, and possibly sensing the approaching end of the scholastic year, the students staged a demonstration on Monday night, 9 May 1898, by throwing stones and earth upon several buildings and also aiming at random at anyone who ventured outside. This continued intermittently until 16 May.

One student was caught in the act. At a subsequent staff meeting, one student was expelled and another suspended for twelve months. Professor Shelton reported this action to the under-Secretary, saying: "On Monday, 9 May, there seems to have been a conspiracy on the part of the bolder and more lawless of the students, which culminated in a night of disorder and violence which I do not remember to have seen paralleled in my experience with college work."

The treatment of the students so reprimanded, and growing dislike of Shelton's handling of students and his organisation of the curriculum, led the student body to petition the Hon. J. V. Chataway, who had replaced Thynne as Minister for Agriculture on 2 March 1898. In a seven-point petition the students indicated their dissatisfaction, culminating in point 7: "Perhaps more than anything else, the cause of the ill feeling is the unsympathetic way in which the Principal treats the students." Thirty-seven of the original thirty-nine students signed the petition. Meeting one dissentient at the College Jubilee celebrations in 1947, the author enquired why he had not signed, to which he replied, "Because the Principal had a pretty daughter!"

Professor Shelton was given the opportunity to reply to this petition by the Under-Secretary and gave his side of the story: no classrooms or desks were available yet; an excess of practical work was needed to get the College into running order quickly; the maturity of the students should mean they did not require supervised study; many students were town boys, not used to rural life; the use of the piano in the dining hall interfered with study and the sleep of the kitchen staff, who had to rise early; and so on.

The Under-Secretary, on behalf of the Minister, instructed John Mahon, Dairy Instructor, and Albert H. Benson, Instructor in Fruit Culture in the Department, to visit the College and individually submit reports on the dairy herd and dairy and the College orchard. Mahon was rather disappointed with the dairying section, particularly with the fact that no production records of the dairy cattle were kept and that no dairy produce was manufactured. Benson was generally satisfied with the orchard, although thorough pruning was needed.

On 9 June 1898 Chataway arranged a thorough enquiry at the College, which he chaired. He invited six staff members—J. C. Brünnich (Chemist), P. M. Pitt (English and Mathematics), J. H. Schmidt (Natural Science and Secretary), H. C. Quodling (Farm Foreman), H. W. Gorrie (Horticulturist and Superintendent of Grounds) and R. F. N. Quinn (Mechanical Department)—to give individual evidence, and twelve students, with one group of five older students and one group of four younger students to collectively contribute. The Hon. J. Leahy, M.L.A., was present during the enquiry. The general consensus was that the Principal was too autocratic, would not delegate authority, had no discipline and was too severe on the students regarding study requirements and recreation.

Professor Shelton was then called and defended his actions. He showed he was not unsympathetic but he did desire to get on with the establishment of the College, and probably was a little hard on the students with regard to recreation. It is interesting that he did not wish to give the Good Friday holiday but finally agreed, as in America to this day, Good Friday is not a public holiday.

The upshot of the enquiry was that Professor Shelton tendered his resignation as from 30 June 1898. ("Management of Agricultural College, Gatton. Resignation of Mr. E. M. Shelton", *Qd Parl. Papers*, 1896, pp. 3–16) It was a sad end to Professor Shelton's eight years of dedicated service to the Department of Agriculture and much more use could have been made of his knowledge within the Department had he not chosen to return to America. He had a vision for the College that his successors took another fifteen years to comprehend.

The College under John Mahon

John Mahon was appointed Principal of the College on 1 July 1898, at a salary of \pounds 500 per annum plus a \pounds 75 quarters allowance and \pounds 50 entertainment allowance. He was only thirty-six years of age.

Mahon was especially qualified for this appointment, having had extensive dairying experience in Victoria before being appointed to Queensland; he added to this seven years' travelling in northern Queensland, and later in southern Queensland in charge of Travelling Dairy No. 2. He and Baron Jones, who was in charge of Travelling Dairy No. 1 in southern Queensland, firmly established the dairying industry throughout the State. Mahon had dedicated a good deal of time and persuasion to the establishment of co-operative dairy factories and to the use of better-bred dairy cattle and pigs and the adequate nutrition of both, and was a keen advocate of the conservation of crops as silage and hay for winter feeding. He had an excellent rapport with the farming community, both in private visits and at conferences and at agricultural shows. He had become Dairy Instructor with the Department of Agriculture and Stock on 1 July 1897 after the closure of the Travelling Dairies, and continued to travel the State discussing dairy improvement. He had also assisted in inspecting land made available for settlement under the terms of The Agricultural Lands Purchases Act of 1894, to assess its suitability for agriculture.

Chataway introduced Mahon to the students at the opening of the new term in July 1898, admonishing the students to observe good behaviour and to report complaints to the Principal, who would endeavour to deal fairly with the matter and involve the Minister only as a last resort. Church attendance would be encouraged. In reply, Mahon promised to work with the students in furthering Queensland's agriculture and assured them that he and the staff would be sympathetic to reasonable suggestions from them.

In the reorganisation of the staff Major A. J. Boyd, Editor of the *Queensland Agricultural Journal*, took over the secretaryship from the Natural Science Master, Schmidt, also continuing his editorial work. On 1 January 1899 he handed over the secretarial work to P. M. Pitt, who, with an assistant, carried it on in addition to his English and Mathematics teaching.

Charles McGrath, Assistant Instructor in Dairying in the Department, became Dairy Instructor at the College on 1 July 1898 at a salary of £156 per year.

H. C. Quodling, Farm Foreman, was transferred to manage the State Farm at Westbrook and on 1 August 1898 Alexander Watt from the Gindie State Farm replaced him at the College.

Hermann Schmidt resigned on 1 April 1899 as Natural Science Master and later became a meat inspector. He was replaced by Peter Sutherland, B.A. (Sydney), who had taught at Ballarat College and at Longerenong Agricultural College in Victoria, which had closed early in 1898 because of a water famine.

In addition to the regular staff of masters, visiting technical officers of the Department gave educational help. W. C. Quinnell, M.R.C.V.S., visited the College each week giving lectures and demonstrations in veterinary science, and R. S. Nevill, Tobacco Expert, E. H. Rainford, Viticulturist, and A. H. Benson, Fruit Expert, visited the College to lecture and to supervise experimental plots of tobacco, vines and fruit trees respectively.

The College, under the control of the Department of Agriculture and Stock, became a link in the chain of promotion of officers as they gained seniority in the Department. They widened their experience in the field of education, while bringing to the College knowledge gained in their special fields within the Department, especially knowledge of a practical nature gained in country districts.

Mahon introduced a more informative approach to the instruction of the students, recording each cow's milk production, testing its quality, introducing feeding tests with different rations for both cattle and pigs, and telling students reasons for adopting such special practices.

Mahon's desire to inform students of his actions led to an amusing incident. He was judging pigs at a district agricultural show and met up with a rather poor-quality pig in one of the classes. In reply to Mahon's rather derogatory remarks, the owner blurted out, "Well, it was bred at Gatton College." Mahon there and then decided that every stud animal leaving the College would carry an identification tag in its ear—"Bred at Q.A. College"— and had tags made in Brisbane. Lecturing his students soon afterwards, he told them of his action, handing a tag around the class and continuing his lecture. The last student to receive the tag promptly pocketed it, Mahon having forgotten it as he continued with his

subject. A few days later students were making hay in one of the paddocks when they startled a kangaroo rat. They ran it down and attached the tag to its ear before releasing it. Mahon delighted in early-morning shooting at hares and took a student with him for company. That morning it was Bert Moran, who later told the tale. Soon after they entered the hunting area out hopped the tagged kangaroo rat and Mahon successfully brought it down with the shotgun. Excitedly he said, "Get it, Moran, get it!" Moran, laughing to himself, retrieved the animal and brought it back to Mahon, who discovered the tag, "Bred at Q.A. College", in its ear!

A problem Mahon encountered early in his new position and one that continues in such institutions was catering for students who did not wish, or whose parents did not wish them, to undertake the full course of three years' study. The parents said they needed the student to help on the home farm, or, if their specialty was in one or two areas of agriculture, they saw no need for the students to take the full suite of subjects.

Mahon's approach was summed up thus:

It would seem to be ill advised...to endeavour to force the knowledge to be gained within the limits of a given time...in each and all branches of agriculture. It were wiser for those who intend to remain, say, a year to devote the whole of that time to one subject and learn it thoroughly. Another argument against the multi-subject course is the fact that some boys have an unconquerable dislike to or inability for bookwork, and at the same time have a great liking and ability for field work. In these cases, to force lads, whose intention is to pass their lives as farmers, to undertake what is to them a hopeless drudgery, is a sheer waste of time, and almost amounts to cruelty. Acting upon this hypothesis, I have during the past year, the acquiescence of the parents being previously obtained, initiated a system of special work, under which students devote themselves to particular kinds of work. This system has been found to work well, but restriction of numbers of such students for dairy work was necessary as demand was too great. However, for the third-year men I feel that the theoretical and scientific teaching should be insisted upon, because the practical knowledge previously gained combined with the theoretical and scientific instruction will finish that course which the College ought to impart to those whose intention is to follow agriculture and who have, for that purpose, spent three years of their lives to gain that knowledge. Scientific and theoretical knowledge alone will not suffice for the farmer and from my experience, it would seem that those who have only attained that knowledge invariably endeavour to become teachers, and will not risk their training to prove their knowledge by becoming farmers. Science, theory and practice should go hand in hand. (A woman once used to call her husband "Theory" because he never worked but surely the theory must have first been wrong!)

Mahon continued:

Science, theory and practice should go hand in hand. The latter may stand by itself, but the two former will fail unless accompanied by practice. It is upon this basis that it is my intention to conduct the agricultural education of those who trust themselves to my guidance. (*An. Rept Dept Agric.*, 1898–99, pp. 11–12)

Because of the circumstances associated with the resignation of Professor Shelton, enrolments were down for the 1898–99 year, and practically no students applied for bursaries offered by the Government, providing a free education for three years. In an endeavour to show the dedication of the new Principal and the excellent progress of the College, Chataway, Minister for Agriculture, took a party of some seventy-three members of both Houses of Parliament and senior public servants to the College by special train on 10 December 1898. Among the company were six Members of the Legislative Council, four Ministers and thirteen Members of the Legislative Assembly, the Under-Secretary for

the Treasury, Lands and Agriculture, and the Deputy Railways Commissioner. They inspected the College buildings and the students at work.

Ploughing was in progress in one of the fields and the temptation to some of the visitors was too strong to resist: while others watched, M.M.L.A. McMaster and Smith took part in a ploughing match. "So far as ploughing was concerned, their hands had not forgotten their cunning. They were not, however, heard to express any regret that ploughing did not now form one of the ordinary occupations of their daily life!"

Mahon told the gathering that in the next eighteen months the College would be self-supporting. Although he did not think that was the desire of the Government, if the College could show the students that it was making a profit from the dairy and the farm they would be more anxious to go in for the business themselves. They were making their own butter and cheese and soon would be making their own bacon. He would like the students to do more practical work, and forty-five per cent of the parents asked for this.

After lunch Chataway addressed the gathering. He said, inter alia, the College in a few years' time would be the pride of the Colony. He asked those who had seen the College that day to spread far and wide what they had seen there and speak of the work done there. They hoped to send weekly shipments of butter to Earl's Court in London for public display and also to participate in the International Show in London in 1899.

Building developments

During the 1898–99 year an updated cowshed to accommodate 40 cows, attached stables to house 30 horses, a barn to store and chaff fodder, houses for the English Master and the Horticulturist (the latter within the orchard) and a gymnasium for students were built under contract. The original dairy was redesigned and updated to include refrigerating chambers, a milk testing room, an ice-making plant, a pasteurising plant and sundry equipment. A blacksmith's shop was erected, a new piggery to house 160 large and 250 small pigs was built to a modern design, and seventy chains of road were constructed between the railway and the College buildings.

By mid-1900 poultry yards and an apiary of fifteen hives had been provided, and in August of that year the electric lighting of the various buildings was carried out by Mr L'Estrange of Barton and White of the Brisbane Electric Supply Company. In October 1900 a road forty chains in length from the dairy to Lockyer Creek, using the "American Champion Road-making Machine", was laid down under the approving eyes of various representatives of municipal councils and divisional boards as well as students.

A water supply from Lockyer Creek was installed to provide water for the houses, sheep paddock, new stables and cowsheds, complete with four large wrought-iron tanks in the horseyards. A cottage for the stewards' quarters connected with the dining hall, and a calf shed (32×30 ft), an implement shed, blacksmith's shop, harness and tool room complex (155×37 ft) completed the "farm square". Another silo ($18 \times 18 \times 16$ ft inside measurements) with a concrete floor was erected. The old silos were pulled down. Timber from the old buildings was used to erect bacon-curing rooms, one (10×10 ft) containing brine tanks, one (8×10 ft) for a drying room fitted with a fan, and one (8×10 ft) for a smoke room. A large

hayshed $(90 \times 75 \times 23 \text{ ft})$ was erected on the banks of Lockyer Creek and a shed was built to house manures for experimental purposes. An insulated cheese room $(15 \times 12 \text{ ft})$ was attached to the dairy and a pasteurising and cooling plant was installed.

In March 1902 the new hayshed was destroyed by fire, causing a loss of fodder valued at £3200. A new hayshed ($75 \times 51 \times 17$ ft) was built to replace it during 1903–04. During 1906 and 1907 a road was completed from the railway siding to Tarampa Road, using the College bullock team to form the road and the "American Champion Road-making Machine" to complete it. Two new silos were also built, one of galvanised iron (60 tons capacity) and one of fibro-cement (120 tons), giving three silos with a total capacity of 220 tons. However, these two new silos provided unsatisfactory silage and a pit silo was excavated in the hayshed (18 ft in diameter and 23 ft deep), which produced excellent silage. A concrete silo was built during 1909–10. The galvanised silo was too thin so variations in temperature affected the material, and it was not airtight. Heavy loss of spoiled silage occurred in the fibro-cement silo and it fractured easily when struck inadvertently by machinery.

During 1905–06 a Snow pump with a capacity of 14 000 gallons was installed on the bank of Lockyer Creek, with 4-inch pipes carrying water the one mile to the College storage tanks on the hill. A bore was put down in the railway paddock in the following year and fitted with a windmill to water the horse teams during the lunch hour as they were working so far from headquarters.

Milking machines were installed in the bails in 1907–08, with alterations made to the building to accommodate the new system.

By the end of Mahon's period as Principal the College was so well equipped with buildings and accessories that major construction was not necessary for several years. Indeed, the Farm Square (bails, stables, machinery shed and chaff shed) remains to this day.

The students took part in most of the above development, thereby gaining valuable practical experience. They worked under R. F. N. Quinn (1897 to 1900) and W. Doughty (26 October 1900 to 30 June 1902)—Mechanics; A. Foster (1 October 1904 to 10 February 1906) and M. J. Lyle (10 February 1906 to 1 July 1912)—College Engineers; A. Jordan (1 October 1904 to 1906) and H. Aberdeen (1906 to 1911)—Carpenters; A. Denis (1898 to 1904) and W. Strath (1 October 1904 to 1933)—Blacksmiths.

The College farm

When Mahon became Principal of the College on 1 July 1898, some 200 acres had been broken up for cultivation; and by the end of December 154 acres were under cultivation, 30 acres were fallowed, and 101 acres had been cleared for the next year. By May 1899 some 337 acres were under cultivation—all by horsepower.

H. C. Quodling, the inaugural College Farm Foreman, was appointed on 4 January 1897 and transferred to manage the Westbrook State Farm on 1 August 1898. He was succeeded by A. Watt, Manager of Gindie State Farm, on 1 August 1898. Watt retired in 1904 to be

replaced by D. Macpherson. In 1905 Macpherson was transferred to manage Biggenden State Farm, and G. B. Brooks came from Gindie State Farm to replace him on 1 October. He was transferred to the Department of Agriculture during 1910–11 to become Agricultural Instructor and was succeeded by A. E. Gibson on 4 July. Mick Jordan, who had been Assistant Farm Foreman since 1 July 1899, became Farm Foreman on 1 July 1913. He continued in that capacity until his retirement in 1935.

Continuity of supervision was somewhat lacking but Mahon kept in close contact and the policies he laid down were followed by each new farm foreman.

Mahon's policy was to expose students to all the types of farm crops and improved pastures that could be grown and to as many varieties of these as could be obtained, so that the College could recommend a particular variety of a suitable crop to local farmers. He instituted manurial trials with important crops such as maize and potatoes to ascertain if such fertilisers could be economically applied, and bookkeeping enabled an economic assessment to be made. Although replicated experiments to specific designs were to come much later, the experiments Mahon instituted were far in advance of current agricultural procedure. Unfortunately for the teaching of plant nutrition, the main College soil under cultivation was so fertile that significant responses were hard to produce.

Meticulous records were kept of the area of each crop sown, the planting rate and distance, the treatment and the yields year by year, and these were generally published in the annual reports. In his later years, Mahon recommended the appointment of an experimentalist to devote his whole time to the task, resulting in the appointment of C. S. Clydesdale in 1915.

The wheat variety experiments for rust resistance initiated by Professor Shelton were continued. Mahon sent H. W. Gorrie, the Horticulturist, to Queanbeyan, New South Wales, in 1899, to be instructed by William Farrer on his system of hybridising wheat. Maize was a major crop, but pumpkins, mangolds and carrots (for pig feeding), lucerne (especially under irrigation), wheat, oats and millet for hay, cowpeas for green manure and hay, barley grain for pig feeding, maize, sorghum and teosinte for ensilage, and rape for winter grazing were also important. Experimental observation crops included rye, rice, sunflowers, buckwheat, flax, sisal hemp, sugarcane, sea island and upland cotton, sweet corn, turnips, onions, broom corn, arrowroot, field peas and vetches, chicory, cassava, castor oil, pigeon pea and teosinte.

With regard to castor oil, Mahon showed a degree of foresight by saying, "I am inclined to think that, no matter how careful one may be in its cultivation it will eventually spread over the cultivation fields and become a pest". It is now a shrubby pest along the Lockyer Creek and Brisbane River banks.

R. S. Nevill, Tobacco Expert, established experimental plots of tobacco on the sandy hill and also on the creek bank alluvium.

Because of the vagaries of the seasons in the Lockyer Valley when crops were grown under natural rainfall, and with the experience of a major drought in the early 1900s, Mahon placed special emphasis on fodder conservation, especially the ensilage of crops such as maize, which would have failed for grain, and the normal conservation of maize and sorghums in the annual silage programme. The dairy cattle especially needed this conserved fodder during the winter months. Several silo structures were tried to assess construction and conservation problems, and the conservation of the natural grasses *Bothriochloa bladhii* (Forest Bluegrass) and *B. decipiens* (Pitted Bluegrass) was tried, but their low moisture content defied successful ensilage in the absence of a knowledge of additives. Spontaneous combustion of the material destroyed the stack. A maize harvester and a No. 17 Ohio ensilage cutter helped to take the heavy work out of ensilage.

John Mahon, because of his work with the Travelling Dairy, paid attention to the quality of the native grasses in each district and their performance as milk producers and was especially disappointed with the quality of the northern grasses in winter. As soon as he took over the reins of the College, he experimented with introduced forage grasses and legumes. At first he introduced a wide range of temperate grasses and clovers to help bridge the winter paucity of natural grazing. But his most successful introduction was *Paspalum dilatatum* (Paspalum) from New South Wales, its first introduction into Queensland. It was so well accepted that soon the College could not meet the annual demand for seed or roots. Its excellent survival under floodwater for a considerable time in January 1901 proved that the grass would withstand floods, and later in the year when a severe drought ensued it received much publicity for its survival of drought conditions at Nerang, Yuleba and Nanango; at the College it was 3 feet high, the dry weather having no effect on it. "This magnificent grass is much admired by those who have seen it growing here." A notice in the April 1901 issue of the *Queensland Agricultural Journal* read:

To purchasers of *Paspalum dilatatum* roots. All orders for Paspalum roots must be accompanied by the amount charged for same—two shillings and sixpence, on receipt of which the parcel will be sent to the nearest "Freight-on" station.

John Mahon PRINCIPAL

During the 1902–03 year 129 040 roots valued at £85 12s 8d and 156 lb of seed valued at £11 5s 0d were sent to all parts of the State, as far away as Cooktown. In 1906 forty acres were under paspalum for grazing and hay.

Prairie grass was shown to be a useful winter grass and the newly acquired Rhodes grass showed such promise that Mahon predicted it would become a popular grass in Queensland.

Labour was always short on the College farm, where only three labourers were available throughout Mahon's term as principal. Skilled labour was hard to obtain and during 1907-08 forty-one farm hands came to and went from the College farm (and twenty-one through the Dining Hall). With the heavy summer rains and the resulting impassable black soil, cultivation was curtailed and weeds luxuriated. So frustrated did Mahon become that in his 1909 annual report he wrote:

The great drawback (as has been the case throughout the whole history of the College) has been the lack of sufficient labour to enable the management to conduct College affairs on lines that would make the institution worthy of the State. There is here a large area of beautiful agricultural land devoted to pastoral purposes, which, if under cultivation, would return a handsome revenue and add considerably to the educational value of the College...ninety per cent of the public are under the impression that there is no limit to the money placed at the disposal of the Principal for the purpose of carrying out the work of the College...It frequently occurs here that classwork and lectures have to be abandoned for many days in order to enable us to cope with important work on the farm...It appears to me very strongly that a step in the right direction would be either to shut the place down altogether, or else make it worthy of its existence. It is thought by many who know very little of the working of the Agricultural Colleges that a great deal of labour is derived from students. This is a very great mistake. In the first place, students are half their time in school; then, again there are so many branches of College work that a lad going through on full course is allotted farm work about one week out of every eight. It may, therefore be seen that very little student labour is available for farming operations.

College students undertook a good deal of farm work and learnt the use of the various types of farm machinery. They were encouraged to enter local ploughing matches: in 1898 A. Dyne won first prize in the under- 18-years class; in 1900 B. Corser (later Member for Burnett) gained first prize in the single-wheel class and Thos. Kidd took second prize in the youths' class; and in 1902 Baker and Fudge were first and second.

The College produce was displayed annually at the Brisbane National Show.

The College livestock

Dairy cattle

John Mahon, while he was still Dairy Instructor with the Department of Agriculture, purchased several head of dairy stock for the College's foundation herd. A noted judge of livestock of all domestic breeds, he could advise farmers on suitable breeds for various purposes.

During the summer vacation in 1900–01 Mahon visited southern States to purchase livestock for the College, calling on Professor Lowrie, Principal of Roseworthy College, South Australia, and the Wagga Experimental Farm to discuss mutual interests. He purchased six Shorthorn heifers from R. Liggett of Ballarat, an Ayrshire bull from J. Burnip, Berkshire pigs from Messrs Madden of Geelong and Bell of Yarra Glen, one Tamworth boar from Mr Chirnside of Werribee Park, and one Yorkshire and two Berkshires from Mr Betts of Gladesville, New South Wales.

In April 1901 a Jersey bull, a Guernsey bull and a heifer were imported from New South Wales and a Romney Marsh ram from Hawkesbury Agricultural College at Richmond, New South Wales. Two Yorkshire pigs were also added to the herd.

During 1904–05 one male and one female of each of the dairy breeds Ayrshire and Shorthorn were imported from Great Britain, and a Shorthorn bull and six heifers from New South Wales.

Holsteins and Lincoln Red bulls were secured for crossbreeding purposes and in 1908–09 a Dexter-Kerry bull and cow were secured.

In March 1910 Mahon was granted leave of absence to visit England, Ireland, Scotland, Wales and France, to purchase livestock for the Government and private individuals. He

visited Cirencester Agricultural College and Cambridge University and School of Agriculture (under Professor T. B. Wood) in England, the Albert Agricultural College at Glasnevin near Dublin in Ireland, the Kilmarnock Dairy School and Experimental Farm in Scotland, to study agricultural education including the main feature of farming in England—the "Norfolk" system of crop rotation. He was taken to see the finest livestock herds in the countries he visited and purchased fifteen stallions and mares, thirteen Shorthorn, eleven Ayrshires and two Jersey cattle, four British Black, eight Berkshire and twenty Yorkshire pigs, and a number of poultry.

With this importation of new blood lines, plus careful breeding records combined with milk production records of each cow being published in the *Queensland Agricultural Journal*, the College dairy herd became well known and the demand for breeding stock was heavy. College cattle were successfully exhibited at local shows and at the Royal National Show in Brisbane, a team of twenty-three entries gaining thirty prizes at this latter show in 1913.

During 1904–05 twenty-one cows averaged a production of 265 lb of commercial butter per head over an average lactation of 10.5 months. Sales of stud bulls were frequent, at shows and from the College, and prices were kept low to encourage dairymen to invest in improved sires. Prices ranged from £7 to £10 per head for two-year-old bulls. In 1909 an annual sale of cattle was instituted at the College, twenty-three young bulls realising from 10 to 23 guineas. All the milking cows were milked by students, who had to be taught milking as a compulsory exercise; this frequent change of milkers somewhat reduced the actual milk production potential of the College cattle.

In addition to breeding methods, feeding was a major part of the instruction. Several different rations were compared, using silage hay, green crops, molasses and, during the 1902 drought, even prickly pear, the grazing of native pastures often being used as a control treatment. It was also shown that rugging of the milking cows during the winter months was beneficial and economical.

The Ayrshire breed was shown to be the best breed for production, but the Holstein was considered the best all-round breed for production and size. Both performed well for crossbreeding. In his annual report in June 1906, Mahon predicted the rapid rise in popularity of the Holstein (Friesian).

In 1909 Mahon said:

The greater number of students who have graduated through this institution are now successfully conducting their own dairy farms. The manner in which they conduct their business is looked upon by many adjoining farmers as an object lesson to themselves. The prejudice that existed at the first regarding the College ex-students, as being too theoretical, is rapidly dying out.

Dairy manufactures

After his years of instruction in dairy manufacturing with the Travelling Dairy, Mahon made sure that the College would turn out trained operators in this field. Mention has been made of the new dairy and its improvements under the heading "Building Developments".

Condensed milk manufacture was added to that of butter and cheese in the 1898–99 year. The demand for the dairy manufacturing course was too great to admit all candidates. To widen their experience, students were allowed to take charge of the milk testing for production competitions at local shows in 1901 and a start was made with College exhibits at the Royal National Show in Brisbane. For the 1900 Show, the College exhibit of dairy produce included cheddar cheese, potted cheese, condensed milk, concentrated milk, pasteurised milk and tinned butter. The College also exhibited bacon, hams and lard.

A consignment of loaf cheese, potted cheese and bacon and ham was, by order from His Royal Highness the Duke of York, placed on board HMS *Ophir* for the use of the royal visitors, here for the Federation celebrations. It was so highly thought of that the order was repeated from New Zealand, and a supply of bacon and cheese was despatched to Adelaide to be placed on board the *Ophir* there.

During the year 1902–03 Messrs Brown, Webb and Co. installed a pasteurising and cooling plant for milk and cream for use in butter-making and experimented to find the best temperatures for storing butter and cheese. Tests at the time showed these were 35°F for butter, and 32- 40°F for cheese.

Such was the demand for the dairy course that in 1903–04 a special dairying course of fourteen days to five months was instituted for students who had had previous experience with dairy production, and eighteen students were enrolled.

Charles McGrath, who had been Dairy Instructor from 1 July 1898 and had worked long hours and given dedicated service, resigned in 1906. He was later to become Director of Dairying in the Department. He was replaced as Dairy Instructor on 11 February 1906 by Arthur Ernest James Charles King Graham from New South Wales. King later became Chief Dairy Expert (1 October 1915) and ultimately Under-Secretary in the Department. His stay at the College lasted just under three years: he left to become general manager of the Queensland Farmers Co-operative Dairying Company. Edgar Frank Youngman, an ex-student, was appointed Dairy Instructor on 5 September 1908. He was granted six months' leave of absence during 1910–11 to further his studies in Canada and Ross Mathieson from Victoria took his place.

During 1909–10 milk and cream testing examinations were inaugurated by the Department and all College students entering were successful in gaining certificates.

Horses

Before the opening of the College, H. C. Quodling, Farm Foreman, had purchased farm horses on the Darling Downs to undertake the initial land preparation work. No horse breeding was instituted until two mares from Victoria and a Clydesdale stallion, "Blackwatch", from New South Wales, winner of the two-year-old prize at the Sydney Royal Show, were bought in 1900.

In 1905 Mahon stressed the need to continue horse breeding at the College.

With regard to horse breeding, after many years of experience and careful observation, I have come to the conclusion that there are but two classes of horses that will produce the animals we

require, viz. the active draught stallion with good head, long rein, a thick low breast, with strong flat bone: this class of horse mated with selected mares, would produce a class of horse suitable for our own use and export. The hackney, the coacher, or buggy horse can be produced from a thoroughbred sire: any departure from this course must eventually result in failure.

During 1905–06 a new Clydesdale stallion, "Prince of Pinegrove", was purchased in Melbourne and used on College mares and to service mares brought to the College. In 1907 a further nine young draught fillies were purchased at Maryvale on the Darling Downs, for use as brood mares. By 1909 the College had twenty-four brood mares and the progeny of "Prince of Pinegrove" were turning out well. Mahon said, "A good man is needed to care for the brood mares as several aborted due to careless handling".

A pair of mules from Buaraba Station, the first of two succeeding teams, were acquired in 1899 to carry mail to and from Gatton and later to pull the "drag" to the railway siding and for cricket matches and church services.

Sheep and wool

In 1900 a flock of 200 Merino sheep was acquired for crossbreeding with Romney and Shropshire rams. The sheep proved useful in keeping down weeds in the maize and on fallowed land. The Shropshire ö Merino crossbred proved better than that produced in a Romney \times Merino cross. The crossbreeding work was severely upset in 1904–05 by raids by neighbouring dogs and was later abandoned. However, the crossbred lambs produced were so good that Mahon predicted a bright future for this enterprise east of the Main Range. He suggested that wool classing should be taught and that students should attend the wool and sheep sales in Brisbane.

During 1908–09 a few purebred Lincoln sheep were acquired for educational purposes but in 1910 Mahon felt it necessary to reintroduce sheep husbandry. The College was fortunate in having a multi-skilled man in James Carew, the Horticulturist, who also was a qualified wool classer, and in 1911 students of the wool classing course were taken on a trip to the Talgai West holding on the southern Darling Downs to see the shearing.

During the 1902–03 year the herdsman, J. Meehan, was allotted the work of teaching butchering to the students so that the College could use its own meat.

Pigs

No record has been found of the source of the supply of the early pigs to the College piggery, but on 1 July 1898 there were 98 pigs under the supervision of A. Cullac. Mahon made the piggery unit a most effective College teaching and livestock sales centre. A new piggery, to house 160 large and 250 small pigs, was built to the most modern design during 1898–99, and feeding experiments were soon in train.

Comparisons between natural grazing, boiled mangolds plus kitchen swill, and barley grain plus boiled mangolds showed the last-named regime to produce the best gain, and in a later experiment boiled barley performed better than ground barley in a ration.

Injections of new blood occurred fairly frequently, as mentioned earlier, and 170 purebred pigs were sold during1900–01 for breeding; they included Berkshires, Tamworths and Large, Middle and Small Yorkshires.

Several crossbred pigs, surplus to the College needs, were also disposed of satisfactorily. Crossbreeding trials had shown that the Berkshire \times Middle Yorkshire cross was the earliest-maturing and most economic bacon producer. By the year 1903–04 the demand for purebred pigs was four times greater than the College supply.

After the introduction of British Black pigs by Mahon in 1910, the British Black \times Berkshire cross proved the best bacon pig.

Bacon curing had been introduced into the foundation courses and was continued throughout Mahon's time. A special building for the purpose was erected from old timber in 1900.

Poultry

Poultry yards were built in late 1900 and during the 1900–01 year a number of valuable fowls of the best breeds were imported to establish the poultry section. William Hindes was appointed Poultry Instructor and during the 1902–03 year dealt with breeding, crossbreeding, the use of incubator and the art of caponising.

Egg-laying records were kept for the thirteen breeds for six months, Buff Orpingtons laying an average of 93 eggs per bird, fallowed by the White Leghorns with 92, Brown Leghorns with 89, and Black Orpingtons with 86. The diet was pollard in the morning and wheat grain at night, with green lucerne or cabbage leaves at midday. During the 1903–04 year 109 birds for breeding and 103 settings of eggs were sold.

Many of the College birds won prizes at the Brisbane show.

On 1 July 1904 the first egg-laying competition was staged, using sixteen pens to house the entrants—fifteen competitive pens, including seven from New South Wales, and a non-competitive pen from the College. The competition, extending over nine months, was won by E. T. Griffiths of Waratah, New South Wales; his pen of White Leghorns laid 938 eggs. The College non-competitive White Leghorns laid 915 eggs, the next-highest figure. The egg-laying competition continued each year to well beyond Mahon's term, and had a great bearing on the improvement of Queensland's poultry industry.

During 1907–08 a few turkeys and ducks were added to the flock but there was little demand for them. During 1910–11 some more stud birds, selected by Mahon, were imported from Scotland.

Apiary

A small apiary was established in mid-1900 under the care of R. F. N. Quinn, the officer in charge of the Mechanical Department. At first the yield of honey was excellent, but as clearing of the College ground progressed the access to eucalypts lessened and other

sources of pollen probably lucerne, were used. On Quinn's departure, the apiary came under the control of William Hindes, the Poultry Instructor.

When livestock judging competitions were held at the Royal Brisbane Show, College students won all the prizes during Mahon's principalship. This success gave him much satisfaction. From when he took control of the College to a few months before his death, 2165 purebred animals were sold, and during the last seven years (the duration of the whole history of the poultry section) 851 purebred fowls and 515¹/₂ settings of eggs were delivered to buyers.

The College orchard and vegetable garden

H. W. Gorrie had developed an excellent orchard and vegetable garden and had beautified the College grounds before his death in February 1900. A. H. Benson, Fruit Expert in the Department of Agriculture, who had reported on the condition of these ventures, then came to the College. He enlarged the orchard and undertook a severe pruning programme and cyanide treatment to control San José scale.

E. H. Rainford, Departmental Viticulturist, established a vineyard of three-quarters of an acre on the banks of Lockyer Creek and a further two acres on the shallow sandy soil on the College hill. S. Voller, Assistant Instructor in Fruit Culture in the Department, established an olivetum on the hill beside the main building. C. Cole, a nurseryman from Richmond, Victoria, became Horticulturist on 22 March 1900, but left on 31 August 1901. G. Jackson, an ex-student, took over the vegetable section during 1902–03 and, with the installation of irrigation, produced a plentiful supply of vegetables for College use; Voller supervised the orchard till James Carew, the gardener, was appointed Horticulturist on 14 June 1903. He took over the orchard, vegetable garden and vineyards. Such were Carew's vitality and accomplishments (he held a wool classing certificate) that he added lectures in wool classing to his duties during 1908–09.

During 1903–04 the first serious attacks by the Queensland fruit fly on the stone fruit and, to a lesser extent, the mandarins occurred, and the stone fruit had to be picked early and made into jam or stewed fruit. The fruit fly was to remain a major pest.

By 1905 excess vegetables were being grown by Carew and the students, thanks to liberal dressings of stable manure and the use of irrigation. The surplus was disposed of to the Leper Station at Dunwich and to private homes. In that year flying foxes made their first raids on peaches and figs and such raids continued for some years. Shooting had little effect.

Pests were also building up in the gardens and spraying with resin-caustic soda-fish oil and baiting with Paris green were introduced, as well as tobacco water (nicotine), sulphur and lime. Cyaniding the citrus trees was carried out. The bean fly *Agromyza phaseoli* made its first appearance.

Henry Tryon, Departmental Entomologist, visited the College for some time to deliver lectures.

There was some shortage of water for irrigation and Mahon made a public plea for weirs on Lockyer Creek, a cry that was not heeded until the late 1920s. To counter changing consumer tastes a large consignment of vegetable seeds was obtained from Melbourne for trial in the College gardens.

The students had an excellent opportunity to learn the basics of fruit and vegetable culture, from lecturers both from the College and visiting from the Department.

Other teaching programs

Engineering

In addition to learning the engineering aspects of building construction, road construction, the operation and care of all types of machinery, pumping and irrigation equipment, students were encouraged by James Lyle, the College Engineer from 1906 to 1911, to study for certificates engine drivers and boiler attendants (issued under the Shop and Factory Acts) and in 1906 thirty-three students passed the examinations. Lyle introduced lectures in elementary physics to assist the course and suggested that working models of engines be obtained—a request that was later granted.

By 1911 Lyle was able to report that nearly all the older students leaving the College held cerificates in steam-boiler attendance and engine driving.

Chemistry

Apart from basic courses in inorganic chemistry designed by J. C. Brünnich, the practical chemistry courses were closely allied to field work.

The first analysis carried out was for the Department of Agriculture, on soils of the Departmental Experiment Farm at Redland Bay. The practical work for the students started with a complete analysis of an average sample of Queensland milk taken over a three-day period; Brünnich said he presumed it to be the first exhaustive analysis of Queensland milk. It was taken to the third decimal place, and included a separate analysis of the mineral content of the ash. The results were published in the annual report of the Department for 1898–09, pp. 20–21. Analyses of College soils from the hill and the alluvium on the creek bank followed.

Brünnich was transferred to head office in Brisbane from 1 January 1900, his duties being taken over by the Science Master, P. Sutherland, and the Assistant Chemist, F. Van Nott. Soil for potato experiments, numerous fertilisers, bones, filter-press cake from the sugar mills, stable compost, and maize used for silage making were analysed by them, working in conjunction with Brünnich.

Both Sutherland and Van Nott resigned, and Elliott Henry Gurney, Chief Assistant Chemist of the Department of Agriculture, New South Wales, became Natural Science Master at a salary of £300 per year, plus quarters (£40). Gurney cast his lectures and practical work "at a lower level than Universities, where the classes are composed of young men of higher educational attainments". He impressed on his classes the need to acquire a knowledge of the mechanical and chemical analyses of soil, the plant food requirements of different crops, and the composition and use of artificial manures. He pointed out the scientific principles taught in the laboratory that had been adopted on the College farm. He analysed the water from Lockyer Creek, finding it hard, with a high content of magnesium chloride. Permanent hardness was high. Gurney pronounced the water satisfactory for domestic and stock purposes, but said that with heavy irrigation use, particularly in dry times, it would cause soil structural problems—a prophecy later fulfilled. He pointed out that the normal heavy summer rains would leach excess chlorine and magnesium from the root zone.

On 1 July 1908 Gurney was transferred to the Departmental laboratory in Brisbane to be replaced by A. F. Gode, but he continued as a visiting lecturer until his successor arrived. On 1 November, 1909 W. C. Ellard became Science Master. He introduced geology and bacteriology, the latter subject fascinating the students, but found that in a number of cases their neglected primary education made it impossible for students to advance in science.

English and mathematics

P. M. Pitt, who handled English and mathematics, also conducted the College entrance examinations. He continued to have trouble rationalising the courses for students of mixed ages, and especially of varying levels of primary education. In 1906 the entrance age was raised to a minimum of seventeen years to encourage greater motivation.

In June 1903 Pitt wrote despairingly:

As many of those who join us cannot spell correctly, and have a very vague knowledge of the meanings and uses of words in common use, it may therefore be seen that it is absolutely impossible to effect much improvement in the short time at my disposal. Moreover...however much they need it, lads over fifteen years consider such elementary work as spelling, etc. to be "beneath their dignity" and no force or encouragement that may be brought to bear upon them will effect much improvement. I do not see, considering the number of subjects of a more practical nature with which we have to deal and the limited time at our disposal, how much more time can be devoted to the subject of English nor do I consider it fair to ask us to take up elementary work which should have been taught elsewhere.

In 1910 Pitt finally eliminated English composition from his course and replaced this with lectures in business correspondence and bookkeeping, and methods of acquiring land under the Lands Acts. However, his class and field instruction in mensuration and surveying were greatly appreciated by the students.

In 1904 four bursaries were offered. They provided free accommodation and tuition to those who passed a special bursary examination embracing fifth class standard in the State schools in the subjects of writing, arithmetic, English composition, geography, and elements of agriculture. Textbooks that were recommended included Professor Tanner's three dealing with principles of agriculture. The bursars were excused from other entrance examinations.

Visiting lectureships

Veterinary science

The College did not have a veterinary surgeon on its staff during its administration by the Department of Agriculture and Stock. The Department provided a visiting lecturer who travelled weekly to perform what duties were needed. Wilmot Clifton Quinnell, M.R.C.V.S., lectured on domestic animals and anatomy and physiology, with demonstrations on conducting post mortem examinations, bandaging unsoundnesses in horses, horseshoeing, bandaging and general handling of animals. Any diseases recurring in College animals were demonstrated to students and treatments were given, including preparation of drugs and ointments. The College dairy herd was subjected to the tuberculin test.

In October 1900 four foundation students, Messrs Redmond, Anderson, McIlwraith and Webb, presented themselves for examinations in animal anatomy and physiology held under the auspices of the Brisbane Technical College, and all passed, three with credits.

In January 1904 A. J. Cory replaced Quinnell as visiting lecturer in veterinary science and was himself succeeded by George Tucker in 1907. He was followed, in 1911, by Adam McGown, who had to handle a severe attack of strangles amongst the horses.

Botany

In 1899–1900, early in Mahon's time, Philip MacMahon, Curator of the Botanical Gardens, visited the College to lecture students on economic botany and horticulture. Peter Sutherland, before his resignation, encouraged students to make a private collection of native grasses during their holidays, credit being given to them for this work. But it was J. F. Bailey, Assistant Botanist to his father F. Manson Bailey and later Director of the Botanic Gardens, who gave continuity of instruction for some eight years with lectures, demonstrations and field excursions that were much appreciated by students. The botany lectures became part of the science course under the new Science Master, also housemaster, W. C. Ellard, in 1909.

Miscellaneous lectures

The medical officer in Gatton, initially Dr MacDonald, began a yearly series of lectures and demonstrations in first aid to the students. (In late 1898, an outbreak of scarlet fever caused the cessation of general College instruction for a period of six weeks.)

Popular lectures were given by visiting specialists as the opportunity arose; for example, Mr Cox, M.I.C.E., spoke on artesian waters and well-boring, and Mr Worboys lectured on how to make farming pay.

Teachers' schools

An innovation during the 1904–05 year was the inauguration of short courses for teachers, midsummer and midwinter, of ten to twelve days' duration. Sixty teachers came from all parts of the State, and the scheme was a great success. Teachers returning to their schools

were soon telling the local public and schoolchildren about the treatment of animals for milk fever and blackleg and the testing of milk and cream.

These schools continued. An obvious development was the establishment of school experimental plots of grasses and fodder plants to demonstrate suitable varieties for local planting, the forerunner of the School Project Clubs of later years.

Examinations

John Mahon introduced external examiners into the examination system in 1900 to allow an unbiased appreciation of College teachings, especially in relation to the two main aspects of the College training—farming and dairying. The first two examiners were A. Moffat of Radford (farm work) and Frank McCaffrey (dairying). All examination results were published in the *Queensland Agricultural Journal*, together with the external examiner's comments.

Study had been reduced to one hour in the evening, following the early complaints of the foundation students, and it was conducted under the supervision of one of the teaching staff.

On 30 June 1900 the first ten students graduated with a Diploma in Agriculture. These included seven students who had completed the full three-year course, and three who had completed the requirements in two years (these are marked *). These first diplomates and their subsequent occupations were:

- Albert Edward Anderson-Bureau of Sugar Experiment Stations, Bundaberg
- Charles Barth—farming at Clifton
- Percy Mollineau Bayley—managing the Pittsworth Cheese Factory
- Thomas Francis Bowler*-dairying at Bangalow, New South Wales
- Andrew John Conachan*—grazing at Kabra via Rockhampton
- Frank Lloyd Jones*—farming at Childers
- William A. McIlwraith—farming at Laidley
- Angus McKinnon—farming at Gowrie, Darling Downs
- Frank Hendy Palmer—farming in the Fassifern district
- Edward James Redmond—farming at Bundaberg.

These young men were the first of numerous graduates who, with the endorsed seal of the College diploma, were to make their way in the world. They were the product of a training outlined by Mahon on 30 June 1903:

The College is furnishing a liberal and thorough practical education to the students within its walls, and also disseminating by correspondence knowledge on various matters in connection with products raised from the soil, breeding, feeding, and raising livestock, etc. of inestimable value to this State...every branch of work in connection with the cultivation of the soil is receiving the best attention, and is being taught by competent officers. This includes agriculture in all its branches, both practical and theoretical, backed up by theoretical and practical chemistry, and experiments carried out on the farm, together with an up to date system of bookkeeping. The horticultural department comes in for a large share of attention, included in which are fruit growing and vine culture. Two hours per week are devoted to botany, and it may thus be seen that the students are made acquainted with the habits and growth of the different varieties of plant life. Dairying, in all its branches, is given the attention which I consider necessary to enable students to work their own dairies or to take the management of

factories or creameries. The methods of breeding, feeding and raising livestock are backed up by lectures and practical demonstrations by a qualified veterinary surgeon. Pig raising, with bacon curing, is also a branch of College work, and being of very great importance, is given the necessary attention. Bee keeping and poultry raising are now carried on here on a reasonably large scale, or...to such an extent as to enable students to acquire the necessary knowledge to undertake the business themselves. Sheep breeding on a small scale...blacksmithing, carpentry and engineering,...english, arithmetic, mensuration and land surveying and farm bookkeeping are given a good deal of attention. In fact, all matters from which young men going on the land are likely to derive benefit are carefully considered by myself and the teaching staff and when a student has made rapid progress in class work and has acqired a knowledge sufficient to fit him for a higher division, he is immediately transferred to a class in a more advanced part of the College teaching and in which by his careful study and energy, he has fitted himself to take part. There is no thought of turning out scientific men, but no effort is spared in aiding the development of men who will do credit to the institution as advanced agriculturists.

In 1902 the Principal's gold medal was won by C. Stumm. He kept in touch with ex-students, following their careers and corresponding with many. In 1905 an Old Boys Union was formed, meeting at an annual dinner in Brisbane during the Royal National Exhibition week. Students who had left the College up to 30 June 1910 numbered 453; the records of the subsequent careers of most of these are listed below:

- Engaged in farming 241
- Dairy work 22
- Overseers sugar plantations 4
- Pastoral pursuits 36
- Overseers sheep and cattle stations 3
- Fruit farming 31
- Deceased 10
- Known to have left the State 8
- In attendance less than six months 37
- Expelled 11
- Unaccounted for 29

In July 1911 the Hon. James Tolmie (Toowoomba), the newly appointed Minister for Agriculture and Stock, requested two school inspectors (Messrs A. S. Kennedy and W. H. Smith) and two staff members of the University of Queensland to undertake an inspection of the College in order to ascertain its "exact educational value", because until that time there had been no minimum educational standard for admission. (Minister's letters on file AGS/N 208, Qd. State Archives) (Actually, there had always been entrance examinations, supervised by P. M. Pitt, the English and Mathematics Master, but the standard of such must have been low because he and other members of the staff continually complained that the lack of primary training of the lower echelon of the enrolling students made instruction of the better-qualified most difficult to ensure.)

The inspectors made various recommendations, including the institution of an entrance examination of minimum standard, replacement of the system whereby students did class work and field work in alternate weeks, the holding of monthly examinations, an annual inspection of the College, and the appointment of external examiners for the final year of the course. (John Mahon had already introduced external examiners for farming and dairy work.)

The Professor of Chemistry (Professor B. D. Steele) and the Lecturer in Physics (T. Parnell) at Queensland University reported that the students showed "lamentable ignorance in these

subjects; and that while the furnishings of the laboratory (benches, etc.) were adequate for the small amount of work done, even that could not be done efficiently unless there were additional equipment suitable for teaching elementary science". (Black, 1976)

Despite the criticism of the teaching at the College by this Committee, students who had received instruction during Mahon's regime were to play a significant role in the general improvement of agriculture and in community organisations in the next forty years. They were to become leaders especially in animal breeding, dairy factory management and agricultural extension, until the new graduates from the universities had had sufficient experience in the field to step into their shoes.

The first graduate from the University of Queensland to become Director-General of the Department, A. F. Bell, achieved this honour on 1 July 1947. The first Queensland Agricultural College diplomate to obtain his University degree in Agricultural Science and then become Director-General was Alan A. Ross, as late as 1976.

Visitors

The College had more than one thousand visitors a year in its early days, all eager to see how it was run, the standard of its work, the prospects of a sound education for their children, and the general tone of the institution. Visits had to be confined to certain days to prevent interference with classes and practical work.

As regards the tone of the institution, Mahon established a good rapport with the students. He remedied the mistakes of the closing days of the foundation year by providing social outlets in sports and other activities and a sympathetic but firm response to the students' "boyishness", and encouraging attendance at church services and correct behaviour towards others.

In one report Mahon commended the general conduct of students but he regretted...

the great lack of Australian students of reverence for their parents, their elders, superiors and their church. This fact is more noticeable when the Queensland lads are brought into comparison with young men who have been reared in England, several of whom have gone through a course of training at this institution. [There were six from England, one from Scotland and one from Jersey Island in 1910.] The English lad gazes in amazement on the Australian boy when the latter speaks of his parents, naming his father and mother respectively as my "old man" and my "old woman"...such utterances to say the least of it, have not the effect of elevating the dignity of our young fellows in the eyes of those who have travelled about, and who pride themselves on their mode of discourse. I consider the matter is due to the parents allowing their children too much freedom in their early training.

John Mahon's death

John Mahon died on Christmas Day 1911 at the age of forty-nine years, and by his death "the agriculturists and the State of Queensland lost a valuable stalwart". (E. G. E. Scriven, *Rep. Dep. Agric. Stk*, 1911–12)

Mahon had sought to turn out practical agriculturists and to create an efficient dairy production and manufacturing industry. He was acclaimed by the rural community and Members of Parliament on both sides of the House. In his thirteen and a half years as Principal Mahon served under nine Ministers, without a public rebuff. The Queensland Agricultural College has dedicated the John Mahon School of Food Technology to his memory.

The winds of change

During Mahon's absence from 7 March to about 3 December 1909 to purchase livestock in Europe, Harold Cecil Quodling, Instructor in Agriculture at the head office of the Department of Agriculture in Brisbane (the original farm foreman), was installed at the College as Acting Principal. Surveying the College scene in his new capacity, Quodling saw that some improvements were needed: a new source of fuel, as practically all the timber had been cleared from the College grounds; a larger water supply; introduction of a septic system; a drainage scheme for the dairy; an up-to-date dairy; a bacon curing room; a wool classing room; the introduction of a course in saddlery and harness making; the sale of all grade cattle and the maintenance of a purebred herd; and more emphasis on the control of nut grass.

On Mahon's death, Quodling became Acting Principal again on 1 February 1912 and made some important suggestions with regard to education. The College had trouble with inadequate entrance standards and too many "practical" students, causing the College to have two groups based on academic ability and a third group of older students coming for special instruction. He said:

No diploma looms in the distance for those who drop the more strictly scientific subjects. The College should look for its supply of students from the present High Schools, where a training in elementary agricultural science might be added to the curriculum, and a number of bursaries given each year. For those who propose entering the College from other schools some technical training, equivalent to that obtainable at a high school should be insisted upon. To meet the requirements of the "practically" disposed youths who may not be equipped with a primary education above a certain fixed standard, it is suggested that the case would be met by a properly equipped farm continuation school where educational facilities existed. Here, the instruction would require to be such as to admit of grading up to the College standard by a qualifying examination. A probationary period should be made compulsory, nothing is to be gained by attempting to train labourers. It is quite possible that a proportion of "special" students might be drawn to the College from such a source...An added interest would be taken by students in their lectures here, if prizes, including one for "dux" were made available.

Unfortunately, the arrangement of the dormitories does not at present lend itself to, nor admit of, students studying systematically. This in itself is regarded as a serious drawback. With an improved standard of education, a certain number of students, who have passed through their full course here, would be better qualified to work towards some higher degree in Agriculture, such as Bachelor of Agricultural Science, and, should it be practicable, it would be a fitting goal to work to, especially if scholarships were made available in various parts of the world (until such time as our own University admits of such), where Queensland might look forward to having her sons trained with the object of supplying scientists for every branch of the services.

Quodling also advocated obtaining more visual aids—a collection of labelled grasses and economic plants, insects, anatomical specimens, specimens of rocks and soils, models and diagrams of agricultural interest, a lantern outfit and slides, standard textbooks, the binding of publications, and meteorology. He stressed the need for systematic experimental work

adaptable to Queensland conditions in animal husbandry and nutrition, saying, "A trained mind is the only one to succeed."

During 1911–12 the dairy building was converted into a powerhouse and a new dairy was provided, including a meat house at the back of the dairy, with facilities for bacon curing. Otherwise the status quo of the College was maintained until the new Principal, John Brown, B.Sc., took up duty on 28 January 1913, having been appointed to the position on 14 November 1912.

The College under John Brown

John Brown's first two months were taken up with "a minute enquiry into the past history and existing organisation and position of the College and the College farm with a view to determining the best policy for their future guidance and control". He deplored the "open house" for entry by students with poor primary training, the lack of a biological laboratory, microscope and germinator, and lack of any special appointments for research. New regulations were framed and submitted.

These while providing a strictly practical course of work and instruction for students unable to benefit by regular science studies, at the same time systematise the work and offer a definite objective in the form of a diploma to students taking the regular course. The institution of conjoint courses for State Farm apprenticeship and College training is also to be noted as a progressive step both from the point of view of raising the status of the College and of making more thorough the training for agricultural pursuits available to the youth of Queensland. Substantial reasons have also been advanced for the affiliation of the College to the University of Queensland, and the recognition of certain of the College courses as qualifying pro tanto for a Bachelor of Science degree in Agriculture. [This was to come in 1927.] It is hoped that some action will be taken shortly. (Brown, John, *Rep. Dep. Agric . Stk*, 1912–13)

A department of saddlery was established under the tuition of R. Pusey, but Brown decided to restrict the time given to "industrials" (carpentry, blacksmithing, saddlery and engineering) to allow for more practical farm work.

John Brown was, however, impressed with the dairy course and the new dairy facilities, although manufacturing was delayed by lack of raw material, a result of the drought. Regulations for a two-year course leading to a Diploma in Dairying were prepared in anticipation of an increased enrolment in 1914. So great was the demand for dairy technologists, however, that few dairy students stayed for the full course, instead entering the industry with what training they had.

Twenty-five animals had been found to be suffering from tuberculosis and were destroyed, severly depleting the herd and milk supply. Brown suggested the breeds be restricted to Jerseys and Holsteins, with the disposal of the Shorthorns, and that the Ayrshire stud be located at the Warren State Farm. Thomas Jones, manager of Warren State Farm, was sent to Europe and purchased six Jerseys and six Holsteins for the College herd, as well as other animals for other institutions.

With the dry year and the shortage of cattle, plus the fact that the old dairy had been taken over as a powerhouse and the new dairy was not quite complete, E. F. Youngman, the Dairy Instructor, took students on visits to several dairy factories to learn their manufacturing
methods. He resigned in August 1913 to become manager of the Atherton Co-operative Butter Factory and was replaced by W. G. Lee, a diplomate from Hawkesbury Agricultural College. With the inauguration of the new dairy, outside suppliers were required to deliver cream on alternate days to provide enough raw material for the courses.

The College Engineer, Thomas J. Barratt, had been appointed on 1 July 1912 after a career as a marine engineer travelling the old world routes. He had a busy time setting up the old dairy as a powerhouse, fitted with a suction gas plant, connecting a new turbine pump at the creek to service the old main supply line (which because of its deteriorated condition was replaced in 1914), placing a portable motor on the old carriage of the Hornsby oil engine to supply mobile power for chaff cutting, the circular saw and the ensilage cutter, and repairing the old fire engine. He said, however, that it was out-of-date and could not cope with anything greater than a bonfire. He found the pumping equipment insufficient to handle the normal College and stock water requirements as well as the enlarged scheme of irrigation set down by the Principal.

The Farm Foreman and Experimentalist, Alf. E. Gibson, who was to become Director of Agriculture in 1933, continued the usual cropping programme to show students the different crops. He also instituted a few experiments with varieties of wheat and clover and cultural and manurial trials with lucerne. As the wood supply for the College was dwindling, Gibson was relieved when an "electric exploder" was purchased, with a flexible cable for electric shot firing in conjunction with high explosives: logs that in the past had defied the efforts of the maul and wedges could now be dealt with cheaply and easily.

The giant step forward in the farming calendar was the purchase in September 1913 of the "Big Four" tractor manufactured by the Emerson-Brantingham Co. "It was considered that the relatively high cost of feed for horses and their reduced capacity for continuous active exertion in a hot climate, together with relatively high rates for the services of teamsters, might turn the scale in favour of this form of motive power!"

Between 1 September 1913 and 30 June 1914 the "Big Four" ploughed 939 acres at an average cost of 7s 6d per acre. In measured tests with 8-inch discing of stubble ground, the cost worked out at 4s 6d per acre, compared with ploughing with horse teams pulling a double furrow disc plough costing 10s 0d per acre. The great advantage, apart from the decreased cost, was the ability to prepare a large area of ground in a short time.

But life was not meant to be easy with the new machinery. On 1 February 1915 the vaporiser in the suction gas plant burnt through and the whole plant had to be dismantled and repaired, throwing the power supply out of action. The "Big Four" tractor had to be called in to drive the main dynamo, depriving the farm of its services for thirty-eight days when ploughing was in full swing!

With the increasing work at the College, four ex-students were appointed as assistants: Charles Shearer Clydesdale assisted P. M. Pitt, and later became Experimentalist and finally one of the foremost agricultural advisers in the Department of Agriculture and Stock; E. Cowley became assistant to the Experimentalist; C. Culley became assistant to the Engineer; and A. C. Francis became assistant in dairying.

A two-week course for forty farmers was held towards the end of June 1914.

Brown was anxious to develop extension work from the College. He thought the College was notably weak in this area and suggested some of the staff (the outside staff) take information out to the farmers, starting with crop growing contests amongst junior farmers, an advisory board of agriculture and an agricultural bureau similar to that in southern Colonies. He wanted a botanist, two experimentalists (one for stock and one for crops), an entomologist and a veterinary surgeon resident at the College as soon as these could be provided.

It struck Brown as altogether remarkable that sheep, which in the other States and in New Zealand had been growing steadily in importance and favour in the closely settled farming district, had no place in the scheme of farming here. He was able to obtain sanction to obtain Lincoln Romney Marsh and Border Leicester rams to mate with Merino ewes for fat lamb raising experiments. These were run on the fallows and on nut grass until the fencing of the paddocks was completed. Ewes produced from the Lincoln \times Merino cross were then mated with Dorset Horn, Southdown and Shropshire rams.

A start was also made with systems of seed selection and multiplication with a view to supplying farmers, and a two-storey building for the purpose was erected. Some plant breeding was also initiated and the first rotation experiments started with two- and three-year rotations, with accompanying soil analyses.

To motivate students (as suggested earlier by Quodling), the following awards were made:

- the Principal's gold medal for dux of the College 1914—F. Caine;
- gold medal for ploughing, donated by the Principal and the Agriculturist— L. Brimblecombe;
- gold medal awarded for stock judging—L. Brimblecombe (killed during World War I);
- gold medal awarded to dux of second-year students-D. Downs;
- gold medal awarded to dux of first-year students—J. B. Manuel.

Having initiated all of the above changes and suggested others, Brown resigned on 25 May 1915 to take up an appointment in New Zealand "making it incumbent to send Mr. G. B. Brooks to Gatton for the first three months of the year as Acting Principal and later as lecturer during the Farmers Winter Courses". (H. C. Quodling, *Rep. Dep. Agric. Stk*, 1915–16, p. 75)

E. G. E. Scriven, Under-Secretary, wrote:

The resignation of the Principal...after being in this State for two years only, has caused an inconvenience that is not to the welfare of the College insofar as that the tenor of education there must necessarily be much disturbed...The last year has shown the lowest attendance of students, the average number being 23 in all, including bursars. The highest number was in 1901–2, when 69 were on the roll. The inducements offered by the new scheme, initiated by Mr. Brown, under which it was hoped an older and more promising class of students from a College point of view would be induced to attend, has not been as effective as expected and the Mathematics Lecturer and Secretary (Mr. P. M. Pitt) who conducts the entrance examinations is of the opinion that the lads who came up were practically of the same standing as in former years. As regards the attendance, it may be mentioned that Gatton, in common with the Agricultural Colleges throughout Australia, is suffering from the effect of the war: none of them at the present time are enjoying the attendance of students in their full numbers. (E. G. E. Scriven, *Rep. Dep. Agric. Stk*, 1914–15)

Brooks held the reins until the appointment on 30 July 1915 of the new Principal, Cuthbert Potts, B.A., who came from the staff of the Hawkesbury Agricultural College, New South Wales. He had graduated in Arts at Sydney University in 1898 and for two years had done an additional course in mining engineering. He subsequently engaged in dairy farming at Narellan in New South Wales, afterwards serving a term as surveyor's field assistant. He was Junior Demonstrator in Chemistry at Sydney University in 1901, and from 1901 to 1915 was Lecturer in Chemistry and Physics at Hawkesbury Agricultural College, Richmond, New South Wales, where he was at times Acting Principal. (*Gatton College Magazine*, 1938, p. 72)

World War I had started in August 1914, and Potts wrote on 30 June 1916:

Owing to enlistments, the College lost during the year:

Officers: Messrs. E. F. Youngman (Dairy Instructor), C. S. Clydesdale (Apiculturist), R. Tarrant (Assistant Engineer)

Students in Residence: J. Marsland, S. Hannaford, L. Brimblecombe, J. M. Marson

Farm hands: J. Adams, J. Davidson, T. O'Keefe, T. O'Rourke, F. Reuter, J. Aherne, J. Coffey, P. Condon, G. Amy, H. Wakeham, M. Cleary.

The College had records of 179 enlistments. The final College Honour Roll, rechecked in 1940 (see *Gatton College Magazine*, 1940), read as follows:

ROLL OF HONOUR

A Roll of Gatton College Students who lost their lives on Active Service

1914–1919

Pro patria ceciderunt

ATKINSON, J. B.	FULJAMES, R. E.	POWER, N.
BAXTER, N.	GRAHAM, H. J.	PRATT, C.
BRIMBLECOMBE, L. H.	HENRY, J. W. E.	ROBERTSON, G. H.
BROWN, J. M.	HIDES, J. G.	SAUNDERS, F. E.
COFFIN, C. D.	HODGES, G. S.	SCOTT, A. A.
COWLEY, E. S.	IZDEBSKI, C. V.	SMITH, J. I.
CULPIN, C. H.	LINEDALE, W.J.	STAINTON, R. H. W.

DEVINE, P. E.	MACKELLAR, R. A.	STEVENS, H. R.
DUNN, O. T.	MARKS, H. H. S.	WADDELL, G. M.
FAIRLIE, D.	MASSEY, C. B.	WHITE, E. G.
FRANCIS, A. C.	MOLONY, K. T.	WILSON, F. G. L.
FULCHER, G. E.	O'NEILL, T. J.	

The College under Cuthbert Potts

With his background, it was not surprising that Cuthbert Potts should introduce a more scientific approach into the College courses. He stressed the importance of the classroom for teaching fundamental agricultural principles, suggesting that after graduation trained students should work under a successful practical man. With regard to a current notion that a country lad should learn under his own father the art of farming, Potts held that however successful a man may be in his management of the land he was not the man to teach his own son. Individual successful practical men seldom had the breadth of vision that was essential for a sound foundation of a profession and the son usually perpetuated the mistakes of his father. Potts urged agriculturists to engage College diplomates in subordinate positions until they gained enough practical expertise to finalise their training.

In examining the situation at the College, Potts stated that the College was primarily an educational institution whose main object was to afford a sound technical training in the principles and practice of agriculture, animal husbandry and dairying. But he said that in this the College had had indifferent success. Some of the causes seemed to be:

- 1. the policy that insisted that theoretical training should go hand in hand with manual labour on the farm—Potts felt that there should be more lectures, with farm work provided mainly for town boys with no previous farming experience;
- 2. a distinct misconception throughout the State as to the necessary educational requirements to fit a boy to enter the College course—students entered at all levels of education, mostly low, because "it seems to be considered that if a boy is not bright at school he is fit for the Agricultural College". There was room for high schools and more short courses;
- 3. inadequacy of staff—visiting lecturers were not satisfactory and more staff would allow more experimental work, etc; and
- 4. the isolation of the College in respect to other teaching institutions and the Department's agriculturists—Potts strongly pressed for an advisory board, with representatives from schools and rural interests.

Commenting on the lack of interest in agricultural education, Potts suggested that "something of the history of achievement, something of the glory of success, something of the romance of Agriculture should be incorporated in all the school books and school teaching". To encourage enrolments in the general College course, he addressed Chambers of Commerce in Brisbane, Toowoomba and Ipswich. He drew attention to the gap in a boy's education between his leaving primary school at the age of twelve to fourteen and attaining the minimum age of sixteen years necessary to enrol at the College. He suggested that the Departments of Public Instruction and Agriculture and Stock should discuss this problem.

Potts' term as Principal spanned the greater part of World War I (1914–18), when older students were listening to the call of the Empire and young lads who might otherwise have enrolled at the College were often needed on the farm to do the work that would normally have been done by those who had enlisted. Also, the aim of the College authorities to have each student enter with a higher standard of education and complete the full course for the diploma was being pursued.

The concept of an agricultural high school mooted

During 1920–21 the committee of the small College View primary school and the committee of the Lockyer High School approached Potts to see if the College could cooperate by providing training in agriculture to students who might enter a proposed agricultural section of the Lockyer High School, say, on two days a week. The basic reasons for this movement were that:

- 1. many farmers wanted their children to have a high school education but not to leave the land;
- 2. children wanting to return to the land could drop, to them, unnecessary subjects such as Latin, French and pure science and substitute agriculture;
- 3. at that time the Agricultural College would not accept students till they were sixteen years of age, so the course would act as a feeder to the College.

All local people agreed and the proposal was put to, and reported on by, Mr Riddell, Superintendent of Technical Education. A trial scheme was approved, but for some reason it was deferred. The idea was adopted in 1925, but with the high school incorporated into the College system.

Fodder conservation

Potts' period was plagued by unfavourable seasons, which caused problems in cropping. From 1914 to 1916 dry weather was experienced, followed by an excessively wet summer in 1916–17 and a wet spring and summer in 1917–18, when cultivation was difficult and weeds proliferated. Next came thirteen months of severe drought, from February 1918 to march 1919. Some College cattle had to be sent to the Coast on agistment and returned later in a rather anaemic state.

The droughts led Potts to be an early advocate of conservation of moisture in the heavy black soils. He said each foot of soil could retain one to two inches of rain, and with this knowledge (and a soil auger) the prospect of reaping a successful crop could be assessed.

Early in his administration Potts had abandoned tractor power and returned to horse teams and bullock teams "because the unlimited use of the motor tractor has largely interfered with the students' training", but he was later to admit that motor power was the answer to preparing the land quickly when needed (and an aid to the soil conservation process). Drought continued during the summer of 1919 and the maize crops, obviously failing for grain, were ensiled in a stack silo. This process was witnessed by about three hundred farmers from the Lockyer, the Darling Downs and the Coast, who then went home and did likewise. This was followed by demonstrations of the making of stack silage at the Toowoomba and Ipswich shows.

Potts also suggested that a systematic collection of statistics of future fodder requirements, conserved fodder on hand and the quantities in sight be compiled and the figures be published monthly. He published a detailed paper entitled "Fighting Drought, an Analysis and Some Suggestions". The drought broke in May 1920 and the bountiful season allowed the College to store a large quantity of hay and silage, enabling it to carry all of its stock through the dry 1920–21 year without purchase of fodder, an action forced on most of the surrounding farmers.

Dairying

The College dairying herd, which had previously been tested privately, was entered in the official herd testing scheme and performed creditably: several cows entered the advanced register, as did the imported Ayrshire bull "Netherton King George" for the performance of his progeny.

At the Royal National Show in 1918 the College gained "Champion Holstein" and "Reserve Champion Ayrshire" cow, both College-bred, and four first and two second prizes, resulting in improved sales of breeding stock. In April 1922 the College herdsman for the previous eleven years resigned to farm on his own account and Potts sought to appoint "an officer of higher qualifications who can take charge of all the stud stock at the College and undertake instruction in Veterinary Science".

During the drought years the cream supply so dwindled that the Silverwood Butter Factory at Gatton closed down and the local farmers approached the Minister to ask that the College process their output. This was agreed to and in the 1917–18 year fifty outside suppliers sent cream in, giving the students excellent practice in receiving cream, grading it and making butter. Milk for cheese making was difficult to obtain because of the use of skim milk for calf and pig feeding. With the cooperation of D. Saxelby (later an external examiner) of the Queensland Co-operative Dairy Company, dairy diploma course students were allowed to work in the Company's factory during the vacation. L. Moran, in 1916 the first College diplomate in Dairying, was sent to the Yeerongpilly laboratory to work under the Departmental bacteriologist, C. J. Pound, to obtain advanced instruction in bacteriology.

Pigs

The College's pig section continued to prosper, with the demand for stud pigs always exceeding supply. New Berkshire blood was introduced from the southern States during 1915–16; Middle Yorkshires from the Sydney Royal Show in 1917–18; and Berkshires and Tamworths during 1920–21.

During November and December 1917 unthrifty litters were dropped, then weakling litters; finally half-developed pigs were aborted. The trouble was traced to formalin from the dairy

factory, used to spray flies then being washed into the receptacle in which the buttermilk for the pigs was collected. The piggery was reconstructed during 1917–18.

Sheep

The sheep section, and especially the fat lamb experiments, suffered during the vagaries of the seasons: drought, and then the very wet year 1915–16, when rank growth gave poor nutrition and encouraged stomach worm infestations and an extensive growth of Noogoora burr, which damaged the wool. The Border Leicester \times Merino cross lambs were still attractive. It was decided that artificial pastures and forage crops should be used for sheep grazing.

Horses

The College's Clydesdale stud was continued, with the stallion "Prospero" from Hermitage taking the place of the very prepotent sire "Lord Cellus", but the day of the farm tractor had dawned and the demand for horses declined.

Extension

Potts was a keen advocate of agricultural extension, especially by College staff. The annual winter schools for farmers continued as in former years, but with the withdrawal of the one-third rail concession for travel the numbers dwindled and it was considered that the schools should cease. At July 1923 a total of 199 farmers had attended winter schools at the College.

In February 1917 a group of twenty Dairy Inspectors of the Department of Agriculture and Stock attended the College for demonstrations in silage making, cream grading and instruction in the interpretation of the Acts. In the same year twelve Crown Land Rangers attended to learn about silage making.

Since the inception of the College, 712 teachers had attended teachers' schools to receive instruction in a variety of agricultural fields.

Training for returned soldiers

To settle returned soldiers on the land as soon as possible after their discharge, Potts had discussions with the War Council in 1916 regarding the availability of land, the selection of suitable sites, the areas required, the access to markets, the supply of building materials and courses of training. He suggested the College provide short courses in training as well as build up a supply of nucleus poultry stock for the returned men to start their enterprises.

In June 1916 the first five returned soldiers arrived to take courses, four in poultry raising and one in butter making. During 1917 new poultry pens were erected, further away from the College buildings, on a site east of the Farm Square comprising ten acres with an

east-north-east aspect. They were supervised by Mr Harwood, who took charge of the section in April 1917. There were twenty breeding pens erected for returned soldiers' work, as well as a 20×30 ft incubator house containing two College incubators and a Mammoth incubator of 3000-egg capacity lent to the College by the Lands Settlement Repatriation Committee, then two brooder houses, each of four compartments, to hold eight Newtown brooders of 500-chick capacity each. Alongside were 120 single laying pens for competition purposes (the six-pen group failing to actually identify the individual laying performance of each bird).

The immediate object was to raise 4000 pullets (that is, 12 000 eggs laid down in incubators for returned soldiers in the initial season). Returned soldiers at the Mount Gravatt settlement were also supplied with stud cockerels.

To further enhance the poultry training of the general public, the returned men and the students, the first of several annual poultry conferences was held at the College in August 1917. It was organised by Mr Beard (Poultry Expert for the State) and Mr Harwood. These conferences were very successful and kept the College in touch with the industry. Some 150 people attended in 1919 and derived great benefit from discussion of matters of common interest. Models of full-sized poultry pens were displayed at the Royal National Exhibition.

Altogether 139 returned soldiers attended the College before June 1919, engaging in courses ranging from three months up to two years, but mostly less than a year. The greater number undertook poultry raising instruction, but dairy farming, dairy factory work, general farming and pig raising were also selected. All the returned men were fully motivated, anxious to learn and to carve out a future career.

The year 1921 saw the close of the Commonwealth general scheme of vocational training for returned soldiers. The Mammoth incubator was sent to the Soldier Settlement at Mount Gravatt. Potts suggested a "broiler" industry be developed, or that farmers should caponise young cockerels "to keep their tender, luscious flesh up to eighteen months of age".

Costs connected with the College

Academic record

Despite the slight increase in enrolments of more highly qualified students at the College during Potts' time, the total output of diplomates was small, only 33 in eight years. They are listed below.

December 1915 Queensland Diploma in Agriculture (Q.D.A.): J. B. Manuel, L. Strachan, E. J. Park. The first Queensland Diploma in Dairying (Q.D.D.): L. Moran

December 1916 Q.D.A.: E. H. Fabian Q.D.D.: G. Wilster

December 1917 Q.D.A.: E. H. Gillingwater (He enlisted immediately after graduation.)

December 1918 Q.D.A.: R. W. Astill, H. Benson, A. D. Brightwell, L. J. Landells, J. L. McGrath, H. Park Q.D.D.: W. H. Jackson

December 1919 Q.D.A.: G. W. M. Nicholson (dux and gold medallist), E. C. Bennett, V. Tighe Q.D.D.: T. Herbert, R. K. Hodges

December 1920 Q.D.A.: J. A. Tait Q.D.D.: N. A. Black, W. B. Homemann, J. N. Irwin

December 1921 Q.D.A.: D. S. Hall, W. R. Straughan, A. W. McLuckie

December 1922 Q.D.A.: S. F. Murphy, K. V. Henderson, L. C. J. Clifton, T. Y. Bonar, K. M. Tait Q.D.D.: J. Kelsey, D. V. Ward

This brought up the matter of the cost of the College.

The costs reviewed

The expense of administering the Queensland Agricultural College was constantly in the minds of the Government, and especially of the Parliamentary Opposition. Even before its founding the cost to the public purse was a major issue.

On 15 October 1902 the Secretary for Agriculture, the Hon. Digby Denham, reported to His Excellency the Governor, Sir Herbert Charles Chermside, on the expenses of the Department. He said, as might be expected, the most costly institution connected with the Department was the Agricultural College at Gatton. "But when it is remembered how great the outlay on buildings and plant must be during the early years of such institutions, it may well be conceded that few agricultural colleges are maintained so economically." The following table shows the decline in cost over three years.

	1899-1900	1900-1901	1901-1902	
	£	£	£	
Gross expenditure	8,599	7,040	6,262	
Revenue	1,823	2,940	2,934	
Net Cost	£6,776	£4,100	£3,328	

While the cost had been diminishing, the number of students in attendance had been increasing. In 1899–1900 the number was 38; in 1900–01 it was 45; and in 1901–02 it was 69. Expressed in other terms, the cost per student, which was £178 in 1899–1900 and £91 in 1900–01, was only £48 in 1901–02.

The question of cost was again raised by Potts in his annual report for the year ended 30 June 1921. He presented a table of expenditure and receipts since 1910 (*Rep. Dep. Agric. Stk*, 1920-21, p. 25)

This showed that the total expenditure was rising more rapidly than the receipts. In commenting on this, Potts said:

It is necessary to remember that the functions of the College are threefold.

First, there is the education of students in the art and practice of agriculture and stock raising. This side of the College could never show a profit and the fees are so low that they do not even cover maintenance. This, however, is fully in accord with the general policy of the State affording its citizens a cheap education. An immediate loss is incurred, though an ultimate gain is assured. Second, the College is a station for the conduct of experiments with stock and crops. Here again, we have a section which cannot be expected to show annual profits, though results may easily be obtained which would be of great benefit and profit to the State as a whole. Third, the College is a stud farm where pure bred stock of various breeds and pure seeds of various varieties are raised for the purpose of selling to farmers at reasonable rates...this section is utilised for the practical training of students, but the magnitude of the work carried out is far in excess of the requirements for purely educational purposes...If a persistent loss is incurred, it can only be inferred that either the College is underselling the private breeder [which it was] or else that the conditions of employment and work at the College render it impossible to compete with private men [and they were, especially regarding wages].

To overcome staff shortages and reduce the expenses of conducting a large farm, Potts suggested moving the instructional side of the College nearer to the University to make use of more part-time staff, improving the teaching of subtropical agriculture to embrace crops etc. which could not be grown at the College, and serving as a nucleus around which the suggested University school could develop.

The curtain falls

The opening of the University of Queensland early in 1911, during the last year of Mahon's principalship, brought a new educational force into the Queensland system. The University was looking at the possible source of its students and Professor Steele and T. Parnell's inspection of the Queensland Agricultural College courses had a long-term objective. They found the science knowledge of the students "lamentably weak". Inspectors Kennedy and Smith sought the causes of the low academic achievements compared with the practical training, and recommended raising the standard of the entrance examinations.

In 1912 John Brown became Principal; he had ideas of raising the standard, making provision for students to proceed right through to the diploma as their chief aim on entering the College. His stay was brief, but his successor, Potts, built on his work and recognised that the gap between primary school and College entrance at sixteen years was a major barrier to continuous education and hence to tertiary status.

It was the demand from scientific bodies and far-sighted primary producers for tertiary education in agricultural science that led to continuous pressure for a faculty of agriculture to be established within the University. The Queensland Agricultural College was to be an integral part of this system. Without its land, equipment and crop and livestock resources, the cost of establishing such a faculty would be too great for the limited finances of the State, given the priorities determined by the current Queensland Government. (J. Zillman, *The Establishment of the Faculty of Agriculture, University of Queensland School of Science*, 1979)

The Scottish Agricultural Commission report Australia, Its Land, Conditions and Prospects, Blackwood, Edinburgh, 1911, p. 169 (Zillman, 1979) described the work

carried out in the agricultural colleges and the experimental stations as "distinctly disappointing".

Soon after the Inaugural Ceremony of the University on 1 June 1911, Sir William MacGregor, its Chancellor, stressed the need for a chair in agriculture and a veterinary chair; in June 1912 a committee consisting of Sir Thomas Robinson, Robert Philp and Robert Christison in London set out to obtain funds to establish a chair of agriculture. The pressure gained momentum but an unsympathetic State Government delayed its establishment for some fifteen years.

On 9 August 1916 the Senate of the University of Queensland, on a motion moved by J. D. Story, then Under-Secretary of the Department of Public Instruction, resolved:

As the question of the primary industries is closely interwoven with post war problems and a good system of Agricultural Education will be helpful in the development and expansion of the primary industries in Queensland, it is desirable the Agricultural Education should be carefully organised and developed.

A committee, whose members were Mr Crompton, Archbishop Duhig, Professor Gibson (Engineering), Mr Henderson, Professor Priestley (Mathematics), Mr Thynne and Mr Story was appointed to enquire into the matter and report to the Senate. This committee, amongst its several recommendations, stated that "Agricultural Education is a matter for State and University concern rather than private concern, and...should be closely interwoven with the State system, and with University schemes and should not be a detached and isolated branch of education", and added:

While the Queensland Agricultural College (Q.A.C.) should continue with its present functions, its role should also be expanded and organised with increased expenditure on staff and equipment so that it could meet conditions for affiliation with the University. The curricula of the Diploma courses at Q.A.C. as well as the staff teaching these courses, would have to be approved by the University. The students who would take the (University) Diploma courses would include matriculated students and those University graduates who had completed a degree in Science and who wished to gain practical agricultural training and experience for the award of the Bachelor of Science in Agriculture. If Q.A.C. was organised along these lines, it would be possible with little, if any, additional expense to the University:

- (i) To utilise the present Science courses, with suitable modifications or extensions for the University work in Science to be covered by undergraduates in the Science Department of Agriculture;
- (ii) To accept the Diploma course work at Q.A.C. as covering the practical and other requirements, in addition to the work done in the University needed for the Degree of Bachelor of Science in Agriculture.

The Senate approved the committee's report on 14 December 1917 and the Board of Faculties subsequently recommended that the Statutes be amended to allow representation from the State Department of Agriculture on the Faculty of Science. This was so that Departmental officers could be members of a committee of the Faculty of Science that would consider the recommendations of the Senate committee on Agricultural Education. The Senate agreed and H. C. Quodling (Director of Agriculture), A. H. Cory (Chief Inspector of Stock), A. E. Graham (Director of Dairying) and Cuthbert Potts (Principal of QAC) were subsequently appointed as members of the Faculty of Science.

For several years discussion centred around the desirability of issuing a Diploma in Agriculture. A Senate Committee set up in October 1918 decided that there was a public need for a Faculty of Agriculture, but no serious public demand for it, that research expenditure would be heavy and that agricultural research, if undertaken by the University, should be a prime charge against a State Department of Agriculture. The committee conferred with Potts, who agreed that while there was an urgent need, there was at present no pressing demand for agricultural education at university level. He felt that the University should create the demand. His view was that a diploma course would be the first step, but he pointed out that QAC did not have the staff to run a diploma (university) course at present.

In an interview with the Brisbane *Daily Mail* on 13 September and in an address to the Brisbane Chamber of Commerce on 28 October 1919, Potts pressed for the establishment of a faculty of agriculture and suggested that the McCaughey Bequest should be drawn on to establish it. (Zillman, pp. 38–39)

Pressure was applied by organisations such as the Farmers Co-operative Distributing Company, chambers of commerce, agricultural societies and the Australian Sugar Producers Association to establish a faculty of agriculture. In 1916 the Commonwealth Advisory Council for Science and Industry was set up, and the University began agricultural research in cattle ticks, beef nodules, prickly pear and fruit fly —all most important problems. Trained staff were needed to undertake these programmes, and the Department of Agriculture and Stock was also beset with urgent problems which needed trained staff to elucidate them.

In 1921 Messrs George and Riddell (Public Service Inspectors) were asked to investigate the status of the Queensland Agricultural College and determine the extent to which it had fulfilled the purposes for which it had been established and to ascertain, if possible, whether good results had been achieved. In reporting on their findings to the Minister for Agriculture (the Hon. W. N. Gillies) in a Minute dated 30 September 1921, J. D. Story, Public Service Commissioner, stated:

The general purposes for which the College was established seem to have been these:

- (a) To provide a systematic and practical course of training for young men in the science of improved agriculture, dairying, animal husbandry and poultry farming;
- (b) To afford students a practical training by having much of the work incidental to general agriculture, experimental agriculture, dairying, animal husbandry and poultry farming, done by the students themselves as part of their practical training;
- (c) To assist in improving the quality of the Stock throughout the State by raising pure bred stock and disposing of it at prices more reasonable than those prevailing in the open market;
- (d) To conduct experiments for the elucidation of agriculture.

With regard to these four aspects, the investigators decided:

The review of the work done, and being done, by the College and the analyses of the costs prepared by the investigators showed that the College was not fulfilling the purposes for which it was established and it was not achieving results commensurate with the expenditure.

Story then considered why the College had not been a success. His conclusions were that it had never been coordinated with the general system of State education, it was a detached fragment, it had no well-defined feeders from the primary or secondary schools, and there was an age gap between primary school and College entrance. When extension scholarships were granted from the Junior examination by the Government on 10 June 1919, only one was taken up at the College. The College had not received the support of parents and what little support there was came from the city rather than the country. The primary producers apparently did not rate it highly and experience had shown that it was not possible to combine with success the three functions, agricultural education, stock breeding and experiments, under one head in the one institution.

Story recommended that the Minister give serious consideration to closing down the College and converting a local high school —say, Forest Hill —into a rural school. A council of agricultural education should be appointed to advise the Government, and experts of the Department of Agriculture should advise on the desirability of selling in whole or in part the College's present livestock or distributing it to other Government institutions, retaining some stock for the use of a local rural school. He recommended that an officer of the Agriculture Department, an Inspector of Works and a Land Commissioner visit the College and furnish a joint report into:

- i. the possibility of cutting up the College property into suitable farms,
- ii. the practicability of removing to, and erecting on, those farms, some of the cottages at present on the College grounds (educational buildings should be retained as they might be required for use elsewhere), and
- iii. the approximate amount that might be expected to be realised if the property were so cut up and sold.

He also recommended that the Director of Agriculture confer with the Principal on whether it was necessary to retain the present farm hands and field staff.

In place of the College, Story recommended that a suitable agricultural institution be established on a site at Zillmere and that the Council of Agricultural Education formulate a scheme to provide city boys with agricultural teaching while they lived at home (to reduce costs), and to link the primary school with the rural school and the Central Technical College with the rural school, and keep this new institution in touch with the parent Government Departments and the University.

Discussion continued both in the University Senate and in Parliament as to the best method of coordinating agricultural education at all levels. After full consideration by the Government, a special committee was appointed by the Governor-in-Council to advise on the reorganisation of the College. Its members were A. E. Graham, the Director of Dairying, H. C. Quodling, the Director of Agriculture, R. M. Riddell, Inspector of Technical Colleges, and R. A. Wearne, Principal of the Central Technical College, with the Under-Secretary for Agriculture and Stock, E. G. E. Scriven, as Chairman. Briefly, their more important recommendations were the establishment of an agricultural high school and college, and a rural school for day scholars to link up with the high school; bursaries for boys of fourteen years who had obtained State and State High School Scholarships, the first twenty annually to be free of all costs of maintenance, but preference in selection to be given to State School scholarships; extension scholarships from the Junior course to a

senior standard; travelling research scholarships; instruction by correspondence; reservation of land for students who had graduated honourably; and reorganisation of the Queensland Agricultural College, by improvement of the accommodation and the erection of additional buildings.

The committee's report was approved in June 1923 and tabled in the Legislative Assembly on 13 July 1923.

In the *Queensland Agricultural Journal* for July 1923 (pp. 17–18), the Hon. W. N. Gillies, Minister for Agriculture, announced that it was intended to discontinue the operations of the Agricultural College at Gatton as it was then constituted, and, in its place, to establish an agricultural high school and college, to provide a high school education in agriculture for youths from 14 to 18 years of age. The Minister said:

The Government fully recognises the vital importance of agricultural training as being an important part of the rural organisation and land settlement policy, and it has been forced to the conclusion that the Queensland Agricultural College as at present constituted is not obtaining the best results for the purpose for which it exists. This conclusion has not been reached by the Government as it is at present constituted, but the members of the Government immediately preceding had similar views. I have, as also did my immediate predecessor, given much consideration to the problem, and an adverse report by Public Service inspectors some time ago confirmed the impression that had been formed. I have no desire to animadvert in any way upon the ideas of the Government which founded the College, and am quite ready to believe that then and for years afterwards it served the purpose of its foundation, but times have changed, and there is no doubt, for the number of students who attend and the number who graduate in comparison with the cost of maintenance, the continuation of it on the present basis is not warranted.

There is at present accommodation at this institution for sixty resident students. The average number during the past five years is forty, and the average net cost per student is £333.

The war made a difference in the number of students, and other colleges in Australia were affected likewise, but with every allowance for those circumstances the fact remains that the average annual number of students of all kinds —full paying, bursars, soldier, and other short-period students —for the past five years, and the average annual cost of maintenance each year, in the same period, does not indicate a satisfactory condition of things. Moreover, the college has departed in several ways from the original idea of a college; a large herd of the different dairy breeds is kept, far larger than is necessary for college purposes; pig-breeding and dealing is on a commercial scale, a butter factory is maintained, poultry competitions are carried out, and so on.

Several methods of improvement were considered and discussed, but without practical result, because they could not be carried out upon the lines of what is really required —the broadening of agricultural education, bringing it within reach of all who so desired, from the usual time of leaving the State school, and at the same time providing for the higher education in agriculture, preparatory to the time when there would be an opportunity for a student to take an agricultural course at the University...

The Committee recommends that the Queensland Agricultural College be terminated, and that in its place an Agricultural High School and College be established, the intention being to provide a High School education in agriculture for boys of, say, from fourteen to eighteen years, who then, it is hoped, would enter the college at the regulation age and complete the agricultural education, so far as opportunities are provided. The date of the change has been fixed for the 1st September next [1923], and the Department of Agriculture, in conjunction with the Public Service Commissioner, are now taking the necessary action accordingly.

A concern to achieve a successful integration of the activities of the College was expressed in the committee's recommendations that the person appointed as principal should have an understanding of male youth, executive ability, imagination and vision, a competent general knowledge of all branches of the institution's work, sympathy with general education and enthusiasm in agricultural education. A similar concern for integration was implied in the recommendation that the number of livestock maintained at the College should be reduced to a level governed by its requirements as a teaching institution. The committee also noted with regret the absence of scientific control and investigation at the College. It made suggestions concerning the shape of the curriculum and emphasised the importance of appointing staff who would be able to foster and maintain a "suitable tone and atmosphere within the institution". (Black, pp. 226–228)

Cuthbert Potts retired as Principal of the Queensland Agricultural College on 3 August 1923. Jack Keith Murray, B.A., B.Sc.Agr. (Syd), N.D.D. (Kilmarnock), was appointed Principal of the Queensland Agricultural High School and College, on probation for six months from 14 September 1923. His appointment was confirmed as from 3 November 1923 by notice in the *Queensland Government Gazette* under the signature of John Huxham, Minister for Public Instruction, on 26 June 1924. Murray, like Potts, had come from the staff of the Hawkesbury Agricultural College at Richmond, New South Wales, where his specialty was bacteriology. He had served in World War I.

The arrival of Professor E. J. Goddard in 1923 to take up the Chair in Biology at the University of Queensland brought the University greater involvement in rural research, such as the control of the Queensland fruit fly and bunchy top in bananas, banana ripening, and the control of prickly pear. Goddard felt that the Diploma in Agriculture previously proposed by the University Committee at QAC would provide excellent practical training for young men who intended to take up farming, but there remained the question of training research specialists in agriculture in the fields of plant pathology and economic entomology. The recent reorganisation and development of the QAC and the further additions to the University staff made it possible to set up a faculty of agriculture with a minimum of expenditure.

On 29 January 1925 a conference was held at Parliament House to discuss the matter. The following persons were present: W. N. Gillies (Minister for Agriculture), A. E. Graham (Under-Secretary, Department of Agriculture), F. T. Brennan (Minister for Public Instruction), B. McKenna (Under-Secretary, Department of Public Instruction), L. D. Edwards (Chief Inspector, Department of Public Instruction), J. D. Story (Public Service Commissioner), A. J. Thynne (Vice-Chancellor), E. J. Goddard (Professor of Biology), J. McCaffrey (University administrative staff) and J. K. Murray (Principal, QAC).

Graham, the new Under-Secretary of the Department of Agriculture, enthusiastically supported the establishment of the Faculty of Agriculture. Agriculture was becoming more complex and dependent on science. He recognised the need not only to develop scientific services to cater for the physical and biological areas but also to pay close attention to agricultural economics. The Department would allow its staff to be used as part-time University lecturers and would send at least three students per annum to the University — they would be employed by the Department after graduation. (Zillman, 1979, pp. 65–66)

In 1925, William Forgan-Smith became Minister for Agriculture. With backing from J. D. Story and Professor Goddard, he placed the initial £5000 in the estimates from the

beginning of the 1927–28 financial year for the purpose of establishing a faculty of agriculture.

At its meeting of 10 December 1926, the University Senate on J. D. Story's motion resolved:

That seeing that a Chair of Agriculture has already been established pro forma the first year of the course of study leading to the Degree of B.Sc. (Agric.) be inaugurated as from the beginning of the academic year 1927.

Students were to spend the first two years at the University, with the third and fourth years being divided between QAC and the University. J. K. Murray, Principal of QAC, was appointed the first Professor of Agriculture —a part-time honorary position —while retaining his position as Principal of QAC. (Zillman, 1979, p. 74)

Thus the Queensland Agricultural College had finally been placed in a continuous scheme of agricultural education from primary level through the secondary (diploma) level to the tertiary, serving as an important link in the educational chain. Its administration had passed from the Department of Agriculture and Stock to the Department of Public Instruction, but the Department of Agriculture and Stock was to become the greatest consumer of the new breed of scientists emanating from the University Faculty of Agriculture.

QUEENSLAND AGRICULTURAL COLLEGE

Planning and preparation

The need for an agricultural college in Queensland

In May 1874 E. W. Pechey, timber merchant and Member for a Darling Downs electorate, introduced a motion in the Queensland Parliament asserting the desirability of establishing a school of mines and a school of agriculture, the latter to be located in the "fertile wheat growing district of the Darling Downs". The Premier, Arthur Macalister, a solicitor, argued that the motion was too vague and suggested it be withdrawn and brought forward in a more practical shape. Pechey withdrew it and as he left Parliament after one term, the idea lapsed. (Black, A. W., *Organisational Genesis and Development: A Study of Australian Agricultural Colleges*, 1976, University of Queensland Press)

The establishment of Roseworthy Agricultural College in South Australia in 1881 was the first tangible move to promote agricultural education at this level in Australia and doubtless led some Queenslanders to seek a similar institution in Queensland, especially as Queensland's climate differed so markedly from that of southern Australia. The Hon. Dr W. F. Taylor said that he had been in Warwick in 1881 when this subject was first mooted. "We were all very much in favour of it and did everything we could to urge the Government to establish a College." (*QPD*, 18 Nov. 1896)

After the passing of the Victorian Agricultural College Act in 1884, Francis B. Kates, a German flour miller and Member for the Darling Downs, introduced a motion in 1886 asking that various lands be set aside for the endowment of "agricultural Colleges and University institutions". (*QPD*, 29 Nov. 1887, p. 1860) This was passed with some opposition from some pastoralist members. In May 1886 Kates, bearing letters of introduction from the Queensland Premier, Sir Samuel Griffith, visited the other Australian Colonies to obtain information on the operation of their departments of agriculture and schools of agriculture. (Black, 1976)

The despatch of Peter McLean to the southern States and New Zealand by the Hon. C. B. Dutton in the latter half of 1886 was probably the first government move towards the implementation of the idea. He reported on the establishment of Roseworthy College in South Australia in 1881, Dookie Agricultural College in Victoria in 1884 and Lincoln College in New Zealand. (*Journal of the Legislative Council*, Vol. 37, Part III, 1887, pp. 1087–1100)

In November of that year, in reply to a question from Kates, Griffith stated that because of the financial condition of the Colony the Government did not feel justified in giving immediate effect to the 1885 Parliamentary Resolution concerning the establishment of an agricultural college. (Black, 1976)

Then followed the Hon. Henry Jordan's announcement in Parliament on 29 November 1887 that the Government was obtaining the services of a professor of agriculture from the

United States, nominated and recommended by the Government there as being thoroughly competent. The request to Washington stated inter alia "the attention that has been paid by the Government of the United States to the systematic teaching of agriculture, and the great benefits that have accrued to your country from your action in this respect, induce us to think that it would be of great advantage to Queensland...if we could obtain the services of a competent man acquainted with the American methods both of instruction and practical operation". Jordan advised the House that the appointee would be under the Minister, not the Under-Secretary, and would instruct classes in agriculture and in all the sciences that were necessary for its successful practice, and in that way they would lay the foundation of agricultural schools in the Colony very economically and very successfully. (See Chapter 1.) In the ensuing debate, Mr Kellert (Stanley) said that the establishment of agricultural colleges would be of great benefit to the Colony, and added that it had been well said by one Honourable Member that they knew less about agriculture in Queensland than in any other part of the world.

On 26 July 1889 in the Legislative Assembly, Mr Groom (Drayton and Toowoomba) moved, pursuant to notice:

That this House will, at its next sitting resolve itself into a Committee of the Whole to consider the following Resolutions:

- 1. That, in view of the great importance of imparting a practical Agricultural Education to the youth of the Colony and encouraging young men to enter upon the cultivation of the soil, this House is of the opinion that the time has arrived when Agricultural Colleges, or Schools of Agricultural Training, should be established in the Northern, Southern and Central Divisions of the Colony.
- 2. That, to give effect to the foregoing Resolution, an Address be presented to the Governor, praying that His Excellency will be pleased to cause to be placed on the Supplementary Estimates for 1889-90, the sum of £22,500: £7,500 for the Northern Division, £7,500 for the Southern Division and £7,500 for the Central Division.

After some debate, Groom amended his resolution:

That, in view of the great importance of imparting a practical Agricultural Education to the youth of the Colony and encouraging young men to enter upon the cultivation of the soil, this House is of the opinion that areas of land should be set apart in various districts of the Colony as Permanent Endowments for the encouragement of agriculture.

This was put and passed.

In September 1889 Professor Shelton was appointed by the Government, through J. M. Rusk, United States Secretary of Agriculture, as Instructor in Agriculture. He began duty in Queensland on 13 February 1890, six months before completing his sixteenth year of service as Professor of Agriculture at the Kansas State Agricultural College.

In the annual report on the Department of Agriculture and Stock for the year ending 30 May 1890, made to the Secretary for Public Lands, the Hon. M. Hume Black, Peter McLean, Under-Secretary, wrote:

The arrival of Professor Shelton as Instructor in Agriculture raises the question of the establishment of Schools of Agriculture and Experimental Farms and I would call your special attention to the advisability of making special provision for this purpose as not only affording a technical but also a practical system of agricultural education for the youth of the Colony. Many European countries, recognising the truth that the prosperity of a nation is in proportion

to its production, have made liberal provision for agricultural education by direct money grants, whilst the United States of America and some of the Australian Colonies and New Zealand have set apart large tracts of land for the same purpose. It is well known to all intelligent cultivators of the soil that the productiveness of the earth is subject to the influence of natural laws, invariable and indisputable: the production, therefore, will be in proportion to the intelligence of the producers, and success will attend upon the knowledge of the action of these laws and the proper application of their principles. By the establishment of Schools of Agriculture and Experimental Farms this knowledge, so essential to the nation's greatness, is secured and a sound basis of national wealth established.

In March 1890, soon after taking up the position of Instructor in Agriculture, Professor Shelton accompanied the Under-Secretary to Melbourne to attend an interstate conference on rust in wheat and then had a quick look at Victorian agriculture. He visited Dookie Agricultural College and saw the possibility of a similar development in Queensland. In his first annual report, on 30 May 1890, Shelton stated:

It seems clear to me that Queensland has reached that stage in the growth and development of its agriculture, where an Agricultural College and Experiment Station are indispensable. We cannot afford longer to be without these means of solving systematically the multitude of questions which press upon the farmers in their daily work, and which by them are crowded upon the Department of Agriculture.

McLean, commenting on Professor Shelton's report on his visit to north Queensland, wrote: "I trust the prelude to the establishment of a School of Agriculture and Experiment Farm in the near future." (*An. Rept Dept Agric.*, 1889-90, p.3)

At the Beenleigh Farmers' Conference in 1890, E. J. Stevens, M.L.A. (Logan), said:

With regard to Agricultural Colleges and Experiment Farms, I can only say now what I have said before—I am thoroughly in favour of their establishment and shall give my hearty support to any measures of that kind. In my opinion, one College would not be sufficient. This Colony covers an immense area and different climate conditions and soils prevail and we should require three or perhaps more Experimental Farms. We can hardly have too many. (*An. Rept Dept Agric.*, 1890–91, p. 10)

On 5 August 1890, Groom asked the Secretary for Public Lands (Black) whether any reservations of crown lands had been made as endowments to agricultural colleges, in accordance with the Resolutions passed by the House in the previous session, and whether it was the intention of the Government to submit proposals to the House in the current session for the establishment of one or more agricultural colleges. Black's reply to the first question was "Not yet".

Instructions had been issued to Professor Shelton to report on suitable localities; his report would be submitted to Parliament for the purpose of giving effect to the Resolution referred to. On 12 August 1890, however, the Morehead Government was defeated and the second Griffith Ministry came to power. Black gave way to the Hon. Alfred Sandlings Cowley (Member for Herbert), who became Minister for Public Lands and Agriculture. Two months later, on 14 October 1890, Mr Jessop (Dalby) asked the new Minister, "Is it the intention of the Government to introduce a Bill this Session to provide for the Endowment of Agricultural Colleges and Experiment Farms?" His answer was "Yes".

In 1891 Professor Shelton appeared as a witness before the Commission that was enquiring into the need for a university. The Commission recommended the establishment, without delay, of an agricultural college.

The choice of a site for an agricultural college

Immediately Cowley had announced his intention on 14 October 1890 to proceed with the agricultural college, there was pressure from several Members to have it set up in their electorates. Golding pushed the claims of Herberton, Barton spoke for West Moreton, Murray for the Central Districts and Powers for the Wide Bay and Burnett, while Samuel Grimes (Oxley) extracted a promise that all agricultural districts would be considered.

During 1889 Peter McLean had travelled through the Warwick – Killarney area with the Minister for Lands (Black) and expressed the view to the Minister that that area was an excellent one in which to establish an agricultural college. In the next year, he accompanied Professor Shelton to Warwick, where Shelton gave a series of lectures in which he referred to the urgent need in Queensland for one or more experimental farms with agricultural training schools or colleges attached. They travelled from Warwick to Killarney by train with Arthur Morgan, Member for Warwick, and told him how impressed they were with the Emu Vale country, with its advantages of soil, climate and water supply for an experimental farm and training school. Morgan evidently thought about this and felt it worthwhile to approach the Hon. J. D. Macansh, M.L.C., of "Canning Downs", about the matter. The sequence of letters and other offers of land and subsequent government hesitancy are recorded in the *Queensland Parliamentary Papers*, Vol. 3, 1893, p. 957.

Two free offers of land were made.

On 1 August 1890, Morgan wrote to Macansh, stating inter alia:

I fear that, in the present state of the finances, the Government would not feel disposed to expend any considerable sum of money in the purchase of the quantity of land necessary to give effect to the scheme they have in view—land which of course must be easy of access and convenient to the centres of agricultural settlement. But knowing that you take a great interest in the progress of agriculture, and believing that you are fully impressed with the necessity for an Experiment Farm and Training School, and would be glad to assist the project, I venture to ask if you would be disposed to let the Government have a portion of the Canning Downs land along the Killarney branch line of railway, between Emu Creek and Farm Creek, for such purpose, and if so, would you make any reduction in the price? Kindly let me have an answer at your convenience. N.B. Plan not with (known to) Department of Agriculture.

In reply to Morgan, Macansh stated on 4 August: "If the Government decides upon establishing such a farm and school in this district, I will make a free gift for the purpose of 500 acres of such land in the locality you mention as, after inspection by the Government, may be considered suitable."

Later Morgan advised the Minister for Lands and Agriculture, the Hon. A. S. Cowley, that Macansh imposed no condition as to the immediate establishment of the farm or school. "Should his offer be accepted, he is prepared to hold the land and utilise it for grazing purposes at present, until the condition of the public finances permits of its being made use of by Government for the purposes for which it is offered."

The Minister asked the Under-Secretary and Professor Shelton for comments and they advised that immediate action should be taken to accept. The special advantages of the district were:

- 1. the character of the soil—the land in question appeared to leave nothing to be desired in the variety demanded for experimental undertakings, including irrigation, for the growth of cereals and grasses, and for fruit-growing and dairying;
- 2. accessibility—it was near the centre of a very rich agricultural and pastoral district and a school located here could be easily reached from any part of the Colony; and
- 3. the undeniable healthfulness of the locality, a feature essential in connection with an establishment of this kind.

The Minister asked McLean to convey his thanks to Macansh through Morgan and expressed the hope that he might visit the site soon. Nothing more was heard from the Minister till 8 June 1891, nine months later, when Morgan enquired of the present state of the matter, to which the Minister replied that the matter, inter alia, was under consideration by the Government.

At Cowley's request McLean submitted the requirements for the establishment of an agricultural college and a detailed statement of the probable expenditure for the first year. He also attached particulars of some of the agricultural colleges then in existence in the United Kingdom, United States of America, the German Empire (Prussia, Bavaria and Wurtemberg) and Japan, and in South Australia, New South Wales and Victoria. He gave detailed notes on the conduct of the Dookie Agricultural College, Victoria. McLean's submissions regarding the requirements for a college and its initial budget were made to the Minister on 25 June 1891:

In accordance with your wish, I have the honour to submit herewith the following details for the establishment of an Agricultural College and Experiment Station, suited to the present wants of the Colony. In dealing with the question of the establishment of Colleges of Agriculture and Experiment Stations, it is advisable that the subject should be considered from a practical point of view, and a comprehensive scheme submitted for their initiation. Technical and practical agricultural education should not be looked upon as of an ephemeral nature, but as that which affects the very foundation of a community, and therefore deserving of being established upon a basis that will stand for all time, and influence the rising generation to such an extent that the highest possible results will be obtained from the tuition afforded. The true principle on which such a system should be built is to place it upon such a footing as will secure successful operations amidst all the fluctuating influences to which every community is periodically subjected. All experience in this direction has proved that the most secure source whence an income can be derived for agricultural instruction is from an endowment either in money or land. The instruction afforded treating of the land and the capabilities thereof, it is natural that the income should be derived from this source, and in a colony like Queensland, with a large territory and vast possibilities, the true system for the establishment of Agricultural Colleges is an endowment of land in the three great divisions of the Colony.

Judging from the present condition of the agricultural interest, and the great need that exists for instruction in the various phases of agriculture most likely to prove of immediate benefit to the farming community, it is absolutely necessary that steps be at once taken to establish a college in the Southern portion of the Colony, where the great bulk of the tillers of the soil are at present located. To accomplish this object, parliamentary appropriation will be required to initiate a scheme and set it in full working order. It will be necessary to have a farm attached to the college, which should comprise an area of not less than 500 acres of land, a large extent of

which should be ready for immediate cultivation, so that the work of a college, in disseminating instruction in agricultural science and practice, should not be held in abeyance to the rough work of clearing and fitting up the farm. The land should be situated in some locality where the principles of irrigation could be applied; and for the convenience of pupils, the interested public, as well as for facilities in working, the farm should be situated in the immediate vicinity of railway communication. It not being at all probable that land suitable and available could be selected from vacant Crown lands, and should the Government not accept the offer of 500 acres from either the Hon. J. D. Macansh or the Messrs. Gore of Yandilla, for a site for an Agricultural College and Farm, the purchase of a suitable area will have to be considered, for which a sum of not less than £2,500 will have to be provided.

On further enquiry as to the costs of establishment, McLean submitted the following:

In accordance with your instructions, I have the honour to submit herewith a detailed statement of the probable expenditure in connection with the inception of an Agricultural College, with an addenda showing the salaries and wages of the teaching staff and farm help when the college is in full working order. For the financial year in which the commencement of the institution is determined upon, only a portion of the total amount would be required which sum would depend upon the time of the year when the land and money would be available, and the energy with which the work when entered upon would be carried out.

The annual expenditure of an Agricultural College can easily be calculated; for the teaching staff and farm help I approximately estimate it at a little over £2,000. The revenue, however, is more difficult to estimate, in fact impossible, as so much depends upon the seasons and the class of work to be turned out. If farming pure and simple is to be the basis upon which the farm is to be worked, and a sufficient area of land is provided, then the income would in all probability be sufficient to meet the expenditure. On the other hand, if the experiment work, which is one of the main functions of an Agricultural College, is to be undertaken, the returns would be likely to accrue from the students, inasmuch as the work which they would be called upon to perform upon the farm, amounting to half their time, should be considered as an equivalent for their tuition, and the only charge which they should be called upon to pay would be to meet the expenses of their board.

On 20 October 1891 Parliament voted the sum of £15 797 to the Department of Agriculture, including £5 000 for the establishment of the agricultural college. The Minister for Lands and Agriculture, Cowley, advised that he intended to establish the college, with a 500 acre farm attached, in the central part of the Colony. Professor Shelton would be in charge and every student attending would receive a thorough practical education in the art of farming.

Macansh's land on the south bank of the Condamine River was inspected by Professor Shelton and McLean in February 1892. On 27 March 1892 McLean wrote to Morgan, saying he was anxious to have the agricultural college established by 30 June and asking Morgan to ascertain if the land was still available as a gift. Morgan replied that it was still available free of cost but added, "It appears to me that the Government are not earnest in the matter".

On 30 March 1892 Macansh called on the Under-Secretary, again offering the land but asking for immediate acceptance or rejection. It had been stated in the *Courier* of 2 August 1892 that 800 to 1000 acres were needed, whereon Macansh offered the required area. On 5 December 1892 the Minister for Lands and Agriculture, Cowley, asked McLean to thank Macansh for his magnificent offer and advise him that he would shortly visit Warwick to view the land.

Francis A. Gore of Yandilla, Darling Downs, had read of Macansh's offer and commended him for it but thought the Killarney district too favoured. He advised the Minister for Lands and Agriculture on 4 December 1890 that he had written to his partners in England to see if they would agree to offering 500 acres of Yandilla for the project and the Minister sent his thanks. The English partners agreed, provided that the land be used for the stated purpose only, the offer be accepted by the Government, buildings erected and work commenced within three years from the date 5 February 1891, otherwise the gift would lapse, that all expenses of survey, boundary fences, deed fees, etc. be borne by the Government, and that the company have sole use of the land until operations were commenced, when deeds would be handed over subject to the above conditions. The land was situated near a proposed railway extension and underground water was plentiful.

In his annual report for 1891–92 Peter McLean wrote (re the agricultural college):

Although a sum of £5,000 was placed upon the Estimates for the past year for this purpose, to my regret, owing to the state of the public finances, it has not been possible to give effect to the vote. This is more to be regretted, as the necessity for such an institution becomes more apparent year by year as the Colony progresses in agriculture and the fact that many of our young men are seeking knowledge beyond the confines of Queensland which could with greater advantage to themselves be given here. The urgency for an experiment farm is clearly evidenced by the reports received from people who have been supplied by the Department with seeds for experiment. The reports of farmers living at no great distance from one another upon the same crop are very conflicting.

In the same report Professor Shelton wrote:

It has been no small disappointment to the friends of agricultural education to learn that the finances of the Colony would not permit of the immediate inauguration of the work as anticipated in the vote. This is certain. If the means of the Colony have diminished, the need for more and better knowledge of agricultural science and practice, and the systematic training of the youth therein, have not grown less pressing with the lapse of time. It suffices to say that the agriculturist has seen the difficulties and obstacles to the successful practice of his calling increase during the year, while he from lack of knowledge, in many cases remains powerless to cope with them. Insects ravage unchecked our canefields and orchards the whole length of the coast, while inland rusts and other fungus diseases consume the profits of the farmer's labours. If we could each year send out into the agricultural districts of the Colony a number of young men having the knowledge that rightly conducted schools of this sort impart we might at least cope hopefully with these "foes seen and unseen". I venture to suggest that, if the larger work of erecting buildings and equipping the School cannot now be undertaken, such preliminary work as locating the new institution and fencing and generally getting the farm in shape for future work should be begun at once. In this way the College would to a considerable extent get the benefit of the time, greater or less, that elapses before the final establishment of the institution, in the growth of those things on the farm which necessarily involve the element of time.

Apparently some notice was taken of this statement, as Professor Shelton inspected possible sites for a college during 1892 and submitted reports to the Minister, who, on 1 November 1892 during the Supply Debate in Parliament, said immediately he had time he intended to examine each site personally, with Professor Shelton and the Surveyor-General, and select the one that they considered would be the most advantageous to the Colony.

Further offers of land came from Messrs King and Sons, Gowrie, on 26 November 1892. They offered two sites, one on the railway line running through the property and served by Gowrie Creek, the other on the proposed railway line from Meringandan to Goombungee. The land was offered at £5 per acre; it was inspected by Cowley, then reduced to £4 per acre.

On 1 December 1892 the Secretary of the Chamber of Commerce in Bundaberg approached the Minister to establish the initial college in Bundaberg, which was the premier sugar district of the Colony and climatically suited to temperate and subtropical products. He was supported also by the Secretary of the local Agricultural and Pastoral Society. Cowley was to inspect this area in the following week.

On 5 December 1892 W. B. O'Connell, M.L.A. (Musgrave), wrote offering help to Cowley when he visited the Wide Bay district. The Secretary of the Wide Bay and Burnett Pastoral and Agricultural Society, Maryborough, wrote to the Minister suggesting the Degilbo lands, which had impressed Professor Shelton and McLean on an earlier visit. He added:

I may mention that several sons of agriculturists who have had successful training in the grammar and high schools here, and passed the Sydney University local examinations, have had to proceed to New South Wales to finish their agricultural training...this society was one of the first to bring under notice the great want of such an educational institution, and respectfully represented it to you and some of your colleagues during a visit to the town to open the exhibition.

On 10 November 1892 Samuel Cooper offered his farm at the Laidley railway station for sale for the purpose, supported by J. Jackson of Brisbane. The following day a letter from Mr Kates of Roma to the Minister for Lands suggested a site for a college, only six miles from Roma—it was suitable for wheat and other cereals, vines and other fruits, and had a never-failing water supply.

On 14 November 1892 Messrs Kellett and Co., Brisbane, suggested the Government should select some splendid agricultural land on the property owned by Kent and Wienholt on Lockyer Creek near Laidley. (This was later selected.) The following day W. Deacon of Allora wrote to Professor Shelton offering 422 acres on the Toowoomba – Warwick railway, three-quarters of a mile from Clifton Colliery Siding, at £4 10s 0d per acre.

Later, on 22 December 1892, J. S. Jessop, M.L.A. (Dalby), wrote to the Minister for Lands and Agriculture offering land from the town common at Dalby (now part of the Dalby Rural Training School land).

On 31 May 1893 Samuel Grimes (Oxley) asked if a site had been chosen for the college; the answer was no. To a further question from him on 20 June 1893 as to the probability of erecting the college, the Minister answered: "The Government being fully impressed with the advantages of an Agricultural College will take the necessary steps so soon as the state of the finances will admit of their doing so!"

But in the 1892–93 annual report McLean had to state:

To my great regret circumstances have not permitted the expenditure of the vote twice passed by Parliament for an Agricultural College and Experiment Farm, a circumstance which is the more unfortunate because at the present time of depression the minds of many are being directed to land settlement, the opening for the youths of our towns and cities in trades and commercial life becoming each year more limited and the parents crying out for the form of education which an agricultural college would provide. Not a few of our young men of this Colony have of late, to my knowledge, been sent to Victoria, New South Wales and America to receive that education which they ought to be able to obtain here.

Professor Shelton added:

The high hopes raised by the action of Parliament in voting two years in succession, a sum of money to be used in establishing a school of agriculture ended in disappointment. I am hopeful that, with the return of better times, Queensland people of all classes will unite in securing for the Colony, an institution which, if rightly managed, would do for the agricultural class what universities have done elsewhere for the learned and professional classes.

During the year he had undertaken a somewhat extended examination of suggested sites for the proposed agricultural college, in company with the Minister for Lands, Cowley.

On his trip to north Queensland in 1893, McLean reported: "While in Hughenden, I inspected and recommended a site to be reserved for an Agricultural College and Experiment Farm of an area of 2,371 acres. There is no surface water on the land, which is situated alongside the river, in which there is water at all seasons." Then, on his visit to Herberton, he wrote: "At Herberton, I inspected and recommended a site for an Agricultural College and Experiment Farm and hope that at no distant date both this and the site at Hughenden will be utilised for the purposes for which they are set apart." (*An. Rept Dept Agric.*,1892–93, p. 6)

Early in 1893, with a general election approaching, Cowley sent a detailed memorandum to each Minister recommending the purchase of a 1020 acre site ten miles north-west of Toowoomba (Gowrie) or, failing that, the acceptance of Macansh's offer, which had by then been increased to a total of 1000 acres. However, no further action had been taken when, following Griffith's resignation as Premier in March 1893, Cowley was replaced as Minister by A. H. Barlow, a former banker, representing the satellite electorate of Ipswich. In August 1893 McLean drew Barlow's attention to the Bill drafted in 1890. By this time, Sir Thomas McIlwraith, who had spoken against Groom's motion four years earlier, was Premier.

Because of the serious financial position after the floods of 1893 and general financial stringency, no vote for the establishment of the college was included in the 1893 estimates and the public service was reduced by 10 per cent. (F. Manson Bailey, Colonial Botanist, was retrenched for four months.)

Commenting on Tryon's discovery of potato blight in crops at Ravensbourne and Corinda in 1893, McLean said:

This instance is only one among many that can be used as a powerful argument in favour of the establishment of an Experiment Farm in connection with the Agricultural College where diseases could be studied in all their stages, and remedies in all likelihood provided, and provides evidence of the necessity here for an entomologist in connection with this Department.

In his 1893–94 annual report, McLean repeated his words of 1892–93, when no action was taken because of the depression. Professor Shelton, in his report, said:

The need of an Agricultural School or College, properly equipped, has been constantly felt...In every part of the Colony parents have come to me with the question "Where shall we send our sons that they may receive the education and training necessary to the successful prosecution of farming?" The attraction of farming would be enhanced if a central institution, having a good farm, and necessary tools, with a teaching force sufficient to give the rudiments of agricultural science, could place its privileges within easy reach of the class of young men needing them. It is often objected that one School of Agriculture cannot meet all the requirements, in this regard a country varying in climate and soil production as is the case in Queensland. To this I reply

that the principles of agriculture are the same the world over. The man who understands the fundamental practices of farming...and something of the nature of soils, their needs (and remedial measures)...will not be at a loss to apply this knowledge on the cultivation of special crops, however unfamiliar.

The heavy demand for agricultural land in the 1890s led the Government, under the Hon. Hugh Muir Nelson (Murilla), to pass The Agricultural Lands Purchases Act of 1894, whereby the Government could purchase land suitable for agriculture from the large estates of squatters, then subdivide and sell the blocks for closer settlement. The land under offer in the first place had to be reported on by the Land Board, then its suitability for agricultural purposes reported on by the Department of Agriculture (this was usually done by McLean, Professor Shelton or John Mahon), and then the local Land Commissioner or Land Agent reported on the demand for land in the district. With these reports before him, the Minister for Lands investigated the proposal, considered the terms upon which the land was offered, and either accepted or rejected it.

In the Supply Debate of 1894, the subject of agricultural colleges was raised so insistently by various representatives of agricultural electorates that Barlow promised to introduce a Schools of Agriculture Bill along the lines of the School of Mines Bill that was shortly to come before the House. When the Bill was debated in November 1894 some of the Members who had earlier advocated the establishment of agricultural colleges opposed the clauses that required any district wishing to have a college to raise a minimum of £1000 in cash or land equivalent, which the Government would then match on the basis of two pounds for every pound raised. The Government therefore did not press the Bill and it lapsed when Parliament was prorogued in the following month.

In 1895 twelve Parliamentary Members supporting the Government formed the Farmer's Representative Union and shortly afterwards published a scheme for the setting up of various experimental farms where boys could be taught "the practical work of farming". As a result of further pressure from this group, the sum of £5000 was placed on the Supplementary Estimates for this purpose. (Black, 1976)

McLean inspected and reported on the Rosewood Estate, an area of 11 000 acres between Gatton, Tarampa, and Forest Hill, with frontages to the Lockyer and Laidley Creeks, traversed by the Tarampa – Gatton and Forest Hill – Gatton roads and the Western Railway. On 23 April 1896, he requested that sections of the Estate be set aside for a school of agriculture and experiment farm. McLean and Professor Shelton had already selected the site for a 600 acre experiment farm, and it was decided to combine the two in a request for 1750 acres, the purchase of which was to receive official sanction.

The Hon. A. J. Thynne, a Brisbane solicitor and Member of the Legislative Council, became Minister for Agriculture in the Nelson Ministry on 6 May 1896, following a general election. He needed no convincing of the value of agricultural education—he had sent his son to Hawkesbury Agricultural College in New South Wales for such training. A few days after taking office he sanctioned the purchase of a further 6160 acres 2 roods by the Government from the Rosewood Estate trustees for William Kent (deceased), namely James Sargent Turner and Edward Wienholt, at a price of £3 12s 6d per acre for 1692 acres of the 1750 acres set aside. The total price paid out of Consolidated Revenue was £6380.

The remainder of the Estate was thrown open for conditional selection on 12 May 1896. Some fourteen portions were taken over for the agricultural college.

On 11 November 1896, in the Supply Debate in the State Parliament, the Minister for Public Lands (on behalf of the Hon. A. J. Thynne, Postmaster-General and Minister for Agriculture, who was a Member of the Legislative Council and had no seat in the Assembly) moved that £19 613 be granted to the Department of Agriculture: this included £900 for agricultural and horticultural societies, £500 for reserves (provincial gardens), £200 in aid of the propagation of trout and feathered game on the Darling Downs (there were few, the Minister imagined, who did not desire the streams of our uplands filled with trout!), £300 for the destruction of noxious weeds, £4000 for salaries, £4000 for the agricultural college and £2000 for the experimental and training farm. On enquiry from Mr Groom (Drayton and Toowoomba), the Minister said £1400 from the Works Estimate would provide for furnishing the college buildings, while the cost of the buildings themselves would be defrayed from the £5000 voted in the previous year. The £6000-odd for the college land would be paid by debenture as a purchase under the Agricultural Lands Purchase Act.

The ensuing debate was quite animated. The Members generally, and the Downs representatives particularly, deplored the fact that one of the free offers of land by Macansh and Gore was not accepted. All were also concerned that the Minister for Agriculture was not in the Chamber to answer questions about the choice of the site.

Although the actual reasons for choosing the site were not disclosed, from comments made they appeared to be that the site was easily accessible, and fairly close to Brisbane, where most of the Departmental experts resided; and that it consisted of three broad soil types—very fertile alluvium along Lockyer Creek, which could be irrigated; poor shallow soil on the ridge where the use of fertilisers could be demonstrated (this area provided an excellent site for buildings); and melon hole, that is, fairly moist land between the hill and the railway line where drainage could be demonstrated and which would provide excellent grazing land. Thus there was scope for experimentation and cultivation on three major soil types, to provide sound experience for the students. A local clergyman, the Rev. Thatcher, wrote condemning the site as being inundated, probably having seen it during the 1893 flood rains, which led one Member of Parliament to suggest that the land would only be suitable for a web-footed poultry run! The big rains of 1893 emphasised the need for drainage instruction, particularly in the minds of the Logan and Moreton Members, but to the author's knowledge no drainage has been implemented in the southern part of the College to this day (1982).

Samuel Grimes (Oxley), in a sensible speech, said the fundamental principles of agriculture could be taught as well at Gatton as anywhere else, and once a person had been taught those principles a little experience would enable him to grow any crop. He had no hesitation in saying the site had been well chosen. The selection of a site had been the great difficulty in the past, but the present Secretary for Agriculture (the Hon. A. J. Thynne, M.L.C.) had chosen the site soon after assuming office on 6 May 1896. In that he had shown his wisdom, because if he had waited he would have been beset with requests on all hands to select this or that site. (*Hansard*, 11 November 1896)

Joshua Thomas Bell (Dalby) asked that, now that the college site had been selected, experiment farms be located in other agricultural districts. A special plea was made by

R. H. Smith (Bowen) for a college in tropical Queensland. The Minister for Lands said that sites at Emerald (Emerald Downs run), Herberton and Hughenden had been reserved for experimental farms.

Regarding the necessity for a college, Mr Keogh (Rosewood) said, as far as farmers' sons were concerned, there would be very few of them as pupils. He believed a boy of sixteen years of age was worth £16 a year to a farmer, but the pupils were to be charged £25 a year. No doubt that seemed cheap enough, but there were few farmers in West Moreton who could afford to pay that amount for their son's education, and those who would derive the greatest benefit would be the sons of merchants and lawyers. Most of the information derived would be upon the questions of soils and machinery, and when a boy returned home his parents would not be able to find the necessary money to supply him with machinery. Mr Chataway (Mackay) said that agricultural colleges were filled all over the world, because there were many men with sons of sixteen or seventeen whom they did not know what to do with. They said the boys were no good, and they sent them to the agricultural colleges, knowing that if they did them no good they would do them no harm and might give them a taste for agriculture! N. E. T. Tooth (Burrum) said, with regard to the college, his opinion was that it would never turn out practical farmers, though it might turn out agricultural prigs.

The Shelton period

Professor Shelton described the land acquired for the college thus:

The College Land: The total area of land set aside for the use of the Agricultural College is 1,692 acres. Of this, there are about 500 acres of inferior ridge land, the remainder being level country, for the most part of excellent quality. Along the railway line, following the southern boundary, there is a narrow strip of low "melon hole" country, which will need draining before it can be brought into arable condition. Then, again, on the north-east there are a few acres of swamp, while, following the ridge above referred to, there are here and there smaller areas of low "melon hole" land. The total, however, of all this wet land is, in comparison with the good land, insignificant. It is most unfortunate for the College that nearly the wettest and most forbidding portion of the estate touches the railway line and thus is seen by every observant passer. Doubtless this fact has much to do with the unfavourable reports current concerning the College farm. I have no hesitation in saying that there are fully 1,000 acres of first-class farming land within the present limits of the College farm. Of the remaining 700 acres, 200 acres can, with ditching and proper treatment in other respects, be made nearly equal to the best of the "good land". The 400 odd acres of ridge land are mostly valuable for grazing alone, but this ridge furnishes a site for College buildings and "grounds" that can hardly be surpassed. I go thus at length into the character of the College farm, in order to correct, as far as possible, the widely current unfavourable, and mostly untruthful, reports concerning it. The College farm is suited to the growth of great crops of the great staples, particularly maize, lucerne, root crops, and various forages such as setarias and sorghums. It is most fortunate that a large amount-200 acres or more-of the best land upon the farm is capable of irrigation by gravitation. The abundant waters of the Lockyer are contiguous to this strip of country for a mile or more.

Like most of the good land of the world, the College farm will grow weeds as vigorously, and successfully as crops, and as the farm generally is what farmers call "strong" land, it is plain that crops will not be grown without work. Then we have a share of nut-grass, a weed pest which has many of the characteristics of the worst weeds known. In a few places, especially along the Lockyer, it is abundant. Generally, however, it is found in widely separated patches, and often large areas are completely free from it. But if nut-grass is a permanent nuisance to Queensland agriculture it certainly ought to have a place upon the College farm. Here, if

anywhere, the best means of coping with it ought to be made plain. (Shelton, *Rep. Q.A.C.*, 30 June 1897)

Preparation prior to the opening of the college

The building program

The responsibility for the buildings on the college site lay with the Department of Public Works. Supervision of the other improvements was undertaken by Professor Shelton from about September 1896, although his appointment as principal of the college did not take place till 25 June 1897.

The contract for the erection of seven college buildings was let to R. Roe in July 1896. These were the main building, containing two lecture rooms, a library, a study, the principal's office, a visitor's room and the secretary's office, the whole surrounded by a 12 foot verandah; two students' dormitories; a teachers' dormitory; a dining hall and kitchen including servant's quarters but with a separate laundry; the principal's house; and a house for the farm foreman. The ceremony of fixing the stump (stump-capping) of the main building was performed by the Minister for Agriculture, the Hon. A. J. Thynne, M.L.C., in the presence of a large gathering of people, on 22 August 1896. (The verandah of this building, when it was finished, overlooked nearly all the college property.)

Tenders were accepted for clearing and grubbing 232 acres shortly after the letting of the building contract. At about the same time the work of fencing off the two public highways (Forest Hill – Gatton and Glenore Grove – Gatton) that traversed the property and of filling in the numerous breaks in the boundary was carried out by contract. The first ploughing done on the college farm (32 acres) was let by contract in October 1896 and finished in the following January.

The contract period in the history of the college may be said to have come to an end on 4 January 1897 when the farm foreman, H. C. Quodling, took up duty. His appointment, at the salary of £156 per year, was confirmed on 1 July 1897. In addition to the executive duties of principal of the college, the management of the college farm, in a special degree, fell within the range of his duties. H. W. Gorrie began work as horticulturist in March 1897 (an appointment confirmed on 1 July also, when the College officially opened, also at a salary of £156 per year).

A considerable force of carpenters and labourers was employed initially on the various improvements under the principal's control. During the first six months were erected: a temporary cowshed (32×5 ft), with stalls for 16 cattle; stables and tool room (21×59 ft), having stalls for seven horses and three wagons; a wooden rectangular silo ($12 \times 16 \times 12$ ft), with an antbed floor, of a capacity of 55 tons of silage; and men's quarters ($20\frac{1}{2} \times 32$ ft), with one living room and four bedrooms.

Purchase of livestock

To meet the educational requirements of the students in ploughing, harrowing and cultivation operations generally, and to haul a considerable amount of material from the college railway siding, muster stock and carry mail to and from Gatton, Quodling selected and purchased sixteen draughthorses and three stock horses in the Toowoomba and Dalby districts at an average price of £7 per head.

The chief interest in the early days of the college was the establishment of the dairy herd. Professor Shelton decided that, at the outset, no better work could be done by the College in its direct relations with the farming community than building up a really superior herd of dairy cattle. This would be a perennial lesson to students and bring home to visiting farmers the great value of well-bred dairy cattle. Two Ayrshire bulls and eleven heifers were purchased by John Mahon, manager of Travelling Dairy No. 2, from various Victorian breeders, mainly T. A. Grant of Milton, J. W. B. Amess of Riddell's Creek, and J. T. Burnit.

Professor Shelton purchased a Friesian bull and heifer from the well-known Victorian herd of David Mitchell of Lilydale, a South Coast (Illawarra) Shorthorn bull and eleven heifers from the herd of Messrs Craig and Dudgeon of Jamberoo near Kiama, and a single Jersey heifer from the same district. These animals constituted the original dairy herd. By June 1898 another nine Jersey heifers had been selected and purchased by Mahon, mainly from the Kirkham Estate of the Hon. J. White of New South Wales, and a bull from Mrs Smart.

Acquisition of machinery

A stock of colonial, English and American machinery and tools was obtained for the initial work of the College. A number of machines new to the agricultural practices of the Colony were included, to prove instructive to local farmers and provide hints for local manufacturers, as were bench tools for twelve work-benches and a complete outfit of tools and equipment for a blacksmith's shop.

Initial farming for food and fodder

On arrival at the College the horses were put to work cross-ploughing, harrowing and planting maize on sixteen of the original thirty-two acres previously ploughed by contractors. The maize was scuffled three times and, despite the prevailing dry weather and late planting, turned out to be a reasonable crop, which because of the lateness of the planting and the need for winter fodder, was ensiled. Publicity was given to the operation as silage-making was comparatively new to Queensland and a great crowd of more than 200 people, mainly farmers and their wives from as far away as Warwick, Nanango and the North Coast, assembled at the College to watch the operations on 16 April 1897. The entire process of cutting the crop with a "Scientific Harvester", hauling it to the silo and there chaffing it and filling the silo was followed with great interest.

The material was neither weighted nor covered, but great care was taken to pack it firmly by treading, especially at the corners and sides. A month later a smaller gathering witnessed the completion of the ensiling of the crop, which at this time was more mature. Material surplus to the capacity of the silo was stripped of its cobs to feed the livestock and the remainder was made into stover. When the silage was opened three months later it was found to be in excellent condition except for some losses in the corners, and furnished the livestock—thirty cows and eleven horses—with their principal food during three months of the winter. Professor Shelton remarked that he considered the small silo perhaps the best investment made upon the College farm that year. It had enabled them "to use a great lot of late sown corn which would otherwise almost certainly have gone to waste, thus saving a great outlay for hay and grain, and ensuring a full flow of milk from the cows consuming it". He did, however, say that the relatively immature maize ensiled on 16 April did not produce as much milk when fed to cattle as silage as that from the more mature maize ensiled later.

Meanwhile, the horticulturist, Gorrie, was busy preparing the grounds around the twenty-odd acres of College buildings and establishing the vegetable garden near Lockyer Creek. Seven acres planted to potatoes failed in the dry weather, but persistent watering and intelligent care provided an abundance of vegetables.

Experimental work

Professor Shelton's wheat variety experiments in 1895 and 1896 were marred by lack of rainfall and the 1897 experiments were sown at the College in June 1897 just before its opening. Three hundred and forty-five varieties were sown and at 30 June all had germinated and shown vigorous growth.

Before the official opening the Minister for Agriculture, the Hon. A. J. Thynne, M.L.C., invited a large number of delegates from various farming centres in northern, central, western and southern Queensland to assemble in a residential conference at the Gatton Agricultural College from 10 to 12 June 1897. This was a master stroke as it brought together influential men from all over the State to meet one another in conference, to discuss agricultural problems and especially to inspect the new agricultural college, its land and facilities. The delegates were taken by train to inspect the new Hermitage State Farm near Warwick; for many this was their first look at the fertile and extensive Darling Downs.

Questioned in Parliament by Mr Grimes (Oxley) on 7 July about the cost of this special train trip to Killarney and back to Brisbane, the Minister announced the Secretary for Railways' figures. The cost of running the special train on Sunday 13 June was: traffic $\pounds 4$ 6s 3d, and locomotive $\pounds 2$ 15s 3d, exclusive of tear and wear. The fourteen employees engaged had received Sunday pay, that is, fifty per cent above ordinary pay — in all, $\pounds 6$.

Thynne chaired the conference. The organisations represented and the delegates were: Eastern Downs Horticultural and Agricultural Association (James Wilson, D. Lamb); Central Downs Agricultural and Horticultural Association (W. Deacon, G. Moulday); Border Agricultural, Horticultural, Pastoral and Mining Society, Stanthorpe (R. Hoggan, K. W. Scholz); Drayton and Toowoomba Agricultural and Horticultural Society, Toowoomba (W. R. Robinson, W. C. Peak); Wallumbilla Farmers Association (Geo. Williamson, T. W. Caswell); Logan Farmers and Industrial Association, Loganholme (A. Watt, Thomas Armstrong); Logan and Albert Agricultural and Pastoral Society, Beaudesert (W. H. Stephens, M. S. Smith); Agricultural and Pastoral Society of Southern Queensland, Beenleigh (Savage); Burpengary Farmers Association (J. A. Bourke, J. F. Fountain); United Pastoralists Association of Queensland, Brisbane (C. W. Murray); Zillmere Horticultural Society (J. Lang, H. Robinson); Lockyer Agricultural and Industrial Society, Laidley (A. Philp, Jnr, M. O'Keefe); Rosewood Farmers Club (H. M. Stephens, T. E. Coulson); Ipswich and West Moreton Agricultural and Horticultural Society, Ipswich (H. T. Hooper, P. W. Cameron); Gympie Agricultural, Mining

and Pastoral Society (S. Harding); Pialba Farmers Association (J. B. Stephens); Wide Bay and Burnett Pastoral and Agricultural Society, Maryborough (J. E. Noakes, Geo. Stuckey); Biggenden Progress Association (A. W. Baulch, J. H. Simpson); Degilbo Progress Association, Woowoonga (F. A. Griffiths, H. B. Griffiths); South Isis Planters and Farmers Association (I. H. Wells, H. Epps); North Isis Canegrowers Association (A. C. Walker, W. J. Young); Central Queensland Farmers and Selectors Association, Coowonga, Rockhampton (T. Whiteley, E. Adams); Marathon Pastoral and Agricultural Society, Longreach (J. H. McConnell); Pioneer River Farmers Association, Mackay (E. Denman, E. Swayne); and Herbert River Pastoral and Agricultural Association, Ingham, (J. Lely).

Officers of the Agricultural Department present included P. McLean (Under-Secretary for Agriculture), Professor Shelton (Instructor in Agriculture), J. C. Brünnich (Chemist), John Mahon (Dairy Expert), A. H. Benson (Fruit Expert), and A. J. Boyd (Editor, *Queensland Agricultural Journal*). Messrs J. V. Chataway, M.L.A., M. Battersby, M.L.A., P. Waller (Neusa Vale) and W. Soutter (Acclimatisation Society) were also present.

In welcoming the delegates, Thynne stated inter alia that the interests of the agriculturists of one part of the Colony were equally the interests of the agriculturists all over the rest of the Colony; the objects of the conference mainly were to discuss matters of mutual interest to the agricultural community:

It has fallen to me to hold the active administration of the Agricultural Department, and in this to give action to the wishes of Parliament and Government, and I hope from this Conference we will be able to get the material by which further to promote the interests of agriculture—my idea of the functions of the Department is that in the first place we should be able to give every agriculturist in this Colony useful information upon any subject bearing upon his business upon which enquiry is made. It is for this purpose that we have already secured the services of specialists...In this great question of agricultural education, which you now see exemplified in the establishment of this institution in the carrying on of experiments which cannot be effectively made by private individuals...or communicated to others with the same facility as through the Department...you will find the officers of the Department always ready to join and assist in every way in their power.

The conference dealt with the following papers: "Notes on Farming in the Wide Bay and Burnett Districts", "The Sugar Industry and Its Requirements", "Sugar Bounties", "Climatic Difficulties, Pests and Blights in the Northern Canefields", "Sub-drainage", "Importance of Chemistry to Agriculture" (J. C. Brünnich), "Bacon Pigs and How to Breed Them", "Farm Implements" (Professor Shelton), "Farm Servants and Farmers", "Irrigation in Queensland Agriculture", "The Cultivation of Wheat and Barley", "Breeding and Treatment of Dairy Cattle" (John Mahon), and "Farmers' Associations".

Resolutions passed by the Conference Recommendations Committee included inspection of cane weighbridges, protection of locally grown sugar against bounty-fed European beet sugar, requests for further conferences, inspection of pigs for human consumption, a proposal that drainage rights be investigated between farms, and congratulations to the Department on the selection of the College site.

Advertisement for students

With the successful conclusion of the Residential Farmers' Conference, the College was almost ready for student occupation. Professor Shelton had drawn up a prospectus for its operations, and students were sought by advertisement. The following circular appeared in the *Queensland Agricultural Journal*, Vol. 1, pp. 87–88, 1897.

(CIRCULAR NO. 1)

THE QUEENSLAND AGRICULTURAL COLLEGE, OPEN FOR THE RECEPTION OF STUDENTS, 1ST JULY, 1897.

EXAMINATION OF CANDIDATES, 30TH JUNE, 1897.

The College offers to Queensland youth a Direct Education in the Practice and Science of Farming. To carry out the intentions of the Government in this respect the School has been liberally equipped for its proposed work. This equipment (in part) embraces -

A competent staff of teachers; A Farm, consisting of 1,692 acres of land; Five Commodious Buildings; Dormitory Accommodation for 56 students; Three Breeds of Dairy Stock; Implements, Apparatus, and Library.

Plans for a Commodious Chemical Laboratory and Lecture-room have already been approved by the Minister. This building, it is expected, will be ready for the use of Students of the Second Half-year.

FEES—£25 per annum, payable half-yearly in advance, and a deposit of £1 as a guarantee against damage of buildings and furniture.

The fee covers board, washing (not to exceed ten pieces weekly), room rent, and lights. Each room is furnished with bedstead, bed, pillows, chairs and table. All other furnishings must be supplied by the Student.

LABOUR—Students work one-half of the time, a day of labour alternating with one of study.

The practical work proposed for students embraces, besides the care of Livestock and the operations included in Tillage and Harvesting, Fencing, Clearing and Grubbing, Tile-draining, and Construction of Farm Buildings.

COURSE OF STUDY

First Half-Year—

Arithmetic	Botany
English Composition	Agriculture (Lectures)
Drawing	

Second Half-Year-

Mensuration	Elementary Chemistry
English Composition	Agriculture and Horticulture (Lectures)
Drawing (Technical)	Agricultural Botany

Books and stationery are supplied by the College at actual cost price.

NON-RESIDENT STUDENTS—The Minister desires to encourage the attendance of Non-Resident Pupils, who are prepared to fulfil the College regulations in all other respects. The conditions of the admission of such Students to the privileges of the College may be learned upon application to the Principal.

Students should secure tickets to the College Station, located about one mile from the College buildings. All Passenger and Mixed Trains, except the Sydney Mail Train, stop, due notice having been given the Guard, for passengers to alight at this Station.

The Train leaving Brisbane at 6 a.m. is due at the College Station at about 9 a.m., and the Train departing from Toowoomba at 7 a.m. reaches the College Station at half-past 9 nearly.

Students travelling by the above Trains will reach the College, on the morning of the 30th of June, in time for the Examinations. The College teams will meet these Trains for Students and their effects.

Students travelling by Steamer are advised to proceed at once to the College on landing. Board and lodgings will be supplied such Students for the time that elapses to the opening of the College: provided notice of the wishes of the Student in this regard is given in advance.

For further information address-

THE PRINCIPAL,

Agricultural College,

GATTON.

The Queensland Agricultural College,

5th June, 1897

Staff

Professor E. M. Shelton had come to Queensland on 12 January 1890 as Instructor in Agriculture and travelled widely throughout the State addressing farmers on various agricultural matters, conducting wheat variety experiments and loudly proclaiming the need for an agricultural college and experiment farm. He had inspected several possible sites, alone and in company with the Under-Secretary and various Ministers, and drawn up the initial prospectus. On 25 June 1897 he was appointed Principal of the College at a salary of £750 per year—his starting salary with the Department of Agriculture. He had a staff of six men.

Johannes Christian Brünnich was both Chemist, Department of Agriculture, and Chemist, Queensland Agricultural College. Brünnich, who in 1896 was Manager of the Colonial Sugar Refining Company's mill at Homebush, Mackay, was appointed Agricultural Chemist to the Department at a salary of £350 per year and suggested a laboratory at the College would initially serve the needs of both the Department and the College.

Philip Mackenzie Pitt, English, Surveying and Mathematics Master, was appointed from 28 June 1897 at a salary of £250 per year. He remained at the College for 25 years, becoming also Secretary from 1 February 1899 and receiving an extra £50 in salary. He was given an assistant, usually a graduating student, for a short term before the student ventured into the outside world.

Joachim Samuel Hermann Schmidt was appointed Natural Science Master and Secretary from 25 June 1897 at £200 per year. He resigned on 1 April 1899 and later became a meat inspector with the Department of Agriculture.

Harold Cecil Quodling, Farm Foreman, was appointed on 4 January 1896 to prepare the farm for the first student intake, at a salary of £156 per year. On 1 August 1898 he became Manager of Westbrook State Farm and in 1901 he became Manager of Hermitage State Farm. On 1 January 1905 he took over from Peter McLean as Agricultural Inspector at the salary of £250 per year.

Hugh William Gorrie, Horticulturist, an ex-student of the agricultural classes at the Watt College, Edinburgh, and for six years in charge of the propagating and forwarding department of the Queensland Acclimatisation Society, took up duty in March 1896. In a short time he had formed a fine vegetable and fruit garden near Lockyer Creek and laid out and planted the gardens around the main building and an avenue of plane trees and pepper trees from the College hall to the railway siding. He was appointed at a salary of £156 per year. On 1 December 1898 he was appointed also a lieutenant in the Queensland Defence Force (Land), but unfortunately died on 12 February 1900, at the age of 33 years.

Robert F. N. Quinn, Superintendent, Mechanical Department, was appointed on 1 July 1898 to oversee buildings and machinery.

The College opens

The foundation students

P. M. Pitt took up duties as English and Mathematics Master on 28 June 1897 and on the opening of the College on 1 July superintended the entrance examinations. On the opening day, twenty-three young men presented themselves for admission and were duly entered as students. The numbers were rapidly augmented and before the end of the first term in December the enrolment had reached thirty-four. The foundation students came from nearly every settled portion of Queensland, both agricultural and pastoral. Their average age was a fraction over eighteen years. Nearly 90 per cent announced their intention of making farming the business of their lives.

Pitt found the young men were, with few exceptions, very backward in both English and arithmetic. The spelling of many of the candidates was decidedly bad, and their ideas on English composition were very elementary. He suggested that in future such students should be put into a "preparatory class", in which they would be required to remain for one term before commencing the regular College course. By this means all would be enabled to start their first year's work on practically the same footing.

The foundation students are listed as follows:

R. E. Soutter E. Youngman J. L. Redmond C. L. R. Jaggar W. H. C. Mayne J. H. B. Preston J. Norris A. L. Brawn R. St G. Sigley A. McKinnon W. A. McIlwraith F. G. Johnson A. C. Julius A. E. Anderson P. Hunter E. R. Rutledge W. A. Dunlop A. A. Nott W. H. Gillham G. E. L. Watson

B. F. Whitehouse G. Tate C. J. C. Philp S. Wilson D. E. Green W. Palmer N. W. Philp F. H. Palmer L. C. Stupart G. W. Jackson C. H. Culpin V. C. Pugh P. R. F. Grant E. R. Isaacs P. M. Bayley A. R. Walker H. C. Webb C. Barth A. C. Reid

Course of study and work

The underlying idea of the course of study and work followed from the inception of the College involved manual labour and class work and preparation for it, in about equal

portions of the students' time. The school was divided into two nearly equal divisions, working on alternate days in field and classroom. Every student was expected to take three studies, a rule only departed from for special reasons. In addition to the above, a system of industrials or education work was performed. On the day given to class work, the division thus occupied devoted three hours to labour, which as far as possible was made instructive and illustrative. During the initial year the industrial, because of the need for more facilities, was mainly the use of tools in carpentry. After a preliminary trial a three-year course of study was devised as follows:

First year

- First term—arithmetic; botany; English composition; drawing; industrials—farming, gardening, carpentry.
- Second term—arithmetic; botany; English composition; drawing; industrials—farming, gardening, carpentry.

Second year

- First term—agriculture (lectures), sixteen weeks; botany, six weeks; physics; elementary chemistry; mensuration; farm bookkeeping, two hours per week; industrials—farming, dairying, blacksmithing.
- Second term—horticulture; entomology; chemistry—laboratory work; technical drawing, two hours per week; industrials—farming, horticulture, dairying.

Third year

- First term—anatomy and physiology; organic chemistry—laboratory work; agricultural geology; industrials—farming, horticulture, dairying.
- Second term—agriculture and stockbreeding; bacteriology; agricultural chemistry; veterinary science; industrials—special work which, in the case of students sufficiently advanced, may embrace laboratory work and application in the field of the sciences of the course.

The editor of the *Queensland Agricultural Journal* described the daily routine for students thus:

At 6 a.m. the bell rings, and in a short time the hive is astir. Tools are served out, and all but the ploughing squad get to work at some useful employment near the house until breakfast time, 8 a.m. Meanwhile the horses have been fed and groomed, the cattle and swine attended to, and all is ready for the solid business of the day directly after the morning meal, which is substantial, well cooked, and neatly served. It should be mentioned that at 7 a.m. Mr. Shelton holds an "assembly" at which all are present, unless specially exempted. At this assembly the orders of the day are given out, and the students receive ten minutes of wholesome advice and instruction from the Principal on the subjects of morality, deportment, duties towards each other and the authorities, etc.—an excellent practice which cannot fail to have a good effect on the present and future lives of the students. (Boyd, A. J., *QAJ*, Oct. 1897, p. 275)

Boyd did not mention the evening program, namely, two and a half hours study by the students in their bedrooms each evening without supervision, using a kerosene lamp, and then to bed—a routine that was very contentious during the foundation year.
Official opening

The opening of the Queensland Agricultural College was described in the *Queensland* Agricultural Journal (Vol. 1, 1897, pp. 172–177).

The official opening of the Gatton Agricultural College took place on Friday, 9th July. At the invitation of the Minister for Agriculture (Hon. A. J. Thynne), the ceremony was performed by His Excellency the Governor (Lord Lamington). A large party of members of both Houses of the Legislature and other gentlemen visited Gatton, and lent countenance to the function. Amongst those who travelled by the special train to the College were:- His Excellency the Governor, accompanied by Captain Pelham, A. D. C., Hon. A. J. Thynne (Minister for Agriculture), Hons. P. Perkins, J. T. Smith, A. C. Gregory, J. Cowlishaw, F. T. Brentnall, W. Forrest, W. G. Power, A. H. Barlow, B. D. Morehead, J. C. Heussler, and G. W. Gray, MM.L.C.; Hon. R. Philp (Minister for Works), Hon. D. H. Dalrymple (Minister for Education), Hon. J. R. Dickson (Minister for Railways), and Messrs. Groom, Smith, Daniels, Murray, Castling, Stewart, Kidston, Battersby, King, Browne, Boles, Newell, Cribb, G. Thorn, A. J. Stephenson, Jackson, Cross, Dibley, and Bell, MM.L.A.; Mr. P. R. Gordon (Chief Inspector of Stock), Mr. A. H. Benson (fruit expert), Mr. J. Mahon (dairy expert), Mr. A. J. Boyd (editor of the Agricultural Journal), Hon. W. J. M. Larnach (New Zealand), Messrs. C. J. Pound, G. Woolnough, F. W. Ward, H. Tryon, C. A. Bernays and J. G. Anderson.

The party were met on arrival by the Under Secretary for Agriculture (Mr. Peter McLean), and Professor Shelton, and under the guidance of these gentlemen, made a thorough inspection of the College premises and the lands which so far have been worked. In consequence of the long prevalent unfavourable season the fields presented a rather parched appearance, and the little cultivation that had been attempted could hardly be taken as illustrating either the value of the methods employed or the potentialities of the land selected for the initial efforts.

The guests spent two hours inspecting the College then assembled at luncheon in the dining hall. Subsequently, at the invitation of the Minister, His Excellency the Governor and the visitors adjourned to the main lecture room, where the students were assembled and where the opening ceremony was performed.

Professor Shelton said:

Your Excellency, Mr. Thynne and Gentlemen...I should say a word to you this afternoon concerning the work of the last six months in connection with the organisation of this College... There had not then been a single acre cleared, and not a furrow had been turned up to the time of commencing operations in November last...We had not a single field, not a building upon the place except a rude hut on the banks of the Lockyer; and when we came here on the 1st of January, we had to turn our teams out and go to work with one eye regulating the work and the other on the horses for fear they would escape.

Then he outlined the building and fencing programme achieved and added:

In all our plans and calculations in respect to this school, we have proceeded with the idea foremost that the school must, as soon as possible, in all practical respects, be self-sustaining; that we must here, upon the place, grow our own potatoes, vegetables, maize, wheat and hay...We shall, I hope, soon make our own butter, and it will no doubt interest you to know that we begin killing our own beef next week.

Alluding to the twenty-four original students before him, he said:

Of the twenty-four students, exactly twenty write themselves as expecting to be farmers. Two state their intentions to be graziers. One is uncertain, while another gives a mercantile profession as his aspiration... the boys came here...meaning business...I believe in conclusion, Your Excellency and gentlemen, that among all the enterprises inaugurated in this jubilee year of Her Majesty, none will tell of greater good to the colony than this Agricultural College,

which is not merely for the development of farming, but to induce experimental work. We hope to bring forth new facts, new truths in agriculture...On behalf of myself and the pupils I welcome you to the school. I hope your stay has been a pleasant one, and that you have been enabled to see something of our hopes and aspirations.

The Hon. A. J. Thynne, supplementing Professor Shelton's remarks, said that the total expenditure to date on buildings was \pounds 5070, and the outside expenditure on purchase of machinery and stock was \pounds 3854 6s 0d, giving a total outlay under \pounds 9000.

The Department is charged with the price of the land at the rate which would have been charged for it had it been selected—something over £6,000. So that the total cost of this magnificent estate, which is now devoted to future generations in the great cause of agriculture, stands to this colony at a cost of under £15,000...Although I set great store on the necessity of advancing agricultural education, I do hope the efforts of the Government will not be limited to that branch of industry. In presenting these students to Your Excellency today, I cannot ask you to speak to them without feeling a great amount of grave anxiety as to the future these young men have to make for themselves. I look upon them as the pioneers of what I hope will became an army of agriculturists, who will in the future, instead of engaging in bloody battles, fight peaceful ones for the development of this magnificent country we have at our disposal. We who have, most of us, gone through the battle of life cannot but look with fatherly interest and goodwill upon the young men who are now commencing to pursue their course. I ask you now, Your Excellency, to declare this institution open.

His Excellency the Governor said:

Mr. Thynne, Principal Shelton, and Gentlemen,—I have indeed great pleasure in being here today, and at having had an opportunity of inspecting this institution. I think what I say will not be regarded as over-complimentary—for my opinion, I think, will be endorsed by others who like myself have come as strangers to the place—when I say that it is wonderful what has been done in the short space of time mentioned by Professor Shelton. Further, having inquired into what is the organisation and the proposed system of instruction, it seems to me to be most complete, most thorough.

I understand that every conceivable branch of agriculture will be thoroughly developed, and that training will be afforded for those anxious to undertake even the minor industries of poultry and bee keeping. It pleases me to see what comfortable, and at the same time what modest and simple, buildings have been erected for the resident students; also I observed in the various rooms that notices have been fixed indicating that, without undue severity of laws, there is to be a certain amount of disciplinary provision. I think it is interesting to know, as I understand from the Minister of Agriculture, that three days a week are to be devoted to lectures and what I might call bookwork, and three days to manual or field work. The three days in the field are, I understand, to be a financial recompense for the instruction that is given to the students on the other three days, and it is very gratifying to hear from Professor Shelton that the institution is to be self-supporting.

The most important thing of all is the magnificent area of land which is attached to these buildings—an area, I understand, far larger than is possessed by any other agricultural College in the neighbouring colonies, chiefly so because we rejoice in large areas. It is a further particular advantage that within the 1,700 acres around us you have three distinctive features of soil. First of all, you have rich land which can be easily cultivated; then the poorer land, such as these buildings have been erected upon, and which ought to afford useful lessons as to the best means of deriving profit from inferior soils; and again between us and the railway station is a marshy tract where valuable instruction may be given in systems of drainage and so on.

I think the Government of Queensland have taken a right step in bringing about the establishment of such an institution as this. I understand it is the first College in Queensland, and very rightly the inauguration of the first college in Queensland should be that connected with agriculture, upon which this country is bound to look in the future as its great mainstay and most productive industry. In these days, when we seek world-wide markets, success in competition depends upon two primary factors: one is that your goods should be of the first

quality; and another, that they should be produced at the lowest possible cost. There are the two necessary factors in regard to competition when you seek it outside of your own country. Also, there is an indirect benefit—a smaller one—which should result from such an institution as this. Where industry is stimulated in the direction of the manufacture of goods of the best quality, it gives to the general public standards of excellence, educates their tastes, and in one way and another stimulates the whole of the producers of the country.

This institution may be regarded as a centre in which may be focussed the agricultural information of the world. It is a kind of clearing house, and those who attend the lectures and are resident students, will become possessors of knowledge obtained, not only from the experimental grounds, but from the experience of men in every other civilised country. One feature, which I have already alluded to, I think is of the utmost importance. It is that the students should have some sort of discipline. They should learn habits of industry, and how wisely to distribute their hours of labour. Above all, supreme attention should be given to the development of their faculties of observation. These are all qualities absolutely essential in these days for the career of a successful farmer. Those who have merely a technical knowledge of the theories of agriculture, and go to work on plans which they have seen applied in the old country—those who engage in farming without practical experience—generally spell failure for themselves. Not that I disregard the importance of ordinary farm life. But in ordinary farm life, in modern times, you cannot acquire that scientific knowledge which is essential in these times.

As regards the scientific instruction it is proposed to give, I do not know the list of subjects; but I imagine it is intended to give the students some acquaintance with botany, entomology, natural science, and so on. It has become necessary, in order to produce satisfactory articles, to have a groundwork of scientific knowledge to go upon. This institution may be regarded as the generalisation of the agricultural knowledge of the world. It may be called a kind of reservoir in which everything that is known or ascertained in regard to a particular science may be stored. Those who go out of it will, like rivulets from some system of irrigation, carry into their own localities all they have learned and gained, and afford a healthy stimulus to their neighbours in the development of the riches of the soil.

I do not think our Anglo-Saxon race can be said to be very observant of detail. We do not take enormous or minute pains about anything we engage in. This is more generally the case where the country is young, and where there is no pressing necessity to take advantage of every opportunity that offers itself or to carefully finish every detail of the work we have in hand. That is a characteristic which cannot be gainsaid. Here, I am confident, one lesson that will be taught will be to pay the most minute attention to the treatment of every inch of ground and to see that nothing is wanted to produce to the best degree every plant which may be grown. It is only by careful attention to detail that one can command success, and perfection is only attainable after immeasurable trouble. Genius has been defined as an infinite capacity for taking pains. Whether that is a correct definition I cannot say; I only hope that from time to time there will issue from these buildings, and go into the larger world, batches of thoroughly equipped geniuses.

In this country there are to be found none of the adverse circumstances which are encountered in plenty of places elsewhere throughout the world. I have noted that such-and-such a branch of agriculture cannot be pursued without extraneous aid from the Government. I do not believe in doles or sops from the Central Government, and from what I see has been done already by the residents of Queensland—their neat homesteads, the satisfactory exhibitions of their productions, and their general contentment with their position at the present time and with their future prospects—I cannot credit that, with the industry and the energy of the inhabitants of this colony, there is any necessity, except in peculiar circumstances, to ask or invoke Government aid.

I would say that if there is one defect in Queensland it is that Nature here is almost too prodigal. In the case of individuals, as with mankind, adversity oftentimes produces success. We have instances where countries have come to the fore under the worst conditions. I think that, if, in Queensland, the advance is in the right direction, there is a great and glorious future awaiting the residents of this country.

Students, when you go out into the world it will not be to engage in warfare. You have not to subdue some unfriendly foe. Nature lays before you, for your use, her best resources. Your

enterprise is indeed a peaceful one, and the furrows you will plough here or on the bosom of the rolling downs will serve to reveal rich treasures that are hidden. Your advance in time will take place on the great Western plains, and these will blossom in your wake. Corn, wine, and plenty will spring where you have trod. I have the greatest pleasure in inaugurating an institution which I believe is fraught with the utmost promise for the future development of the riches of Queensland.

I believe Parliament has been wise in undertaking such a work as this; and I think the thanks of the country are due to those gentlemen who have organised and carried out this project.

Above all, I congratulate those who come here, as the first recruits of the great army which is to develop the lands of the colony in the future, upon the facilities which are offered to them here to prepare for a career which is one of the most beneficial that is open to mankind. With these words I beg to thank you, Professor Shelton, for the opportunity you have afforded me of being here today; and I have the utmost pleasure, with the fullest hopes of its prosperity, in declaring this Agricultural College now open.

The foundation students were certainly well provided with practical experience in "industrials", the main item of which was carpentry. R. F. N. Quinn, the officer in charge of the Mechanical Department, reported in July 1897 that the twenty-eight students enrolling had not the slightest knowledge of the use of tools, and consequently had to be taught to handle and use the simplest. By January 1898 fifty students were enrolled and with the assistance of a "journeyman" carpenter and part-time carpenter and bricklayer they took part in the first year in the erection of a five-roomed cottage, a meat store under the dining roam (including a butcher's shop), a carpenter's shop under "A" dormitory, a cottage for the farm foreman, a farm implement store under "C" dormitory, a shelter shed for bulls, a cottage for the herdsmen, and a windmill with pump and pipes for water reticulation; fixed a steam pump on Lockyer Creek and laid out 1000 feet of irrigation piping; erected a new silo; prepared plans and specifications for a new dairy; built a cool room, and also did all the painting.

H. C. Quodling, the farm foreman, under the direction of the Principal, also reported a busy first year for the students. This included further clearing of timber, including stumps, using the "Forest Devil"; building about sixteen miles of fencing, including a stockyard and pigyard; sinking a well at the northern foot of the hill, finding ample water at 47 feet; making 20 chain of roads; feeding cattle, pigs and horses; and handling a variety of crops—maize, lucerne, red kaffir corn, natal grass cut for hay, millet, teosinte, pigeon pea, grains, *Paspalum dilatatum* (brought from New South Wales by John Mahon), flax (linseed), hairy vetch, potatoes, oats, cape barley, wheat, cowpeas, castor beans and pumpkins. Cowpeas had been introduced as a result of a recommendation by Professor Shelton as a soil renovating crop, as well as for fodder. The two silos, No. 1 ($12 \times 12 \times 16$ ft) and No. 2 ($12 \times 16 \times 6$ ft) were filled with a mixture of maize, red kaffir corn, pigeon pea, teosinte and lucerne. Details of crops—sowing rate, planting distances, yields and uses—were recorded.

In the Horticultural Department, under Hugh W. Gorrie, student work was distributed over the grounds, orchard, vineyard and vegetable garden. Twenty acres of ground around the buildings were cleared and grubbed, the timber was burnt and gardens were laid out, with shrubs and ornamental trees planted. Six acres of orchard on the alluvial soil near Lockyer Creek were planted with fruit trees suitable to the district and some grapevines. Two acres of Marguerite and Pink's Prolific strawberries gave a heavy and much-appreciated crop, being watered by bucket, hand-manoeuvred by a windlass set up over the creek. The vegetable garden provided a liberal supply of cabbages and cauliflowers for College use, with the surplus sold at 5s to 6s per dozen for cauliflowers and 4s to 5s per dozen for cabbages, to farmers mainly between Gatton and Helidon.

Asparagus, onions, rhubarb and other common vegetables were grown and experimental plots of eight varieties of kidney beans, pineapples, fibre crops (sisal hemp, *Agave sisalana*, and Mauritius hemp, *Furcraea gigantea*) and twenty-four varieties of potatoes (twenty-one from Tasmania and three from Kansas, USA) were planted, including Carmen and Bismarck, which were later to become very popular in Queensland.

Gorrie recommended that a separate team of horses and set of implements be allotted to him, that a spraying plant be purchased, that a toolshed, seedroom, packing and drying shed, stables and cartshed be erected, as well as a residence for the horticulturist within the garden area to prevent pilfering. (Gorrie rode a horse to the College each day from Gatton, some four miles away, where he lived!) The stealing of melons seemed to be a common student pastime.

J. C. Brünnich, Agricultural Chemist, was appointed on 31 March 1897 as Chemist to the Department of Agriculture and to the Queensland Agricultural College, at a salary of £300 per year. As the appointment of a chemist to the Department was a new one, and pending the establishment of a laboratory for the carrying out of analytical work, he paid a visit to the agricultural laboratories in Sydney and Melbourne, and the chemists there, Messrs F. B. Guthrie and A. N. Pearson, supplied him with data and facts for his guidance in the establishment of such a laboratory. At the same time, he visited the magnificent chemical laboratories at Sydney University and paid short visits to Hawkesbury Agricultural College and to Wagga Experiment Farm. He saw that a laboratory was needed not only for the Department but also for the successful teaching of chemistry at the College.

In order to reduce expenses the Minister decided, on Brünnich's suggestion, to erect a laboratory building, which would serve both purposes, at the College. The building was completed towards the end of 1897 and the fittings were completed towards the end of May 1898. A full range of equipment, installed to carry out analytical work, included a polariscope, a furnace and a gasoline plant. The laboratory was described in detail in the *Queensland Agricultural Journal* of October 1898.

Although chemistry was not scheduled to commence until January 1898, Brünnich found it necessary to start a class of seven of the more advanced students; the main class of twenty-four students started as planned in the second term, with basic physics and chemistry.

The laboratory was ready to start analytical work in July 1898 and Brünnich prepared a schedule of fees to be paid by the public for special analyses they might request.

Reporting on the library's progress and donations to the College, Professor Shelton said:

I have great pleasure in reporting that we already have the beginnings of a library. During the year nearly 600 volumes have been obtained, including the ninth edition of the Encyclopaedia Britannica, itself a library. Our purchases of books have, aside from this, been largely agricultural and horticultural. A good many books of general scientific interest have also been secured, as well as a small number covering more general topics. These books have seen good service during the year, and have been freely consulted by teachers and students.

The reading room has been well supplied with newspapers during the year, some twenty papers having been received and filed. This room is always open to students, and I need hardly say, has been almost constantly in use during leisure hours.

Below is given a list of various gifts made to the College by interested friends during the year. Several of these donations are of such intrinsic importance and value as to merit much more than such passing notice. During the second term, Miss Munroe (Mrs. Philp), in conjunction with lady friends of Brisbane and Maryborough, raised funds sufficient to purchase a magnificent piano, which in due course was presented to the College. This instrument, manufactured by Metzler and Co., London, is a boon that is sure to be appreciated in a community, located as the College is, quite out of the reach of the ordinary diversions of Queensland life. This graceful and generous action of Mrs. Philp and her friends will be gratefully remembered by future generations of Queensland College boys.

Denham Brothers, of Brisbane, have, with great liberality and enterprise, placed in the College Dairy one of their Sharples Separators of the turbine type. This machine, furnished with boiler, tank, and all necessary piping, without cost soever to the College, is a most complete and useful dairy plant. The following is a list of the principal donations made to the College during the year, with the names of the donors:

Piano, Metzler and Co., London-Miss Munroe (Mrs. Philip) and ladies of Brisbane and Maryborough.

Sharples Separator, with boiler, tank, and piping complete—Denham Brothers, Brisbane.

Journal Chemical Society of England (16 vols.)—Edgar Hall, Tenterfield.

Coates' Herd-book, 18 vols. with catalogues, books-Mr Hull, Ingham.

Two Berkshire Pigs—W. R. Robinson, Toowoomba.

Trees, Shrubs, and Bulbs-Geo. Moulday, Allora.

Garden Seeds-Barteldes and Co., Lawrence, U.S.A.

Garden Seeds-J. Williams, Mount Gravatt.

Garden Seeds-Arthur Yates and Co., Sydney, N.S.W.

Garden Seeds—Sutton and Sons, London.

Two Dozen Trees-Curator, Botanic Gardens, Toowoomba.

Aerator and Strainer for milk-W. Dobson, Warwick.

A large collection of domestic and foreign wools has been secured, largely through the kind offices of Mr. P. R. Gordon, Chief Inspector of Stock.

The College progresses

Wheat experiments

In addition to his duties as principal, Professor Shelton continued to be interested in wheat varieties suitable for Queensland conditions. He sowed 340 varieties of wheat in experimental plots on a fertile heavy clay loam at the College in June 1897 with the main object of selecting for rust resistance. No rust occurred during the winter but in mid-September most varieties were severely affected, the least troubled being a dozen hybrids developed by William Farrer of New South Wales.

Natural Science

Natural Science studies were in the hands of Hermann Schmidt, who also acted as College secretary. From the remarks of students, he was a gifted lecturer, but his botany lectures could not be followed up by practical work in the field or in a laboratory, and he had very little time or equipment to seek out specimens for class work. There were no microscopes. This lack of practical periods was cause for complaint from the student body.

Resignation of Professor Shelton

Irked by the somewhat severe rules with regard to recreation and the use of the gift piano, and the strict regulations with regard to prolonged study in the bedrooms at night from 7.00 to 9.30 p.m. under unsatisfactory conditions, the lack of classrooms, microscopes and desks, and the lack of holidays and transport for church attendance, and possibly sensing the approaching end of the scholastic year, the students staged a demonstration on Monday night, 9 May 1898, by throwing stones and earth upon several buildings and also aiming at random at anyone who ventured outside. This continued intermittently until 16 May.

One student was caught in the act. At a subsequent staff meeting, one student was expelled and another suspended for twelve months. Professor Shelton reported this action to the under-Secretary, saying: "On Monday, 9 May, there seems to have been a conspiracy on the part of the bolder and more lawless of the students, which culminated in a night of disorder and violence which I do not remember to have seen paralleled in my experience with college work."

The treatment of the students so reprimanded, and growing dislike of Shelton's handling of students and his organisation of the curriculum, led the student body to petition the Hon. J. V. Chataway, who had replaced Thynne as Minister for Agriculture on 2 March 1898. In a seven-point petition the students indicated their dissatisfaction, culminating in point 7: "Perhaps more than anything else, the cause of the ill feeling is the unsympathetic way in which the Principal treats the students." Thirty-seven of the original thirty-nine students signed the petition. Meeting one dissentient at the College Jubilee celebrations in 1947, the author enquired why he had not signed, to which he replied, "Because the Principal had a pretty daughter!"

Professor Shelton was given the opportunity to reply to this petition by the Under-Secretary and gave his side of the story: no classrooms or desks were available yet; an excess of practical work was needed to get the College into running order quickly; the maturity of the students should mean they did not require supervised study; many students were town boys, not used to rural life; the use of the piano in the dining hall interfered with study and the sleep of the kitchen staff, who had to rise early; and so on.

The Under-Secretary, on behalf of the Minister, instructed John Mahon, Dairy Instructor, and Albert H. Benson, Instructor in Fruit Culture in the Department, to visit the College and individually submit reports on the dairy herd and dairy and the College orchard. Mahon was rather disappointed with the dairying section, particularly with the fact that no production records of the dairy cattle were kept and that no dairy produce was manufactured. Benson was generally satisfied with the orchard, although thorough pruning was needed.

On 9 June 1898 Chataway arranged a thorough enquiry at the College, which he chaired. He invited six staff members—J. C. Brünnich (Chemist), P. M. Pitt (English and Mathematics), J. H. Schmidt (Natural Science and Secretary), H. C. Quodling (Farm Foreman), H. W. Gorrie (Horticulturist and Superintendent of Grounds) and R. F. N. Quinn (Mechanical Department)—to give individual evidence, and twelve students, with one group of five older students and one group of four younger students to collectively contribute. The Hon. J. Leahy, M.L.A., was present during the enquiry. The general consensus was that the Principal was too autocratic, would not delegate authority, had no discipline and was too severe on the students regarding study requirements and recreation.

Professor Shelton was then called and defended his actions. He showed he was not unsympathetic but he did desire to get on with the establishment of the College, and probably was a little hard on the students with regard to recreation. It is interesting that he did not wish to give the Good Friday holiday but finally agreed, as in America to this day, Good Friday is not a public holiday.

The upshot of the enquiry was that Professor Shelton tendered his resignation as from 30 June 1898. ("Management of Agricultural College, Gatton. Resignation of Mr. E. M. Shelton", *Qd Parl. Papers*, 1896, pp. 3–16) It was a sad end to Professor Shelton's eight years of dedicated service to the Department of Agriculture and much more use could have been made of his knowledge within the Department had he not chosen to return to America. He had a vision for the College that his successors took another fifteen years to comprehend.

The College under John Mahon

John Mahon was appointed Principal of the College on 1 July 1898, at a salary of \pounds 500 per annum plus a \pounds 75 quarters allowance and \pounds 50 entertainment allowance. He was only thirty-six years of age.

Mahon was especially qualified for this appointment, having had extensive dairying experience in Victoria before being appointed to Queensland; he added to this seven years' travelling in northern Queensland, and later in southern Queensland in charge of Travelling Dairy No. 2. He and Baron Jones, who was in charge of Travelling Dairy No. 1 in southern Queensland, firmly established the dairying industry throughout the State. Mahon had dedicated a good deal of time and persuasion to the establishment of co-operative dairy factories and to the use of better-bred dairy cattle and pigs and the adequate nutrition of both, and was a keen advocate of the conservation of crops as silage and hay for winter feeding. He had an excellent rapport with the farming community, both in private visits and at conferences and at agricultural shows. He had become Dairy Instructor with the Department of Agriculture and Stock on 1 July 1897 after the closure of the Travelling Dairies, and continued to travel the State discussing dairy improvement. He had also assisted in inspecting land made available for settlement under the terms of The Agricultural Lands Purchases Act of 1894, to assess its suitability for agriculture.

Chataway introduced Mahon to the students at the opening of the new term in July 1898, admonishing the students to observe good behaviour and to report complaints to the Principal, who would endeavour to deal fairly with the matter and involve the Minister only as a last resort. Church attendance would be encouraged. In reply, Mahon promised to work with the students in furthering Queensland's agriculture and assured them that he and the staff would be sympathetic to reasonable suggestions from them.

In the reorganisation of the staff Major A. J. Boyd, Editor of the *Queensland Agricultural Journal*, took over the secretaryship from the Natural Science Master, Schmidt, also continuing his editorial work. On 1 January 1899 he handed over the secretarial work to P. M. Pitt, who, with an assistant, carried it on in addition to his English and Mathematics teaching.

Charles McGrath, Assistant Instructor in Dairying in the Department, became Dairy Instructor at the College on 1 July 1898 at a salary of £156 per year.

H. C. Quodling, Farm Foreman, was transferred to manage the State Farm at Westbrook and on 1 August 1898 Alexander Watt from the Gindie State Farm replaced him at the College.

Hermann Schmidt resigned on 1 April 1899 as Natural Science Master and later became a meat inspector. He was replaced by Peter Sutherland, B.A. (Sydney), who had taught at Ballarat College and at Longerenong Agricultural College in Victoria, which had closed early in 1898 because of a water famine.

In addition to the regular staff of masters, visiting technical officers of the Department gave educational help. W. C. Quinnell, M.R.C.V.S., visited the College each week giving lectures and demonstrations in veterinary science, and R. S. Nevill, Tobacco Expert, E. H. Rainford, Viticulturist, and A. H. Benson, Fruit Expert, visited the College to lecture and to supervise experimental plots of tobacco, vines and fruit trees respectively.

The College, under the control of the Department of Agriculture and Stock, became a link in the chain of promotion of officers as they gained seniority in the Department. They widened their experience in the field of education, while bringing to the College knowledge gained in their special fields within the Department, especially knowledge of a practical nature gained in country districts.

Mahon introduced a more informative approach to the instruction of the students, recording each cow's milk production, testing its quality, introducing feeding tests with different rations for both cattle and pigs, and telling students reasons for adopting such special practices.

Mahon's desire to inform students of his actions led to an amusing incident. He was judging pigs at a district agricultural show and met up with a rather poor-quality pig in one of the classes. In reply to Mahon's rather derogatory remarks, the owner blurted out, "Well, it was bred at Gatton College." Mahon there and then decided that every stud animal leaving the College would carry an identification tag in its ear—"Bred at Q.A. College"— and had tags made in Brisbane. Lecturing his students soon afterwards, he told them of his action, handing a tag around the class and continuing his lecture. The last student to receive the tag promptly pocketed it, Mahon having forgotten it as he continued with his

subject. A few days later students were making hay in one of the paddocks when they startled a kangaroo rat. They ran it down and attached the tag to its ear before releasing it. Mahon delighted in early-morning shooting at hares and took a student with him for company. That morning it was Bert Moran, who later told the tale. Soon after they entered the hunting area out hopped the tagged kangaroo rat and Mahon successfully brought it down with the shotgun. Excitedly he said, "Get it, Moran, get it!" Moran, laughing to himself, retrieved the animal and brought it back to Mahon, who discovered the tag, "Bred at Q.A. College", in its ear!

A problem Mahon encountered early in his new position and one that continues in such institutions was catering for students who did not wish, or whose parents did not wish them, to undertake the full course of three years' study. The parents said they needed the student to help on the home farm, or, if their specialty was in one or two areas of agriculture, they saw no need for the students to take the full suite of subjects.

Mahon's approach was summed up thus:

It would seem to be ill advised...to endeavour to force the knowledge to be gained within the limits of a given time...in each and all branches of agriculture. It were wiser for those who intend to remain, say, a year to devote the whole of that time to one subject and learn it thoroughly. Another argument against the multi-subject course is the fact that some boys have an unconquerable dislike to or inability for bookwork, and at the same time have a great liking and ability for field work. In these cases, to force lads, whose intention is to pass their lives as farmers, to undertake what is to them a hopeless drudgery, is a sheer waste of time, and almost amounts to cruelty. Acting upon this hypothesis, I have during the past year, the acquiescence of the parents being previously obtained, initiated a system of special work, under which students devote themselves to particular kinds of work. This system has been found to work well, but restriction of numbers of such students for dairy work was necessary as demand was too great. However, for the third-year men I feel that the theoretical and scientific teaching should be insisted upon, because the practical knowledge previously gained combined with the theoretical and scientific instruction will finish that course which the College ought to impart to those whose intention is to follow agriculture and who have, for that purpose, spent three years of their lives to gain that knowledge. Scientific and theoretical knowledge alone will not suffice for the farmer and from my experience, it would seem that those who have only attained that knowledge invariably endeavour to become teachers, and will not risk their training to prove their knowledge by becoming farmers. Science, theory and practice should go hand in hand. (A woman once used to call her husband "Theory" because he never worked but surely the theory must have first been wrong!)

Mahon continued:

Science, theory and practice should go hand in hand. The latter may stand by itself, but the two former will fail unless accompanied by practice. It is upon this basis that it is my intention to conduct the agricultural education of those who trust themselves to my guidance. (*An. Rept Dept Agric.*, 1898–99, pp. 11–12)

Because of the circumstances associated with the resignation of Professor Shelton, enrolments were down for the 1898–99 year, and practically no students applied for bursaries offered by the Government, providing a free education for three years. In an endeavour to show the dedication of the new Principal and the excellent progress of the College, Chataway, Minister for Agriculture, took a party of some seventy-three members of both Houses of Parliament and senior public servants to the College by special train on 10 December 1898. Among the company were six Members of the Legislative Council, four Ministers and thirteen Members of the Legislative Assembly, the Under-Secretary for

the Treasury, Lands and Agriculture, and the Deputy Railways Commissioner. They inspected the College buildings and the students at work.

Ploughing was in progress in one of the fields and the temptation to some of the visitors was too strong to resist: while others watched, M.M.L.A. McMaster and Smith took part in a ploughing match. "So far as ploughing was concerned, their hands had not forgotten their cunning. They were not, however, heard to express any regret that ploughing did not now form one of the ordinary occupations of their daily life!"

Mahon told the gathering that in the next eighteen months the College would be self-supporting. Although he did not think that was the desire of the Government, if the College could show the students that it was making a profit from the dairy and the farm they would be more anxious to go in for the business themselves. They were making their own butter and cheese and soon would be making their own bacon. He would like the students to do more practical work, and forty-five per cent of the parents asked for this.

After lunch Chataway addressed the gathering. He said, inter alia, the College in a few years' time would be the pride of the Colony. He asked those who had seen the College that day to spread far and wide what they had seen there and speak of the work done there. They hoped to send weekly shipments of butter to Earl's Court in London for public display and also to participate in the International Show in London in 1899.

Building developments

During the 1898–99 year an updated cowshed to accommodate 40 cows, attached stables to house 30 horses, a barn to store and chaff fodder, houses for the English Master and the Horticulturist (the latter within the orchard) and a gymnasium for students were built under contract. The original dairy was redesigned and updated to include refrigerating chambers, a milk testing room, an ice-making plant, a pasteurising plant and sundry equipment. A blacksmith's shop was erected, a new piggery to house 160 large and 250 small pigs was built to a modern design, and seventy chains of road were constructed between the railway and the College buildings.

By mid-1900 poultry yards and an apiary of fifteen hives had been provided, and in August of that year the electric lighting of the various buildings was carried out by Mr L'Estrange of Barton and White of the Brisbane Electric Supply Company. In October 1900 a road forty chains in length from the dairy to Lockyer Creek, using the "American Champion Road-making Machine", was laid down under the approving eyes of various representatives of municipal councils and divisional boards as well as students.

A water supply from Lockyer Creek was installed to provide water for the houses, sheep paddock, new stables and cowsheds, complete with four large wrought-iron tanks in the horseyards. A cottage for the stewards' quarters connected with the dining hall, and a calf shed (32×30 ft), an implement shed, blacksmith's shop, harness and tool room complex (155×37 ft) completed the "farm square". Another silo ($18 \times 18 \times 16$ ft inside measurements) with a concrete floor was erected. The old silos were pulled down. Timber from the old buildings was used to erect bacon-curing rooms, one (10×10 ft) containing brine tanks, one (8×10 ft) for a drying room fitted with a fan, and one (8×10 ft) for a smoke room. A large

hayshed $(90 \times 75 \times 23 \text{ ft})$ was erected on the banks of Lockyer Creek and a shed was built to house manures for experimental purposes. An insulated cheese room $(15 \times 12 \text{ ft})$ was attached to the dairy and a pasteurising and cooling plant was installed.

In March 1902 the new hayshed was destroyed by fire, causing a loss of fodder valued at £3200. A new hayshed ($75 \times 51 \times 17$ ft) was built to replace it during 1903–04. During 1906 and 1907 a road was completed from the railway siding to Tarampa Road, using the College bullock team to form the road and the "American Champion Road-making Machine" to complete it. Two new silos were also built, one of galvanised iron (60 tons capacity) and one of fibro-cement (120 tons), giving three silos with a total capacity of 220 tons. However, these two new silos provided unsatisfactory silage and a pit silo was excavated in the hayshed (18 ft in diameter and 23 ft deep), which produced excellent silage. A concrete silo was built during 1909–10. The galvanised silo was too thin so variations in temperature affected the material, and it was not airtight. Heavy loss of spoiled silage occurred in the fibro-cement silo and it fractured easily when struck inadvertently by machinery.

During 1905–06 a Snow pump with a capacity of 14 000 gallons was installed on the bank of Lockyer Creek, with 4-inch pipes carrying water the one mile to the College storage tanks on the hill. A bore was put down in the railway paddock in the following year and fitted with a windmill to water the horse teams during the lunch hour as they were working so far from headquarters.

Milking machines were installed in the bails in 1907–08, with alterations made to the building to accommodate the new system.

By the end of Mahon's period as Principal the College was so well equipped with buildings and accessories that major construction was not necessary for several years. Indeed, the Farm Square (bails, stables, machinery shed and chaff shed) remains to this day.

The students took part in most of the above development, thereby gaining valuable practical experience. They worked under R. F. N. Quinn (1897 to 1900) and W. Doughty (26 October 1900 to 30 June 1902)—Mechanics; A. Foster (1 October 1904 to 10 February 1906) and M. J. Lyle (10 February 1906 to 1 July 1912)—College Engineers; A. Jordan (1 October 1904 to 1906) and H. Aberdeen (1906 to 1911)—Carpenters; A. Denis (1898 to 1904) and W. Strath (1 October 1904 to 1933)—Blacksmiths.

The College farm

When Mahon became Principal of the College on 1 July 1898, some 200 acres had been broken up for cultivation; and by the end of December 154 acres were under cultivation, 30 acres were fallowed, and 101 acres had been cleared for the next year. By May 1899 some 337 acres were under cultivation—all by horsepower.

H. C. Quodling, the inaugural College Farm Foreman, was appointed on 4 January 1897 and transferred to manage the Westbrook State Farm on 1 August 1898. He was succeeded by A. Watt, Manager of Gindie State Farm, on 1 August 1898. Watt retired in 1904 to be

replaced by D. Macpherson. In 1905 Macpherson was transferred to manage Biggenden State Farm, and G. B. Brooks came from Gindie State Farm to replace him on 1 October. He was transferred to the Department of Agriculture during 1910–11 to become Agricultural Instructor and was succeeded by A. E. Gibson on 4 July. Mick Jordan, who had been Assistant Farm Foreman since 1 July 1899, became Farm Foreman on 1 July 1913. He continued in that capacity until his retirement in 1935.

Continuity of supervision was somewhat lacking but Mahon kept in close contact and the policies he laid down were followed by each new farm foreman.

Mahon's policy was to expose students to all the types of farm crops and improved pastures that could be grown and to as many varieties of these as could be obtained, so that the College could recommend a particular variety of a suitable crop to local farmers. He instituted manurial trials with important crops such as maize and potatoes to ascertain if such fertilisers could be economically applied, and bookkeeping enabled an economic assessment to be made. Although replicated experiments to specific designs were to come much later, the experiments Mahon instituted were far in advance of current agricultural procedure. Unfortunately for the teaching of plant nutrition, the main College soil under cultivation was so fertile that significant responses were hard to produce.

Meticulous records were kept of the area of each crop sown, the planting rate and distance, the treatment and the yields year by year, and these were generally published in the annual reports. In his later years, Mahon recommended the appointment of an experimentalist to devote his whole time to the task, resulting in the appointment of C. S. Clydesdale in 1915.

The wheat variety experiments for rust resistance initiated by Professor Shelton were continued. Mahon sent H. W. Gorrie, the Horticulturist, to Queanbeyan, New South Wales, in 1899, to be instructed by William Farrer on his system of hybridising wheat. Maize was a major crop, but pumpkins, mangolds and carrots (for pig feeding), lucerne (especially under irrigation), wheat, oats and millet for hay, cowpeas for green manure and hay, barley grain for pig feeding, maize, sorghum and teosinte for ensilage, and rape for winter grazing were also important. Experimental observation crops included rye, rice, sunflowers, buckwheat, flax, sisal hemp, sugarcane, sea island and upland cotton, sweet corn, turnips, onions, broom corn, arrowroot, field peas and vetches, chicory, cassava, castor oil, pigeon pea and teosinte.

With regard to castor oil, Mahon showed a degree of foresight by saying, "I am inclined to think that, no matter how careful one may be in its cultivation it will eventually spread over the cultivation fields and become a pest". It is now a shrubby pest along the Lockyer Creek and Brisbane River banks.

R. S. Nevill, Tobacco Expert, established experimental plots of tobacco on the sandy hill and also on the creek bank alluvium.

Because of the vagaries of the seasons in the Lockyer Valley when crops were grown under natural rainfall, and with the experience of a major drought in the early 1900s, Mahon placed special emphasis on fodder conservation, especially the ensilage of crops such as maize, which would have failed for grain, and the normal conservation of maize and sorghums in the annual silage programme. The dairy cattle especially needed this conserved fodder during the winter months. Several silo structures were tried to assess construction and conservation problems, and the conservation of the natural grasses *Bothriochloa bladhii* (Forest Bluegrass) and *B. decipiens* (Pitted Bluegrass) was tried, but their low moisture content defied successful ensilage in the absence of a knowledge of additives. Spontaneous combustion of the material destroyed the stack. A maize harvester and a No. 17 Ohio ensilage cutter helped to take the heavy work out of ensilage.

John Mahon, because of his work with the Travelling Dairy, paid attention to the quality of the native grasses in each district and their performance as milk producers and was especially disappointed with the quality of the northern grasses in winter. As soon as he took over the reins of the College, he experimented with introduced forage grasses and legumes. At first he introduced a wide range of temperate grasses and clovers to help bridge the winter paucity of natural grazing. But his most successful introduction was *Paspalum dilatatum* (Paspalum) from New South Wales, its first introduction into Queensland. It was so well accepted that soon the College could not meet the annual demand for seed or roots. Its excellent survival under floodwater for a considerable time in January 1901 proved that the grass would withstand floods, and later in the year when a severe drought ensued it received much publicity for its survival of drought conditions at Nerang, Yuleba and Nanango; at the College it was 3 feet high, the dry weather having no effect on it. "This magnificent grass is much admired by those who have seen it growing here." A notice in the April 1901 issue of the *Queensland Agricultural Journal* read:

To purchasers of *Paspalum dilatatum* roots. All orders for Paspalum roots must be accompanied by the amount charged for same—two shillings and sixpence, on receipt of which the parcel will be sent to the nearest "Freight-on" station.

John Mahon PRINCIPAL

During the 1902–03 year 129 040 roots valued at £85 12s 8d and 156 lb of seed valued at £11 5s 0d were sent to all parts of the State, as far away as Cooktown. In 1906 forty acres were under paspalum for grazing and hay.

Prairie grass was shown to be a useful winter grass and the newly acquired Rhodes grass showed such promise that Mahon predicted it would become a popular grass in Queensland.

Labour was always short on the College farm, where only three labourers were available throughout Mahon's term as principal. Skilled labour was hard to obtain and during 1907-08 forty-one farm hands came to and went from the College farm (and twenty-one through the Dining Hall). With the heavy summer rains and the resulting impassable black soil, cultivation was curtailed and weeds luxuriated. So frustrated did Mahon become that in his 1909 annual report he wrote:

The great drawback (as has been the case throughout the whole history of the College) has been the lack of sufficient labour to enable the management to conduct College affairs on lines that would make the institution worthy of the State. There is here a large area of beautiful agricultural land devoted to pastoral purposes, which, if under cultivation, would return a handsome revenue and add considerably to the educational value of the College...ninety per cent of the public are under the impression that there is no limit to the money placed at the disposal of the Principal for the purpose of carrying out the work of the College...It frequently occurs here that classwork and lectures have to be abandoned for many days in order to enable us to cope with important work on the farm...It appears to me very strongly that a step in the right direction would be either to shut the place down altogether, or else make it worthy of its existence. It is thought by many who know very little of the working of the Agricultural Colleges that a great deal of labour is derived from students. This is a very great mistake. In the first place, students are half their time in school; then, again there are so many branches of College work that a lad going through on full course is allotted farm work about one week out of every eight. It may, therefore be seen that very little student labour is available for farming operations.

College students undertook a good deal of farm work and learnt the use of the various types of farm machinery. They were encouraged to enter local ploughing matches: in 1898 A. Dyne won first prize in the under- 18-years class; in 1900 B. Corser (later Member for Burnett) gained first prize in the single-wheel class and Thos. Kidd took second prize in the youths' class; and in 1902 Baker and Fudge were first and second.

The College produce was displayed annually at the Brisbane National Show.

The College livestock

Dairy cattle

John Mahon, while he was still Dairy Instructor with the Department of Agriculture, purchased several head of dairy stock for the College's foundation herd. A noted judge of livestock of all domestic breeds, he could advise farmers on suitable breeds for various purposes.

During the summer vacation in 1900–01 Mahon visited southern States to purchase livestock for the College, calling on Professor Lowrie, Principal of Roseworthy College, South Australia, and the Wagga Experimental Farm to discuss mutual interests. He purchased six Shorthorn heifers from R. Liggett of Ballarat, an Ayrshire bull from J. Burnip, Berkshire pigs from Messrs Madden of Geelong and Bell of Yarra Glen, one Tamworth boar from Mr Chirnside of Werribee Park, and one Yorkshire and two Berkshires from Mr Betts of Gladesville, New South Wales.

In April 1901 a Jersey bull, a Guernsey bull and a heifer were imported from New South Wales and a Romney Marsh ram from Hawkesbury Agricultural College at Richmond, New South Wales. Two Yorkshire pigs were also added to the herd.

During 1904–05 one male and one female of each of the dairy breeds Ayrshire and Shorthorn were imported from Great Britain, and a Shorthorn bull and six heifers from New South Wales.

Holsteins and Lincoln Red bulls were secured for crossbreeding purposes and in 1908–09 a Dexter-Kerry bull and cow were secured.

In March 1910 Mahon was granted leave of absence to visit England, Ireland, Scotland, Wales and France, to purchase livestock for the Government and private individuals. He

visited Cirencester Agricultural College and Cambridge University and School of Agriculture (under Professor T. B. Wood) in England, the Albert Agricultural College at Glasnevin near Dublin in Ireland, the Kilmarnock Dairy School and Experimental Farm in Scotland, to study agricultural education including the main feature of farming in England—the "Norfolk" system of crop rotation. He was taken to see the finest livestock herds in the countries he visited and purchased fifteen stallions and mares, thirteen Shorthorn, eleven Ayrshires and two Jersey cattle, four British Black, eight Berkshire and twenty Yorkshire pigs, and a number of poultry.

With this importation of new blood lines, plus careful breeding records combined with milk production records of each cow being published in the *Queensland Agricultural Journal*, the College dairy herd became well known and the demand for breeding stock was heavy. College cattle were successfully exhibited at local shows and at the Royal National Show in Brisbane, a team of twenty-three entries gaining thirty prizes at this latter show in 1913.

During 1904–05 twenty-one cows averaged a production of 265 lb of commercial butter per head over an average lactation of 10.5 months. Sales of stud bulls were frequent, at shows and from the College, and prices were kept low to encourage dairymen to invest in improved sires. Prices ranged from £7 to £10 per head for two-year-old bulls. In 1909 an annual sale of cattle was instituted at the College, twenty-three young bulls realising from 10 to 23 guineas. All the milking cows were milked by students, who had to be taught milking as a compulsory exercise; this frequent change of milkers somewhat reduced the actual milk production potential of the College cattle.

In addition to breeding methods, feeding was a major part of the instruction. Several different rations were compared, using silage hay, green crops, molasses and, during the 1902 drought, even prickly pear, the grazing of native pastures often being used as a control treatment. It was also shown that rugging of the milking cows during the winter months was beneficial and economical.

The Ayrshire breed was shown to be the best breed for production, but the Holstein was considered the best all-round breed for production and size. Both performed well for crossbreeding. In his annual report in June 1906, Mahon predicted the rapid rise in popularity of the Holstein (Friesian).

In 1909 Mahon said:

The greater number of students who have graduated through this institution are now successfully conducting their own dairy farms. The manner in which they conduct their business is looked upon by many adjoining farmers as an object lesson to themselves. The prejudice that existed at the first regarding the College ex-students, as being too theoretical, is rapidly dying out.

Dairy manufactures

After his years of instruction in dairy manufacturing with the Travelling Dairy, Mahon made sure that the College would turn out trained operators in this field. Mention has been made of the new dairy and its improvements under the heading "Building Developments".

Condensed milk manufacture was added to that of butter and cheese in the 1898–99 year. The demand for the dairy manufacturing course was too great to admit all candidates. To widen their experience, students were allowed to take charge of the milk testing for production competitions at local shows in 1901 and a start was made with College exhibits at the Royal National Show in Brisbane. For the 1900 Show, the College exhibit of dairy produce included cheddar cheese, potted cheese, condensed milk, concentrated milk, pasteurised milk and tinned butter. The College also exhibited bacon, hams and lard.

A consignment of loaf cheese, potted cheese and bacon and ham was, by order from His Royal Highness the Duke of York, placed on board HMS *Ophir* for the use of the royal visitors, here for the Federation celebrations. It was so highly thought of that the order was repeated from New Zealand, and a supply of bacon and cheese was despatched to Adelaide to be placed on board the *Ophir* there.

During the year 1902–03 Messrs Brown, Webb and Co. installed a pasteurising and cooling plant for milk and cream for use in butter-making and experimented to find the best temperatures for storing butter and cheese. Tests at the time showed these were 35°F for butter, and 32- 40°F for cheese.

Such was the demand for the dairy course that in 1903–04 a special dairying course of fourteen days to five months was instituted for students who had had previous experience with dairy production, and eighteen students were enrolled.

Charles McGrath, who had been Dairy Instructor from 1 July 1898 and had worked long hours and given dedicated service, resigned in 1906. He was later to become Director of Dairying in the Department. He was replaced as Dairy Instructor on 11 February 1906 by Arthur Ernest James Charles King Graham from New South Wales. King later became Chief Dairy Expert (1 October 1915) and ultimately Under-Secretary in the Department. His stay at the College lasted just under three years: he left to become general manager of the Queensland Farmers Co-operative Dairying Company. Edgar Frank Youngman, an ex-student, was appointed Dairy Instructor on 5 September 1908. He was granted six months' leave of absence during 1910–11 to further his studies in Canada and Ross Mathieson from Victoria took his place.

During 1909–10 milk and cream testing examinations were inaugurated by the Department and all College students entering were successful in gaining certificates.

Horses

Before the opening of the College, H. C. Quodling, Farm Foreman, had purchased farm horses on the Darling Downs to undertake the initial land preparation work. No horse breeding was instituted until two mares from Victoria and a Clydesdale stallion, "Blackwatch", from New South Wales, winner of the two-year-old prize at the Sydney Royal Show, were bought in 1900.

In 1905 Mahon stressed the need to continue horse breeding at the College.

With regard to horse breeding, after many years of experience and careful observation, I have come to the conclusion that there are but two classes of horses that will produce the animals we

require, viz. the active draught stallion with good head, long rein, a thick low breast, with strong flat bone: this class of horse mated with selected mares, would produce a class of horse suitable for our own use and export. The hackney, the coacher, or buggy horse can be produced from a thoroughbred sire: any departure from this course must eventually result in failure.

During 1905–06 a new Clydesdale stallion, "Prince of Pinegrove", was purchased in Melbourne and used on College mares and to service mares brought to the College. In 1907 a further nine young draught fillies were purchased at Maryvale on the Darling Downs, for use as brood mares. By 1909 the College had twenty-four brood mares and the progeny of "Prince of Pinegrove" were turning out well. Mahon said, "A good man is needed to care for the brood mares as several aborted due to careless handling".

A pair of mules from Buaraba Station, the first of two succeeding teams, were acquired in 1899 to carry mail to and from Gatton and later to pull the "drag" to the railway siding and for cricket matches and church services.

Sheep and wool

In 1900 a flock of 200 Merino sheep was acquired for crossbreeding with Romney and Shropshire rams. The sheep proved useful in keeping down weeds in the maize and on fallowed land. The Shropshire ö Merino crossbred proved better than that produced in a Romney \times Merino cross. The crossbreeding work was severely upset in 1904–05 by raids by neighbouring dogs and was later abandoned. However, the crossbred lambs produced were so good that Mahon predicted a bright future for this enterprise east of the Main Range. He suggested that wool classing should be taught and that students should attend the wool and sheep sales in Brisbane.

During 1908–09 a few purebred Lincoln sheep were acquired for educational purposes but in 1910 Mahon felt it necessary to reintroduce sheep husbandry. The College was fortunate in having a multi-skilled man in James Carew, the Horticulturist, who also was a qualified wool classer, and in 1911 students of the wool classing course were taken on a trip to the Talgai West holding on the southern Darling Downs to see the shearing.

During the 1902–03 year the herdsman, J. Meehan, was allotted the work of teaching butchering to the students so that the College could use its own meat.

Pigs

No record has been found of the source of the supply of the early pigs to the College piggery, but on 1 July 1898 there were 98 pigs under the supervision of A. Cullac. Mahon made the piggery unit a most effective College teaching and livestock sales centre. A new piggery, to house 160 large and 250 small pigs, was built to the most modern design during 1898–99, and feeding experiments were soon in train.

Comparisons between natural grazing, boiled mangolds plus kitchen swill, and barley grain plus boiled mangolds showed the last-named regime to produce the best gain, and in a later experiment boiled barley performed better than ground barley in a ration.

Injections of new blood occurred fairly frequently, as mentioned earlier, and 170 purebred pigs were sold during1900–01 for breeding; they included Berkshires, Tamworths and Large, Middle and Small Yorkshires.

Several crossbred pigs, surplus to the College needs, were also disposed of satisfactorily. Crossbreeding trials had shown that the Berkshire \times Middle Yorkshire cross was the earliest-maturing and most economic bacon producer. By the year 1903–04 the demand for purebred pigs was four times greater than the College supply.

After the introduction of British Black pigs by Mahon in 1910, the British Black \times Berkshire cross proved the best bacon pig.

Bacon curing had been introduced into the foundation courses and was continued throughout Mahon's time. A special building for the purpose was erected from old timber in 1900.

Poultry

Poultry yards were built in late 1900 and during the 1900–01 year a number of valuable fowls of the best breeds were imported to establish the poultry section. William Hindes was appointed Poultry Instructor and during the 1902–03 year dealt with breeding, crossbreeding, the use of incubator and the art of caponising.

Egg-laying records were kept for the thirteen breeds for six months, Buff Orpingtons laying an average of 93 eggs per bird, fallowed by the White Leghorns with 92, Brown Leghorns with 89, and Black Orpingtons with 86. The diet was pollard in the morning and wheat grain at night, with green lucerne or cabbage leaves at midday. During the 1903–04 year 109 birds for breeding and 103 settings of eggs were sold.

Many of the College birds won prizes at the Brisbane show.

On 1 July 1904 the first egg-laying competition was staged, using sixteen pens to house the entrants—fifteen competitive pens, including seven from New South Wales, and a non-competitive pen from the College. The competition, extending over nine months, was won by E. T. Griffiths of Waratah, New South Wales; his pen of White Leghorns laid 938 eggs. The College non-competitive White Leghorns laid 915 eggs, the next-highest figure. The egg-laying competition continued each year to well beyond Mahon's term, and had a great bearing on the improvement of Queensland's poultry industry.

During 1907–08 a few turkeys and ducks were added to the flock but there was little demand for them. During 1910–11 some more stud birds, selected by Mahon, were imported from Scotland.

Apiary

A small apiary was established in mid-1900 under the care of R. F. N. Quinn, the officer in charge of the Mechanical Department. At first the yield of honey was excellent, but as clearing of the College ground progressed the access to eucalypts lessened and other

sources of pollen probably lucerne, were used. On Quinn's departure, the apiary came under the control of William Hindes, the Poultry Instructor.

When livestock judging competitions were held at the Royal Brisbane Show, College students won all the prizes during Mahon's principalship. This success gave him much satisfaction. From when he took control of the College to a few months before his death, 2165 purebred animals were sold, and during the last seven years (the duration of the whole history of the poultry section) 851 purebred fowls and 515¹/₂ settings of eggs were delivered to buyers.

The College orchard and vegetable garden

H. W. Gorrie had developed an excellent orchard and vegetable garden and had beautified the College grounds before his death in February 1900. A. H. Benson, Fruit Expert in the Department of Agriculture, who had reported on the condition of these ventures, then came to the College. He enlarged the orchard and undertook a severe pruning programme and cyanide treatment to control San José scale.

E. H. Rainford, Departmental Viticulturist, established a vineyard of three-quarters of an acre on the banks of Lockyer Creek and a further two acres on the shallow sandy soil on the College hill. S. Voller, Assistant Instructor in Fruit Culture in the Department, established an olivetum on the hill beside the main building. C. Cole, a nurseryman from Richmond, Victoria, became Horticulturist on 22 March 1900, but left on 31 August 1901. G. Jackson, an ex-student, took over the vegetable section during 1902–03 and, with the installation of irrigation, produced a plentiful supply of vegetables for College use; Voller supervised the orchard till James Carew, the gardener, was appointed Horticulturist on 14 June 1903. He took over the orchard, vegetable garden and vineyards. Such were Carew's vitality and accomplishments (he held a wool classing certificate) that he added lectures in wool classing to his duties during 1908–09.

During 1903–04 the first serious attacks by the Queensland fruit fly on the stone fruit and, to a lesser extent, the mandarins occurred, and the stone fruit had to be picked early and made into jam or stewed fruit. The fruit fly was to remain a major pest.

By 1905 excess vegetables were being grown by Carew and the students, thanks to liberal dressings of stable manure and the use of irrigation. The surplus was disposed of to the Leper Station at Dunwich and to private homes. In that year flying foxes made their first raids on peaches and figs and such raids continued for some years. Shooting had little effect.

Pests were also building up in the gardens and spraying with resin-caustic soda-fish oil and baiting with Paris green were introduced, as well as tobacco water (nicotine), sulphur and lime. Cyaniding the citrus trees was carried out. The bean fly *Agromyza phaseoli* made its first appearance.

Henry Tryon, Departmental Entomologist, visited the College for some time to deliver lectures.

There was some shortage of water for irrigation and Mahon made a public plea for weirs on Lockyer Creek, a cry that was not heeded until the late 1920s. To counter changing consumer tastes a large consignment of vegetable seeds was obtained from Melbourne for trial in the College gardens.

The students had an excellent opportunity to learn the basics of fruit and vegetable culture, from lecturers both from the College and visiting from the Department.

Other teaching programs

Engineering

In addition to learning the engineering aspects of building construction, road construction, the operation and care of all types of machinery, pumping and irrigation equipment, students were encouraged by James Lyle, the College Engineer from 1906 to 1911, to study for certificates engine drivers and boiler attendants (issued under the Shop and Factory Acts) and in 1906 thirty-three students passed the examinations. Lyle introduced lectures in elementary physics to assist the course and suggested that working models of engines be obtained—a request that was later granted.

By 1911 Lyle was able to report that nearly all the older students leaving the College held cerificates in steam-boiler attendance and engine driving.

Chemistry

Apart from basic courses in inorganic chemistry designed by J. C. Brünnich, the practical chemistry courses were closely allied to field work.

The first analysis carried out was for the Department of Agriculture, on soils of the Departmental Experiment Farm at Redland Bay. The practical work for the students started with a complete analysis of an average sample of Queensland milk taken over a three-day period; Brünnich said he presumed it to be the first exhaustive analysis of Queensland milk. It was taken to the third decimal place, and included a separate analysis of the mineral content of the ash. The results were published in the annual report of the Department for 1898–09, pp. 20–21. Analyses of College soils from the hill and the alluvium on the creek bank followed.

Brünnich was transferred to head office in Brisbane from 1 January 1900, his duties being taken over by the Science Master, P. Sutherland, and the Assistant Chemist, F. Van Nott. Soil for potato experiments, numerous fertilisers, bones, filter-press cake from the sugar mills, stable compost, and maize used for silage making were analysed by them, working in conjunction with Brünnich.

Both Sutherland and Van Nott resigned, and Elliott Henry Gurney, Chief Assistant Chemist of the Department of Agriculture, New South Wales, became Natural Science Master at a salary of £300 per year, plus quarters (£40). Gurney cast his lectures and practical work "at a lower level than Universities, where the classes are composed of young men of higher educational attainments". He impressed on his classes the need to acquire a knowledge of the mechanical and chemical analyses of soil, the plant food requirements of different crops, and the composition and use of artificial manures. He pointed out the scientific principles taught in the laboratory that had been adopted on the College farm. He analysed the water from Lockyer Creek, finding it hard, with a high content of magnesium chloride. Permanent hardness was high. Gurney pronounced the water satisfactory for domestic and stock purposes, but said that with heavy irrigation use, particularly in dry times, it would cause soil structural problems—a prophecy later fulfilled. He pointed out that the normal heavy summer rains would leach excess chlorine and magnesium from the root zone.

On 1 July 1908 Gurney was transferred to the Departmental laboratory in Brisbane to be replaced by A. F. Gode, but he continued as a visiting lecturer until his successor arrived. On 1 November, 1909 W. C. Ellard became Science Master. He introduced geology and bacteriology, the latter subject fascinating the students, but found that in a number of cases their neglected primary education made it impossible for students to advance in science.

English and mathematics

P. M. Pitt, who handled English and mathematics, also conducted the College entrance examinations. He continued to have trouble rationalising the courses for students of mixed ages, and especially of varying levels of primary education. In 1906 the entrance age was raised to a minimum of seventeen years to encourage greater motivation.

In June 1903 Pitt wrote despairingly:

As many of those who join us cannot spell correctly, and have a very vague knowledge of the meanings and uses of words in common use, it may therefore be seen that it is absolutely impossible to effect much improvement in the short time at my disposal. Moreover...however much they need it, lads over fifteen years consider such elementary work as spelling, etc. to be "beneath their dignity" and no force or encouragement that may be brought to bear upon them will effect much improvement. I do not see, considering the number of subjects of a more practical nature with which we have to deal and the limited time at our disposal, how much more time can be devoted to the subject of English nor do I consider it fair to ask us to take up elementary work which should have been taught elsewhere.

In 1910 Pitt finally eliminated English composition from his course and replaced this with lectures in business correspondence and bookkeeping, and methods of acquiring land under the Lands Acts. However, his class and field instruction in mensuration and surveying were greatly appreciated by the students.

In 1904 four bursaries were offered. They provided free accommodation and tuition to those who passed a special bursary examination embracing fifth class standard in the State schools in the subjects of writing, arithmetic, English composition, geography, and elements of agriculture. Textbooks that were recommended included Professor Tanner's three dealing with principles of agriculture. The bursars were excused from other entrance examinations.

Visiting lectureships

Veterinary science

The College did not have a veterinary surgeon on its staff during its administration by the Department of Agriculture and Stock. The Department provided a visiting lecturer who travelled weekly to perform what duties were needed. Wilmot Clifton Quinnell, M.R.C.V.S., lectured on domestic animals and anatomy and physiology, with demonstrations on conducting post mortem examinations, bandaging unsoundnesses in horses, horseshoeing, bandaging and general handling of animals. Any diseases recurring in College animals were demonstrated to students and treatments were given, including preparation of drugs and ointments. The College dairy herd was subjected to the tuberculin test.

In October 1900 four foundation students, Messrs Redmond, Anderson, McIlwraith and Webb, presented themselves for examinations in animal anatomy and physiology held under the auspices of the Brisbane Technical College, and all passed, three with credits.

In January 1904 A. J. Cory replaced Quinnell as visiting lecturer in veterinary science and was himself succeeded by George Tucker in 1907. He was followed, in 1911, by Adam McGown, who had to handle a severe attack of strangles amongst the horses.

Botany

In 1899–1900, early in Mahon's time, Philip MacMahon, Curator of the Botanical Gardens, visited the College to lecture students on economic botany and horticulture. Peter Sutherland, before his resignation, encouraged students to make a private collection of native grasses during their holidays, credit being given to them for this work. But it was J. F. Bailey, Assistant Botanist to his father F. Manson Bailey and later Director of the Botanic Gardens, who gave continuity of instruction for some eight years with lectures, demonstrations and field excursions that were much appreciated by students. The botany lectures became part of the science course under the new Science Master, also housemaster, W. C. Ellard, in 1909.

Miscellaneous lectures

The medical officer in Gatton, initially Dr MacDonald, began a yearly series of lectures and demonstrations in first aid to the students. (In late 1898, an outbreak of scarlet fever caused the cessation of general College instruction for a period of six weeks.)

Popular lectures were given by visiting specialists as the opportunity arose; for example, Mr Cox, M.I.C.E., spoke on artesian waters and well-boring, and Mr Worboys lectured on how to make farming pay.

Teachers' schools

An innovation during the 1904–05 year was the inauguration of short courses for teachers, midsummer and midwinter, of ten to twelve days' duration. Sixty teachers came from all parts of the State, and the scheme was a great success. Teachers returning to their schools

were soon telling the local public and schoolchildren about the treatment of animals for milk fever and blackleg and the testing of milk and cream.

These schools continued. An obvious development was the establishment of school experimental plots of grasses and fodder plants to demonstrate suitable varieties for local planting, the forerunner of the School Project Clubs of later years.

Examinations

John Mahon introduced external examiners into the examination system in 1900 to allow an unbiased appreciation of College teachings, especially in relation to the two main aspects of the College training—farming and dairying. The first two examiners were A. Moffat of Radford (farm work) and Frank McCaffrey (dairying). All examination results were published in the *Queensland Agricultural Journal*, together with the external examiner's comments.

Study had been reduced to one hour in the evening, following the early complaints of the foundation students, and it was conducted under the supervision of one of the teaching staff.

On 30 June 1900 the first ten students graduated with a Diploma in Agriculture. These included seven students who had completed the full three-year course, and three who had completed the requirements in two years (these are marked *). These first diplomates and their subsequent occupations were:

- Albert Edward Anderson-Bureau of Sugar Experiment Stations, Bundaberg
- Charles Barth—farming at Clifton
- Percy Mollineau Bayley—managing the Pittsworth Cheese Factory
- Thomas Francis Bowler*-dairying at Bangalow, New South Wales
- Andrew John Conachan*—grazing at Kabra via Rockhampton
- Frank Lloyd Jones*—farming at Childers
- William A. McIlwraith—farming at Laidley
- Angus McKinnon—farming at Gowrie, Darling Downs
- Frank Hendy Palmer—farming in the Fassifern district
- Edward James Redmond—farming at Bundaberg.

These young men were the first of numerous graduates who, with the endorsed seal of the College diploma, were to make their way in the world. They were the product of a training outlined by Mahon on 30 June 1903:

The College is furnishing a liberal and thorough practical education to the students within its walls, and also disseminating by correspondence knowledge on various matters in connection with products raised from the soil, breeding, feeding, and raising livestock, etc. of inestimable value to this State...every branch of work in connection with the cultivation of the soil is receiving the best attention, and is being taught by competent officers. This includes agriculture in all its branches, both practical and theoretical, backed up by theoretical and practical chemistry, and experiments carried out on the farm, together with an up to date system of bookkeeping. The horticultural department comes in for a large share of attention, included in which are fruit growing and vine culture. Two hours per week are devoted to botany, and it may thus be seen that the students are made acquainted with the habits and growth of the different varieties of plant life. Dairying, in all its branches, is given the attention which I consider necessary to enable students to work their own dairies or to take the management of

factories or creameries. The methods of breeding, feeding and raising livestock are backed up by lectures and practical demonstrations by a qualified veterinary surgeon. Pig raising, with bacon curing, is also a branch of College work, and being of very great importance, is given the necessary attention. Bee keeping and poultry raising are now carried on here on a reasonably large scale, or...to such an extent as to enable students to acquire the necessary knowledge to undertake the business themselves. Sheep breeding on a small scale...blacksmithing, carpentry and engineering,...english, arithmetic, mensuration and land surveying and farm bookkeeping are given a good deal of attention. In fact, all matters from which young men going on the land are likely to derive benefit are carefully considered by myself and the teaching staff and when a student has made rapid progress in class work and has acqired a knowledge sufficient to fit him for a higher division, he is immediately transferred to a class in a more advanced part of the College teaching and in which by his careful study and energy, he has fitted himself to take part. There is no thought of turning out scientific men, but no effort is spared in aiding the development of men who will do credit to the institution as advanced agriculturists.

In 1902 the Principal's gold medal was won by C. Stumm. He kept in touch with ex-students, following their careers and corresponding with many. In 1905 an Old Boys Union was formed, meeting at an annual dinner in Brisbane during the Royal National Exhibition week. Students who had left the College up to 30 June 1910 numbered 453; the records of the subsequent careers of most of these are listed below:

- Engaged in farming 241
- Dairy work 22
- Overseers sugar plantations 4
- Pastoral pursuits 36
- Overseers sheep and cattle stations 3
- Fruit farming 31
- Deceased 10
- Known to have left the State 8
- In attendance less than six months 37
- Expelled 11
- Unaccounted for 29

In July 1911 the Hon. James Tolmie (Toowoomba), the newly appointed Minister for Agriculture and Stock, requested two school inspectors (Messrs A. S. Kennedy and W. H. Smith) and two staff members of the University of Queensland to undertake an inspection of the College in order to ascertain its "exact educational value", because until that time there had been no minimum educational standard for admission. (Minister's letters on file AGS/N 208, Qd. State Archives) (Actually, there had always been entrance examinations, supervised by P. M. Pitt, the English and Mathematics Master, but the standard of such must have been low because he and other members of the staff continually complained that the lack of primary training of the lower echelon of the enrolling students made instruction of the better-qualified most difficult to ensure.)

The inspectors made various recommendations, including the institution of an entrance examination of minimum standard, replacement of the system whereby students did class work and field work in alternate weeks, the holding of monthly examinations, an annual inspection of the College, and the appointment of external examiners for the final year of the course. (John Mahon had already introduced external examiners for farming and dairy work.)

The Professor of Chemistry (Professor B. D. Steele) and the Lecturer in Physics (T. Parnell) at Queensland University reported that the students showed "lamentable ignorance in these

subjects; and that while the furnishings of the laboratory (benches, etc.) were adequate for the small amount of work done, even that could not be done efficiently unless there were additional equipment suitable for teaching elementary science". (Black, 1976)

Despite the criticism of the teaching at the College by this Committee, students who had received instruction during Mahon's regime were to play a significant role in the general improvement of agriculture and in community organisations in the next forty years. They were to become leaders especially in animal breeding, dairy factory management and agricultural extension, until the new graduates from the universities had had sufficient experience in the field to step into their shoes.

The first graduate from the University of Queensland to become Director-General of the Department, A. F. Bell, achieved this honour on 1 July 1947. The first Queensland Agricultural College diplomate to obtain his University degree in Agricultural Science and then become Director-General was Alan A. Ross, as late as 1976.

Visitors

The College had more than one thousand visitors a year in its early days, all eager to see how it was run, the standard of its work, the prospects of a sound education for their children, and the general tone of the institution. Visits had to be confined to certain days to prevent interference with classes and practical work.

As regards the tone of the institution, Mahon established a good rapport with the students. He remedied the mistakes of the closing days of the foundation year by providing social outlets in sports and other activities and a sympathetic but firm response to the students' "boyishness", and encouraging attendance at church services and correct behaviour towards others.

In one report Mahon commended the general conduct of students but he regretted...

the great lack of Australian students of reverence for their parents, their elders, superiors and their church. This fact is more noticeable when the Queensland lads are brought into comparison with young men who have been reared in England, several of whom have gone through a course of training at this institution. [There were six from England, one from Scotland and one from Jersey Island in 1910.] The English lad gazes in amazement on the Australian boy when the latter speaks of his parents, naming his father and mother respectively as my "old man" and my "old woman"...such utterances to say the least of it, have not the effect of elevating the dignity of our young fellows in the eyes of those who have travelled about, and who pride themselves on their mode of discourse. I consider the matter is due to the parents allowing their children too much freedom in their early training.

John Mahon's death

John Mahon died on Christmas Day 1911 at the age of forty-nine years, and by his death "the agriculturists and the State of Queensland lost a valuable stalwart". (E. G. E. Scriven, *Rep. Dep. Agric. Stk*, 1911–12)

Mahon had sought to turn out practical agriculturists and to create an efficient dairy production and manufacturing industry. He was acclaimed by the rural community and Members of Parliament on both sides of the House. In his thirteen and a half years as Principal Mahon served under nine Ministers, without a public rebuff. The Queensland Agricultural College has dedicated the John Mahon School of Food Technology to his memory.

The winds of change

During Mahon's absence from 7 March to about 3 December 1909 to purchase livestock in Europe, Harold Cecil Quodling, Instructor in Agriculture at the head office of the Department of Agriculture in Brisbane (the original farm foreman), was installed at the College as Acting Principal. Surveying the College scene in his new capacity, Quodling saw that some improvements were needed: a new source of fuel, as practically all the timber had been cleared from the College grounds; a larger water supply; introduction of a septic system; a drainage scheme for the dairy; an up-to-date dairy; a bacon curing room; a wool classing room; the introduction of a course in saddlery and harness making; the sale of all grade cattle and the maintenance of a purebred herd; and more emphasis on the control of nut grass.

On Mahon's death, Quodling became Acting Principal again on 1 February 1912 and made some important suggestions with regard to education. The College had trouble with inadequate entrance standards and too many "practical" students, causing the College to have two groups based on academic ability and a third group of older students coming for special instruction. He said:

No diploma looms in the distance for those who drop the more strictly scientific subjects. The College should look for its supply of students from the present High Schools, where a training in elementary agricultural science might be added to the curriculum, and a number of bursaries given each year. For those who propose entering the College from other schools some technical training, equivalent to that obtainable at a high school should be insisted upon. To meet the requirements of the "practically" disposed youths who may not be equipped with a primary education above a certain fixed standard, it is suggested that the case would be met by a properly equipped farm continuation school where educational facilities existed. Here, the instruction would require to be such as to admit of grading up to the College standard by a qualifying examination. A probationary period should be made compulsory, nothing is to be gained by attempting to train labourers. It is quite possible that a proportion of "special" students might be drawn to the College from such a source...An added interest would be taken by students in their lectures here, if prizes, including one for "dux" were made available.

Unfortunately, the arrangement of the dormitories does not at present lend itself to, nor admit of, students studying systematically. This in itself is regarded as a serious drawback. With an improved standard of education, a certain number of students, who have passed through their full course here, would be better qualified to work towards some higher degree in Agriculture, such as Bachelor of Agricultural Science, and, should it be practicable, it would be a fitting goal to work to, especially if scholarships were made available in various parts of the world (until such time as our own University admits of such), where Queensland might look forward to having her sons trained with the object of supplying scientists for every branch of the services.

Quodling also advocated obtaining more visual aids—a collection of labelled grasses and economic plants, insects, anatomical specimens, specimens of rocks and soils, models and diagrams of agricultural interest, a lantern outfit and slides, standard textbooks, the binding of publications, and meteorology. He stressed the need for systematic experimental work

adaptable to Queensland conditions in animal husbandry and nutrition, saying, "A trained mind is the only one to succeed."

During 1911–12 the dairy building was converted into a powerhouse and a new dairy was provided, including a meat house at the back of the dairy, with facilities for bacon curing. Otherwise the status quo of the College was maintained until the new Principal, John Brown, B.Sc., took up duty on 28 January 1913, having been appointed to the position on 14 November 1912.

The College under John Brown

John Brown's first two months were taken up with "a minute enquiry into the past history and existing organisation and position of the College and the College farm with a view to determining the best policy for their future guidance and control". He deplored the "open house" for entry by students with poor primary training, the lack of a biological laboratory, microscope and germinator, and lack of any special appointments for research. New regulations were framed and submitted.

These while providing a strictly practical course of work and instruction for students unable to benefit by regular science studies, at the same time systematise the work and offer a definite objective in the form of a diploma to students taking the regular course. The institution of conjoint courses for State Farm apprenticeship and College training is also to be noted as a progressive step both from the point of view of raising the status of the College and of making more thorough the training for agricultural pursuits available to the youth of Queensland. Substantial reasons have also been advanced for the affiliation of the College to the University of Queensland, and the recognition of certain of the College courses as qualifying pro tanto for a Bachelor of Science degree in Agriculture. [This was to come in 1927.] It is hoped that some action will be taken shortly. (Brown, John, *Rep. Dep. Agric . Stk*, 1912–13)

A department of saddlery was established under the tuition of R. Pusey, but Brown decided to restrict the time given to "industrials" (carpentry, blacksmithing, saddlery and engineering) to allow for more practical farm work.

John Brown was, however, impressed with the dairy course and the new dairy facilities, although manufacturing was delayed by lack of raw material, a result of the drought. Regulations for a two-year course leading to a Diploma in Dairying were prepared in anticipation of an increased enrolment in 1914. So great was the demand for dairy technologists, however, that few dairy students stayed for the full course, instead entering the industry with what training they had.

Twenty-five animals had been found to be suffering from tuberculosis and were destroyed, severly depleting the herd and milk supply. Brown suggested the breeds be restricted to Jerseys and Holsteins, with the disposal of the Shorthorns, and that the Ayrshire stud be located at the Warren State Farm. Thomas Jones, manager of Warren State Farm, was sent to Europe and purchased six Jerseys and six Holsteins for the College herd, as well as other animals for other institutions.

With the dry year and the shortage of cattle, plus the fact that the old dairy had been taken over as a powerhouse and the new dairy was not quite complete, E. F. Youngman, the Dairy Instructor, took students on visits to several dairy factories to learn their manufacturing methods. He resigned in August 1913 to become manager of the Atherton Co-operative Butter Factory and was replaced by W. G. Lee, a diplomate from Hawkesbury Agricultural College. With the inauguration of the new dairy, outside suppliers were required to deliver cream on alternate days to provide enough raw material for the courses.

The College Engineer, Thomas J. Barratt, had been appointed on 1 July 1912 after a career as a marine engineer travelling the old world routes. He had a busy time setting up the old dairy as a powerhouse, fitted with a suction gas plant, connecting a new turbine pump at the creek to service the old main supply line (which because of its deteriorated condition was replaced in 1914), placing a portable motor on the old carriage of the Hornsby oil engine to supply mobile power for chaff cutting, the circular saw and the ensilage cutter, and repairing the old fire engine. He said, however, that it was out-of-date and could not cope with anything greater than a bonfire. He found the pumping equipment insufficient to handle the normal College and stock water requirements as well as the enlarged scheme of irrigation set down by the Principal.

The Farm Foreman and Experimentalist, Alf. E. Gibson, who was to become Director of Agriculture in 1933, continued the usual cropping programme to show students the different crops. He also instituted a few experiments with varieties of wheat and clover and cultural and manurial trials with lucerne. As the wood supply for the College was dwindling, Gibson was relieved when an "electric exploder" was purchased, with a flexible cable for electric shot firing in conjunction with high explosives: logs that in the past had defied the efforts of the maul and wedges could now be dealt with cheaply and easily.

The giant step forward in the farming calendar was the purchase in September 1913 of the "Big Four" tractor manufactured by the Emerson-Brantingham Co. "It was considered that the relatively high cost of feed for horses and their reduced capacity for continuous active exertion in a hot climate, together with relatively high rates for the services of teamsters, might turn the scale in favour of this form of motive power!"

Between 1 September 1913 and 30 June 1914 the "Big Four" ploughed 939 acres at an average cost of 7s 6d per acre. In measured tests with 8-inch discing of stubble ground, the cost worked out at 4s 6d per acre, compared with ploughing with horse teams pulling a double furrow disc plough costing 10s 0d per acre. The great advantage, apart from the decreased cost, was the ability to prepare a large area of ground in a short time.

But life was not meant to be easy with the new machinery. On 1 February 1915 the vaporiser in the suction gas plant burnt through and the whole plant had to be dismantled and repaired, throwing the power supply out of action. The "Big Four" tractor had to be called in to drive the main dynamo, depriving the farm of its services for thirty-eight days when ploughing was in full swing!

With the increasing work at the College, four ex-students were appointed as assistants: Charles Shearer Clydesdale assisted P. M. Pitt, and later became Experimentalist and finally one of the foremost agricultural advisers in the Department of Agriculture and Stock; E. Cowley became assistant to the Experimentalist; C. Culley became assistant to the Engineer; and A. C. Francis became assistant in dairying.

A two-week course for forty farmers was held towards the end of June 1914.

Brown was anxious to develop extension work from the College. He thought the College was notably weak in this area and suggested some of the staff (the outside staff) take information out to the farmers, starting with crop growing contests amongst junior farmers, an advisory board of agriculture and an agricultural bureau similar to that in southern Colonies. He wanted a botanist, two experimentalists (one for stock and one for crops), an entomologist and a veterinary surgeon resident at the College as soon as these could be provided.

It struck Brown as altogether remarkable that sheep, which in the other States and in New Zealand had been growing steadily in importance and favour in the closely settled farming district, had no place in the scheme of farming here. He was able to obtain sanction to obtain Lincoln Romney Marsh and Border Leicester rams to mate with Merino ewes for fat lamb raising experiments. These were run on the fallows and on nut grass until the fencing of the paddocks was completed. Ewes produced from the Lincoln \times Merino cross were then mated with Dorset Horn, Southdown and Shropshire rams.

A start was also made with systems of seed selection and multiplication with a view to supplying farmers, and a two-storey building for the purpose was erected. Some plant breeding was also initiated and the first rotation experiments started with two- and three-year rotations, with accompanying soil analyses.

To motivate students (as suggested earlier by Quodling), the following awards were made:

- the Principal's gold medal for dux of the College 1914—F. Caine;
- gold medal for ploughing, donated by the Principal and the Agriculturist— L. Brimblecombe;
- gold medal awarded for stock judging—L. Brimblecombe (killed during World War I);
- gold medal awarded to dux of second-year students-D. Downs;
- gold medal awarded to dux of first-year students—J. B. Manuel.

Having initiated all of the above changes and suggested others, Brown resigned on 25 May 1915 to take up an appointment in New Zealand "making it incumbent to send Mr. G. B. Brooks to Gatton for the first three months of the year as Acting Principal and later as lecturer during the Farmers Winter Courses". (H. C. Quodling, *Rep. Dep. Agric. Stk*, 1915–16, p. 75)

E. G. E. Scriven, Under-Secretary, wrote:

The resignation of the Principal...after being in this State for two years only, has caused an inconvenience that is not to the welfare of the College insofar as that the tenor of education there must necessarily be much disturbed...The last year has shown the lowest attendance of students, the average number being 23 in all, including bursars. The highest number was in 1901–2, when 69 were on the roll. The inducements offered by the new scheme, initiated by Mr. Brown, under which it was hoped an older and more promising class of students from a College point of view would be induced to attend, has not been as effective as expected and the Mathematics Lecturer and Secretary (Mr. P. M. Pitt) who conducts the entrance examinations is of the opinion that the lads who came up were practically of the same standing as in former years. As regards the attendance, it may be mentioned that Gatton, in common with the Agricultural Colleges throughout Australia, is suffering from the effect of the war: none of them at the present time are enjoying the attendance of students in their full numbers. (E. G. E. Scriven, *Rep. Dep. Agric. Stk*, 1914–15)

Brooks held the reins until the appointment on 30 July 1915 of the new Principal, Cuthbert Potts, B.A., who came from the staff of the Hawkesbury Agricultural College, New South Wales. He had graduated in Arts at Sydney University in 1898 and for two years had done an additional course in mining engineering. He subsequently engaged in dairy farming at Narellan in New South Wales, afterwards serving a term as surveyor's field assistant. He was Junior Demonstrator in Chemistry at Sydney University in 1901, and from 1901 to 1915 was Lecturer in Chemistry and Physics at Hawkesbury Agricultural College, Richmond, New South Wales, where he was at times Acting Principal. (*Gatton College Magazine*, 1938, p. 72)

World War I had started in August 1914, and Potts wrote on 30 June 1916:

Owing to enlistments, the College lost during the year:

Officers: Messrs. E. F. Youngman (Dairy Instructor), C. S. Clydesdale (Apiculturist), R. Tarrant (Assistant Engineer)

Students in Residence: J. Marsland, S. Hannaford, L. Brimblecombe, J. M. Marson

Farm hands: J. Adams, J. Davidson, T. O'Keefe, T. O'Rourke, F. Reuter, J. Aherne, J. Coffey, P. Condon, G. Amy, H. Wakeham, M. Cleary.

The College had records of 179 enlistments. The final College Honour Roll, rechecked in 1940 (see *Gatton College Magazine*, 1940), read as follows:

ROLL OF HONOUR

A Roll of Gatton College Students who lost their lives on Active Service

1914–1919

Pro patria ceciderunt

ATKINSON, J. B.	FULJAMES, R. E.	POWER, N.
BAXTER, N.	GRAHAM, H. J.	PRATT, C.
BRIMBLECOMBE, L. H.	HENRY, J. W. E.	ROBERTSON, G. H.
BROWN, J. M.	HIDES, J. G.	SAUNDERS, F. E.
COFFIN, C. D.	HODGES, G. S.	SCOTT, A. A.
COWLEY, E. S.	IZDEBSKI, C. V.	SMITH, J. I.
CULPIN, C. H.	LINEDALE, W.J.	STAINTON, R. H. W.

DEVINE, P. E.	MACKELLAR, R. A.	STEVENS, H. R.
DUNN, O. T.	MARKS, H. H. S.	WADDELL, G. M.
FAIRLIE, D.	MASSEY, C. B.	WHITE, E. G.
FRANCIS, A. C.	MOLONY, K. T.	WILSON, F. G. L.
FULCHER, G. E.	O'NEILL, T. J.	

The College under Cuthbert Potts

With his background, it was not surprising that Cuthbert Potts should introduce a more scientific approach into the College courses. He stressed the importance of the classroom for teaching fundamental agricultural principles, suggesting that after graduation trained students should work under a successful practical man. With regard to a current notion that a country lad should learn under his own father the art of farming, Potts held that however successful a man may be in his management of the land he was not the man to teach his own son. Individual successful practical men seldom had the breadth of vision that was essential for a sound foundation of a profession and the son usually perpetuated the mistakes of his father. Potts urged agriculturists to engage College diplomates in subordinate positions until they gained enough practical expertise to finalise their training.

In examining the situation at the College, Potts stated that the College was primarily an educational institution whose main object was to afford a sound technical training in the principles and practice of agriculture, animal husbandry and dairying. But he said that in this the College had had indifferent success. Some of the causes seemed to be:

- 1. the policy that insisted that theoretical training should go hand in hand with manual labour on the farm—Potts felt that there should be more lectures, with farm work provided mainly for town boys with no previous farming experience;
- 2. a distinct misconception throughout the State as to the necessary educational requirements to fit a boy to enter the College course—students entered at all levels of education, mostly low, because "it seems to be considered that if a boy is not bright at school he is fit for the Agricultural College". There was room for high schools and more short courses;
- 3. inadequacy of staff—visiting lecturers were not satisfactory and more staff would allow more experimental work, etc; and
- 4. the isolation of the College in respect to other teaching institutions and the Department's agriculturists—Potts strongly pressed for an advisory board, with representatives from schools and rural interests.

Commenting on the lack of interest in agricultural education, Potts suggested that "something of the history of achievement, something of the glory of success, something of the romance of Agriculture should be incorporated in all the school books and school teaching". To encourage enrolments in the general College course, he addressed Chambers of Commerce in Brisbane, Toowoomba and Ipswich. He drew attention to the gap in a boy's education between his leaving primary school at the age of twelve to fourteen and attaining the minimum age of sixteen years necessary to enrol at the College. He suggested that the Departments of Public Instruction and Agriculture and Stock should discuss this problem.

Potts' term as Principal spanned the greater part of World War I (1914–18), when older students were listening to the call of the Empire and young lads who might otherwise have enrolled at the College were often needed on the farm to do the work that would normally have been done by those who had enlisted. Also, the aim of the College authorities to have each student enter with a higher standard of education and complete the full course for the diploma was being pursued.

The concept of an agricultural high school mooted

During 1920–21 the committee of the small College View primary school and the committee of the Lockyer High School approached Potts to see if the College could cooperate by providing training in agriculture to students who might enter a proposed agricultural section of the Lockyer High School, say, on two days a week. The basic reasons for this movement were that:

- 1. many farmers wanted their children to have a high school education but not to leave the land;
- 2. children wanting to return to the land could drop, to them, unnecessary subjects such as Latin, French and pure science and substitute agriculture;
- 3. at that time the Agricultural College would not accept students till they were sixteen years of age, so the course would act as a feeder to the College.

All local people agreed and the proposal was put to, and reported on by, Mr Riddell, Superintendent of Technical Education. A trial scheme was approved, but for some reason it was deferred. The idea was adopted in 1925, but with the high school incorporated into the College system.

Fodder conservation

Potts' period was plagued by unfavourable seasons, which caused problems in cropping. From 1914 to 1916 dry weather was experienced, followed by an excessively wet summer in 1916–17 and a wet spring and summer in 1917–18, when cultivation was difficult and weeds proliferated. Next came thirteen months of severe drought, from February 1918 to march 1919. Some College cattle had to be sent to the Coast on agistment and returned later in a rather anaemic state.

The droughts led Potts to be an early advocate of conservation of moisture in the heavy black soils. He said each foot of soil could retain one to two inches of rain, and with this knowledge (and a soil auger) the prospect of reaping a successful crop could be assessed.

Early in his administration Potts had abandoned tractor power and returned to horse teams and bullock teams "because the unlimited use of the motor tractor has largely interfered with the students' training", but he was later to admit that motor power was the answer to preparing the land quickly when needed (and an aid to the soil conservation process). Drought continued during the summer of 1919 and the maize crops, obviously failing for grain, were ensiled in a stack silo. This process was witnessed by about three hundred farmers from the Lockyer, the Darling Downs and the Coast, who then went home and did likewise. This was followed by demonstrations of the making of stack silage at the Toowoomba and Ipswich shows.

Potts also suggested that a systematic collection of statistics of future fodder requirements, conserved fodder on hand and the quantities in sight be compiled and the figures be published monthly. He published a detailed paper entitled "Fighting Drought, an Analysis and Some Suggestions". The drought broke in May 1920 and the bountiful season allowed the College to store a large quantity of hay and silage, enabling it to carry all of its stock through the dry 1920–21 year without purchase of fodder, an action forced on most of the surrounding farmers.

Dairying

The College dairying herd, which had previously been tested privately, was entered in the official herd testing scheme and performed creditably: several cows entered the advanced register, as did the imported Ayrshire bull "Netherton King George" for the performance of his progeny.

At the Royal National Show in 1918 the College gained "Champion Holstein" and "Reserve Champion Ayrshire" cow, both College-bred, and four first and two second prizes, resulting in improved sales of breeding stock. In April 1922 the College herdsman for the previous eleven years resigned to farm on his own account and Potts sought to appoint "an officer of higher qualifications who can take charge of all the stud stock at the College and undertake instruction in Veterinary Science".

During the drought years the cream supply so dwindled that the Silverwood Butter Factory at Gatton closed down and the local farmers approached the Minister to ask that the College process their output. This was agreed to and in the 1917–18 year fifty outside suppliers sent cream in, giving the students excellent practice in receiving cream, grading it and making butter. Milk for cheese making was difficult to obtain because of the use of skim milk for calf and pig feeding. With the cooperation of D. Saxelby (later an external examiner) of the Queensland Co-operative Dairy Company, dairy diploma course students were allowed to work in the Company's factory during the vacation. L. Moran, in 1916 the first College diplomate in Dairying, was sent to the Yeerongpilly laboratory to work under the Departmental bacteriologist, C. J. Pound, to obtain advanced instruction in bacteriology.

Pigs

The College's pig section continued to prosper, with the demand for stud pigs always exceeding supply. New Berkshire blood was introduced from the southern States during 1915–16; Middle Yorkshires from the Sydney Royal Show in 1917–18; and Berkshires and Tamworths during 1920–21.

During November and December 1917 unthrifty litters were dropped, then weakling litters; finally half-developed pigs were aborted. The trouble was traced to formalin from the dairy

factory, used to spray flies then being washed into the receptacle in which the buttermilk for the pigs was collected. The piggery was reconstructed during 1917–18.

Sheep

The sheep section, and especially the fat lamb experiments, suffered during the vagaries of the seasons: drought, and then the very wet year 1915–16, when rank growth gave poor nutrition and encouraged stomach worm infestations and an extensive growth of Noogoora burr, which damaged the wool. The Border Leicester \times Merino cross lambs were still attractive. It was decided that artificial pastures and forage crops should be used for sheep grazing.

Horses

The College's Clydesdale stud was continued, with the stallion "Prospero" from Hermitage taking the place of the very prepotent sire "Lord Cellus", but the day of the farm tractor had dawned and the demand for horses declined.

Extension

Potts was a keen advocate of agricultural extension, especially by College staff. The annual winter schools for farmers continued as in former years, but with the withdrawal of the one-third rail concession for travel the numbers dwindled and it was considered that the schools should cease. At July 1923 a total of 199 farmers had attended winter schools at the College.

In February 1917 a group of twenty Dairy Inspectors of the Department of Agriculture and Stock attended the College for demonstrations in silage making, cream grading and instruction in the interpretation of the Acts. In the same year twelve Crown Land Rangers attended to learn about silage making.

Since the inception of the College, 712 teachers had attended teachers' schools to receive instruction in a variety of agricultural fields.

Training for returned soldiers

To settle returned soldiers on the land as soon as possible after their discharge, Potts had discussions with the War Council in 1916 regarding the availability of land, the selection of suitable sites, the areas required, the access to markets, the supply of building materials and courses of training. He suggested the College provide short courses in training as well as build up a supply of nucleus poultry stock for the returned men to start their enterprises.

In June 1916 the first five returned soldiers arrived to take courses, four in poultry raising and one in butter making. During 1917 new poultry pens were erected, further away from the College buildings, on a site east of the Farm Square comprising ten acres with an

east-north-east aspect. They were supervised by Mr Harwood, who took charge of the section in April 1917. There were twenty breeding pens erected for returned soldiers' work, as well as a 20×30 ft incubator house containing two College incubators and a Mammoth incubator of 3000-egg capacity lent to the College by the Lands Settlement Repatriation Committee, then two brooder houses, each of four compartments, to hold eight Newtown brooders of 500-chick capacity each. Alongside were 120 single laying pens for competition purposes (the six-pen group failing to actually identify the individual laying performance of each bird).

The immediate object was to raise 4000 pullets (that is, 12 000 eggs laid down in incubators for returned soldiers in the initial season). Returned soldiers at the Mount Gravatt settlement were also supplied with stud cockerels.

To further enhance the poultry training of the general public, the returned men and the students, the first of several annual poultry conferences was held at the College in August 1917. It was organised by Mr Beard (Poultry Expert for the State) and Mr Harwood. These conferences were very successful and kept the College in touch with the industry. Some 150 people attended in 1919 and derived great benefit from discussion of matters of common interest. Models of full-sized poultry pens were displayed at the Royal National Exhibition.

Altogether 139 returned soldiers attended the College before June 1919, engaging in courses ranging from three months up to two years, but mostly less than a year. The greater number undertook poultry raising instruction, but dairy farming, dairy factory work, general farming and pig raising were also selected. All the returned men were fully motivated, anxious to learn and to carve out a future career.

The year 1921 saw the close of the Commonwealth general scheme of vocational training for returned soldiers. The Mammoth incubator was sent to the Soldier Settlement at Mount Gravatt. Potts suggested a "broiler" industry be developed, or that farmers should caponise young cockerels "to keep their tender, luscious flesh up to eighteen months of age".

Costs connected with the College

Academic record

Despite the slight increase in enrolments of more highly qualified students at the College during Potts' time, the total output of diplomates was small, only 33 in eight years. They are listed below.

December 1915 Queensland Diploma in Agriculture (Q.D.A.): J. B. Manuel, L. Strachan, E. J. Park. The first Queensland Diploma in Dairying (Q.D.D.): L. Moran

December 1916 Q.D.A.: E. H. Fabian Q.D.D.: G. Wilster

December 1917 Q.D.A.: E. H. Gillingwater (He enlisted immediately after graduation.)
December 1918 Q.D.A.: R. W. Astill, H. Benson, A. D. Brightwell, L. J. Landells, J. L. McGrath, H. Park Q.D.D.: W. H. Jackson

December 1919 Q.D.A.: G. W. M. Nicholson (dux and gold medallist), E. C. Bennett, V. Tighe Q.D.D.: T. Herbert, R. K. Hodges

December 1920 Q.D.A.: J. A. Tait Q.D.D.: N. A. Black, W. B. Homemann, J. N. Irwin

December 1921 Q.D.A.: D. S. Hall, W. R. Straughan, A. W. McLuckie

December 1922 Q.D.A.: S. F. Murphy, K. V. Henderson, L. C. J. Clifton, T. Y. Bonar, K. M. Tait Q.D.D.: J. Kelsey, D. V. Ward

This brought up the matter of the cost of the College.

The costs reviewed

The expense of administering the Queensland Agricultural College was constantly in the minds of the Government, and especially of the Parliamentary Opposition. Even before its founding the cost to the public purse was a major issue.

On 15 October 1902 the Secretary for Agriculture, the Hon. Digby Denham, reported to His Excellency the Governor, Sir Herbert Charles Chermside, on the expenses of the Department. He said, as might be expected, the most costly institution connected with the Department was the Agricultural College at Gatton. "But when it is remembered how great the outlay on buildings and plant must be during the early years of such institutions, it may well be conceded that few agricultural colleges are maintained so economically." The following table shows the decline in cost over three years.

	1899-1900	1900-1901	1901-1902	
	£	£	£	
Gross expenditure	8,599	7,040	6,262	
Revenue	1,823	2,940	2,934	
Net Cost	£6,776	£4,100	£3,328	

While the cost had been diminishing, the number of students in attendance had been increasing. In 1899–1900 the number was 38; in 1900–01 it was 45; and in 1901–02 it was 69. Expressed in other terms, the cost per student, which was £178 in 1899–1900 and £91 in 1900–01, was only £48 in 1901–02.

The question of cost was again raised by Potts in his annual report for the year ended 30 June 1921. He presented a table of expenditure and receipts since 1910 (*Rep. Dep. Agric. Stk*, 1920-21, p. 25)

This showed that the total expenditure was rising more rapidly than the receipts. In commenting on this, Potts said:

It is necessary to remember that the functions of the College are threefold.

First, there is the education of students in the art and practice of agriculture and stock raising. This side of the College could never show a profit and the fees are so low that they do not even cover maintenance. This, however, is fully in accord with the general policy of the State affording its citizens a cheap education. An immediate loss is incurred, though an ultimate gain is assured. Second, the College is a station for the conduct of experiments with stock and crops. Here again, we have a section which cannot be expected to show annual profits, though results may easily be obtained which would be of great benefit and profit to the State as a whole. Third, the College is a stud farm where pure bred stock of various breeds and pure seeds of various varieties are raised for the purpose of selling to farmers at reasonable rates...this section is utilised for the practical training of students, but the magnitude of the work carried out is far in excess of the requirements for purely educational purposes...If a persistent loss is incurred, it can only be inferred that either the College is underselling the private breeder [which it was] or else that the conditions of employment and work at the College render it impossible to compete with private men [and they were, especially regarding wages].

To overcome staff shortages and reduce the expenses of conducting a large farm, Potts suggested moving the instructional side of the College nearer to the University to make use of more part-time staff, improving the teaching of subtropical agriculture to embrace crops etc. which could not be grown at the College, and serving as a nucleus around which the suggested University school could develop.

The curtain falls

The opening of the University of Queensland early in 1911, during the last year of Mahon's principalship, brought a new educational force into the Queensland system. The University was looking at the possible source of its students and Professor Steele and T. Parnell's inspection of the Queensland Agricultural College courses had a long-term objective. They found the science knowledge of the students "lamentably weak". Inspectors Kennedy and Smith sought the causes of the low academic achievements compared with the practical training, and recommended raising the standard of the entrance examinations.

In 1912 John Brown became Principal; he had ideas of raising the standard, making provision for students to proceed right through to the diploma as their chief aim on entering the College. His stay was brief, but his successor, Potts, built on his work and recognised that the gap between primary school and College entrance at sixteen years was a major barrier to continuous education and hence to tertiary status.

It was the demand from scientific bodies and far-sighted primary producers for tertiary education in agricultural science that led to continuous pressure for a faculty of agriculture to be established within the University. The Queensland Agricultural College was to be an integral part of this system. Without its land, equipment and crop and livestock resources, the cost of establishing such a faculty would be too great for the limited finances of the State, given the priorities determined by the current Queensland Government. (J. Zillman, *The Establishment of the Faculty of Agriculture, University of Queensland School of Science*, 1979)

The Scottish Agricultural Commission report Australia, Its Land, Conditions and Prospects, Blackwood, Edinburgh, 1911, p. 169 (Zillman, 1979) described the work

carried out in the agricultural colleges and the experimental stations as "distinctly disappointing".

Soon after the Inaugural Ceremony of the University on 1 June 1911, Sir William MacGregor, its Chancellor, stressed the need for a chair in agriculture and a veterinary chair; in June 1912 a committee consisting of Sir Thomas Robinson, Robert Philp and Robert Christison in London set out to obtain funds to establish a chair of agriculture. The pressure gained momentum but an unsympathetic State Government delayed its establishment for some fifteen years.

On 9 August 1916 the Senate of the University of Queensland, on a motion moved by J. D. Story, then Under-Secretary of the Department of Public Instruction, resolved:

As the question of the primary industries is closely interwoven with post war problems and a good system of Agricultural Education will be helpful in the development and expansion of the primary industries in Queensland, it is desirable the Agricultural Education should be carefully organised and developed.

A committee, whose members were Mr Crompton, Archbishop Duhig, Professor Gibson (Engineering), Mr Henderson, Professor Priestley (Mathematics), Mr Thynne and Mr Story was appointed to enquire into the matter and report to the Senate. This committee, amongst its several recommendations, stated that "Agricultural Education is a matter for State and University concern rather than private concern, and...should be closely interwoven with the State system, and with University schemes and should not be a detached and isolated branch of education", and added:

While the Queensland Agricultural College (Q.A.C.) should continue with its present functions, its role should also be expanded and organised with increased expenditure on staff and equipment so that it could meet conditions for affiliation with the University. The curricula of the Diploma courses at Q.A.C. as well as the staff teaching these courses, would have to be approved by the University. The students who would take the (University) Diploma courses would include matriculated students and those University graduates who had completed a degree in Science and who wished to gain practical agricultural training and experience for the award of the Bachelor of Science in Agriculture. If Q.A.C. was organised along these lines, it would be possible with little, if any, additional expense to the University:

- (i) To utilise the present Science courses, with suitable modifications or extensions for the University work in Science to be covered by undergraduates in the Science Department of Agriculture;
- (ii) To accept the Diploma course work at Q.A.C. as covering the practical and other requirements, in addition to the work done in the University needed for the Degree of Bachelor of Science in Agriculture.

The Senate approved the committee's report on 14 December 1917 and the Board of Faculties subsequently recommended that the Statutes be amended to allow representation from the State Department of Agriculture on the Faculty of Science. This was so that Departmental officers could be members of a committee of the Faculty of Science that would consider the recommendations of the Senate committee on Agricultural Education. The Senate agreed and H. C. Quodling (Director of Agriculture), A. H. Cory (Chief Inspector of Stock), A. E. Graham (Director of Dairying) and Cuthbert Potts (Principal of QAC) were subsequently appointed as members of the Faculty of Science.

For several years discussion centred around the desirability of issuing a Diploma in Agriculture. A Senate Committee set up in October 1918 decided that there was a public need for a Faculty of Agriculture, but no serious public demand for it, that research expenditure would be heavy and that agricultural research, if undertaken by the University, should be a prime charge against a State Department of Agriculture. The committee conferred with Potts, who agreed that while there was an urgent need, there was at present no pressing demand for agricultural education at university level. He felt that the University should create the demand. His view was that a diploma course would be the first step, but he pointed out that QAC did not have the staff to run a diploma (university) course at present.

In an interview with the Brisbane *Daily Mail* on 13 September and in an address to the Brisbane Chamber of Commerce on 28 October 1919, Potts pressed for the establishment of a faculty of agriculture and suggested that the McCaughey Bequest should be drawn on to establish it. (Zillman, pp. 38–39)

Pressure was applied by organisations such as the Farmers Co-operative Distributing Company, chambers of commerce, agricultural societies and the Australian Sugar Producers Association to establish a faculty of agriculture. In 1916 the Commonwealth Advisory Council for Science and Industry was set up, and the University began agricultural research in cattle ticks, beef nodules, prickly pear and fruit fly —all most important problems. Trained staff were needed to undertake these programmes, and the Department of Agriculture and Stock was also beset with urgent problems which needed trained staff to elucidate them.

In 1921 Messrs George and Riddell (Public Service Inspectors) were asked to investigate the status of the Queensland Agricultural College and determine the extent to which it had fulfilled the purposes for which it had been established and to ascertain, if possible, whether good results had been achieved. In reporting on their findings to the Minister for Agriculture (the Hon. W. N. Gillies) in a Minute dated 30 September 1921, J. D. Story, Public Service Commissioner, stated:

The general purposes for which the College was established seem to have been these:

- (a) To provide a systematic and practical course of training for young men in the science of improved agriculture, dairying, animal husbandry and poultry farming;
- (b) To afford students a practical training by having much of the work incidental to general agriculture, experimental agriculture, dairying, animal husbandry and poultry farming, done by the students themselves as part of their practical training;
- (c) To assist in improving the quality of the Stock throughout the State by raising pure bred stock and disposing of it at prices more reasonable than those prevailing in the open market;
- (d) To conduct experiments for the elucidation of agriculture.

With regard to these four aspects, the investigators decided:

The review of the work done, and being done, by the College and the analyses of the costs prepared by the investigators showed that the College was not fulfilling the purposes for which it was established and it was not achieving results commensurate with the expenditure.

Story then considered why the College had not been a success. His conclusions were that it had never been coordinated with the general system of State education, it was a detached fragment, it had no well-defined feeders from the primary or secondary schools, and there was an age gap between primary school and College entrance. When extension scholarships were granted from the Junior examination by the Government on 10 June 1919, only one was taken up at the College. The College had not received the support of parents and what little support there was came from the city rather than the country. The primary producers apparently did not rate it highly and experience had shown that it was not possible to combine with success the three functions, agricultural education, stock breeding and experiments, under one head in the one institution.

Story recommended that the Minister give serious consideration to closing down the College and converting a local high school —say, Forest Hill —into a rural school. A council of agricultural education should be appointed to advise the Government, and experts of the Department of Agriculture should advise on the desirability of selling in whole or in part the College's present livestock or distributing it to other Government institutions, retaining some stock for the use of a local rural school. He recommended that an officer of the Agriculture Department, an Inspector of Works and a Land Commissioner visit the College and furnish a joint report into:

- i. the possibility of cutting up the College property into suitable farms,
- ii. the practicability of removing to, and erecting on, those farms, some of the cottages at present on the College grounds (educational buildings should be retained as they might be required for use elsewhere), and
- iii. the approximate amount that might be expected to be realised if the property were so cut up and sold.

He also recommended that the Director of Agriculture confer with the Principal on whether it was necessary to retain the present farm hands and field staff.

In place of the College, Story recommended that a suitable agricultural institution be established on a site at Zillmere and that the Council of Agricultural Education formulate a scheme to provide city boys with agricultural teaching while they lived at home (to reduce costs), and to link the primary school with the rural school and the Central Technical College with the rural school, and keep this new institution in touch with the parent Government Departments and the University.

Discussion continued both in the University Senate and in Parliament as to the best method of coordinating agricultural education at all levels. After full consideration by the Government, a special committee was appointed by the Governor-in-Council to advise on the reorganisation of the College. Its members were A. E. Graham, the Director of Dairying, H. C. Quodling, the Director of Agriculture, R. M. Riddell, Inspector of Technical Colleges, and R. A. Wearne, Principal of the Central Technical College, with the Under-Secretary for Agriculture and Stock, E. G. E. Scriven, as Chairman. Briefly, their more important recommendations were the establishment of an agricultural high school and college, and a rural school for day scholars to link up with the high school; bursaries for boys of fourteen years who had obtained State and State High School Scholarships, the first twenty annually to be free of all costs of maintenance, but preference in selection to be given to State School scholarships; extension scholarships from the Junior course to a

senior standard; travelling research scholarships; instruction by correspondence; reservation of land for students who had graduated honourably; and reorganisation of the Queensland Agricultural College, by improvement of the accommodation and the erection of additional buildings.

The committee's report was approved in June 1923 and tabled in the Legislative Assembly on 13 July 1923.

In the *Queensland Agricultural Journal* for July 1923 (pp. 17–18), the Hon. W. N. Gillies, Minister for Agriculture, announced that it was intended to discontinue the operations of the Agricultural College at Gatton as it was then constituted, and, in its place, to establish an agricultural high school and college, to provide a high school education in agriculture for youths from 14 to 18 years of age. The Minister said:

The Government fully recognises the vital importance of agricultural training as being an important part of the rural organisation and land settlement policy, and it has been forced to the conclusion that the Queensland Agricultural College as at present constituted is not obtaining the best results for the purpose for which it exists. This conclusion has not been reached by the Government as it is at present constituted, but the members of the Government immediately preceding had similar views. I have, as also did my immediate predecessor, given much consideration to the problem, and an adverse report by Public Service inspectors some time ago confirmed the impression that had been formed. I have no desire to animadvert in any way upon the ideas of the Government which founded the College, and am quite ready to believe that then and for years afterwards it served the purpose of its foundation, but times have changed, and there is no doubt, for the number of students who attend and the number who graduate in comparison with the cost of maintenance, the continuation of it on the present basis is not warranted.

There is at present accommodation at this institution for sixty resident students. The average number during the past five years is forty, and the average net cost per student is £333.

The war made a difference in the number of students, and other colleges in Australia were affected likewise, but with every allowance for those circumstances the fact remains that the average annual number of students of all kinds —full paying, bursars, soldier, and other short-period students —for the past five years, and the average annual cost of maintenance each year, in the same period, does not indicate a satisfactory condition of things. Moreover, the college has departed in several ways from the original idea of a college; a large herd of the different dairy breeds is kept, far larger than is necessary for college purposes; pig-breeding and dealing is on a commercial scale, a butter factory is maintained, poultry competitions are carried out, and so on.

Several methods of improvement were considered and discussed, but without practical result, because they could not be carried out upon the lines of what is really required —the broadening of agricultural education, bringing it within reach of all who so desired, from the usual time of leaving the State school, and at the same time providing for the higher education in agriculture, preparatory to the time when there would be an opportunity for a student to take an agricultural course at the University...

The Committee recommends that the Queensland Agricultural College be terminated, and that in its place an Agricultural High School and College be established, the intention being to provide a High School education in agriculture for boys of, say, from fourteen to eighteen years, who then, it is hoped, would enter the college at the regulation age and complete the agricultural education, so far as opportunities are provided. The date of the change has been fixed for the 1st September next [1923], and the Department of Agriculture, in conjunction with the Public Service Commissioner, are now taking the necessary action accordingly.

A concern to achieve a successful integration of the activities of the College was expressed in the committee's recommendations that the person appointed as principal should have an understanding of male youth, executive ability, imagination and vision, a competent general knowledge of all branches of the institution's work, sympathy with general education and enthusiasm in agricultural education. A similar concern for integration was implied in the recommendation that the number of livestock maintained at the College should be reduced to a level governed by its requirements as a teaching institution. The committee also noted with regret the absence of scientific control and investigation at the College. It made suggestions concerning the shape of the curriculum and emphasised the importance of appointing staff who would be able to foster and maintain a "suitable tone and atmosphere within the institution". (Black, pp. 226–228)

Cuthbert Potts retired as Principal of the Queensland Agricultural College on 3 August 1923. Jack Keith Murray, B.A., B.Sc.Agr. (Syd), N.D.D. (Kilmarnock), was appointed Principal of the Queensland Agricultural High School and College, on probation for six months from 14 September 1923. His appointment was confirmed as from 3 November 1923 by notice in the *Queensland Government Gazette* under the signature of John Huxham, Minister for Public Instruction, on 26 June 1924. Murray, like Potts, had come from the staff of the Hawkesbury Agricultural College at Richmond, New South Wales, where his specialty was bacteriology. He had served in World War I.

The arrival of Professor E. J. Goddard in 1923 to take up the Chair in Biology at the University of Queensland brought the University greater involvement in rural research, such as the control of the Queensland fruit fly and bunchy top in bananas, banana ripening, and the control of prickly pear. Goddard felt that the Diploma in Agriculture previously proposed by the University Committee at QAC would provide excellent practical training for young men who intended to take up farming, but there remained the question of training research specialists in agriculture in the fields of plant pathology and economic entomology. The recent reorganisation and development of the QAC and the further additions to the University staff made it possible to set up a faculty of agriculture with a minimum of expenditure.

On 29 January 1925 a conference was held at Parliament House to discuss the matter. The following persons were present: W. N. Gillies (Minister for Agriculture), A. E. Graham (Under-Secretary, Department of Agriculture), F. T. Brennan (Minister for Public Instruction), B. McKenna (Under-Secretary, Department of Public Instruction), L. D. Edwards (Chief Inspector, Department of Public Instruction), J. D. Story (Public Service Commissioner), A. J. Thynne (Vice-Chancellor), E. J. Goddard (Professor of Biology), J. McCaffrey (University administrative staff) and J. K. Murray (Principal, QAC).

Graham, the new Under-Secretary of the Department of Agriculture, enthusiastically supported the establishment of the Faculty of Agriculture. Agriculture was becoming more complex and dependent on science. He recognised the need not only to develop scientific services to cater for the physical and biological areas but also to pay close attention to agricultural economics. The Department would allow its staff to be used as part-time University lecturers and would send at least three students per annum to the University — they would be employed by the Department after graduation. (Zillman, 1979, pp. 65–66)

In 1925, William Forgan-Smith became Minister for Agriculture. With backing from J. D. Story and Professor Goddard, he placed the initial £5000 in the estimates from the

beginning of the 1927–28 financial year for the purpose of establishing a faculty of agriculture.

At its meeting of 10 December 1926, the University Senate on J. D. Story's motion resolved:

That seeing that a Chair of Agriculture has already been established pro forma the first year of the course of study leading to the Degree of B.Sc. (Agric.) be inaugurated as from the beginning of the academic year 1927.

Students were to spend the first two years at the University, with the third and fourth years being divided between QAC and the University. J. K. Murray, Principal of QAC, was appointed the first Professor of Agriculture —a part-time honorary position —while retaining his position as Principal of QAC. (Zillman, 1979, p. 74)

Thus the Queensland Agricultural College had finally been placed in a continuous scheme of agricultural education from primary level through the secondary (diploma) level to the tertiary, serving as an important link in the educational chain. Its administration had passed from the Department of Agriculture and Stock to the Department of Public Instruction, but the Department of Agriculture and Stock was to become the greatest consumer of the new breed of scientists emanating from the University Faculty of Agriculture.

ORGANISATION OF THE AGRICULTURAL INDUSTRIES: 1920-1929

Introduction

The decade 1920–29 was one of unprecedented advancement in the agricultural industry. It could be called "the decade of organised marketing". It could be labelled "the reign of King Cotton". In China it would no doubt have been hailed as "the decade of the pig". It was also the decade of the White Australia policy in sugar and the emergence of science in agriculture.

The decade was fortunate in that the Minister for Agriculture and Stock had his predecessor "looking over his shoulder" in support to provide a pool of expertise with similar goals, facilitated by the absence of political opposition from an Upper House. William Lennon, who was Minister for Agriculture in the Ryan Labor Ministry, moved up to become Lieutenant-Governor, paving the way for E. G. Theodore to become Premier and abolish the Legislative Council. Theodore had selected W. N. Gillies to be his Minister for Agriculture in 1919 and Gillies likewise moved up to be Premier in 1928, with William Forgan-Smith filling his shoes until May 1929, when the Country Party under A. E. Moore held the reins of government for three years before falling to the Forgan-Smith Labor Ministry in 1932.

The 1914–18 war had taken away a large number of rural able-bodied young men and for several years the economic and international climate prevented major developments in agriculture and settlement. During the early postwar years, trade depression, financial stringency and credit deflation had frustrated the farming community.

The 1920–21 year generally saw a return to normal conditions. The summer rains ended the long drought and wheat, sugar and cotton harvests were excellent. The number of owners engaged in cultivation in 1920 was 26 921, or 3.66 per cent of the population, and the number of owners of cattle with more than 300 head was the highest recorded since 1915. The total value of exports during 1912–20 was £14,362,855, of which agricultural and pastoral interests contributed £13,968,846, or 97.6 per cent of the whole, of which agriculture provided only 6.65 per cent.

There was, however, little organisation amongst farmers - with consequent little bargaining power - and prices were unsatisfactory. A voluntary organising trust fund was set up by J. H. Cecil Roberts, H. M. Hart and M. R. Harrison of the Queensland Farmers' Union by a levy on farmers of one penny per bushel of wheat of the 1920 crop to establish a voluntary wheat pool to demand a higher price. (Borchardt, 1978)

In 1914 the Australian cotton grower received 1.65d per lb for cotton on the farm; in 1915 he obtained 2.54d; in 1917 the price was 3.58d; and in 1918 it was 4d. Imports of cotton and cotton seed were allowed into Australia duty free and imports during 1919–20 totalled

611,394 lb of unmanufactured cotton valued at £44,476. Yet it was impossible to sell the ginned local cotton at a fair price in competition.

Lennon had, during his term as Minister, initially planned and laid much of the foundation of the advance in rural organisation (Forgan-Smith, W., *QAJ*, Vol. 25, Jan. 1926, pp. 1–2) E. G. Theodore, recognising the need for support for his Government from the small farmers, addressed a conference of representatives of butter and cheese factories and milk condensaries in March 1922, held to consider methods of improving the unsatisfactory conditions in the dairying industry. He announced that the Government recognised the urgent need for greater development of the rural industries of the State and that action would be taken towards that end. With the then Minister for Agriculture and Stock, Gillies, in the Chair, the Premier outlined a scheme for the complete organisation of the agricultural industry through a Council of Agriculture, established under a foreshadowed Primary Producers' Organisation Act.

Legislative and administrative actions, 1919–29

Mention has been made in Chapter 3 of the accession of the Hon. W. N. Gillies to the portfolio of Minister for Agriculture and Stock on 9 September 1919. He had been Assistant Minister and then Minister for Justice in 1918.

Only two Ministers for Agriculture and Stock administered the Department between 9 September 1919 and 20 May 1929—the Hon. W. N. Gillies and the Hon. W. Forgan-Smith.

The Department under Gillies

J. F. F. Reid wrote in the Queensland Agricultural Journal of March 1928 (p. 208):

On his entry into the Agriculture Office, Mr. Gillies found twenty-two Acts of Parliament to administer. In the course of his Ministerial term he had seven of these amended or consolidated and added fourteen new agricultural and related measures. The whole period was marked by phenomenal departmental activity.

The establishment of the cotton industry, stabilisation of the sugar and other farming industries, systematic agricultural organisations, formation of wheat and other pools, the placing of the farmers' co-operative movement on a sound basis, the protection of banana growing and its preservation as a white man's industry, the Sugar Agreement with the Commonwealth–all required special legislation or regulation, and in these enactments the general benefit of agriculture, and therefore of the nation, was the basic idea. The administrative acts of Mr. Gillies during this period also covered a very wide field. Among other practical measures the system of advances to settlers was liberalised, schemes for grain and fodder conservation were initiated, native birds and animals were protected more closely, the scientific services of the department were extended, and publicity in respect to rural enterprises, conditions and problems by motion pictures and otherwise was greatly improved (and a library established). Behind it all Mr. Gillies was a driving force.

In the Queensland Agricultural Journal of January 1925 (p. 2), Reid had written:

During his five year term as Minister, expenditure in agricultural and pastoral development within the State increased by 229 per cent. During the same time the revenue of the Department increased by 333 per cent, while the total amount handled by the Department in respect to both receipts and expenditure increased by 260 per cent. When Mr. Gillies assumed control of the

Department on 8th September, 1919 the staff enrolment was 389. By January 1925 it had increased to 546, and the additions were mainly of field and professional officers.

Notable additions to departmental personnel included technical cotton staff, an increase of the entomological staff from three to thirteen, and an instructor in pig raising. The establishment of experiment farms at Home Hill and in the Burnett also meant addition to the technical services and an effective liaison with the Queensland University, particularly in relation to biological and pathological problems affecting agriculture and stock raising within the State. The remarkable expansion of the activities of the Department outlined followed the gradual application of a broadvisioned, statesmanlike rural policy—a policy as expressed in recent legislation, that has claimed the attention of commentators in other countries and aroused the interest of farmers and others concerned with agricultural development in every State in the Commonwealth.

In 1921 Gillies became Deputy Premier and on 26 February 1925 he became the first farmer Premier of Queensland. He resigned the Premiership on 22 October 1925 and later accepted a seat on the Board of Trade and Arbitration. He died suddenly at Toowong at the age of sixty years on 9 February 1928.

The legislative Acts introduced by Gillies are listed below.

- 1. The Stock Foods Act of 1919 (10 Georgii V. No. 8, *Qd Govt. Gaz.*, No. 262, 22 November 1919) assented to on 17 November 1919. This is explained in Chapter 3.
- 2. The Co-operative Agricultural Production and Advances to Farmers Act Amendment Act of 1919 (10 Georgii V. No. 9, *Qd Govt. Gaz.*, No. 263, 24 November 1919) assented to on 17 November 1919. In conjunction with the original Act it could be referred to as The Co-operative Agricultural Production and Advances to Farmers Acts, 1914 to 1919.

The idea governing the Act was to assist farmers, at the outset of establishment on the land, to secure an income at a time when capital had been spent on working improvements, and at terms for repayment which could not be obtained from any financial institution. Most demand was for the purchase of livestock (cows, calves, bulls, pigs and sheep). The greatest disappointment was the lack of requests for silo construction, only three applications being received in 1921–22 and one only in 1923. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1922–23, pp. 20–21) The Under-Secretary remarked: "It seems that education in the conservation of fodder is yet far from complete."

3. The Dairy Produce Act of 1920 (10 Georgii V. No. 15, *Qd Govt. Gaz.*, No. 60, 16 February 1920) assented to on 10 February 1920. The Dairy Produce Acts of the period 1904–11 were repealed. This Act required the registration of all factories engaged in the manufacture of dairy products and inter alia made obligatory the grading of all milk or cream received by factories. Admixture of milk and cream of different quality was not permitted. Dairy produce had to be packed under a registered brand which indicated the quality of the product. Particulars of churn date and number of boxes from each churning had to be shown plainly on each package, with the date of manufacture and batch number marked on each cheese manufactured and on the crates containing the cheese. Distribution of "over-run" was provided for. Advice cards in the form prescribed by the Act had to accompany every consignment of butter and cheese forwarded to cold store, wholesaler or dairy produce agent. All Queensland dairy

produce was to be subject to examination and grading by an inspector and no dairy produce graded under the Act and cold-stored could be drawn from storage without the sanction of an inspector. Returns regarding dairy produce manufactured, the amount credited to suppliers and the names and addresses of suppliers of milk and cream of indifferent quality had to be supplied to the Under-Secretary at stated periods. (*QAJ*, Vol. 15, June 1921, p. 257) All dairy premises had to be registered. Inspectors would be appointed to inspect premises and condemn unsatisfactory establishments and inspect stock for disease. Stock owners were required to report diseased stock to the amount of butter obtained from the cream according to grade.

- 4. The Wheat Pool Act of 1920 (11 Georgii V. No. 4, *Qd Govt. Gaz.*, No. 275) assented to on 29 November 1920. The first compulsory pool in the State was established under this Act and a State Wheat Board was gazetted early in December 1920, consisting of five grower representatives together with F. J. Morgan, a banker appointed by the Government as Chairman. The Board was empowered under the Act to receive, store, handle and market the whole of the 1920–21 harvest.
- 5. **The Banana Industry Preservation Act of 1921** (12 Georgii V. No. 3., *Qd Govt. Gaz.*, No. 131, 7 October 1921) assented to on 4 October 1921. This Act prohibited persons who did not carry a certificate, gained by passing a dictation test, from growing bananas or being employed in the industry.
- 6. The Regulation of Sugar Cane Prices Act Amendment Act of 1921 (12 Georgii V. No. 8, *Qd Govt. Gaz.*, No. 169, 7 November 1921), assented to on 31 October 1921, dealt with assigned lands, the responsibility of mill owners to crush cane containing more than seven per cent of cane sugar, questions of chemical analyses of cane, and the payments for cane. It also established the Sugar Cane Prices Fund to meet the expenses incurred in the execution of the Act by the Governor-in-Council, the Minister or any local board member.
- 7. The Animals and Birds Act of 1921 (12 Georgii V. No. 20, *Qd Govt. Gaz.*, No. 192, 15 November 1921), assented to on 9 November 1921, came into force on 1 January 1922. The Game and Fishes Acclimatisation Act of 1898, The Native Animals Protection Acts, 1906 to 1910 and The Native Birds Protection Acts, 1877 to 1884 were repealed. All reserves gazetted to this date were proclaimed sanctuaries. The Governor-in-Council was given power to declare districts under the Act; approve society rules; declare open seasons and sanctuaries; prohibit the sale of certain animals and birds; limit the number to be killed; appoint inspectors, rangers or other officers to administer the Act; control poisoning, shooting and egg collection; search and seize; authorise trustees, managers of gardens etc. or scientific bodies to keep animals or birds; license sellers of skins; issue permits to trappers; inspect bird dealers' premises; and generally enforce the provisions of the Act.
- 8. The Wheat Advances Agreement Ratification Act of 1921 (12 Georgii V. No. 25, *Qd Govt. Gaz.*, No. 200, 17 November 1921) assented to on 12 November 1921. This Act approved, confirmed and ratified an agreement dated 5 April 1921 between the Commonwealth of Australia, the State of Queensland and certain banks respecting advances of moneys required to pay for wheat delivered to the State Wheat Board. All moneys necessary to be paid by the State of Queensland could be appropriated from the

Consolidated Revenue Fund. The Board issued certificates for wheat received and the banks made an advance of 5s per bushel less dockage and deducted 7d per bushel for freight handling etc., the first instalment of 2s 6d per bushel to be paid on or after 31 January 1922 and the second of 2s 6d per bushel on or after 30 April 1922.

- 9. The Cheese Pool Act of 1921 (12 Georgii V. No. 27, *Qd Govt. Gaz.*, No. 207, 21 November 1921) assented to on 14 November 1921. This Act provided for the constitution of a State Cheese Board of five persons elected by cheese producers and dairy farmers supplying milk to cheese factories, one of whom would be Chairman. The Board was given power to sell or arrange for the sale of cheese, appoint agents, officers, servants as necessary, arrange with banks or the Commonwealth Bank for financial accommodation, provide cheese for consumption within Queensland and sales interstate or for overseas export. All cheese produced in Queensland had to be delivered to the Board or its agents for sale on behalf of the producers. No cheese could be sold outside the Board, except in certain cases, e.g. small sales, sales direct to vendors, etc. It equalised returns to factories whether the cheese was sold overseas or locally.
- 10. The Primary Producers' Organisation Act of 1922 (13 Georgii V. No. 4, *Qd Govt. Gaz.*, No. 60, 17 August 1922) assented to on 15 August 1922, was to promote agricultural and rural industries by the organisation of the primary producers of Queensland in a completely unified national organisation. It provided for the organisation of primary producers as the Queensland Producers' Association, consisting of (a) the Council of Agriculture, (b) the district councils of agriculture, and (c) the local producers' associations.

The Council of Agriculture would have a membership declared from time to time by the Governor-in-Council by Order-in-Council, but of not more than twenty-five members at one time. No fewer than five members and no more than one-fourth of the total would be appointed by the Governor as government representatives, including the Minister; of the remaining members, no fewer than fifteen would be elected by the district councils. Each district council would elect one member to represent it. All representatives would hold office for a term not exceeding three years but would be eligible for re-election. The Minister would be president of the Council.

The Governor-in-Council, on the recommendation of the Council, appointed a full-time director of the Queensland Producers' Association. The functions of the Council would be to cooperate with the Department, district councils, local associations, and other bodies in:

- i. developing the rural industries;
- ii. effecting the stabilisation of prices of primary produce for the purpose of ensuring to the primary producer a fair remuneration for his labour;
- iii. investigating and dealing with problems relating to the rural industries, including animal husbandry;

- iv. advising and instructing primary producers with regard to matters which require scientific knowledge and training, farm management and farm economics, including cost of production and farm accountancy;
- v. making research on subjects pertaining to the rural industries;
- vi. securing effective action for the controlling of diseases and pests generally;
- vii. securing additional markets for the disposal of produce and improved methods of distribution;
- viii. studying markets, accumulating data regarding marketing processes and costs, disseminating accurate market information, and eliminating waste and unnecessary marketing expenses;
- ix. securing improved means of storage, handling and transport;
- x. promoting a general policy of testing, standardising and grading;
- xi. extending the usefulness of the professional staff of the Department by the utilisation of experts, the dissemination of literature and pamphlets dealing with matters of interest to primary producers and by any other method which the Council thought fit, including the establishment of a Bureau of Information for primary producers;
- xii. encouraging and assisting in the promotion of farmers' co-operative associations and enterprises;
- xiii. bettering the conditions of rural life and the extending of rural education by cooperation with the educational authorities of the State and generally;
- xiv. dealing with matters in relation to agriculture and production of primary produce that might be referred to the Council by the Minister;
- xv. generally advising, assisting and cooperating with the Department and the Association in all matters pertaining to rural industries, and where deemed necessary, convening conferences;
- xvi. making research on the subject of the utilisation of rural products in manufactures, coordinating and assisting in the promotion of such industries by the extension of the Bureau of Information, and, where necessary, convening conferences for this purpose.

Primary producers could establish a Local Producers' Association to which the Council of Agriculture would allocate a District. A Queensland Producers' Association Fund would be established from grants-in-aid from Parliament and from levies.

Generally, local problems would go from the Local Producers' Association to the District Council and then to the Council of Agriculture.

11. **The Primary Products Pools Act of 1922** (13 Georgii V. No. 9., *Qd Govt. Gaz.*, No. 117, 2 October 1922), assented to on 26 September 1922. It gave the Governor-in-Council, upon the recommendation of the Council of Agriculture or on request from a representative number of growers or an organisation representing the growers, power to declare any grain,

cereal, fruit or vegetable, dairy produce or article of commerce prepared from agricultural produce a commodity under the Act, and to constitute a Board to handle the commodity by publication in the *Government Gazette*. If fifty or more growers petitioned the Minister to take a poll and if not fewer than three-quarters of the growers of the commodity voted in favour, a Board would be constituted to sell or arrange the sale of the commodity. The Board would be appointed by the Minister from elected representatives of the growers of the commodity would be delivered to the Board unless specially exempted. The Board would issue certificates for payment of the commodity delivered to the Board and the Board would arrange finance for the payment.

- 12. The Regulation of Sugar Cane Prices Acts Amendment Act of 1922 (13 Georgii V. No. 10, *Qd Govt. Gaz.*, No. 118, 2 October 1922), assented to on 26 September 1922, provided for payment of expenses of sugar industry representatives or Council of Agriculture representatives called to conferences convened by the State or Commonwealth Government.
- 13. The Fruit Cases Acts Amendment Act of 1922 (13 Georgii V. No. 11, *Qd Govt. Gaz.*, No. 119, 2 October 1922), assented to on 26 September 1922, provided that all fruit or vegetables packed for sale or stacked for sale had to be graded according to the regulations.
- 14. **The Sugar Works Act of 1922** (13 Georgii V. No. 30, *Qd Govt. Gaz.*, No. 163, 23 October 1922), assented to on 18 October 1922, gave power to the Governor-in-Council to create a sugar works area in any locality in Queensland with such boundaries and name as he thought proper. He could give power to a corporation to construct sugar works within the area and thereafter manage them. The costs of the works would be met by moneys appropriated by Parliament and lent at an interest rate to be determined, payable to the Treasurer. The Corporation would manage the works, grow cane upon the land or lease or sell the land and make advances on cane supplied to the works.
- 15. The Dingo and Marsupial Destruction Act Amendment Act of 1923 (14 Georgii V. No. 1, Qd Govt. Gaz., No. 63, 27 August 1923) as one with The Dingo and Marsupial Destruction Act of 1918, was assented to on 17 August 1923. Together they could be cited as The Dingo and Marsupial Destruction Acts, 1918 to 1923. It allowed rates of bonus payable for scalps of dingoes and marsupials to be fixed from time to time by regulations under this Act; the rate for foxes need not be the same as for dingoes. (*Qd Govt. Gaz.*, No. 63, 27 August 1923) No live dingo or fox could be kept except with the permission of the Minister. The bonus paid for scalps was fixed at 15s for the scalp of a dingo, 5s for the scalp of a fox, 3d for the scalp of a wallaby, 2d for the scalp of a kangaroo rat, paddy melon or bandicoot. The payment of a bonus for dingoes and foxes was compulsory for all Boards. Whole fox skins could be presented and a bonus paid, with the skin marked and returned to the trapper. (*QAJ*, Vol. 20, Oct. 1923, p. 325)
- 16. The Diseases in Poultry Act of 1923 (14 Georgii V. No. 2., *Qd Govt. Gaz.*, No. 64, 27 August 1923), assented to on 20 August 1923, allowed the Governor-in-Council to appoint inspectors and other officers as might be necessary under the Act. Every member of the police force was made an ex officio inspector, and the Minister could appoint honorary inspectors. By Order-in-Council the Governor-in-Council could constitute any district in the State to be a District under the Act or alter the boundaries thereof. He could declare any birds to be poultry and any disease to be a disease under

the Act. He could also declare an infested area and prohibit the sale of poultry from any district as needed. Introduced poultry would be disinfected and he could prescribe transport routes. An inspector could quarantine an area by giving written notice to the owner. Any diseased poultry or fittings could be destroyed without compensation. Owners were required to notify the nearest inspector or the Under-Secretary of any disease appearing among their poultry and isolate the infected animals. Regulations were to be drawn up and policed by inspectors. Chicken pox, avian diphtheria, common roup, favus, fowl or chicken cholera, fowl enteritis, gapes, poultry lice, scabies, stickfast flea, tuberculosis, tumours and vent gleet were especially mentioned as diseases under the Act. (*Qd Govt. Gaz.*, No. 62, 25 August 1923)

- 17. **The Pest Destroyers' Act of 1923** (14 Georgii V. No. 3., *Qd Govt. Gaz.*, No. 65, 27 August 1923), assented to on 20 August 1923, was designed to regulate the sale of insecticides, fungicides, vermin destroyers and weed destroyers. Any person who put on the market in Queensland any pest destroyer was termed a dealer under the Act. Every dealer within thirty days after the passing of this Act or commencement of business or thereafter before 31 January each year must give notice in writing to the Under-Secretary of:
 - his name and place of business;
 - the distinctive name of every pest destroyer which he then sold and of every pest destroyer which he proposed to sell during the current year; and
 - the places where the same could be purchased or acquired from him.

A fee of 5s for each pest destroyer was payable up to a maximum of $\pounds 1$ in any one year. A sample in the original package, bearing the prescribed label, not less than one half pound, a specimen copy of the prescribed label and directions for use, and a specimen copy of the invoice given to a buyer had to be forwarded to the Department, under the Regulations. Every retailer of pest destroyers also had to inform the Department of the name of the pest destroyer, net weight or volume of the package, the names of the active constituents and their percentages and directions for use, as supplied by the wholesaler dealer.

- 18. The Stallions Registration Act of 1923 (14 Georgii V. No. 16, *Qd Govt. Gaz.*, No. 123, 16 October 1922), assented to on 10 October 1923, gave power to the Governor-in-Council on the recommendation of the Council of Agriculture to declare districts which would come under the Act and to appoint Stallion Boards of not more than five experienced breeders of stock (one of whom must be a veterinary surgeon appointed by the Governor-in-Council as Chairman) to hold office for one year but be eligible for reappointment. Owners of stallions must apply on or before 1 June in each year to the District Board for registration of their stallions including pedigree and district to be served by the stallion. The Board would examine the stallion for standard and soundness, and if approved, register the stallion and issue a certificate. Yearly registration was required for stallions under five years of age; thereafter an examination could be directed by the Minister. Only registered stallions were to be permitted to stand for service
- 19. The Sugar Experiment Stations Act Amendment Act of 1923 (14 Georgii V. No. 27, *Qd Govt. Gaz.*, No. 179, 19 November 1923), assented to on 12 November 1923, provided for the formation of Cane Pest Boards for declared Cane Pest Infested Areas to control, suppress or prevent cane pests (insects or animals or bird pests which detrimentally affect

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sugar cane). Each Cane Pest Board would consist of five members, of whom three would be cane growers elected by cane growers and two elected by mill owners in the area. The costs would be met by the assessment of a levy of not more than 3d on every ton of cane received at a sugar works within the cane pest infested area.

20. The Cotton Industry Act of 1923 (14 Georgii V. No. 28, *Qd Govt. Gaz.*, No. 28, 19 November 1923), assented to on 12 November 1923, provided for marketing cotton, authorising the acquisition of cotton by the State and improving the cotton industry. For the purposes of the Act the Governor-in-Council could appoint inspectors with no pecuniary interest in cotton to administer the Act, could constitute any part of the State a District, and could alter the boundaries or abolish a district under the Act. During the period when the Crown guaranteed a price for seed cotton, the Governor-in-Council, for the Crown, could acquire the whole or any part of the cotton grown within the State. The price was to be fixed by the Governor-in-Council according to quality, but be not less than the guaranteed price for suitable cotton. The Minister for Agriculture could make advances not exceeding 5d per lb for cotton of good quality and length of staple and less for other cotton delivered during the years ending 31 July 1924, 1925 and 1926. No cotton in excess of that produced from 80 acres was eligible for the advance.

All cotton had to be ginned at an authorised factory. All cotton acquired had to be ginned, graded, treated, prepared and sold as the Minister saw fit. The grower had to be paid for all cotton sold at a price in excess of the advance less costs.

No ratoon cotton was to be grown, or any cotton other than for commercial purposes.

To prevent expansion of infection with diseases and pests any such occurrence had to be reported to the Under-Secretary; the area could be quarantined and the plants destroyed. Compensation would only be paid in special circumstances.

By 1 March following harvest, all details of the crop—area sown, area harvested and variety planted—had to be forwarded to the Under-Secretary. No person could sow cotton seed except that distributed by the Department of Agriculture and Stock. All old cotton plants had to be destroyed within six weeks following 31 July in every year.

No wax matches could be used in a cotton field or ginnery. (*Qd Govt. Gaz.*, No. 179, 19 November 1923)

- 21. **The Primary Products Pools Act Amendment Act of 1923** (14 Georgii V. No. 31, *Qd Govt. Gaz.*, No. 184, 21 November 1923), assented to on 12 November 1923, added eggs to the list of commodities. It also provided for thirty days' notice by publication in the *Gazette* and the *Queensland Producer* regarding the making of an order and payment of expenses in taking a poll. It also gave the Commodity Boards power to contract for use of buildings, erect buildings and dispose of property etc.
- 22. The Meat Industry Encouragement Act of 1923 (14 Georgii V. No. 32, *Qd Govt. Gaz.*, No. 185, 21 November 1923), to encourage and improve the meat industry, was assented to on 12 November 1923. It was to be administered by the Secretary for Agriculture and Stock or another Minister. It came into force on 2 April 1925. For the purposes of this Act, a State Meat Advisory Board was established, consisting of four owners of stock representing cattle interests and two owners representing sheep

interests, three persons representing meatworks, a State executive officer and a Commonwealth Government executive officer.

Members who were financial at the time of the elections were eligible to vote on the basis of livestock ownership:

- under 1000 head of cattle or 6000 sheep, one vote;
- between 1000 and 5000 head of cattle or between 6000 and 30 000 sheep, two votes;
- 5000 head of cattle or 30 000 head of sheep and upwards, three votes;
- three votes would be the maximum for any single owner;
- there would be triennial elections.

The Meat Industry Fund would be established by levies etc. and these moneys would become the exclusive property of the Australian Meat Council. Levies would be assessed in September each year at not more than one penny per head of cattle and one-sixth of a penny per head of sheep on the returns of stock required under the Act. Further levies could be decided by a poll of stock owners. Returns under The Stock Returns Act of 1893 could be used.

The Board would advise the Minister on all matters relating to this Act; declare levies; deal with any measures designed to increase the production of beef or mutton and their by-products; improve the methods used in breeding, carrying, killing, cold storing or selling stock or meat; recommend financial assistance for the establishment of co-operative meatworks, abattoirs or factories for the manufacture and preparation of products and by-products.

The Board would elect its own chairman.

The Board would choose four of its members to be members of the Australian Meat Council before every general election of that body, one representing the meatworks, two the cattle interests and one the sheep interests. (*Qd Govt. Gaz.*, No. 185, 21 November 1923)

- 23. **The Primary Producers' Organisation Act Amendment Act of 1923** (14 Georgii V. No. 36, *Qd Govt. Gaz.*, No. 189, 21 November 1923), assented to on 12 November 1923, now The Primary Producers' Organisation Acts, 1922 to 1923. This Act empowered the Council to make a general levy on primary producers for general administrative purposes some time after 1 July 1924 for the first year, which should not exceed in total the sum of £20 000. It could also make a particular levy for sections of industry if a poll taken was in the affirmative.
- 24. **The Fruit Marketing Organisation Act of 1923** (14 Georgii V. No. 39, *Qd Govt. Gaz.*, No. 200, 26 November 1923), assented to on 15 November 1923, provided for the organisation of the marketing of Queensland fruit, which could be extended to the marketing of vegetables. The organisation was to consist of:
 - local associations,
 - sectional group committees, and
 - the Committee of Direction.

The Committee of Direction of Fruit Marketing would be a body corporate with perpetual succession and an official seal and capable in law of suing and being sued, and was deemed to be constituted from the passing of this Act. It was to continue for three years from the date it was constituted and then continue for a further three years unless discontinued on the requisition of five hundred registered fruit growers.

The Committee of Direction had power to purchase, sell, exchange, lease and hold land, goods, chattels, securities and any other property, appoint agents, enter into agreements and contracts, issue debentures, engage and pay officers, servants and employees, impose levies on fruit marketed and all other things as prescribed.

It could make arrangements for financing of local associations and sectional group committees. It was to take control of the marketing of all fruit when required to do so by Order-in-Council.

The Committee of Direction could exempt certain areas.

The first Committee of Direction, known as the Provisional Committee of Direction was constituted for twelve months from 12 June 1924 and named as follows: banana growers—William Alexander Cathcart, Landsborough, and William Bede Christie, Currumbin; pineapple growers—Herbert Vinnicombe, Glasshouse Mountains, and Joseph James Thomas, Montville; citrus fruit growers—Thomas Henry Brown, Montville, and Leslie Garforth Swain, Flaxton; deciduous fruit growers—Jack Stephan Mehan, Broadwater, and David Pfrunder, Applethorpe; other fruit grower—Henry Archibald, Pozieres; Council of Agriculture—Richard Lewis Macgregor, Director, Queensland Producers' Association.

The Provisional Committee had the following powers and functions:

- i. requiring the cooperation of local associations with a view to having one channel of receipt and despatch at station, siding or seaport;
- ii. encouraging the provision of packing sheds where conditions were suitable, and establishing a system of inspection of fruit;
- iii. arranging transportation of fruit, and cartage and handling at destination points;
- iv. arranging for supervision at the markets;
- v. making agreements with fruit commission agents, fruit canners and other persons;
- vi. taking preliminary steps in the direction of extension of markets;
- vii. prohibiting or regulating the use and management of fruit barrows, fruit stalls at railway stations, and fruit growers' retail shops;
- viii. entering into agreements and contracts, engaging and paying officers, servants and employees;
- ix. imposing levies on fruit marketed;

- x. arranging for financing of the operations of local associations and of sectional group committees;
- xi. engaging in such other activities as might be approved by the Governor-in-Council on the recommendation of the Council of Agriculture.

Within six months of the passing of the Act, the Committee of Direction was constituted by election by each sectional group of representatives.

Local associations of bona fide fruit growers were to be formed for each district, the boundaries of which were declared by the Committee of Direction. Local associations were to arrange for preparation, packing, grading and inspection of fruit for market and act as agents for the Committee of Direction.

There were to be five sectional groups—banana, pineapple, deciduous, citrus, other fruit - with power to add vegetables.

An annual conference of delegates of local associations, which the Committee of Direction would report, was to be held.

25. **The Agricultural Bank Act of 1923** (14 Georgii V. No. 41, *Qd Govt. Gaz.*, No. 210, 3 December 1923), assented to on 23 November 1923, made provision for State advances to co-operative companies and associations and to farmers and others, and for other consequential purposes. It was proclaimed on 28 August to come into force on 1 September 1924.

The Act was divided into five parts: Part I, Preliminary; Part II, The Agricultural Bank; Part III; Advances to Co-operative Companies; Part IV, Advances to Farmers and Others; and Part V, Miscellaneous.

It provided that the Secretary for Agriculture and Stock and his successors in office, representing the Crown, should be a corporation under the name "Corporation of the Agricultural Bank", and by that name should have perpetual succession and an official seal, which should be judicially noticed, and be capable in law of suing and being sued, and should have power to take, purchase, sell, exchange, lease and hold land, goods, chattels, securities and any other property whatsoever. The Act was to be administered by the Bank and inspectors, valuers, and other officers appointed or deputed on that behalf.

The Agricultural Bank Fund was created at the Treasury by moneys appropriated by Parliament for such purposes, moneys repaid to the Bank in respect of advances and interest thereon under this Act or any other Act, and all other moneys received by the Bank.

Upon the commencement of the Act all moneys, debentures, Treasury Bills and securities and interest on behalf of the State Advances Corporation under the State Advances Act were vested in the Agricultural Bank. Matters related to the Co-operative Agricultural Production Act were also transferred and no further advances under these Acts were to be made.

Advances under the new Act could be made to joint stock companies whose shareholders were producers of primary or related produce to the extent of two-thirds of the shares. No dividend in excess of five per cent per annum could be paid before all advances had been repaid. The term of the advance could not exceed sixteen years. Advances generally could not exceed two-thirds of the cost of the works envisaged. Advances could, however, be made to companies for any of the listed special purposes.

Advances to farmers who could read and write could not exceed £1700 for the purchase of land, stock, machinery, implements, or for drought or flood relief, etc. These farmers would personally reside on the land until the advance was repaid.

Special advances up to £500 could be made for ringbarking, fencing, etc. as listed.

Advances could be made to dairy farmers, farmers and sheep farmers for purchase of livestock and for fodder conservation.

All advances had to be secured by mortgage. All transactions had to be carried out in a prescribed manner.

26. The Primary Producers' Co-operative Associations Act of 1923 (14 Georgii V. No. 45, *Qd Govt. Gaz.*, No. 214, 3 December 1923), for the formation, registration and management of Primary Producer Co-operative Associations and for other purposes incidental thereto, was assented to on 23 November 1923.

A primary producer was defined thus: "Every person, not being an employee on wages or piecework rates engaged in the occupation of dairy farmer, wheat, maize or cereal grower, cane grower, fruit grower, grazier, or mixed farmer or declared by the Governor-in-Council to be a primary producer for the purposes of this Act."

The Governor-in-Council appointed a Registrar of Primary Producers' Co-operative Associations to register associations. Any seven primary producers or one or more local producers' associations formed under The Primary Producers' Organisation Act of 1922 or existing primary producers' associations could form a primary producers' co-operative association. Generally these co-operative associations could sell, hire, contract; engage persons; acquire and distribute information; lease, purchase or acquire by donation property and all other things aimed at the success of the venture.

An association could apply to be registered as one, with capital divided into shares and with limited liability, or without share capital but limited to the assets of the association, or without share capital and with unlimited liability. Applications had to be submitted by the Registrar to the Minister and if not vetoed by him, the Registrar would register the association. Each association would prepare rules and these would be recorded by the Registrar. Model rules could be adopted.

Any number of Primary Producers' Co-operatives could form a Primary Producers' Co-operative Federation. (*Qd Govt. Gaz.*, No. 214, 3 December 1923) The Primary Producers' Co-operative Associations Act Amendment Act of 1926 (17 Georgii V. No. 4, *Qd Govt. Gaz.*, No. 95, 7 October 1926) to be read as one with The Primary Producers' Co-operative Associations Act of 1923 to become The Primary Producers' Co-operative

Associations Act, 1923 to 1926 was assented to on 24 September 1926, and provided for some alterations of the object of associations, registration of securities and special provision for the Farleigh Co-operative Sugar Milling Association.

- 27. The Diseases in Plants Act Amendment Act of 1924 (15 Georgii V. No. 5, *Qd Govt. Gaz.*, No. 77, 11 September 1924), assented to on 8 September 1924, was to be read as one with The Diseases in Plants Act of 1916 and together they became The Diseases in Plants Acts, 1916 to 1924. It gave permission to inspectors to enter land and seize any infested tree, plant, fruit or vegetable and to order the owner or occupier to destroy infested plants, boxes, packages etc. suspected of harbouring insects such as the fruit fly and codling moth.
- 28. The Animal and Birds Act Amendment Act of 1924 (15 Georgii V. No. 5., *Qd Govt. Gaz.*, No. 140, 4th November 1924) was assented to on 24 October 1924, to be read as one with The Animal and Birds Act of 1921, and together they became The Animal and Birds Acts, 1921 to 1924. It made minor amendments to definitions. All animals and birds and all skins thereof until lawfully taken or killed were declared the property of the Crown. It provided for royalties to be charged and paid on every skin taken, and all royalties to be paid into an Animals and Birds Fund from which the administration of the Act was to be paid. Registration of dealers and permits to trap were required.
- 29. The Cotton Industry Act Amendment Act of 1924 (15 Georgii V. No. 14, *Qd Govt. Gaz.*, No. 141, 4 November 1924), assented to on 28 October 1924, was to be read as one with The Cotton Industry Act of 1923 and together they became The Cotton Industry Acts, 1923 to 1924. It provided for the handling of ratoon cotton and distinguished between the first year's growth, "annual" cotton and ratoon cotton. Cotton seed was also redefined as the seed from the annual cotton crop. It provided for the ground and cotton not the first growth after planting to be cut down within six inches of the ground and cotton not the first growth after planting to be destroyed by a date to be proclaimed. This date was proclaimed to be 22 November 1924. All debris from the cotton crop had to be destroyed by fire by 13 December, 1924.

Major staff and organisational changes under the Gillies administration

With the passage of The Dairy Produce Act of 1920 and The Animal and Birds Act of 1921 and subsequent Acts, inspectorial duties increased. Current inspectors were given additional duties and new inspectors were appointed. Clerical work increased and so additional staff was needed in Head Office.

Instructor in Cheese Making

Queensland cheese production had increased significantly and cheese exports were considerable, so one of the first of the new professional appointments was that of the first Instructor in Cheese Making, Atkinson Robert Wilkin, appointed on 15 September 1920, who would be involved in the administration of some of the Dairy Produce Act and later assist in The Cheese Pool Act of 1921, under which the second official commodity pool was assented to on 14 November 1921. Shortly afterwards, on 2 December 1920, the first "dairy instructor", John Dorward Wears Ogilvie, was appointed, with headquarters in Ipswich.

Entomologist - banana weevil borer

The banana industry was a concern to Gillies, because the Chinese growers would not take advice and some could not read English. The Banana Industry Preservation Act of 1921 was specifically framed to ensure all banana industry personnel could pass a dictation test. This was necessary because of the need to protect the industry against pests and diseases. The banana weevil borer (*Cosmopolites sordidus*) was very destructive, and on 28 October 1920 John Lewis Froggatt, B.Sc., was appointed Entomologist in charge of Banana Beetle Borer Investigations. He was required to report monthly, direct to the Minister.

The Queensland Agricultural Bank

Alfred Haliwell Smith, F.F.I.A., Manager of the State Advances Corporation, was made Manager of the Agricultural Bank on 4 September 1924 and also Manager of the State Advances Corporation, with A. P. Deshon as Assistant Manager. Nine clerks and seventeen inspectors were also transferred from the State Advances Corporation in a transfer under The Public Service Act of 1922. The transfer involved the Advances to Settlers Branch only, the Workers' Dwellings Branch going to the Public Works Department. Deshon succeeded Smith as Manager in 1927.

The original Agricultural Bank Act was passed in 1902, and the recently appointed manager of the bank, Deshon, had joined the institution at the time of its actual inception in 1903. At that time the staff consisted of the manager and Deshon. Over the years he had been closely associated with every section of the bank's many activities.

The institution has grown rapidly having a present staff of 100. It has branches in the principal country centres, and makes advances averaging well over $\pounds 1,000$ per day, and is undoubtedly one of the most important factors at the present time for the advancement of Queensland agriculture.

Mr. Deshon, who is a Queensland native, was educated at the Brisbane Grammar School, and prior to joining the Agricultural Bank was engaged in mercantile pursuits. In addition to his long experience of finance and business, Mr. Deshon has personally a first class knowledge of rural pursuits and land economy.

His father was the late Mr. Edward Deshon, C.M.G., a former Auditor-General of Queensland. The latter gentleman fought in the English Army in the Crimean War, and forty-five years later his son was a member of the Queensland Mounted Infantry in the South African War. Included in the actions in which he participated were the Relief of Mafeking and Siege of Eland's River, and he is the holder of the South African Medal and five clasps. After the conclusion of hostilities and his return to Queensland, Mr. Deshon was one of a picked body of Australian troops specially selected to visit England on behalf of the Commonwealth Government to take part in the celebrations at the coronation of King Edward VII.

Director, Stock Experiment Station, Oonoonba

Dr John Legg, B.V.Sc., who was to contribute so much to the knowledge of tropical animal diseases and pests, was appointed Director of the Stock Experiment Station, Townsville (Oonoonba) on 6 January 1921.

Retirement of Major A. J. Boyd, F.R.G.S.

Major William Alexander Jenyns Boyd, foundation editor of the *Queensland Agricultural Journal* and its editor from 1897 to 1921, retired and his place was taken by (Lieut.) John Francis Ferguson Reid, previously Inspector of Stamps. He was appointed Editor of the *Journal* on 18 April 1921 on six months' probation; this appointment was confirmed and on 1 September 1922 his appointment was changed to Editor, *Queensland Agricultural Journal*, and Editor, Departmental Publications, which position was incorporated in the Publicity Branch on 3 January 1929. He was to have charge of the Library and general control over the Photographic Section.

Boyd was an outstanding figure in Departmental history. He was the son of Colonel Charles Boyd (of the 95th Regiment) of Kilmarnock, Scotland, and was born in Tours, France, on 27 November 1842. His mother was a member of the Vachell family, and Horace Vachell, the author, was his cousin. After passing through a course of primary and secondary education at the Fulham and Brampton Grammar Schools, he was, for higher education, sent to Switzerland, France, Germany and Italy successively, with the intention of his joining the British Army: for many generations his male ancestors had worn Her Majesty's uniform. His father, owing to pecuniary losses, was unable to maintain two sons in the army and it was decided that the younger son should go to sea. He therefore joined the American mercantile marine visiting Australia, but foreseeing after a few years of service that it offered no bright future for a sailor, he determined to seek some other career. Being in London when Dr Lang lectured on cotton growing in Queensland and Henry Jordan (later Queensland Minister for Agriculture), our first immigration agent, was delivering lectures on Queensland as a desirable field of immigration, he decided to come to this State. He arrived in Brisbane on the ship Saldanha in 1861 and pitched his tent on the then wooded slopes of Wickham Terrace on ground which is now a portion of the Roma Street railway reserve. A few days later he purchased land on Oxley Creek adjoining what was afterwards known as Consort Cliff. There he started farming with, in spite of floods, a fair measure of success. He rafted logs felled by his own hand down the river. Cotton growing was then the pet agricultural industry and he started the first ginning establishment in the Oxley district. Prices fell after the American Civil War.

After some time he relinquished cotton growing and entered the service of the Queensland Board of Education as the first headmaster of the Oxley State School. This was his first experience as a schoolmaster, to be frequently repeated in later life. S. Sinnamon (of the Sinnamon Village clan) was a foundation student in 1867.

Later Boyd took up a large area of land at Pimpama, growing sugar and erecting a sugar mill on his property "Ormeau". Success attended this enterprise until pests and rust in the Bourbon cane impoverished for a time nearly all the sugar growers on the Pimpama, Logan and Albert Rivers. He also imported a "Death" sisal-scutching machine and grew some sisal hemp on a nineteen acre plantation "Woolhara Park", Mt Gravatt.

Boyd ceased farming and joined the Department of Public Instruction and became Headmaster of the Townsville State School and Inspector of Schools for North Queensland. The only means of travel in those days was on horseback, and the fierceness of the native blacks made bush travelling very risky. Journalism next attracted him. An opportunity of acquiring the *Cleveland Bay Express* (Townsville) was too fascinating to be resisted by a man of Boyd's literary tastes, and for the sum of £500 he became sole proprietor and editor. The paper, which he developed into a bi-weekly, proved a great success, and realised a handsome figure when disposed of. Boyd left for Brisbane to take up the position of agricultural editor of *The Queenslander* under Gresley Lukin. Apart from routine work, he wrote many Christmas stories for *The Queenslander* and was a frequent contributor to both the pictorial and ordinary columns of the London *Graphic*. His "Old Colonials", in which he described many old Queenslanders such as sawyer, splitter and fencer, the boundary rider, the bullock driver etc., passed through many editions. He wrote the book entitled *Queensland* at the instance of the Government, and *The Shellback*, on life on the sea.

He opened a private school, the Eton High School, at Milton. Boyd's proven teaching ability and his rare faculty for the handling of boys secured for his school a name throughout Queensland so that, after seven years, it became necessary to go further afield to secure larger accommodation. This was found at Nundah, where ten acres were purchased and school buildings were erected at a cost of about £3000.

In 1882 Boyd and his wife made a brief visit to England and on his return he opened his new school, where success continued so to smile on him that the dormitories were soon found to be too small for the reception of all the pupils seeking admission. All went well with him for six or seven years until, under the pressure of bad times, northern and western families found it was no longer possible to bear the expense of boarding their sons in the south. This proved temporarily disastrous for the school, which had to be closed in 1888. Boyd was appointed Headmaster of Toowoomba Grammar School in April 1888, resigning on 22 December of the same year; under pressure he withdrew his resignation but resigned again in January 1890. During this period he had published a book, *The Earth's History for Boys, or Geology in Verse*, loudly acclaimed by the press.

In 1891 Boyd reopened his old school at Nundah and his decision was rewarded with fair prospects until the disastrous flood of 1893 drowned his hopes, in common with those of many southern Queenslanders. This blow caused him to give up proprietary schoolkeeping after having devoted twenty-five of his best years to this work.

Boyd had an enthusiasm for soldiering. He joined the Brisbane Garrison Battery and qualified for all grades from acting-lieutenant to major, which rank he held on the retired list. He established the Eton Cadets at his Nundah school, of which he was very proud. Major-General Byron (of South Africa), Major-General Sellheim, General Foott, General Coxen and General Sir Brudenell White all went through his cadet squad. The Darling Downs Mounted Infantry was largely the fruit of Boyd's recruiting zeal. Though too old for service in the Great War he was one of the first to volunteer for the A.I.F. Boyd's wide knowledge of languages, however, gave him an opportunity of doing excellent work as an intelligence officer, and he coached young volunteers for non-commissioned and commissioned ranks in the newly formed citizens army, which was to win so much honour for Australia on the battlefields of three continents.

Boyd was an enthusiastic member of the Royal Geographical Society and for some time was its Secretary. For his contributions he was created a Fellow of the Royal Geographical

Society (F.R.G.S.). He was also a past master of the St Patrick's Lodge, Irish Constitution of Brisbane Freemasons.

Boyd was appointed foundation editor of the *Queensland Agricultural Journal* in 1897, acting also as Secretary to the Queensland Agricultural College from 1 July 1898 to 1 February 1899. He continued as editor of the *Journal* until his retirement in 1921, after a distinguished period of public service, in the course of which he became a friend of practically every farmer in the State. By general consensus in agricultural and literary circles, the *Journal* under his directorship attained a very high standard as an official publication, and was a distinct credit to the Department and the State.

After his retirement Boyd engaged in literary pursuits, much of his work being published in the metropolitan press.

Boyd died in Sydney on 19 May 1928 at the age of 85 years. He was buried in a casket enclosed in the Union Jack in the Toowong Cemetery on 22 May by the Rev. F. W. E. Wilkinson of St Paul's, Taringa, in the presence of a large gathering of senior officers of the Department of Agriculture and Stock and other citizens.

Director, Queensland Producers' Association

Foreshadowing the passage of The Primary Producers' Organisation Act of 1922 to be assented to on 15 August 1922, Richard Lewis Macgregor was appointed Director of the Queensland Producers' Association for five years from 28 July 1922. His career, prior to his appointment, was as follows:

Mr. Richard Lewis Macgregor is a native of Scotland, and is 36 years of age. He was educated at the Glasgow High School and later at the Glasgow and West of Scotland Technical College. His early business training was acquired at an old-established Scottish county house, where he was trained in banking and law. This house managed the agricultural estates of the late Sir Donald Currie, and Mr. Macgregor was attached to that department and had opportunities of becoming familiar with the theory and practice of modern agriculture, including stock and crop marketing.

At the age of 23, Mr. Macgregor accepted the position of assistant manager of the Gairkhata Estates, Bengal, India. This company controlled several large landed estates, and a large factory. Upwards of 5,000 people were connected directly or indirectly with the company, which undertook housing, water supply, roads, drainage, etc., in addition to works connected with cultivation and manufacturing. While in India Mr. Macgregor had full opportunity afforded him of mastering every detail of business organisation and the control of a large staff. Being desirous of coming to Australia, Mr. Macgregor, after completing his term of engagement with the Bengal company, declined an offer of extended service at increased remuneration, and came to Australia.

Arriving at Perth (Western Australia), he became secretary to Mr. J. Hawter, of Hawter's orchards and nurseries. He there acquired an intimate knowledge of every branch of fruitgrowing, including the growing of young trees—citrus and deciduous—as well as the growing of fruit for the export trade. He relinquished that position to take up wheatgrowing on his own account. At the time he was engaged in wheatgrowing, the agriculturists in the western State were passing through a succession of hard times. The Farmers' Co-operative Company had just been brought into being, and was operating in a very small way under the management of Mr. Stirling Taylor, who is now Director of the Bureau of Commerce and Industry. Mr. Macgregor formulated a scheme for the extension of the co-operative principle in the agricultural districts in the State, and, on outlining the scheme to Mr. Taylor, was invited by the

latter to join him in the carrying out of the project. That success attended his organising efforts in this direction will be manifest when it is stated that the co-operative organisation in the western State now embraces the central wholesale house, the Westralian Farmers Limited, and some ninety odd local co-operative companies engaged in various kinds of co-operative undertakings. Starting eight years ago with a capital of £2,000, the Central company alone now has a capital and reserves amounting to approximately $\pounds 100,000$. When the scheme had been launched, Mr. Macgregor was invited by Mr. Taylor to undertake the management of three of the principal departments of the organisation. In the year 1917 the Farmers' Co-operative Company was successful in securing appointment as sole wheat-acquiring agents in the marketing of wheat for the Western Australian Government. Wheat had to be acquired at some 300 sidings, and large quantities had to be stored for long periods, the work entailing a large inside and outside staff. Owing to the magnitude of the undertaking, Mr. Macgregor was placed in control of that department and at the present time is manager of the wheat department. Mr. Macgregor is also the originator of the present scheme for the bulk handling of wheat in Western Australia, and, in addition to being manager of the wheat department of the Westralian Farmers Limited, is secretary to the Western Australian Grain Growers' Co-operative Elevators Ltd., the company which has been floated to carry out the scheme. He is entirely familiar with every aspect of that question.

In the year 1919 he was sent by the Farmers' Co-operative Company as sole representative to Europe to inquire into the marketing of agricultural products. Reports of his investigations were made available to the Commonwealth Government, and in that connection the Director of the Bureau of Commerce and Industry wrote him as follows:-

"I want to compliment you on both the wheat and fruit reports; the knowledge which you have gained will be invaluable to the whole industry, and should, when it becomes known, dissipate much of the doubt the companies have regarding the success of their own selling schemes."

While overseas, Mr. Macgregor took the opportunity of again familiarising himself with the methods and practices of the great English and Scottish Co-operatives Wholesale Societies, and furnished reports to his principals dealing with these concerns." (*QAJ*, August 1922, p. 72)

He was later to be appointed to the Cotton Advisory Board on 12 February 1925 to hold office till 31 December 1925, and subsequently became Director of Marketing.

Public Service inspection

Following the passage of The Public Service Act of 1922, the Public Service Commissioner arranged for inspection of nine Government Departments, including the Department of Agriculture and Stock.

As a result of the inspectors' report some adjustments of staff were made, resulting in "curtailment to an appreciable degree without impairing, but in fact increasing efficiency". The Public Service Commissioner, J. D. Story, submitted comparative figures.

Story added (reviewing the whole Public Service): "It is essential that the firm grip on staffing be maintained; fresh admissions should be avoided as far as possible and in cases of resignations, retirements, etc., Departments should make earnest efforts to carry on with the remaining staff." (*Qd Parl. Papers*, 1922, Vol. 1, pp. 79–90)

The branches were instituted within the Department during late 1922 and new appointees were attached to sections within branches and to Branches where these were not sectionalised. Minor changes were agreed upon between the Minister, the Under-Secretary and the Public Service Commissioner.

On 1 September 1922 Arthur Henry Cory, M.R.C.V.S. (Chief Inspector of Stock), was made Registrar of Brands and Chief Veterinary Surgeon, to have general control of the Stock Experiment Stations and the Sheep and Wool Branch of the Department.

Director of Sugar Experiment Stations

On the same date Ernest George Edward Scriven, Under-Secretary to the Department, was relieved of his position as Director of Sugar Experiment Stations. Harry Tinniswood Easterby acceded to this office and the post of General Superintendent of Sugar Experiment Stations was abolished.

It is interesting to note that on 6 October 1922 William Alan Thompson Summerville, Learner on Probation, Entomological Branch, was appointed a cadet in the Entomological Branch. He was to become Director of Horticulture, Director-General of the Department and later Queensland Agent-General in London, acquiring also a knighthood.

Chief Instructor in Fruit Culture

On 6 October 1922 John Mansfield Ward, Fruit Expert for Tasmania, was appointed Chief Instructor in Fruit Culture. He had previously visited Queensland at the invitation of the Government when, over fourteen days, he delivered a series of lectures throughout the deciduous and citrus fruit growing districts; and he had visited Brisbane on two occasions in charge of a Tasmanian exhibit of apples. (*QAJ*, Vol. 18, December 1922, p. 385) He unfortunately resigned on 22 December 1923 to become Director of Horticulture in Victoria, but his son, Keighley Ward, was later Assistant Director of Horticulture for Queensland and his grandson, David, was an officer of the tobacco section of the Department. (See "Stone and Pome Fruit".)

A. P. Dodd, Assistant Entomologist

On the same date, 6 October 1922, Alan Parkhurst Dodd was appointed Assistant Entomologist, Entomological Branch, and served with the Sugar Experiment Stations. He was later, as an officer of the Lands Department, to be mainly responsible with John Mann for introducing and distributing *Cactoblastis cactorum*, the caterpillar of which controlled the prickly pear (*Opuntia inermis*) over several million acres of infested country in Queensland.

Librarian

The report of the Public Service Commissioner on the inspection of the Department in 1922 recommended that a library be established under a publicity branch, headed by the Editor of the *Queensland Agricultural Journal* under the title Editor, Departmental Publications. An allocation was made for a Clerk and Librarian on a salary range of £80 to £265, currently on £250 per annum. Comte Gontran Louis de Tournouer was appointed in October 1922. His obituary seven years later outlined a distinguished career:

The death occurred in St. Martin's Hospital on the night of 13th July of Comte Gontran Louis de Tournouer, B. Litt. (Sorb. Paris), Chevalier of Agricultural Merit, Officier d'Academie, and Librarian of the Department of Agriculture and Stock.

Although he was a notable Frenchman, coming from one of the oldest noble families of Brittany, the late Comte de Tournouer also qualified both in his service with the Australian

Imperial Force in the Great War and in his private life in Queensland to the title of a good Australian.

Primarily interested in agriculture he possessed great literary attainments and his ability as a linguist—he could speak fluently every European language as well as Arabic—aided him greatly both in military and civil life. His father and two of his brothers fell fighting for France, each winning high distinction on the battlefield.

Comte de Tournouer was born at Pontivy, Brittany, on 27th August, 1885. He was educated in Paris and graduated in literature at the Sorbonne University. He was about to enter St. Cyr Military Academy when the fortunes of his family suddenly changed and he came to Australia to start life afresh. Going on the land he became engaged in sugar-growing and pastoral pursuits in the Wide Bay district. Later, he joined the Commonwealth Public Service, afterwards transferring to the State Service. He was on the staff of the Government Savings Bank when war broke out in 1914. He enlisted in the Australian Imperial Force for active service overseas on 17th August of that year. He embarked with the Australian Light Horse and saw service with that formation and the Camel Corps on the Eastern fronts; and transferred later to the Fourth Australian Divisional Artillery, and with that unit he was able to return to his native land as a Digger fighting in its defence. Invalided back to Queensland after meritorious field service he was appointed to the Military Censor Staff in Brisbane. After the Armistice he returned to the State Savings Bank and on the merging of some of the activities of that institution with those of the Commonwealth Bank he remained with the Advances to Settlers Board, and in October 1922, was transferred to the Department of Agriculture and Stock.

In recognition of his services to General Pau's Australian Mission and other useful offices he was awarded by the French Government the honour of Chevalier of Agricultural Merit and Officier d'Academie. Sometime president of the Alliance Francaise in Brisbane, he was afterwards its vice-patron.

He was an able contributor to French and other periodicals on Australian life and agricultural and kindred subjects. On the lighter side of *Journal*ism he supplied much prose and verse, and occasionally topical cartoons, to the daily and weekly press, including the Sydney "Bulletin". He was endowed with a nimble and versatile pen—the ever busy tool of a gift of ready expression, of racy anecdote, of whimsical and often piquant humour and other attributes of a well stored mind. (*QAJ*, August 1929, p. 222)

Seeds, Fertilisers and Stock Foods Investigation Branch

The Seeds, Fertilisers and Stock Foods Investigation Branch took control of these activities from the Agricultural Chemist and on 1 January 1923, Frederick Freutel Coleman, Expert and Inspector under the respective Acts, was made officer-in-charge of the new Branch.

Fruit Packing Instructor

Following a previous visit from Tasmania to Stanthorpe to advise on fruit packing, William Rowlands was appointed Fruit Packing Instructor on 17 January 1923. Born in Tasmania, he visited Australian fruit-growing regions and then went to New Zealand to supervise the grading and packing of apples to export to the Argentine, starting with 1200 cases in 1909, increasing to 50 000 in 1914. He enlisted in New Zealand and fought with the New Zealand Mounted Rifles at Gallipoli and was severely wounded during the evacuation. (*QAJ*, 19 February 1923, p. 154) On 29 February 1924 he was appointed Fruit Packing and Marketing Instructor in the Department for three years but he died suddenly soon afterwards at the age of 35 years from complications brought on by severe wounding at Gallipoli.

Instructor in Pig Raising

Pig husbandry was handled on behalf of the Department by officers of the Queensland Agricultural College at Gatton until 1923, when the College was transferred to the administration of the Department of Public Instruction. On 17 August 1923, Ernest James Shelton, a former Hawkesbury College student and lecturer, was appointed Instructor in Pig Raising in the Agriculture Section.

Cotton Section formed within the Agriculture Branch

The Hon. W. N. Gillies was keen to stimulate the cotton growing industry and sent Daniel Jones, the cotton expert, around Queensland's potential cotton-growing areas with a delegation (Messrs Crawford, Vaughan, Johnston and Armstrong) representing the British Cotton Growing Association, which was impressed with Queensland's cotton-growing possibilities. In November 1922 Gillies announced that the Government would advance 5½d per lb on first harvest cotton. This stimulated the industry and, to instruct growers and ginners, the Queensland Government requested the Empire Cotton Growing Association to select an officer to advise on cotton growing in Queensland. The Association recommended Colonel G. Evans, lately Director of Agriculture in Bengal, plus some staff, and agreed to pay their salaries for the first two years from a subsidy of £1 000 000 provided by the British Government to encourage cotton production within the Empire. Colonel Evans, C.I.E., M.A., was appointed Director of Cotton Culture on 10 September 1923, to head the Cotton Section.

Walton Garrett Wells, an American, was appointed Cotton Specialist on 10 November. He had entered the service of the United States Department of Agriculture at the Cotton Experiment Station, San Antonio, Texas, the largest cotton-producing State in USA. He first engaged in plant breeding in Texas, California and Arizona. In 1920 he joined the S.W. Cotton Co., a subsidiary of the Goodyear Tyre Company and when appointed to Queensland was managing a cotton ranch for Goodyear. (*QAJ*, Vol. 18, December 1922, p. 385)

Laurence Lionel Gudge was appointed Cotton Classer on 21 September 1923, to instruct in cotton classing. For the first seven years of his career he was with Messrs J. J. Williams and Company, Cotton Merchants of Liverpool. He then spent a year with Chambers Holder and Company of Liverpool in charge of their sales room. From here he joined O'Hea Bros, a Liverpool firm with branches in England and America and went to Texas for his company as a classer in 1921. He joined the Lower Rio Grande Farmers' Society as cotton classer and buyer. He returned to England, and on the advice of Sir James Currie was appointed to Queensland.

Thus Gillies had succeeded in attracting three highly qualified cotton men to the Queensland Departmental staff. These were supplemented by local men as field assistants (many of them Gatton College Diplomates), inspectors under The Cotton Industry Act of 1923, and assistant graders—a total of seven local officers appointed between October and December 1923. These were Assistant Instructor Ross Rosebury Anson; Senior Field Assistants Alfred Nagle and James Carew; Experimentalist Reginald Walter Peters; additional Inspectors Kenneth Valentine Henderson, Thomas Young Bonar and Walter Henry Franklin; and Assistant Grader (Senior) Ronald Eric Haseler.

Dairying Branch

A. E. J. C. K. Graham's title, Chief Dairy Expert, was changed on 11 August 1922 to Director of Dairying and Cold Storage. In accordance with the Public Service Commissioner's recommendation, two additional herd testers, Harold Lloyd Pentecost and Douglas Francis Keith, were appointed on 1 January 1923 to assist L. F. Andersen. Maurice Robinson Tennant was made Dairy Instructor on 28 August 1923 and Otto Charles Ballhausen became Chief Instructor in Dairying on 1 December 1923.

Poultry

The first northern Instructor in Poultry, William Christian Keany, was appointed on 2 November 1923 and Percival Rumball, who had been Supervisor and Poultry Instructor at the Soldier Settlements at Mount Gravatt, Enoggera and Highlands, was brought into the Public Service as Poultry Expert at Head Office on 7 October 1924.

Home Hill State Farm

Home Hill State Farm, of 150 acres, was developed in the years 1920–22 with two irrigation wells providing 50 000 gallons an hour. It was used initially to record actual costs of production of sugarcane for the information of the Sugar Cane Prices Board. It experimented with irrigation methods for sugarcane and later widened its interests into all tropical crops. In March 1930 the farm was closed, "having accomplished the objects for which it was established".

Part-time veterinary officers

Additional veterinary help was acquired in September 1923 with the appointment of J. S. Penrose, B.V.Sc., as part-time veterinary officer for the Central District and M. J. Reidy, M.R.C.V.S., as part-time veterinary officer for the Northern District.

Bunchy Top in Bananas Committee

Bunchy top in bananas had reached serious levels in northern New South Wales and southern Queensland in 1919 and the plant pathologists of each State proposed that investigations into its cause and control be initiated. On 31 January 1924 Gillies announced that a co-operative effort would be made between the Commonwealth, New South Wales and Queensland Governments to investigate the disease, each Government contributing £1500.

A committee was formed; its members were A. E. V. Richardson, M.A., B.Sc., Dean of the Faculty of Agriculture, Melbourne University, representing the Commonwealth Institute of Science and Technology; Professor R. D. Watt, M.A., B.Sc., Professor of Agriculture, University of Sydney, representing the New South Wales Department of Agriculture; and Professor E. J. Goddard, B.A., D.Sc., Professor of Biology, University of Queensland, representing the Queensland Department of Agriculture. Professor Goddard supervised the research and the funds were handled by the Department. A laboratory was established at Tweed Heads with experimental plots on either side of the border. Charles Joseph Patrick Magee was appointed Assistant Plant Pathologist (Bunchy Top) on 5 May 1924, with headquarters at Coolangatta, and Henry Collard was appointed Assistant Instructor in Fruit Culture on 1 April 1924. Collard was sent to Fiji to observe bunchy top disease there and, if necessary, elsewhere. Both worked under Professor Goddard.

Seven plant disease inspectors were specially engaged by the Department in connection with bunchy top investigations. A banana experimental plot of twelve acres was established on Bribie Island to raise disease-free banana planting material and act as a quarantine station under the supervision of J. R. E. Mitchell, Assistant Instructor in Fruit Culture, and under the direction of A. H. Benson, Director of Fruit Culture. It also handled smooth leaf pineapples, avocados and pecan nuts.

Cotton experimental farms

On 11 July 1924, Stanley Thomas John Clarke was appointed Manager of the Cotton Experimental Farm at Monal Creek and on 1 August 1924 Leslie Wylde Ball was appointed Manager of the Cotton Experimental Farm at Melton. Both of these farms were established to demonstrate cotton prospects in the newly developed Dawson and Callide Valley Settlements.

Retirement of E. G. E. Scriven as Under-Secretary

On 31 December 1924, Ernest George Edward Scriven retired from the Department, after begining with it as its first clerk in 1887. His retirement is recorded in the *Queensland Agricultural Journal* thus:

The retirement at the end of December of Mr. E. G. E. Scriven from the office of Under Secretary of the Department of Agriculture and Stock meant the severance from the official life of Queensland of one of the most capable and beloved men in the Public Service of the State. Mr. Scriven's retirement had been deferred by the Government more than once, so great was the appreciation of his work and achievement in the Department of which he had the direction as permanent head for twenty years. The completion of his official term was marked by fine tributes in the Metropolitan and Country Press to his personal worth and great work in the service of Queensland.

When first he came into its service, the agricultural work was part of the duties of the Lands Office. In a quarter of a century he has seen its extraordinary growth, and with the help of the always growing staff has directed the development of some of Queensland's greatest industries.

When Mr. Scriven was appointed to this department upon its initiation, thirty-seven years ago, it had a staff of two, one being the Under Secretary (Mr. P. McLean), the other himself. That the staff has grown from its small beginnings to one of over 500 members is, to a vast extent, due to Mr. Scriven's ability, foresight, enterprise, and administration as Under Secretary—a position which he has so successfully held, ever with courtesy and kindly regard for others, for twenty years. Excluding the present Minister, he has had association with sixteen Ministers. The Department of Agriculture and Stock has thirty-eight Acts of Parliament, while the branches into which the department now is divided include administration, agriculture, agricultural chemistry, cotton, fruit, stock and brands, sugar, seeds and fertilisers, dairying, publicity—including photography—wool, and entomology, not counting the Agricultural Bank, in Brisbane and throughout the State. To administer all these measures required more than a passing knowledge of their provisions. Mr. Scriven's administrative tenure covers more than a quarter of a century in the development of agriculture in Queensland, a period of remarkable agricultural progress...

Mr. Scriven's early days were not uneventful. As a lad of fifteen he was at school in Paris in the days of the Commune in 1871, and was one of those who took refuge in the British Embassy until the Parisians had become sane again, and it was safe to be in the streets. Prior to those exciting days he had lived where he was born, in Shakespeare's town of Stratford-on-Avon. Any Shakespearian will see the connection between the name of Mr. Scriven's home at Yeronga—Shottery—and the village from which Shakespeare wooed and won Anne Hathaway. Mr. Scriven was born in this beautiful Warwickshire spot in 1856. Coming to Queensland as a

young man to try his fortune in the new land, he gained "colonial experience" at Eton Vale, Cambooya, which was owned by Sir Arthur Hodgson. He also had experience on the land in North Queensland, and after travelling the State on a trigonometical survey for the Lands Department, he and Mr. Peter McLean formed the staff of the Agricultural Department. In those days the dairying industry was practically non-existent, and, as Mr. Gillies, the Minister for Agriculture, pointed out at a presentation to Mr. Scriven, it now is worth about five million sterling annually to the State. That is only one of the monuments which Mr. Scriven will leave behind him.

Mr. Gillies also pointed out that the relations between the retiring chief and his staff always had been most cordial. This could be ascribed to Mr. Scriven's fairness. A hater of evil, said Mr. Gillies, he always had a soft spot in his heart for the evil-door [sic]; and that inherent sense of fairness to all his officers has often prevented him from extending to individual officers favours to which they thought they were entitled.

All interested in primary production in Queensland will regret Mr. Scriven's departure from the official sphere. Since the establishment of the department there have only been three Under Secretaries—Messrs. McLean, P. J. McDermott, and E. G. E. Scriven—each of whom has performed great service to the State, and Mr. Scriven's name will always be associated with the history of Agriculture in Queensland. (*QAJ*, January 1925, pp. 3–5)

New Under-Secretary appointed—A. E. J. C. K. Graham

On 1 January 1925, Arthur Ernest J. C. K. Graham, Director of Dairying and Cold Storage, was appointed Under-Secretary to the Department. The new position of Assistant Under-Secretary was created for Robert Wilson, and Richard Patrick Montford Short was named Senior Clerk. Their old positions—Director of Dairying and Cold Storage, Chief Clerk and Senior Clerk Stock Branch—were abolished.

Mr. Graham was born at Wagga Wagga, in New South Wales, forty-eight years ago. Following his school days and for more than thirty years, he has been continuously associated with agriculture and stock matters, and has made a study of both, specialising particularly in dairying. He was educated at the public school and the Grammar School at Bega, on the South Coast of New South Wales, and passed the public service examination. However, he engaged in the popular pursuit of that noted district-dairying-simultaneously entering upon the study of the theory of agricultural and dairying chemistry. He was the manager of an important butter and cheese factory company when only twenty-one years of age, and after successfully filling that position for several years became instructor in dairying at the Queensland Agricultural College at Gatton. There he taught dairying from both the practical and scientific sides, and lectured on animal husbandry, live stock (breeding and feeding), the growing of fodder crops, dairy factory hygiene, and milk and cream testing; and the practical work included pasteurisation, the propagation of lactic culture, and the manufacture of butter and cheese. From Gatton he came to the head office of the department, where he has ... held the office of Director of Dairying and Cold Storage. He was for years personally responsible for the administration of important Acts bearing on dairying, and practically was the framer of the Dairy Produce Act of 1920-an Act since used as the basis of similar legislation overseas. He is a member of the Australian Dairy Council and the State Dairy Board, and of the Council of Agriculture as a Government nominee. He has done much important work for the Government in the selection and purchase of pedigree stock. He was chairman of the committee appointed by the Council of Agriculture, which prepared and published "The History of Dairying in Queensland," and he has been a prolific writer on dairying, pig raising, and other matters bearing on agricuture and stock. He has also carried out the duties of examiner of students in dairying subjects. Mr. Graham's comprehensive knowledge of the Acts administered by the Minister, and his personal knowledge of the agricultural districts of Queensland, and its conditions of soil and climate generally will be particularly valuable in his new office. (QAJ, January 1925, p. 7)

Entomology

Mention has been made of the appointment of Froggatt to investigate the banana beetle borer. On 1 July 1923 Edmund Jarvis was transferred to the Sugar Experiment Stations specifically to tackle the greyback cane beetle, although he dealt with other pests, and W. Cottrell-Dormer assisted him. On 11 February 1921 Hubert Jarvis was appointed to investigate the fruit fly problem in the Granite Belt. Monthly progress reports were submitted to Gillies in each case.

On 1 July 1922, F. A. Perkins, research scholar at the University of Queensland, went to Stanthorpe to carry out research work on behalf of the University and the Stanthorpe Fruit Growers Association. There was cooperation between the two entomologists and on 1 March 1924 a Special Proclamation compelled all fruit to be sent out of the Granite Belt by 7 April.

The Sugar Agreement of 1920

Apart from staff matters, Gillies was active in commodity matters. One of his outstanding achievements was the sugar agreement arranged with the Prime Minister, the Hon. S. M. Bruce, regarding sugar prices and the embargo on black-grown sugar.

Gillies became Premier of Queensland on 26 February 1925. From the above record it can be seen what a tremendous contribution he had made to the advancement of agriculture in Queensland. He handed his portfolio to William Forgan-Smith, who became Minister for Agriculture and Stock, with Gillies lending a supporting hand for the next eight months.

Organization of the Department, 1924

The staff and organisation of the Department at 30 June 1924 was as shown on the following Public Service List:

DEPARTMENT OF AGRICULTURE AND STOCK (No. of staff in brackets)

Chief Office Revenue (Salaries), No. of officers 134, Salaries £36,038

Executive Branch Secretary for Agriculture and Stock (Minister)—Hon. W. N. Gillies Administrative Division (1)—Under-Secretary—E. G. E. Scriven

Clerical and General Branch Clerical Division (11) under Robert Wilson, Chief Clerk General Division (11)

Accounts Branch Clerical Division (9) under S. S. Hooper, Accountant

Agriculture (General) Branch—under H. C. Quodling, Director of Agriculture Professional Division: Agriculture Section (13) under H. C. Quodling Cotton Section (19) under G. Evans Pure Seeds Section (1) under F. F. Coleman Poultry Section (2) under J. Beard Clerical Division (1) General Division (10)

Fruit Branch—under A. H. Benson, Director of Fruit Culture Professional Division (12) Clerical Division (2)

Dairying Branch—under A. E. J. C. K. Graham, Director of Dairying and Cold Storage Professional Division (6) Clerical Division (3)

Stock Branch—under A. H. Cory, Chief Inspector of Stock Stock Section (Paid from Trust Funds) Clerical Division Brands Section (Paid from Trust Funds) Clerical Division (4) under H. S. Hiff Sheep & Wool Section—Professional Division (2) under W. G. Brown

Science Branch Botanical Museum: Professional Division (2) under C. T. White Clerical Division Government Entomologist—Professional Division (7) under H. Tryon

Publicity Branch Professional Division (2) under J. F. F. Reid, Editor, Departmental Publications Clerical Division (1) General Division (2)

Agricultural Chemical Laboratory Revenue (Salaries) No. of Officers 11 Salaries £3,275 Professional Division (10) under J. C. Brünnich, Agricultural Chemist General Division (1) Dairy Produce Acts

Dairying Branch Revenue (Salaries), No. of Officers 31, Salaries £9,530 Professional Division (8) under A. E. J. C. K. Graham, Director of Dairying (see Dairying Branch) Clerical Division (1) General Division (23)—dairy inspectors

Diseases in Plants Act Revenue (Salaries), No. of Officers 17, Salaries £4,601 General Division (17) - inspectors Slaughtering Act Revenue (Salaries), No. of Officers 27, Salaries £8,145 Professional Division (3) under A. H. Cory, Chief Inspector of Stock (see Stock Branch) General (27)—slaughtering inspectors
State Farms and Gardens

	No. of Officers	Salaries
Revenue (Salaries)	8	£2,515
Revenue (Contingencies)	79	£16,891
	87	£19,316

State Farms General (6)—Managers Farm Hands (43)—(excluded from the Act)

Gardens

Botanic Gardens Queen's Gardens Museum Gardens Government House Trustees (4) (3) Professional Division (1) - E. W. Bick, Curator General Division (8) (3) (5) (5)

The Dise	eases in	Stock	and T	The I	Brands	Acts
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	No. of Officers	Salaries
Trust Funds (Salaries)	62	£20,460
Trust Funds (Contingencies)	52	£1,370
	114	£21,830

Professional Division (3) under A. H. Cory, Chief Inspector of Stock Clerical Division (2) General Division (51)—stock inspectors

Stock Diseases Experiment Stations

	No. of Officers	Salaries
Trust Funds (Salaries)	11	£3,395
Trust Funds (Contingencies)	9	£1,763
	20	£5,158

Professional Division (8) under A. H. Cory, Chief Inspector of Stock Clerical Division (1) General Division (3) plus stable hands (5), labourers (2) excluded from the Act.

The Regulation of Sugar Cane Prices Act Trust Funds (Salaries), No. of Officers 16, Salaries £4,977

Central Sugar Cane Prices Board Board Members (5) Professional Division (1) Clerical Division (2) Cane Testers (10)—excluded from Act. Sugar Experiment Stations Act

	No. of Officers	Salaries
Trust Funds (Salaries)	10	£3,745
Trust Funds (Contingencies)	14	£2,955
	24	£6,700

Professional Division (10) under H. T. Easterby, Director of Sugar Experiment Stations Labourers (14)—excluded from Act.

State Advances Corporation (in separate building under Ministerial jurisdiction) Trust Funds (Salaries), No. of Officers 79, Salaries £18,621 Administrative Division (1) under A. H. Smith, Manager, State Advances Corporation Clerical Division (1) Applications and Securities Section—Clerical (13) Accounts Section—Clerical (15) Correspondence Section—Clerical (5) Records Section—Clerical (14) Typing Section—General (11) Inspectorial Section—General —inspectors (17)

The Department under the Hon. W. Forgan-Smith

William Forgan-Smith

William Forgan-Smith was born on 15 April 1887 at Mylnefield House, Invergowrie, Scotland. He was educated at Invergowrie and Glasgow schools, then Dunoon Grammar School, Argyleshire. He became a house painter. In 1911 he migrated to Mackay.

Forgan-Smith was elected M.L.A. for Mackay on 22 May 1915, holding the seat till 9 December 1942. He was Chairman of Committees in the Legislative Assembly from 13 January to 15 December 1920; Minister without portfolio from 16 December 1920 to 6 October 1922; Secretary for Public Works from 6 October 1922 to 26 February 1925; Minister for Agriculture and Stock from 26 February 1925 to 20 May 1929; Leader of the Opposition, 27 May 1929 to 16 June 1932; Chief Secretary and Treasurer, 17 June 1932 to 12 April 1938; Chief Secretary, 12 April 1938 to 8 December 1941; Chief Secretary and Minister for Public Instruction, 8 December 1941 to 9 February 1942; Chief Secretary, 9 February to 16 September 1942; Minister without portfolio, 16 September to 9 December 1942. He was Chairman of the Central Sugar Cane Prices Board from 1942 to 1953, Queensland Sugar Board 1944 to 1953. He was a member of the Australian Labor Party, Mackay Workers' Political Association, Trades and Labour Council, Mackay Australian Workers' Union and the Central Executive of the Australian Labor Party. He died on 25th September 1953. (Waterson, 1972)

Legislative Acts introduced by Forgan-Smith following Gillies' accession to the Premiership included are listed below.

- 1. The Primary Products Pools Act Amendment Act of 1925 (16 Georgii V. No. 4, *Qd Govt. Gaz.*, No. 121, 12 October 1925) assented to on 28 September 1925. The Act gave power to the Commodity Board to acquire a commodity as owners from growers should the latter request it on a two-thirds majority. It also provided that the Council of Agriculture should issue a precept to the Board fixing the amount of money it should pay for administrative expenses of the Board, its contribution to the expenses of the Council of Agriculture, and insurance funds against fire, hail or flood, etc.
- 2. The Primary Producers' Organisation Acts Amendment Act of 1925 (16 Georgii V. No. 6, *Qd Govt. Gaz.*, No. 123, 12 October 1925) assented to on 28 September 1925. It made minor amendments to the required number of members and those who could become members. In one amendment, paragraph (e) of the said subsection, after the words "insane person" the words "or is a salaried officer of the Council or of any district council" are inserted!
- 3. The Fruit Marketing Organisation Act Amendment Act of 1925 (16 Georgii V. No. 23, *Qd Govt. Gaz.*, No. 203, 18 November 1925) assented to on 12 November 1925, now The Fruit Marketing Organisation Acts, 1923 to 1925. It provided a new definition of marketing, including everything involved in the preparation and packing of fruit for sale and in the offering thereof for sale and the selling thereof and in the transmission of fruit from the producer to the consumer. It gave power to the Committee of Direction to purchase, exchange, lease and hold land, securities and other property; contract for the use of buildings; equip, furnish and maintain the same; appoint, employ and pay employees; arrange finance; enter into contracts; market fruit; and impose levies on fruit. It also gave the Committee power to issue a direction on specific classes of fruit such as citrus, deciduous fruit, bananas, pineapples or "any other fruit", giving the period of time the direction should remain in force and making the direction public.

The Committee of Direction had power to require the cooperation of local associations regarding receipt and despatch of fruit from one station or siding; encourage packing sheds; arrange transportation, improvision of markets, inspection of fruit; make agreements with fruit commission agents, and fruit canners; prohibit or regulate the use and management of fruit barrows, fruit stalls at railway stations and fruit growers' retail shops; and arrange finance in the operation of local associations and sectional groups, etc.

- 4. The Wheat Pool Act Amendment Act of 1925 (16 Georgii V. No. 26, *Qd Govt. Gaz.*, No. 206, 18 November 1925) assented to on 12 November 1925. It provided for wheat to be declared a commodity under the Primary Products Pools Act and for a Wheat Board to be appointed if a poll favoured it, and gave direction regarding the acquisition of the wheat and payments therefore.
- 5. The Primary Producers' Co-operative Associations Act Amendment Act of 1926 (17 Georgii V. No. 4, *Qd Govt. Gaz.*, No. 95, 7 October 1926) assented to on 24 September 1926, now The Primary Producers' Co-operative Associations Acts, 1923 to 1926. The Act made provision for the alteration of the objects of the Association and the Registration of Securities, and made special provision for the Farleigh Co-operative Sugar Milling Association Limited.

- 6. The Cotton Industry Act Amendment Act of 1926 (17 Georgii V. No. 8, *Qd Govt. Gaz.*, No. 114, 25 October 1926) assented to on 16 October 1926. This Act gave power to the Governor-in-Council to acquire cotton seed, to constitute Pure Seeds Districts, to agree with growers to arrange test plots, and required care to be exercised in ginning cotton for seed.
- 7. The Sugar Works Acts Amendment Act of 1926 (17 Georgii V. No. 14, *Qd Govt. Gaz.*, No. 137, 12 November 1926) assented to on 11 November 1926. The Act provided for the owners and occupiers of land from which sugar had been supplied to a Corporation to make good any deficiency in repayments to the Treasury.
- 8. The Primary Producers' Organisation and Marketing Act of 1926 (17 Georgii V. No. 20, *Qd Govt. Gaz.*, No. 158, 25 November 1926) assented to on 20 November 1926, consolidated and amended The Primary Products Pools Act, 1922 to 1928 and The Primary Producers' Organisation Acts, 1922 to 1925 and amended certain other enactments.

The Act repealed the above two Acts but retained existing boards, local producers' associations and commodities. The new Council of Agriculture would not exceed twenty members at any one time, exclusive of the Director of Marketing, who would be ex officio. The Committee of Direction and the State Wheat Board were deemed to be boards under the Act. All members of boards could hold office for a period not exceeding three years but could be eligible for re-election. A President and Vice-President would be elected by the Council. The Council would be a body corporate with perpetual succession and a common seal. A Queensland Producers' Fund would be established subject to annual audit by the Auditor-General's officers. The Government could make Grants-in-aid not exceeding £15 000, and existing funds of previous organisations would be transferred to it.

The Governor-in-Council would appoint a Director of Marketing to be paid out of consolidated revenue, and also receive fees payable to other board members. Other officers could be appointed from the fund subject to the Governor-in-Council.

The functions of the Council of Agriculture were to cooperate with the Department of Agriculture and Stock, local producers' associations, and other approved bodies and persons in:

- i. developing the rural industries,
- ii. advising on all matters pertaining to the furtherance of the interests of primary producers,
- iii. advising the Minister on any matter which he might refer to the Council for consideration,
- iv. advising on matters which were brought under the notice of the Council by associations of primary producers or boards.

Local producers' associations could be registered by the Council of Agriculture. These would take the initiative in local matters and advise, cooperate with and assist the Council of Agriculture.

The Governor could declare any grain, cereal, fruit or vegetable a commodity, conduct a poll and constitute a board to handle it. Property could be vested in the Commodity Board. A board need not have the power of marketing, and one board could control several commodities. The Minister would appoint the Director of Marketing as an additional member of the board where the board was a marketing board. Boards were to be non-political. Other procedures of the Board normally undertaken by Commodity Boards were included.

9. The Fruit and Vegetables Act of 1927 (18 Georgii V. No. 3, *Qd Govt. Gaz.*, No. 117, 10 November 1927) assented to on 5 November 1927. The Fruit Cases Acts, 1912 to 1916 and The Fruit Cases Acts Amendment Act of 1922 were repealed.

Under this Act no fruit could be sold in a case in Queensland except in a case of the prescribed size, measurement and capacity, and either new or clean and free from any insect or fungus disease, the case to bear the packer's name and address. All layers of fruit or vegetables were to be uniform, and the case had to be free of foreign matter, graded and complying with maturity standards prescribed under the regulations. Inspectors or members of the police force had powers of entry for inspection purposes.

10. **The Primary Produce Experiment Stations Act of 1927** (18 Georgii V. No. 9, *Qd Govt. Gaz.*, No. 139, 5 December 1927) assented to on 20 November 1927. This Act gave the Governor-in-Council power by Order-in-Council to establish and maintain primary produce experiment stations ("Experiment Stations"). In regard to fruit, such stations could be constituted for all or each of certain classes of fruit: (a) bananas, (b) pineapples, (c) citrus fruits, (d) deciduous fruits, (e) all or any other fruits as necessary.

Any such experiment station could be equipped as needed to carry out the programme devised for the station.

A fund was to be established at the Treasury, to be called the Primary Produce Experiment Stations Fund, from which all expenses incurred would be paid, and into which all assessments levied under the Act were to be paid. The Government could, if necessary, make a Grant-in-Aid out of Consolidated Revenue, at a rate not exceeding one pound for every one pound paid into the fund in the preceding twelve months.

The Minister could direct funds to be applied for the investigation of eradication of certain pests and diseases. Funds would be shared by experiment stations. Officers could be appointed under the Act and existing officers given additional duties. The Minister would generally direct the control of the experiment stations but could delegate control to certain officers.

An Order-in-Council each year would declare a levy on any grower to which the Act applied on primary produce grown for sale which was encompassed by the experiment station.

Returns and statistics had to be provided by the grower regarding such produce. Any authorised officer of the Department of Agriculture had powers of entry to the property and inspection of books relating thereto.

11. The Stock Foods Act Amendment Act of 1928 (19 Georgii V. No. 5, *Qd Govt. Gaz.*, No. 83, 11 October 1928) assented to on 4 October 1928, now to be called The Stock Foods Acts, 1919 to 1928. The Act made minor amendments concerning proclamation of "by products", maximum percentage of salt and the minimum percentage of

phosphoric acid, lime, magnesia, iron, sulphur and iodine and the forms in which they occur. It also gave the Governor-in-Council power to appoint inspectors under the Act who had no monetary interest in stock foods, and impose penalties under the Act.

12. The Farm Produce Agents Act Amendment Act of 1928 (19 Georgii V. No. 7, *Qd Govt. Gaz.*, No. 85, 11 October 1928) assented to on 4 October 1928. The Act now became The Farm Produce Agents Acts, 1917 to 1928.

The chief amendments related to the keeping of trust accounts by agents, the prescribing of the books and records of transactions and their inspection by authorised persons, and the payment to principals of the proceeds of sales within a given period.

It is provided that all moneys received by an agent in respect of the sale of produce on behalf of a client shall be paid into a special trust account called the "Farm Produce Account". The Department of Agriculture is to be notified of the name of the bank in which this trust account is kept, while production of the passbook relating to the account can be demanded. Money paid into the trust account is protected and is not available for the payment of any other creditor.

An important clause was that which required the principal to be paid within thirty days of the date of sale of the farm produce. There was nothing in the Act to prevent the agent paying his client as early as he pleased, but he must not delay payment beyond thirty days.

Power is given to prescribe the books and records of transactions which are to be kept by agents. Books, including the passbook of the trust account, must not be destroyed for at least twelve months from the date of the last entry therein. The Department has power to inspect these books and records with a view to seeing that the law is being carried out or to investigate the complaint of an aggrieved party to whom the Minister will have power to communicate the result of such inquiry.

The rendering of fraudulent account sales will make an agent liable to imprisonment for three years, or a penalty not exceeding $\pounds 100$.

The destruction by an agent of any farm produce which is in a marketable condition is an offence under the Act.

 The Primary Producers' Organisation and Marketing Act of 1928 (19 Georgii V. No. 8, *Qd Govt. Gaz.*, No. 94, 19 October 1928) assented to on 11 October 1928, with the principal Act, can be referred to as The Primary Producers' Organisation and Marketing Acts, 1926 to 1928.

It provided for "arrowroot flour" to be a commodity. In a poll determining the constitution of a commodity board at least fifty percent of those eligible to vote had to vote and a three-fifths majority be obtained before a board could be constituted. The Governor-in-Council could extend the operations of the board on a petition of growers to do so and if a majority of over half the growers agreed by vote. It also provided for amalgamation of boards and winding-up of boards. A petition could be made to declare fruit a commodity. It also made amendments to The Fruit Marketing Organisation Acts, 1923 to 1925 and The Wheat Pools Acts, 1920 to 1925. In 1923 the Wheat Board purchased from Messrs William Jones and Sons Limited of Shrewsbury, England, land, buildings and improvements at Black Gully, Toowoomba, known as "The Maltings" and under this Act the Government vested the complex in the Board subject to fulfilment of conditions of repayment of the advance of $\pounds 10500$ made to the Board.

Staff changes and features of the Forgan-Smith period

Significant staff changes under Forgan-Smith

Following the major reorganisation of the Department under Gillies, few major positions were created by his successor, though generally promotions were encouraged.

The science groups, entomology and plant pathology, were strengthened. Three additional entomologists and a field assistant were added to the Sugar Bureau staff. The entomology strength at Head Office was considerably augmented by the appointment of Robert Veitch as Chief Entomologist, and George Alexander Currie was added to the Cotton Section as Assistant Entomologist. Currie was to transfer later to be officer in charge of weeds investigations in C.S.I.R., and still later became Professor of Agriculture and a University Vice-Chancellor elsewhere. Henry Tryon, officially retired as Entomologist and Vegetable Pathologist in 1925, was retained as Temporary Vegetable Pathologist till 1929. To take his place John Howard Simmonds was appointed on 1 January 1926, the first full-time Plant Pathologist, and Roy Bilbrough Morwood was made his assistant on 1 January 1929.

Richard Lewis Macgregor was appointed Director of Marketing for five years from 6 December 1926.

The Fruit Branch was seasonally strengthened by the appointment under the Diseases in Plants Act of two packing and grading instructors and five temporary inspectors to monitor the fruit fly at Stanthorpe.

George Williams was promoted to be Director of Fruit Culture on 16 February 1928, vice A. H. Benson, who retired. An assistant instructor in fruit culture, Henry St John Pratt, was appointed on 19 April 1928. When Graham became Under-Secretary, Charles F. McGrath, Dairy Instructor, succeeded him on 16 April 1926 as Supervisor in Dairying after a period in an acting capacity.

In 1927 Arthur Popham ("Pop") Deshon was appointed Manager of the Agricultural Bank.

The field staff of the cotton section was kept up to strength by re-allocation of duties and the appointment of Lloyd Mervyn Hodge as Manager of the Callide Cotton Research Station at Biloela on 30 July 1926. A temporary plant breeder was added, and W. A. R. Cowdry became Assistant Junior Cotton Grader on 6 October 1927.

Two assistant instructors in pig raising, F. Bostock (re-appointed) and Leslie Alfred Downey, were added to the pig raising staff. After a lengthy period during which James Carew looked after sheep and wool matters, John Lewis Hodge was appointed Instructor in Sheep and Wool on 3 May 1929.

Appointment of Robert Veitch as Chief Entomologist

On 15 May 1925, Robert Veitch, B.Sc., of the Colonial Sugar Refining Company, Lautoka, Fiji, was appointed Chief Entomologist in the Department and took up duty in July. He was to succeed Henry Tryon, the foundation Entomologist and Vegetable Pathologist since 1894. Veitch reorganised the Division of Entomology and Plant Pathology, having

oversight of both sections with seven entomologists, three plant pathologists and one illustrator, and Professor Goddard and D. A. Herbert of the University of Queensland acted as Consulting Plant Pathologists to the Department. Irvan Wassil Helmsing was appointed Illustrator to the Science Branch on 25 February 1926 to give added lustre to scientific publications by his brilliant drawings of insects and plant diseases.

Robert Veitch was born in Edinburgh in 1890 and was educated at the University of Edinburgh and the Imperial College of Science, London, and on the continent of Europe. In the course of his distinguished university career he was awarded a number of medals and numerous first-class honours certificates. In 1911 he acted as demonstrator in botany to Professor Balfour, and after graduating in 1912 he conducted a summer school in forestry, and also acted as zoological assistant to the Dick Veterinary College. He acted as assistant entomologist to the Imperial Bureau of Entomology, British Museum, London, from December 1912 to March 1914. In March 1914 he accepted the position of entomologist to the Colonial Sugar Refining Company. He was elected a Fellow of the Entomological Society of London in 1914 and of the Linnean Society of New South Wales in 1917. (*QAJ*, Vol. 23, June 1925, p. 557)

Retirement of A. H. Benson - Departmental Valedictory

Mr. A. H. Benson, Director of Fruit Culture, retired from official life on 31st March, and the occasion was marked by a large gathering of fellow officers, representative of every branch of the Department. On their behalf he was presented with a well-filled wallet by the Under Secretary, Mr. E. Graham, as a mark of his thirty years' association with the service. In the course of a valedictory address Mr. Graham referred to Mr. Benson's connection with the land since he was dux of the Royal Agricultural College, Cirencester, in 1879, until he joined the Queensland Service in 1896, after working in California and New South Wales; and added that Mr. Benson left the Department with the good wishes and respect of the Minister and every one of his fellow officers.

Mr. Benson expressed his pleasure at the good feeling that had always existed between him and his brother officers. He said that it was by no means his intention to become dissociated from the fruit industry, as he had arranged to enter banana growing on the North Coast immediately.

Mr. Albert H. Benson, M.R.A.C., is the only son of the late Joseph Benson, a pioneer Queensland squatter in the Burnett district during the fifty's. Mr. Benson was born on 14th December 1861 near Taunton, in Somersetshire, England, on his father's estate, and was educated at Taunton College, and the Royal Agricultural College, Cirencester, of which he is a member and gold medalist. He has been connected with agriculture during the whole of his life, and is a recognised authority on fruit culture. Shortly after he was twenty-one Mr. Benson was given the management of an agricultural estate in East Lothian, Haddingtonshire, Scotland, a country noted for its good farming. There he gained experience in growing various farm crops, and breeding and fattening sheep and cattle, as well as raising fat lambs for the English market. He occupied this position for five years, when his employer having accepted the Governorship of Madras, decided to let all the farms that had been under his management. Having heard a very glowing account of the prospects for successful culture of fruit in California, Mr. Benson decided to go to that country, where he remained five years, and gained practical experience in all branches of the fruit industry, as well as a general insight into American methods of agricultural investigation and experiment station work, besides taking a course of training at the University of California.

Mr. Benson left California for Sydney early in 1892, and was offered the position of fruit expert to the New South Wales Department of Agriculture, and was the first person in the Commonwealth to be given this title. Although appointed fruit expert, his work was not confined solely to fruit matters, but the knowledge he had gained of American agricultural and horticultural experiment work was made use of during the establishment of the Wagga, Bathurst, Pera Bore, and Wollongbar experiment farms. The value of his work was appreciated very highly by the then Premier of the Mother State (the late Right Hon. Sir George Reid) and Minister for Agriculture (Mr. Sydney Smith).

In 1896 Mr. Benson was offered the position of instructor in fruit culture for Queensland, by the late Mr. A. J. Thynne, then Minister for Agriculture. His services in this State also were not confined to the fruit industry, but included general agriculture as well. Much of his instruction in fruit culture was of a practical nature, given in the orchard itself, and included cultivation, manuring, pruning, pest destruction, and handling and packing fruit for market.

Early in 1908 Mr. Benson was sent to England as a representative of his department at the Franco-British Exhibition, and was absent for twelve months. On his return he visited Ceylon and the Federated Malay States to obtain information in connection with tropical agriculture, and pineapple canning in particular. He resumed his duties as instructor in fruit culture early in 1909, but resigned his position at the end of March 1910, to take up that of Director of Agriculture in Tasmania. Here his early training proved of great value, as his duties necessitated having a good general knowledge of agriculture, stock, and fruitgrowing.

In 1915 Mr. Benson returned to Queensland as Director of Fruit Culture, which position he held until his retirement.

Benson was succeeded on 10 March 1927 by George Williams, previously Experimentalist and Instructor in Fruit Culture, in an acting capacity until 16 February 1928 when his appointment as Director of Fruit Culture was announced.

Retirement of R. W. Winks, Senior Grading Inspector

The following article appeared in the *Queensland Agricultural Journal*, Vol. 28, July 1927 (p. 58):

On 30th June 1927, Mr. R. W. Winks retired after thirty-four years in the service of the Department which he joined in 1893 working with the Travelling Dairy. He was later appointed Dairy Instructor and on the passage of the first Dairy Produce Act, he became the Grader of dairy produce intended for export. Compulsory grading was later introduced and Mr Winks successfully piloted this controversial issue to a cordial and successful acceptance. At one time he was called upon to report on several properties submitted to the Government under the provisions of The Agricultural Land Repurchase Act. He was a great lover of English literature.

Retirement of W. G. Brown, Instructor in Sheep and Wool

William Grierson Brown retired from the Department on 31 December 1927, having reached the age limit.

Mr. Brown is a native of Hobart, Tasmania. In the island State he was reared among the merinos. Concentrating on the technical side he became widely known as a classer of both sheep and wool, and his services were sought by leading pastoralists in all the eastern States. In 1883 he came to Queensland to class the stock on Coongoola, returning later to handle New South Wales and Victorian flocks. As with many Southerners, Queensland as a young country of immense promise had for him an irresistible appeal, and he came back to remain and win a high reputation among Northern graziers as a classer of flocks and fleeces, and also as a shearing contractor and woolscourer.

Seventeen years ago Mr. Brown entered the service of the Department, and the appreciation of his work may be judged from a valedictory note in the "Graziers' Journal" (Brisbane), which is typical of similar notices in the pastoral Press, and which is quoted hereunder.

"Mr. W. G. Brown, State Sheep and Wool Expert, has reached the age limit, and retired from the Department of Agriculture and Stock last week. We feel sure that graziers throughout the State will regret to hear of his retirement. During the seventeen years he has been in the Department he has carried out his duties faithfully, capably, and courteously. He was always

approachable, and was ever ready to give advice to sheepmen. The 'Journal' has no hesitation in saying that the Department has lost one of its most popular and capable officers. Mr. Brown was essentially a sheep man, consequently he carried out his duties most enthusiastically, indeed. The man who makes a success of his job nowadays is he who puts his heart and soul into it. `Bill' did that. Mr. Brown's interesting book, 'The Farmer's Sheep in Queensland', has gone into several editions, and is still being asked for. It is easily the best of its kind ever published in this State, and will undoubtedly serve to perpetuate his memory in sheepland long after the final muster."

Mr. Brown had the misfortune to lose his two sons—Frank and William—in the Great War. They were of the 26th and 25th Battalions of the A.I.F., respectively, and both were killed within an hour on the same day—4th August, 1916.

Mr. Brown is a foundation councillor of the New Settlers' League and of the Queensland Authors and Artists' Association. Possessing an able and facile pen, he has made a name in agricultural and stock *Journal*ism, and his pen name "Tar Boy" is well known to old readers of the Sydney "Bulletin". He is also the author of a novel, "Helen Paley", a Western romance, "Farmers' Sheep in Queensland", and numerous pamphlets on pastoral practice, besides sketches on Australian inland life and industry in a section of the American periodical Press. He is also a member of the Johnsonian Club.

At a Departmental farewell on 23rd December he was the recipient of the good wishes of the entire Head Office staff, accompanied by a substantially filled wallet. The Under Secretary, Mr. E. Graham, made the presentation, and in doing so referred to the success of Mr. Brown's work in the interests of pastoral industry, particularly in respect to the farmers' wool scheme, sheep-farming on coastal country, and experiments in the blow-fly and other scientific investigations for which Mr. Brown had been largely responsible. He added that departmentally they were all sorry that Mr. Brown was retiring, as he was a most popular and conscientious officer. He felt sure that not only his fellow officers, but sheepmen throughout the State, wished him the best of good fortune in his unofficial life. In the course of an appropriate response, Mr. Brown counselled the younger officers present to maintain the reputation of the Department, which all over Australia was known as "easy of access, staffed with capable and courteous officers, having always something useful to impart".

In his well-earned leisure Mr. Brown proposes to travel further along the Inky Way, having accepted a retainer on the metropolitan Press. (*QAJ*, January 1928, pp. 75-76)

Some features of the Forgan-Smith period

Agricultural survey of the State

The Hon. W. Forgan-Smith, Minister for Agriculture and Stock, addressing a deputation from the Council of Agriculture to become its President, said:

It is the Government's intention to encourage and develop the production of those commodities which will find a ready market in Queensland and Australia and with that end in view, Cabinet has approved of a scheme to make a complete agricultural survey of the State. A Committee will be formed to carry out a complete agricultural survey of Queensland, commencing chiefly in the North. Men capable of carrying out that work will be appointed, and I look to the Council of Agriculture to aid that committee of economists in every possible way. (*QAJ*, Vol. 27, January 1927, p. 10)

In this Forgan-Smith foreshadowed the subsequent work in the late 1940s and 1950s of the Bureau of Investigation of Land and Water Resources, within the Lands Department but consisting of the Co-ordinator General, the Under-Secretary for Agriculture and Stock, the Director of Forestry and a senior Lands Department official.

The 1927 committee was made up of Messrs E. Graham (Under-Secretary), R. L. Macgregor (Director of Marketing), H. T. Easterby (Director of Sugar Experiment Stations), H. C. Quodling (Director of Agriculture) and M. B. Salisbury (Land Commissioner), with J. F. F. Reid, Editor of the *Queensland Agricultural Journal*, as secretary—with power to add members.

A committee of experts to control the survey was named by Forgan-Smith: E. Graham, Under-Secretary/Chairman; Professor H. C. Richards (University of Queensland); H. C. Quodling (Director of Agriculture); R. Veitch (Government Chief Entomologist); J. C. Brünnich (Government Agricultural Chemist); C. T. White (Government Botanist); and F. B. Campbell Ford (Acting Surveyor-General).

Amongst the matters involved in the agricultural survey would be:

- a close study of the formation of the soil;
- the character of the soil and subsoil;
- climatic conditions, rainfall, temperatures, etc.;
- the vegetation then in evidence;
- the insect life present;
- the class of agricultural products that could be economically grown in each zone;
- facilities for marketing produce.

Forgan-Smith said the starting point would be the coastal land and hinterlands north of St Lawrence and the survey would ultimately encompass practically the whole of the State.

The Committee first met in February 1927, and on 21 April 1927 the Agricultural Survey of the State was inaugurated, with four field officers: G. B. Brooks (Agricultural Instructor) to handle crop production, water supplies, temperatures, transport, etc.; W. D. Francis (Assistant Botanist) to handle grasses, timbers, etc.; W. R. Winks (Agricultural Chemist) to handle soils and geology; and J. H. Smith (Assistant Entomologist) to handle crop pests. They began a survey of the first section undertaken in Central Queensland—the portion of country lying between Flaggy Rock Creek and Sarina, including the Bolingbroke Holdings and the western slopes of the Connor's Range. (Brooks, G. B., *Rep. Dep. Agric. Stk*, 1926–27, p. 29) A report was submitted and the Agricultural Chemist and a surveyor subsequently made a more detailed survey of the Bolingbroke country. It would be some time before this survey of the State was completed. (*QAJ*, Vol. 28, Nov. 1927, p. 439)

Departmental Economic Committee

A Departmental Economic Committee was appointed by the Minister and at its inaugural meeting on 18 January 1927 the Chairman (E. Graham, Under-Secretary) suggested the scope of its survey—a need for a general enquiry into the basic facts of land settlement, agricultural production and marketing systems. An economic survey was necessary. Farmers were not altogether responsible for the unsatisfactory state of their industry. Economic factors were often against them and in efforts to solve the problems created by those factors, it was felt that such a committee would be of great assistance. Exact knowledge was required to be placed at the disposal of farmers and settlers with respect to crops, acreages, stock-carrying

capacity, suitable areas for the different classes of husbandry and so forth. The Committee might give some consideration to the general difficulties of the industry and collect data on which definite conclusions could be based. It might also classify the several forms of farming into groups, and consider everything relating economically to each group, and place itself in a position of being able to give directive and advisory service to those engaged or about to engage in land pursuits. There was need for representation from the Lands Department—on size of farming areas and land classification. The Committee would be in a position of giving sound advisory service to the farmer on the economics of his industry, in relation to varying production cost factors, adjusting production to demand, areas to be cropped, cycles of production, etc. It was decided to enquire into the dairying industry first. (*QAJ*, Vol. 27, February 1927, p. 81)

The Departmental Economic Committee's first bulletin on the dairying industry, *Bulletin* 1D, was issued in April 1928. It was a general survey of current dairy practice and the economic facts governing it. Consideration was given to land values, costs of improvements, necessary plant and equipment, costs of stock, labour costs, general working expenses, economic production of dairy cows, minimum number of dairy cows required, fodder conservation, field and storage costs. Two members of the committee were in the field obtaining firsthand information from producers in selected dairying districts. (*QAJ*, Vol. 27, June 1927, p. 496)

The second *Bulletin*, Dairying in Queensland No. 2D, was summarised in the August 1928 *Journal*. It stressed the need for herd improvement, the importance of feeding and the necessity for herd testing. Herd improvement must be based on the use of better bulls selected on milk and butter fat production records of dams and grand dams on both the sire and dam's side, not on show ring performance except as a secondary factor to maintain breed type. The "Better Bull" subsidy scheme, commenced in 1925, was aimed at this achievement. Better feeding involved the use of improved pasture species and the growth and conservation of fodder crops. J. C. Brünnich, the Agricultural Chemist, had published a bulletin entitled Stock Foods and E. H. Gurney had published one entitled Rations for Dairy Cows. Herd testing was the third and extremely important factor which identified unproductive cows, which could be sold, and the higher producers to be used for breeding. The Department had encouraged herd testing by appointing herd testers to its staff since 1910. Details of how farmers could become involved in these dairy improvement schemes were set out in appendixes to the bulletin.

Bulletin No. 3D, issued in September 1928, dealt with stock foods and the manufacture and marketing of dairy products. The testing and grading of dairy produce and regulations under the Dairy Produce Act had improved the quality of dairy produce and the introduction of pasteurisation of cream and milk gave a more uniform product. Compulsory marketing of cheese under The Cheese Pool Act of 1921 and the marketing of butter by the Queensland Butter Board and the Australian Butter Stabilisation Scheme of January 1926 all gave a successful marketing programme.

Bureau of Agricultural Economics

Armed with the possibilities of the two Departmental Committees—Agricultural Survey and Economic Committees—Forgan-Smith moved at the Interstate Conference of Ministers of Agriculture at Perth on 5 June 1928 that the Conference give serious consideration to the establishment of a Bureau of Agricultural Economics, stating:

In Australia we have laid down certain definite standards of living and it is desirable that these standards should be maintained and made secure. Any system of social organisation must have as its starting point a sound agricultural policy. Men who are prepared to go on the land and encounter the vicissitudes of country life granted that they are industrious, must have the right to a decent standard of comfort as high at least as the community can afford.

The functions of such a Bureau would have regard to the following matters: climatic influences; land values; systems of farming practice; mixed farming in contradistinction to single commodity operations; costing of commodity production; finance for production; handling, grading, and packing methods and facilities; transportation; storage; processing; marketing credit; local markets as distinguished from world markets; the influence of fiscal policies; the relation of the production of a given State to the world's production; problems dealing with the treatment of surpluses; the varying tastes and preferences of consumers; the relative influences of one commodity upon that of another; and marketing conditions generally.

The Interstate Ministers warmly congratulated Forgan-Smith and adopted the following resolutions:

- 1. That it be a recommendation from this Conference that each State Department of Agriculture should establish an Economics Branch or Division;
- 2. That the State Parliaments provide such legislation (or amending legislation) as may be necessary to establish and facilitate the work of the Economics Divisions;
- 3. That the Commonwealth Government be asked to co-operate with the States on this matter by constituting an Agricultural Economics Committee under the Council of Scientific and Industrial Research, each State Government, together with the Commonwealth Government, to nominate a representative to sit on such Agricultural Economics Committee. (*QAJ*, Vol. 30, July 1928, pp. 17–23)

A Commonwealth Bureau of Agricultural Economics was to be established later, setting the seal on Forgan-Smith's insight into Australia's agricultural needs in the economic field.

The Council of Agriculture

On 24 March 1922 the scheme for the organisation of the agricultural industry in Queensland was propounded by the Premier (the Hon. E. G. Theodore) at a conference of representatives of dairying interests within the State. The scheme was unanimously approved by the Conference. Legislation was then drafted to cover the scheme and The Primary Producers' Organisation Act of 1922 was passed. It provided for local producers' associations to be formed by local producers who would elect a representative to a district council, which itself would elect one member to the Council of Agriculture. A Provisional Council of Agriculture was appointed to hold office for one year to March 1923. Its first meeting was held on 19 April 1922. R. L. Macgregor was appointed director to organise the whole scheme.

In its inaugural year the Provisional Council dealt with the matters listed below.

- Herd improvement—Federal aid for importation and quarantine of stud stock
- State aid-Co-operative Agricultural Production and Advances to Farmers Act
- Herd Book Societies—suitable rules
- Herd testing—promotion
- Fodder conservation-a practical scheme prepared
- Dairy buildings—plans for buildings
- Milking machines—cleanliness
- Cream containers-standard seamless containers protected by fly gauze
- Pasteurisation-promotion
- Coordination of factories—avoidance of duplication
- Uniform system of accounts-for dairymen and factories
- Metropolitan milk supply—plans for a milk pool for the metropolitan area
- Railway transport—reduction of 20 per cent on freight of dairy products
- Stabilisation of prices—on Australia-wide basis
- Grading of dairy produce-one system, State to grade on behalf of Federal authority
- Cold storage—construction of cold stores and vesting in Minister for Agriculture and Stock
- Cheese—to be crated at factories
- Pigs-stabilisation of prices
- Agent-General's Reports-on handling and marketing in London of dairy produce
- Tariff—reduction of tariff on import of dairy machinery
- Additional dairy instructors and inspectors in dairying industry
- Wheat—co-operation between Council and Department on wheat improvement
- Maize-maize pool, increased duty on maize
- Potatoes-"seed" distribution
- Cotton-Department agreed to appoint a Cotton Entomologist
- Arrowroot—pool
- Poultry—recommendation for an egg pool
- Fruit—appointment of Deputy Director of Fruit Culture, experimental plots, hail insurance, increase in entomological staff, legislation standardising sprays, fruit fly eradication. Establishment of Stanthorpe and District Research Fellowship at the Queensland University with the primary object of discovering economical means of combating the fruit fly pest, investigation of bunchy top in bananas, instructors in picking, grading and packing of fruit, legislation for compulsory grading, case timber, utilisation of surplus fruit, standard size of fruit containers, improved railway transport, faster transport, collection of reliable statistics, tomato pool at Stanthorpe, testing systems of storage, publicity, efficient marketing
- Sugar industry matters-fertilisers, standards, supplies, prices
- Water supply schemes
- Pools-legislation
- Soldiers' Settlements-subsidy for clearing
- Rural credit system—devising a scheme
- Co-operative companies-formulation of legislation
- Taxation on fodder-tax commissioners not to tax till fodder is used

This record of the year's work was summarised by the Editor of the Journal thus:

The Queensland Primary Producers' Association Scheme is probably one of the first that has ever been brought into being in any country for the betterment of the man on the land, and it is gratifying to know that the farmers are so generally realising its potentialities and their responsibilities. The power for good of this organisation is limited only by the extent to which the producers of Queensland are willing to support and make use of it and the extent to which they are prepared in the due spirit of co-operation to help each other by means of the scheme. (*QAJ*, Vol. 19, April 1923, pp. 327–333)

The first duly elected Council of Agriculture was constituted as from 23 March 1923 to 30 June 1924. It was made up of the Minister, Department of Agriculture and Stock (the Hon. W. N. Gillies) as President; James Walker Davidson, Commissioner for Railways, Brisbane; Arthur Ernest James Charles King Graham, Director of Dairying, Brisbane; Harold Cecil Quodling, Director of Agriculture, Brisbane; William Joseph James Short, General Manager, Bureau of Central Sugar Mills, Brisbane; John Douglas Story, Public Service Commissioner, Brisbane; and representatives of the 19 District Councils.

The State Government undertook to finance the whole of the organisation for the first twelve months and a grant of £25 000 was made available to cover operations to 30 June 1923. The Act further provided that for the first five years the Government would subsidise the amount subscribed by agriculturists to the extent of at least £1 for £1.

With the exception of the Director, the Council would appoint all its own officers and administer, without any direction from the Government, all the funds placed at its disposal. (*QAJ*, Vol. 19, April 1923, p. 329)

In accordance with the provisions of The Primary Producers' Organisation Act of 1922 seven Standing Committees were formed in April 1923. Departmental representatives included A. E. J. C. K. Graham (Administrative, Publicity and Dairying), J. F. F. Reid (Associate Member—Publicity) and H. C. Quodling (General Agriculture). Each Standing Committee had seven members.

Reorganisation of the Council of Agriculture. Fresh regulations were approved in October 1925 providing for the election of eight district councils for the agricultural districts and an agricultural advisory board for the Atherton Tableland. Local producers' associations in each district were grouped in nine wards. Each ward would return one member to its district council. Each district council would be comprised of nine members. Suppliers of each sugar mill would elect a supplier's committee of three for that mill and one representative for the district executive for each of the nine districts. The district executive would elect one representative for a sugar council and the sugar council would be composed of representatives of the District Council of the sugar industry, fruit industry, and the several commodity boards, making 21 members. (*QAJ*, Vol. 24, Nov. 1925, p. 495)

The Director of the Council of Agriculture (R. L. Macgregor) announced in April 1926 that 26 000 out of 30 000 farmers were members of Local Producers' Associations. On conservative lines he estimated that the direct benefits already reaped by the primary producers under the scheme was £500 000. The State Government had stood behind them with guarantees and not a single loss had been incurred. (*QAJ*, Vol. 25, March 1926, p. 311)

The Principal Act of 1922 establishing the Council of Agriculture and the Primary Products Pools Act giving control over a commodity were modified in 1925, placing the organisation on a commodity basis. Under the new organisation proposed in 1926, the Council of Agriculture would be an executive comprising the commodity concerned. No Government nominees would be on the Council and the Secretary for Agriculture would not necessarily be President. It would be composed of representatives of commodity boards, with the Director of Marketing acting as a liaison officer between the commodity boards, the Council of Agriculture and the Government. Commodity boards would be elected by growers. District councils would be abolished. Commodity boards would be constituted on practically the same basis as pool boards and would have the power to levy for the following purposes:

- 1. for administrative expenses;
- 2. paying the precept to the Council of Agriculture;
- 3. in establishing an insurance fund.

Establishment would depend on a two-thirds majority for a pool. The functions of the Council of Agriculture would be to co-operate with the Department of Agriculture, the local producers' association and other bodies in:

- 1. developing the rural industries;
- 2. advising on matters to the interest of primary producers;
- 3. advising the Minister on matters he might refer to the Council;
- 4. advising on matters brought before the Council by associations or boards.

The Council would be financed by the issue of precepts upon the commodity boards and would meet annually and on special occasions. A Government grant of £15 000 was the final grant. After this the organisation would be self-supporting. Up to 30 June 1926 the Government had assisted the Council of Agriculture to the extent of £95 981. In addition, levies raised by the Council during 1924–25 totalled £20 884 and in 1925–26 they were £25 259, giving an overall income of £142 024. The Bill provided for maintenance of the sugar industry organisation. A Government Director of Marketing would be appointed.

The Bill deleted clauses in the Fruit Marketing Organisation Act, the Stallions Registration Act and the Agricultural Bank Act requiring the Governor-in-Council to seek the approval of the Council of Agriculture on administrative details. (*QAJ*, Vol. 26, November 1926, pp. 373–375)

The first meeting of the new Council of Agriculture was held at Brisbane on 15 December 1926. The opening address was given by the Hon. W. Forgan-Smith, Minister for Agriculture and Stock. He outlined the growth of organised marketing and how the Government wished to hand over to a new council, elected on a commodity basis and responsible for its own finance. The pool boards were financed by Government guarantee—and the Government never lost money on the operation. Now the boards would have to raise their own finance.

The newly constituted Council of Agriculture comprised thirteen members: F. H. Hyde (Northern Pig Board); H. H. Collins (Atherton Tableland Maize Board); F. H. V. Goodchild (Broom Millet Board); J. Archibald (Wheat Board); H. Keefer (Cheese Board); R. A. Chapman (Egg Board); A. G. Gordon (Committee of Direction of Fruit

Marketing); J. Purcell (Butter Board); G. E. McDonald (Cotton Board); A. McGregor Henderson (Arrowroot Board); W. Muir (Peanut Board); T. Muir (Canary Seed Board); G. W. Johnson (Queensland Cane Growers' Council). (*QAJ*, Vol. 27, January 1927, p. 61)

The Council elected its President (who might be any citizen of Queensland) at its first meeting. The President would have all the rights and privileges of members. The Annual Meeting would be held at the close of the financial year and during either July or August. Provision was made for an Executive Committee and for special committees. No officers would incur any expenditure without the authority of the Council. Official documents had to be signed by the President or Vice-President and countersigned by the Secretary. Fees were fixed by Council, but the maximum fees, allowances and travelling expenses would be £2 2s 0d per sitting day, £1 11s 6d per travelling day and first class railway fares. (*QAJ*, Vol. 27, Jan. 1927, p. 62)

A deputation from the Council members, Messrs G. Johnson and H. Keefer, waited on Forgan-Smith and asked him to become the first President of the newly organised Council, to which he agreed. Macgregor was made Director of Marketing in 1926, inaugurating a Marketing Branch within the Department.

Board of Agricultural Education

As a result of a recommendation by J. D. Story, Public Service Commissioner, a new coordinating body to be known as the Board of Agricultural Education was constituted by The Agricultural Education Act of 1922, assented to on 14 October 1922. The purpose was to coordinate all the activities of the State that had for their object the development of agriculture and primary production generally. On the Board were seven members representing the Department of Agriculture and Stock, the Department of Public Instruction, the Queensland University, the Queensland Agricultural College, the Committee of Direction of Fruit Marketing, and the several commodity boards concerned with the business side of rural enterprise. The Minister for Agriculture and Stock (Forgan-Smith) was to be Chairman of the Board. It was to be purely a coordinating body concerned chiefly with the scientific side of agriculture. Included in the functions of the Board were the following:

- i to collect information as to the work which might be undertaken in connection with agricultural and pastoral problems;
- ii to classify such work into correlated groups, and in their order of importance, and submit suggestions as to what portions of the work might be done by the Commonwealth, by the State, and by various institutions and organisations within the State.

A survey of the investigational work was made to determine what overlapping, if any, existed and a register of agricultural research, experimental and demonstration work was compiled for the information of the Board.

Sugar

A Sugar Pool was established during Forgan-Smith's tenure of office; the embargo on the import of sugar was extended, Imperial Preference was instituted, power alcohol was

produced at the Plane Creek Sugar Mill at Sarina, and a Queensland Canegrowers' Council was created in 1926 providing for Mill Suppliers' Committees, District Canegrowers' Executives and the Queensland Canegrowers' Council. Cane assignments were fixed, the Sugar Agreement was renewed and the Queensland Society of Sugar Cane Technologists was established.

Radio broadcasts

Arrangements were made between the Department and the Director of the Queensland Government Radio Service (J. W. Robinson) through his Markets Reports Officer (Robert Wight) for lecturettes on agricultural and related matters. Officers of the Queensland Department of Agriculture and Stock and of the Queensland Agricultural High School and College participated. The broadcasts came over the air at 7.45 p.m. on selected weekdays:

Tuesday, 3 January 1928, "A Talk on Sheep and Wool" by James Carew, Assistant Instructor in Sheep and Wool;

Monday, 9 January 1928, "Care of Pigs in Summer" by E. J. Shelton, Instructor in Pig Raising;

Thursday, 12 January 1928, "Progress of Agriculture in Queensland" by J. F. F. Reid, Editor of Publications.

Queensland Beef Cattle Industry Commission

On 8 December 1927, Messrs W. H. Austin (Chairman), E. F. E. Sunners and E. E. D. White were appointed Commissioners to enquire into killing facilities in the meat industry. They recommended the establishment of public abattoirs in Brisbane.

Departmental Manurial Experimentation Committee

This committee, consisting of J. C. Brünnich (Agricultural Chemist) as Chairman, E. Graham (Under-Secretary), H. C. Quodling (Director of Agriculture), A. H. Benson (Director of Fruit Culture), F. F. Coleman (Seeds, Fertilisers and Stock Foods officer), and J. F. F. Reid (Editor of Publications), met on 4 December 1925. They were to deal with agricultural economics, fertiliser experiments and a soil survey.

The initial fertiliser experiments would be with crops other than sugarcane and cotton, which were already under way. Economics of fertiliser use would be paramount. (*QAJ*, Vol. 25, Jan. 1926, p. 70)

Leasing of Warren and Hermitage State Farms

In late 1927 Forgan-Smith set up a committee whose members were Professor J. K. Murray, Principal of the Queensland Agricultural High School and College, J. Irwin of the Public Service Commissioner's Department and E. Graham, Under-Secretary, Department of Agriculture and Stock, to decide on the future of the Warren and Hermitage State Farms. It was considered that the Callide Cotton Research Station could provide wider and better facilities than Warren State Farm, and that the Hermitage State Farm was too limited in soil types and climatic conditions to cover the wheat growing areas. It was

decided to call tenders for the lease of the two farms for a period of five years, and with the option of a further three years from 1 February 1928. Tenders were called, to close on 23 December 1927.

Primary Produce Experiment Stations

The Act of 26 November 1927 provided for experiment stations, along the lines of the Sugar Experiment Stations, for other crops. Bananas were a major crop in need of research and late in 1928 a station (for south Queensland) was set up on 15 acres of land east of Kin Kin, under H. J. Freeman; another, of 12 acres, was set up at Pawngilly (Bartle Frere) under W. J. Ross. Both stations were established in conjunction with the Committee of Direction of Fruit Marketing. (*QAJ*, Vol. 31, May 1929, p. 351)

Overseas visitors

In 1926 Professor R. G. Stapledon, head of the Plant Breeding Research Institute at Aberystwyth, Wales, visited Australia and met with agronomists and pasture scientists. He was followed later by Dr Orr of the Rowett Research Institute, Aberdeen, Scotland, a prominent animal nutritionist. (Scattini, W. J., *Tropical Grasslands*, Vol. 15, July 1981, p. 65)

Sir Arnold Thieler, K. C. M. G., of South Africa—an authority on tick diseases and nutrition in cattle—met with the members of the Commonwealth Tick Dip Committee at the Department of Agriculture and Stock in June 1928. Those present were Dr W. A. N. Robertson (representing the Commonwealth Government), J. C. Brünnich, A. H. Cory and C. J. Pound (representing the Queensland Government), Max Henry and C. J. Sanderson (New South Wales) and R. P. M. Short (Queensland) as Secretary. Sir Arnold gave valuable advice to the local committee members on ticks and phosphorus nutrition.

Sir John Russell, O.B.E., D.Sc., F.R.S., Director of the Rothamsted Experiment Station, Harpenden, England, was visiting lecturer nominated by the University of Queensland in 1928. On 19 July he delivered an address, "Science and Modern Farming", which was attended by the Under-Secretary (E. Graham), Assistant Under-Secretary (R. Wilson) and a large number of Departmental officers. Subsequently Sir John visited the Department on 23 July and addressed the whole of the scientific staff. He was impressed with the progress in research and field activities. (*QAJ*, Vol. 30, July 1928, pp. 143–145)

Founding of the Queensland University Faculty of Agriculture

In the 1920s there was a growing awareness of the need for trained staff to undertake rural research problems. A Faculty of Agriculture had been mooted almost since the foundation of the Queensland University in 1910. However, in the early 1920s the University became active in investigating problems such as the control of prickly pear, the fruit fly pest and bunchy top in bananas, with Professor Goddard heavily involved. Forgan-Smith was particularly interested in the development of the University and "by the end of 1926 Forgan-Smith with Goddard as a catalyst, had convinced the Government to provide funds for the setting up of a Faculty of Agriculture". (Zillman, 1979, p. 55)

Goddard had a meeting with Forgan-Smith on 8 September 1926 and the Minister stated that an amount of £5000 per annum would be provided in the Government Estimates as

from the beginning of the financial year 1927–28 for the purpose of establishing a Faculty of Agriculture in the University. This was confirmed by the Government early in December 1926 and enabled the Faculty to be established in March 1927. J. D. Story, the Public Service Commissioner, E. Graham, Under-Secretary of the Department of Agriculture and Stock, and A. J. Thynne, former Minister for Agriculture and now Vice-Chancellor of the University, were ardent supporters. The Department agreed to sponsor some of its own staff as early students. H. C. Quodling, Director of Agriculture, was also active as a member of the Faculty of Science, along with Graham. The Forgan-Smith Building at the University pays tribute to Forgan-Smith's contribution to the University development.

General agriculture, 1919–29

H. C. Quodling, Director of Agriculture

The following passage appeared in the *Queensland Agricultural Journal*, April 1926 (p. 331):

Mr. Quodling comes from one of the old Southern pioneering families of sturdy English stock, members of which have made their mark in original surveying and engineering work in New South Wales. It was a Quodling who was the construction engineer on a section of the first railway over the Blue Mountains and his grandson, Mr. H. C. Quodling's brother, who did similar work in connection with the rerouting of the renowned Zig-zag on the same line in recent years. The family is also identified with large pastoral interests in New South Wales and Queensland.

Born at Sydney in the seventies, Mr. Quodling received his early education at Newington College and Sydney High School. A successful course in veterinary science and agriculture at the Sydney Technical College was followed by a general training in the science and practice of farming at the Longerenong Agricultural College, Victoria, and the Hawkesbury Agricultural College, New South Wales. He then accepted a position as Assistant Experimentalist at the latter institution. Seeking wider fields, Mr. Quodling became interested in grazing pursuits, and after some experience of station life, developed successfully a large dairying and agricultural property on the Upper Hunter. The opportunities offering in the Northern State proved a magnet to Mr. Quodling, as well as to many other young Southern settlers, and he acquired a half interest in a Queensland sheep property. He subsequently, in January 1897, entered the service of the Department of Agriculture and Stock as farm foreman at the Queensland Agricultural College at Gatton and was chosen soon afterwards to establish a departmental stud farm. This project was deferred, however, and after terms of management at Westbrook and Hermitage State Farms he was transferred to headquarters to fill the position of Agricultural Inspector. Just prior to and after the death of the late John Mahon, he was Acting Principal of the Gatton College. On the reorganisation of the Department in 1915, Mr. Quodling was appointed Director of Agriculture. His great work for the farmers of Queensland in that capacity is well known and appreciated over the whole of the State. Since 1915 agriculture in Queensland has made extraordinary progress, and in its remarkable development Mr. Quodling has been no small influence.

State farms

Hermitage

The testing of varieties of wheat, barley and oats suited to the heavy soils of the Darling Downs and the sale of seed to farmers after the cleaning and grading of the grain from field crops was the main activity of Hermitage State Farm during the decade. An associated crossbred lamb project crossing Lincoln and Merino sheep produced fine-quality lambs for sale. An interesting crop of *Phalaris minor* was made into hay in 1925, yielding 1.75 tons per acre.

Tenders were called for the leasing of this farm for five years in December 1927.

Gindie

The chief interest of Gindie State Farm from 1920 onwards was the breeding of stud beef Shorthorn cattle and Suffolk Punch and Clydesdale horses for shows and sales. The beef Shorthorn cows were entered in the appendix of the Shorthorn herd book. Two new bulls were purchased—"Grand Duke of Oxford 5th", followed by a young bull from Sir Anthony Hordern's famous four-thousand-guinea bull, "Masterkey"—to improve the blood lines. Numerous show prizes were won with the stock and sales were good.

There was good demand for the stud horses offered for sale and the Clydesdales were augmented by the transfer of nineteen mares from Gatton College. In 1926 six Clydesdale mares were sent to Ellinthorpe on the Darling Downs to be mated with an imported stallion, "The Intent", and four foals resulted. Fodder was grown to feed the stud stock and good crops of wheat were made into hay and maize and Sudan grass into silage.

Roma

Plant breeding at Roma State Farm was continued under the direction of R. E. Soutter, involving mainly wheat, but including the breeding of sudan grass strains of low hydrocyanic acid content, cowpeas resistant to nematodes, field peas, and the fixing of a pure strain of Beaudesert pumpkin to eliminate variability. Notes were made on several varieties of peanuts (including some from Java) with a view to breeding work. Observation plots of sixteen selections of Durango cotton, millets and forty varieties of sweet potatoes were made. The vineyard and the olives found a congenial home on the deep sandy soils in this Western area. Breeding work on grapes continued. Date palms of the Deglet Noir variety were planted.

The wheat research work was paramount. Manurial experiments over nine years showed that an increased yield of 2.4 bushels per acre could be obtained by applying one hundredweight of superphosphate per acre. However, there were doubts about the profitability of this venture.

The link between the breeding and release of new varieties of wheat from the farm, through district testing plots and subsequent release through the Wheat Board to farmers, constituted an excellent crop improvement scheme. Two contrasting wheat-growing seasons added valuable information on wheat varieties. A very wet 1924–25 season was disastrous to growers but provided Soutter with important information regarding resistance

to lodging and wheat rust of his varieties. The favourite district variety "Florence" was affected by rust but crosses between it and "Cretan" provided rust-resistant types. The 1928–29 season was very dry but two outstanding observations were made—the undoubted value of early and thorough preparation of the land, and the fact that wheats of quick-maturing habit when lightly seeded made the best use of the limited supplies of soil moisture and returned the highest yield. (*Rep. Dep. Agric. Stk*, 1928–29, p. 22) The Agricultural Chemist undertook the laboratory analyses for hydrocyanic acid and advised on manurial experiments.

Warren

The pig and Ayrshire dairy cattle studs kept at Warren State Farm provided valuable stud stock for local farmers, and demonstrations with the production of silage for stock feeding were valuable. Emphasis was placed on the sorghum crop for grain and ensilage and arrowroot for pigs. Experimental work was reduced in 1920–21 when the manager was gored by a bull and subsequently lost a leg.

Instructional work with pupils at Stanwell and other local schools was provided in saddlery, tinsmithing, milk and cream testing, seed testing, stock judging and general agriculture during 1923–25. The prickly pear on the farm was treated with cochineal insects and Robert's pear poison from the Commonwealth Prickly Pear Board's Station at Westwood, the latter being very effective in killing the pear.

In 1927 it was decided to offer the farm for lease for five years as the Callide Cotton Research Station at Biloela could provide better research and instructional facilities. An Instructor in Agriculture based in Rockhampton could satisfy local demands for information. (*QAJ*, Vol. 29, January 1928, p. 81)

Kairi

In the early postwar years there was a demand for land for soldier settlement and five hundred acres of the Kairi State Farm were surrendered for this purpose. During 1920–21 another 50 acres of tropical rainforest were cleared.

The main crops being grown were maize, sweet potatoes and pumpkins for dairying and pig feeding and sugarcane varieties for "plants" for the coastal sugar areas. Taro was found to be a useful root crop. Kikuyu grass had found a congenial home in this area and was replacing Rhodes grass in the wetter districts. Huban clover had proved unpalatable.

The stud dairy herds of Jerseys and Milking Shorthorns (the latter founded on "Darbalara" blood from New South Wales) and the Berkshire pig stud helped to meet the increasing local demand for purebred stock. The establishment of a bacon factory at Floreat Siding near Mareeba during 1924–25 promoted greater interest in pig breeding.

A Suffolk Punch stallion was located at the Kairi farm. He was purchased from the "Dangar" Stud in New South Wales.

Weed control, which was to be a continuing problem on the Atherton Tableland, became a major problem in the farm crops.

Home Hill

Home Hill State Farm was established to study irrigation methods. One hundred and fifty acres were developed from 1920 onwards and two wells providing 50 000 gallons of water per hour were equipped. Sufficient sugarcane was grown to make the farm self-supporting while still experimenting with other crops. A quick flow of irrigation water through the crop close to the root system proved best for the sugarcane, with flows up to 6 chains still being efficient. Applied water was not allowed to rise above one-third the height of the bank carrying the cane so that the roots would not be disturbed by implements. The top of the bank was kept relatively dry to discourage weed growth. Recording of actual costs of production of sugarcane for the Sugar Cane Prices Board was an important part of the programme. Other crops grown were Durango cotton, sweet potatoes, Upland rice, sorghum, velvet beans, soybeans, tomatoes and lucerne. Cotton had to be planted to ripen in the dry season between May and December. On 24 March 1924 Colin Munro was appointed Manager and widened the crop suite to include taro, peanuts, yams, adlay (Job's tears), horse and green gram, chick and pigeon peas, Japanese clover and gingelly. (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1924–25, p. 20)

By 1929 additions included oranges, bananas, pineapples, oats, English potatoes, grapes, peaches, custard apples, cherries and *Bassia latifolia*. In March 1930, the farm was closed, having fulfilled its purpose.

Primary Produce Experiment Stations

On 8 December 1927, the Hon. W. Forgan-Smith introduced a Bill to Parliament to establish more experiment stations along the lines of the Sugar Experiment Stations to serve agriculture in general. More immediate consideration was to be given to banana growing. (*QAJ*, Vol. 28, December 1927, p. 553)

On 20 December the Minister called together members of the Banana Sectional Group Committee of the Committee of Direction of Fruit Marketing, the University of Queensland and the Department. He said that the banana industry was now worth £750 000 yearly to Queensland. The Queensland Government had provided £3700 for investigations into bunchy top and squirter diseases. There were now ten field officers either solely or partially engaged in advising banana growers. The meeting agreed that it was desirable to establish an experiment station in south Queensland on Crown land of an area of at least 100 acres and that experiments should include soil studies, plant material selection, effect of resuckering, variety testing including transport qualities, seedling trials, spacing trials, green manures, pests and diseases, whole or dissected bunches. (*QAJ*, Vol. 29, January 1928, pp. 2–3) Stations were established at Kin Kin (south Queensland) and at Pawngilly (north Queensland).

Botanic Gardens

His Royal Highness the Prince of Wales visited the Gardens on 26 July 1920 to attend a children's demonstration, and on 30 July to officiate at a citizens' reception.

Elephant and Kikuyu grasses were distributed from the Gardens in the 1920s. Grasses were also planted for the Royal National Association. Plant distribution during 1920–21 was heavy: 415 State schools received 2302 plants, other Government Departments 877, local authorities 318, churches, convents and cemeteries 268, progress associations 156, hospitals 183, botanic gardens 187, general exchanges 956. Exchanges came from India, Java, Singapore, Japan, France, Egypt, South Africa and Cuba, and palm seeds were obtained from the Director of Botanic Gardens, Buitenzorg, Batavia, and the Director of Singapore Botanic Gardens. Band concerts were staged on Sunday afternoons and on Sunday nights when the gardens were open. Zoological collections were continued. The domain was used for football, the Printing Office Cricket Club used the wicket for matches, and the University students used it for practice. The children's playground was popular. (Bick, E. W., *Rep. Dep. Agric. Stk*, 1920–21, pp. 82–84)

In 1921 Bick made recommendations for tree planting for shade and shelter in Queensland. For shelter belts he recommended hoop pine (*Araucaria cunninghamii*), Cypress pine (*Callitris glauca*), carob bean (*Ceratonia siliqua*), olive (*Olea europea*), Moreton Bay ash (*Eucalyptus tessellaris*), silky oak (*Grevillea robusta*), Himalayan pine (*Pinus longifolia*), she-oaks (*Casuarina spp.*), mulga (*Acacia aneura*), elm (*Celtus chinensis*) and plane tree (*Platanus orientalis*). For individual planting in small groups, Moreton Bay ash and weeping fig (*Ficus benjamini*) were recommended. For warm districts, Hill's weeping fig (*Ficus hillii*), Moreton Bay fig (*Ficus macrophylla*), crow's ash (*Flindersia australis*), Queensland beech (*Gmelina leichhardt*), Himalayan pine and plane tree were suggested. For the Western Downs and cold districts, Indian Siris tree (*Albizia lebbek*), pepperina (*Schinus molle*), white cedar (*Melia azadarach*), kurrajong (*Brachychiton diversifolia*), broad-leaved bottle tree (*B. australis*) and narrow-leaved bottle tree (*B. rupestris*) were cited. (Bick, E. W., *QAJ*, Vol. 16, July 1921, pp. 36–37) In 1921 Bick also contributed articles to the *Queensland Agricultural Journal* on flowering trees of the Brisbane Botanic Gardens.

During 1921–22 a new rose garden was finished and it then housed 700 varieties. New asphalt paths were laid down. Paspalum was being dug out and replaced with blue couch in the lawns. Grass plots of Kikuyu, elephant grass, *Paspalum notatum, Pennisetum setosum* (Mission grass) and Vasey grass (*Paspalum urvillei*) were planted. *P. notatum* looked promising for pasture. (Bick, E. W., *Rep. Dep. Agric. Stk*, 1921–22, pp. 91–93)

During 1922–23 a large number of plants was distributed within Queensland and valuable exchanges made with other States and countries. Extensive collecting was done on the Eungella Range near Mackay and on the Bellenden Ker Range, where numerous new plants, particularly palms and ferns, were obtained. Nurserymen from Florida and Illinois visited the gardens and exchanged notes and plants. Mr Reasoner of Florida strongly advocated that the Curator obtain some Guatemalan avocado pears for trial.

Transfer of the Botanic Gardens to the Greater Brisbane Council

During 1924–25 it was decided to hand the Botanic Gardens over to the control of the Greater Brisbane Council and Bick submitted his final annual report. Numerous requests for plants were received from schools, Government institutions and herbaria, and several exchanges were made. His Highness Maharaja Rana Bhawani Sing of Jhalawar visited the gardens and offered to exchange plants with Queensland.

Government Botanist

During the 1920–21 year 2660 specimens were identified by the Government Botanist. Botanical collections were made on Bribie and Stradbroke Islands, on the Mistake Range and in the Laidley Valley. A comprehensive collection of named native grasses and fodder trees was displayed at the Royal National Exhibition.

Numerous educational lectures were given by the Botanists and a series of articles was published for schoolchildren in *The School Paper*. Articles were also produced for the *Queensland Agricultural Journal* and *The Queensland Naturalist* while research material was published in botany bulletins and the *Proceedings of the Royal Society of Queensland*. C. T. White's "Answers to Correspondents" in the *Queensland Agricultural Journal* was a popular monthly contribution and enabled people on the land to effectively communicate from a distance with the State botanists without regular visits to the capital.

A most important sector of this communication was White's notes on numerous plants believed poisonous to stock that were sent in for identification. Field inspections were made where possible in the locality of the poisoning, and feeding tests, in collaboration with the Stock Experiment Stations, were arranged when possible to verify the assessment. This poisonous plant work was to be continued and enlarged by White's successor as Government Botanist, Dr Selwyn L. Everist.

Specific publications written by White included *Forest Flora of Queensland, An Elementary Book of Australian Forest Botany*, published by a Sydney firm in 1923, which received very favourable notice in a bulletin issued by the Royal Botanical Gardens, Kew, England (*QAJ*, Vol. 20, December 1923, p. 471) and his *Monograph on the Eucalypts of the Brisbane District*. The Assistant Botanist, W. D. Francis, concentrated on rainforest flora, visiting Imbil, the Macpherson Range and other rainforest areas from 1926 to 1929 to obtain data and photographs for his work *Australian Rain Forest Trees*, published in 1929. In December 1925 he published one of the few ecological surveys in Queensland at that time, dealing with the ecology of the vegetation around Charleville—the mulga association, cypress pine and gidgea forests. (Francis, W. D., *QAJ*, Vol. 24, December 1928, pp. 598–601) (Colleagues say that Francis was very close to unravelling the secret of DNA, well ahead of the discoverers.)

In March 1922 White, the Government Botanist, spent twelve days in the Russell River and Bellenden Ker area to obtain seeds of Meston's mangosteen (*Garcinia mestoni*) and the Russell River lime (*Citrus inodora*) for the United States Department of Agriculture for breeding purposes. The mangosteen was common on the eastern slopes of the Bellenden Ker Range at an elevation over 2000 feet but no fruit was found at that time. However, 200 seeds of the Russell River lime were sent to the United States. Another attempt to gather seeds of the mangosteens was made by White, Bick (Director of the Botanic Gardens) and A. L. Merrotsy (District Forester) in January 1923, and they succeeded in gathering 300 seeds of the native mangosteens *Garcinia mestoni* and *G. gibbseae* for the United States and the Brisbane Botanic Gardens. Seeds of a thin-shelled Queensland nut (*Macadamia ternifolia*) were obtained from J. B. Waldron of Upper Eungella, Tweed River, New South Wales. Collecting trips for the Herbarium were made to New Caledonia and locally as time permitted.

Visiting botanists sought their Queensland counterparts' advice on Australian and other flora. During 1920–21 Professor E. H. Wilson of the Arnold Arboretum, Harvard University, a leading dendrologist, was taken on visits to Imbil, to Fraser, Bribie and Stradbroke Islands and to the hardwood forests at Benarkin. In August 1921 White accompanied Professor Douglas H. Campbell of the Leland Stanford University, California, to the Blackall Range and Woogooroo scrub near Brisbane to examine plant associations. They were also busy with exchanges of plant materials with other herbaria. During 1925–26 a duplicate set of all the known Queensland Aristida species of grasses was collected and sent through the Royal Botanical Gardens at Kew to Professor Henrard, who was producing a monograph on this genus.

The Forestry Department made full use of the services of the botanists and during 1922–23 both White and Francis travelled widely through the State identifying forest trees and other plants for its officers. During the 1926–27 year White gave a series of twenty-five lectures to University students in third-year Science and to cadets of the Provisional Forestry Board. He also reported on silviculture in Queensland for the Public Service Commissioner and prepared a descriptive text on the species of prickly pear naturalised in Australia for the Commonwealth Prickly Pear Board.

White's other research work included a study with F. B. Smith of the occurrence of saponins in Queensland flora (White, C. T., *Rep. Dep. Agric. Stk*, 1923–24, pp. 107–108) and a critical examination of the species Flindersia. (White, C. T., *Rep. Dep. Agric. Stk*, 1920-21, pp. 78–81)

Agricultural Chemist

During 1920–21 the Agricultural Chemist, J.C. Brünnich, compared analyses of existing soils on the Atherton Tableland with figures he had obtained from sites analysed in 1903. He found serious depletion over the thirteen years, particularly in potash figures, but complete fertilisers would be needed to remedy the situation.

Analyses of fodder grasses, such as Elephant grass (*QAJ*, July 1921) were made, also of Sudan grass and saccaline sorghum for hydrocyanic acid. Analysis of Nulkuru (*Helescharis sphacelata*), a sedge growing in brackish water of 200 grains of salt per gallon, showed the tubers to be of equal value to sweet potatoes, and noogoora burr marl contained 19.7% of crude protein, while *Lepidium hyssopifolium* (pepper cress) contained 15.59% of crude protein but tainted milk. Dried blood meal proved to be a valuable food for sheep. Brünnich also showed that any arsenical solution coming in contact with soil soon loses its poisonous properties owing to arsenous oxide forming insoluble compounds with iron and alumina in the soil. Samples of fertilisers were monitored. (Brünnich, J. C., *Rep. Dep. Agric. Stk*, 1920–21, pp. 34–36)

Brünnich and A. F. Bell published "Analyses of Fertilisers" in the November 1921 issue of the *Journal*, and also analyses of wood and plant ashes.

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The chemical staff was increased during 1922–23 by the appointment of W. J. Cartmill and N. G. Cassidy as cadets.

A large number of soil analyses for the Sugar Bureau was undertaken. A soil search for the cause of bunchy top in bananas and phosphorus deficiency in maize soils was made at Tolga. During the drought many water samples were submitted and the Chemist adopted a maximum salt content of 100 grains per gallon for irrigation water and 300 grains per gallon for continuous stock use. Dipping fluids, viscera from animals eating prickly pear poisoned with arsenic, dairy produce, dairy salts, fertilisers, lime, insecticides, grape vine must and stock foods were analysed. Brünnich was pleased to report that the entomologist Hubert Jarvis had had success with destroying cane grubs with dichlorbenzole, a chemical he had recommended as early as 1913.

A second revised edition of Elementary Lessons on the Chemistry of the Farm, Dairy and Household was published during 1921.

A conference of State agricultural chemists was held in Melbourne to bring about uniformity with regard to legislation, description and labelling of fertilisers and methods of analyses; preparation of a Bill covering all pest destroyers and the fixing of standards for them; the fixing of standards; and suggesting uniformity of legislation regarding stock foods.

F. F. Coleman was appointed a special inspector under the Fertilisers and Stock Foods Act.

A. F. Bell and H. W. Kerr resigned to take up travelling scholarships and were replaced by G. Sutherland and W. R. Winks. Numerous soil analyses were made. Some cotton yields were low yet large bushes were formed, e.g. at Kingaroy and Mt Larcom. Brünnich suggested imbalance in PKCa and N—these soils might need more lime. Tests were made to identify pasteurised from unpasteurised milk. Tests for HCN were made on sorghums and canned pineapples for export. (Brünnich, J. C., *Rep. Dep. Agric. Stk*, 1923–24, pp. 29–32)

During 1925–26 the Agricultural Chemist was actively engaged in developing new techniques for nitrogen determination and for moisture determination in meat extract; in soil fertility problems and, owing to the drought, giving a good deal of advice on drought feeding. In September 1926 he produced a pamphlet entitled "Stock Foods" for distribution for this purpose. Fertiliser trials for pasture renovation and fodder crops were designed in conjunction with the Director of Agriculture, for Maleny and at Runcorn.

Brünnich published a very informative account of lime—its sources, its particle size, its necessity and chemical reactions in its use in agriculture. Liming of the soil had always been a rather haphazard practice. (*QAJ*, Vol. 24, August 1925, pp. 141–145)

The Agricultural Chemist was called upon to analyse Mitchell and Flinders grasses for J. E. Thomas of the C.S.I.R., who was investigating malnutrition caused by periods of drought affecting the sheep industry. He found great variation in the quality of the grasses with soils and stage of growth. He stated Mitchell grass (*Astrebla* spp.) of good quality contained over three times as much crude protein (8.0%) as the same grass of poor quality (2.6%) and said sheep supplied with the latter must starve unless their diet was supplemented. With the increase in the use of mineral licks it was deemed necessary to analyse these and several tests were made to determine hydrocyanic acid in Sudan grass. Analyses were also made of soils being used for pasture improvement at Runcorn, Maleny,

Cooroy and Atherton. The Runcorn and Cooroy soils were lamentably poor in phosphoric acid—trace to 0.01 per cent at Runcorn and 0.04 per cent at Cooroy. The Maleny soils ranged from 0.26 to 0.29 per cent and Atherton was 0.36 per cent. Superphosphate gave striking responses in all soils. (Brünnich, J. C., *Rep. Dep. Agric. Stk*, 1926–27, pp. 75–91)

E. H. Gurney, Senior Analyst, published a number of rations which would prove useful for dairy farmers in increasing milk production. (*QAJ*, Vol. 29, April 1928, pp. 304–310)

In September 1928, the Minister, Forgan-Smith, arranged for the Agricultural Chemist, Brünnich, and the Instructor in Sheep and Wool, James Carew, to visit the north-western and central Mitchell and Blue grass downs from Charters Towers to Winton and Springsure to advise on sheep nutrition matters. (*QAJ*, Vol. 30, September 1928, p. 309)

Seeds, fertilisers, stock foods and pest destroyers

With the creation of a Seeds, Fertilisers and Stock Foods Investigational Branch separate from the Agricultural Chemist, Frederick Freutel Coleman was appointed officer in charge on 1 January 1923. At the request of the Council of Agriculture he prepared a series of articles on branch operations and standards, which were published in the Departmental annual report for 1922–23 and in the March 1923 *Queensland Agricultural Journal*. A table published in the annual report listed the weed seeds and poisonous plant seeds found in commercial samples of seeds and stock foods during the year. It gave the scientific and common names of 139 species, remarks regarding the importance of the plants and the frequency of their occurrence.

Seed samples sent for analysis were examined and a certificate returned by the officer-in-charge indicating the percentage purity (the percentage by weight of pure seed the sample contained), the germination percentage and foreign ingredients, which later included the percentage of inert matter, hard seeds (viable but had delayed germination), percentage of named weed seeds and percentage of dead or non-germinable seeds.

Tables were also published on the germination capacity and analytical purity of the principal local seeds and those imported through the port of Brisbane; and analyses of stock foods for sale. (Coleman, F. F., *Rep. Dep. Agric. Stk*, 1922–23, pp. 48–66)

Pest destroyers were added to the materials for analysis and standardisation in December 1923; some four hundred dealers were counselled regarding regulations, fees, etc. and 208 samples were registered under the Act in the first year. As experience was gained some alterations to the Act were found necessary. Confusion in the classification of "millets", the presence of poisonous seeds of thornapple (*Datura* spp.) and castor oil (*Ricinus communis*) and the poisonous fungi—bunt (*Tilletia tritici*) in wheat and ergot (*Claviceps purpurea*) in canary seed—and the presence of dodder seed in lucerne needed special regulations. (Coleman, F. F., *Rep. Dep. Agric. Stk*, 1923–24, pp. 44–49)

In January 1925 new regulations were issued under the Fertilisers Acts. Every dealer had to obtain a licence at a fee of $\pounds 1$ 1s 0d. New fees were prescribed for dealers and others for analyses. Each dealer had to inform the Department on a certificate of the name of the fertiliser and the percentage of nitrogen, phosphorus and potash and their form and, in the

case of lime, the amount of lime as carbonate etc. Forms were also needed for wholesalers' transactions and specimens of the printed labels to be used for each registered fertiliser. A $\pounds 200$ penalty could be imposed for breaches. (*QAJ*, Vol. 23, 1925, p. 99)

With the 1926 drought the search for suitable licks and stock foods generally kept the Branch extremely busy; during the year ended 30 June 1927, over one thousand persons called at the Branch: 42 per cent in connection with pest destroyers; 36 per cent in connection with stock foods; 17 per cent in connection with fertilisers; and 5 per cent in connection with seeds.

The small percentage enquiring regarding seeds and fertilisers was also a reflection of drought conditions. Over 96 per cent of the callers were merchants or dealers in the above commodities and from the beginning of January to the middle of March, the Inspector under the Pest Destroyers Act was fully occupied in the office and could not do field work. With the increase in Stock Foods merchandising, microscopic work in the laboratory demanded a good deal of time. The Seeds Section was busy identifying Datura and Cuscuta (dodder) seeds in sorghum and lucerne seed respectively, and seeds of market garden crops in relation to storage life. The low germination of freshly harvested Paspalum and Rhodes grass seed and the presence of "hard seed" in lucerne resulted in several enquiries. (Coleman, F. F., *Rep. Dep. Agric. Stk*, 1926–27, pp. 92–129)

In 1923 maize was imported from South Africa for feed purposes and Coleman stored some of the grain to ascertain if it was insect-infested, although there was no external evidence. It was found that some was badly infested and so in 1926 Coleman experimented with storage methods. He found paradichlor at the rate of 0.5 grammes per 1000 cc killed all insects, and when the grain was dried for 3 hours at 50°C and then stored under airtight conditions this also killed all insects; but grain fumigated with carbon bisulphide at 2 lb per 1000 cubic feet and stored under airtight conditions did not give a full kill. As a result the recommended dose was raised to 42 lb of carbon bisulphide per 1000 cubic feet of maize. (QAJ, Vol. 25, May 1926, pp. 442–451)

Crop production and land settlement

Grain grops: Wheat, Maize, Rice, Sorghum, Canary seed

Wheat

An Organising Trust Fund established by J. H. Cecil Roberts, H. M. Hart and M. R. Harrison, members of or associated with the Queensland Farmers' Union, by approaching farmers to contribute one penny per bushel of wheat of the 1920 crop, was found by a Royal Commission to be legal and the moneys legally spent on organising a wheat pool and organising farmers to demand a higher price. The Government responded in 1922 by organising a Wheat Pool for the 1922 harvest. (*Qd Parl. Papers*, 1922, Vol. 1, 1077–1095) (Borchardt, 1979)

The first compulsory pool in the State was established under The Wheat Pool Act of 1920, assented to on 29 November 1920. The State Wheat Board was gazetted early in December

1920; it consisted of five representatives of growers and a chairman, F. J. Morgan, a banker, appointed by the Government. The Board was empowered under the Act to receive, store, handle and market the whole of the crop of the 1920–21 harvest. The Board got a late start and much of the wheat crop, estimated at 4 250 000 bushels, had already been harvested. The Board was able to secure the extension of the Commonwealth guarantee of five shillings per bushel to Queensland, which enabled it to make a first and second advance of 2s 6d per bushel to growers of f.a.q. (fair average quality), and also advances to growers of inferior wheat. The total advances to growers were shown in the Department's annual report for 1920-21 (p. 12).

The State Government's guarantee of eight shillings per bushel encouraged the cultivation of wheat and undoubtedly had the effect of influencing the fixation of the home consumption price, at a Conference of State Premiers with the Prime Minister, at nine shillings per bushel. This assured the farmers of a good return for milling wheat. The Board established a subsidiary pool to handle inferior wheat.

The Queensland Wheat Board, because of its small exportable surplus, remained independent of the Australian Wheat Board but used the machinery of the Australian Wheat Board for the disposal of its surplus. Up to 31 August 1920, the Board had exported 620 400 bushels, realising an average price in London of 9s 2¹/₄d per bushel for f.a.q. wheat. The cost of landing it in London, including freight and all charges was 1s 8¹/₂d per bushel. The Board had limited storage available and wheat dumps were arranged at important centres. Local sales were satisfactory.

The cost of indoor administration of the Board was under one penny per bushel and outdoor administration under three farthings per bushel. Other costs were: general expenses per bushel 0.25d, insurance 0.64d, railage 2.7d, storing and handling 0.82d and shipping 3.43d. Every assistance was given to the Board by the Department of Agriculture and Stock. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1920–21, pp. 11–12)

After the first year's operations a referendum was conducted as to whether the Wheat Pool was to be continued: 87¹/₂ per cent of growers agreed, and so the pool was continued until the 1924–25 season. The Chairman of the Board was appointed by the Government, with five grower representatives elected yearly.

The wheat breeding work of the Roma State Farm was extended into field plots in different wheat growing districts.

The first sale of Queensland-bred wheats, from Roma State Farm and at Hermitage State Farm, were offered through the *Queensland Agricultural Journal* in April 1921; they were "Inglewood", "Patriot", "The Prince", "Gundi" and "Amby" varieties. From Roma State Farm could be purchased direct the varieties "Amby", "Bunge No. 1", "Soutter's Early", "Cedric" and "Inglewood". All varieties were available at eleven shillings per bushel. By 1924 seventeen varieties were available for distribution.

The coordination of the activities of the Department and the Wheat Board was effected during 1921–22. The details were as follows:

The scheme proposed by the Department of Agriculture and Stock for the standardisation of varieties of wheat grown in Queensland, and for the propagation, grading, cleaning, and distribution of seed wheat:

- 1. The Department of Agriculture to co-ordinate its wheat-breeding and wheat-testing work and to link it up with the activities of the Wheat Board.
- 2. The scientific and technical work necessary to give effect to the scheme to be carried out as at present by the Department of Agriculture, and, when seed of new and improved varieties recommended by the Department is available from time to time in sufficient quantities, the approved grower to take it over by purchase (at a price to be mutually agreed upon at the time), and make arrangements for sowing the respective varieties in localities on picked areas, on similar lines to those detailed under Clauses 9 and 10.
- 3. The Board, in sequence, to secure seed from these sources, rail it to its central depot for cleaning, fumigating, grading, and storage, for ultimate despatch to the localities decided upon for the commercial propagation of specified types of wheat.
- 4. For the purposes of the successful working of the scheme, and of the production of standard types of grain, the State to be classified into districts or zones, so that efforts may be directed towards the growing of suitable types and varieties within each, for delivery to and subsequent distribution by the Board. In this way it would be possible to draw upon certain classes of grain for milling or export, as may be required.
- 5. That a classification be made as per attached Schedule, of varieties now in cultivation, with a view to the discarding of those which are undesirable or unsuitable for Queensland conditions, or which are of soft, starchy, poor milling, or indifferent keeping qualities.
- 6. That the Board take the necessary steps to further this latter object, by ensuring the delivery by the grower of all wheat to the Board which comes under this latter category. In this way, the usual reservations or arrangements for next season's seed by the grower will be brought into line with the policy of standardisation, as the approved wheats can then be supplied in lieu thereof.
- 7. That for the purpose of ensuring the preservation of pure supplies of seed of varieties finally approved of under the scheme, the Department to continue the work of seed selection by maintaining small nursery plots at its wheat-breeding or on other farms, with the object also of the improvement by selection, and the maintenance of certain strains within the respective varieties, which could be drawn upon, should the identity or purity to type of the original varieties require to be renewed at any time.
- 8. That the Wheat Board appoint a man specially fitted to take charge of its seed-wheat business.
- 9. That Seed Propagation Farms be chosen in different districts by a member of the Wheat Board and a Field Officer of the Department, on which supplies of pure seed of one or more varieties are to be grown on clean ground from year to year, by arrangement with the owner of the farm, who would be paid a premium by the Wheat Board of, say, 6d per bushel for approved seed drawn from crops rogued before the grain is harvested.
- 10. That provision be made under the scheme for the growing each year of wheats in No. 1 and No. 2 groups, representing standard and approved varieties recommended by the Department of Agriculture and Stock, and agreed upon, in conference, by the Wheat Board.
- 11. That up-to-date seed cleaning and grading machinery be installed by the Board at one or more centres as may be determined, so that all grain used for seed purposes may be pure to type and free from impurities.
- 12. That the Board endeavour to eliminate Bunt (or Smut) from all Queensland-grown wheat.
- 13. That, in order to place the Queensland wheat-grower in the best possible position, every encouragement be given by the Board to bring about the elimination of undesirable and unsuitable varieties, and the substitution of approved kinds by sale or exchange.

14. That seedsmen dealing in seed wheat be furnished by the Department of Agriculture and Stock with an outline of the scheme, in order to secure their active co-operation in effecting its aims and objects by placing varieties purchased from the Board, or other sources, with growers in districts or zones to which such varieties have been allotted.

The demonstration of fallowing techniques for the conservation of moisture practised at the Roma State Farm and applied generally to Queensland's wheat country was reflected in the average yield of 20.91 bushels per acre for the 1920–21 crop, the highest yield in the Commonwealth to that date in any year. At the Roma State Farm a little earlier a crop of "Warren" wheat yielded 24 bushels per acre in a growing period with rainfall of only 1.76 inches! Approximately a million bushels of wheat were harvested in 1920 from varieties raised and brought into cultivation by the Department of Agriculture and Stock. (Reid, J. F. F., *QAJ*, Vol. 17, January 1922, p. 12, footnote)

A hail insurance scheme was arranged between the Wheat Board and insurance companies to cover the whole crop in Queensland against hail damage from the wheat coming into ear until it was harvested for the 1923–24 crop, amounting to a premium of 1.617d per bushel. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1923–24, p. 11)

Before the 1926 wheat planting season arrangements were made between the Department and the Wheat Board for individual growers to grow pure seed for delivery to the Board under a premium system and for its cleaning and grading at suitable district centres from whence it would be distributed as required. Between thirty and forty growers were supplied with pure Departmental seed. The Board also helped the Department to eliminate smut (bunt) by having all seed pickled with copper carbonate before it was sown. (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1925–26, p. 16)

Reviewing the great contribution R. E. Soutter had made at the Roma State Farm in breeding wheats suitable for Queensland districts, Quodling described thirteen new crossbred wheats available for distribution at nine shillings per bushel, freight paid from Brisbane to any railway station in the recognised wheat belt. Summarising Soutter's aims in breeding a suitable variety, he said a variety, to be popular with growers, must have the capacity to resist rust and bunt (smut); have the ability to withstand dry spells; be of good milling quality, preferably with a hard-textured, medium-sized, weevil-resistant grain; come from upright, strong-walled straw not inclined to lodge; have a minimum amount of flag; be preferably of a firm, somewhat erect nature; have a good strong root system; have the capacity to mature quickly, with a minimum period of time between flowering and ripening; have evenness of ripening, have level-headedness of crop; have a good, well-developed ear in which the grain does not readily discolour or bleach; and have the capacity to hold grain without shedding it in the field. The variety must be easy to harvest, not too tough to thresh, and prolific. (Quodling, H. C., *QAJ*, No. 23, April 1925, p. 324)

The varieties "Cedric", "Noro", "Roma Red", "Watchman", "Warroo" and "Three Seas" bred by Soutter were in general cultivation. One hundred new crossbreds were tried at Allora in 1925 and some looked very promising.

C. S. Clydesdale, Assistant Instructor in Agriculture, concentrated more on wheat improvement during 1926–27. Wheat propagation plots were laid out at Southbrook, Bony Mountain, Inglewood and Allora, and pure seed production for the Wheat Board was undertaken at Oakey (heavy soils) and Acland (scrub soils). Variety trials were conducted

at Allora, Bony Mountain, Jandowae and Inglewood. (Clydesdale, C. S., *Rep. Dep. Agric. Stk*, 1926–27, pp. 35–36)

Wheat crop competitions. Wheat crop competitions, promoted by the combined Agricultural Societies of Queensland with the assistance of the Wheat Board, were instituted for the 1927 wheat crop. Judging was based on trueness to type and purity, freedom from disease, evenness of crop, condition and cleanliness, and apparent yield. The aim of the competition was to raise the standard of wheat growing, to encourage growers to conserve moisture for the crop, to bring about the use of pure, clean, graded seed of prolific, rust-resistant or rust-escaping varieties, and to prove the efficiency of seed treatment to overcome disease, and to show the losses occurring from wild oats, foreign seeds and weeds. Departmental officers assisted with the judging. (QAJ, No. 29, January 1928, pp. 69–74)

After a visit to the Roma State Farm with J. A. J. Hunter, M.H.R., the Minister for Home and Territories, C. W. Marr, D.S.O., M.C., paid a great tribute to the work of Soutter, whom he described as the Luther Burbank of Australia. Soutter's work had added thousands of pounds to the agricultural wealth of Queensland, Hunter said, and the Federal Government appreciated the fact. (*QAJ*, 29 March 1928, p. 248)

A Proclamation dated 28 April 1928 extended the Wheat Pool Acts so that they would apply to all wheat harvested during the seasons 1928–29 to 1932–33, only half of one per cent of growers requesting a referendum. (*QAJ*, No. 30, August 1928, p. 170) The Wheat Pool Act was amended during the 1928 season to provide for the vesting in the Wheat Board of "the maltings". The Board was also empowered to sell or dispose of land and improvements in connection with maltings. Power was given to the Board to purchase and dispose of land. The Wheat Board had already erected a number of grain sheds and the Amending Act of 1928 legalised these. Power was also given to the Board to borrow money from the Government, and to create any special funds.

An economic survey of wheat growing was made on selected farms in several wheat growing areas during 1928–29, H. S. Hunter surveying the Maranoa, and other officers surveying the Darling Downs.

Maize

The 1919 drought caused maize prices to rise and with the break of the season in 1920 growers planted a large area. The big resultant crop caused prices to fall to a low 3s 6d per bushel, seriously affecting the finances of the soldier settlers on the Atherton Tableland who had only a limited market locally and had to sell cheaply to southern buyers or store till prices rose. The northern maize was often harvested at high moisture content under the high rainfall conditions and would not store very well. Quodling advised the growers to diversify into mixed farming including maize, dairying and pigs. Meanwhile, Quodling interested them in methods of drying, treatment and storage. The Department obtained two grain moisture testing machines and located one at the Kairi State Farm with Field Assistant F. J. S. Wise (later to become Administrator of the Northern Territory) and one in the Pure Seeds Branch at Head Office. F. F. Coleman, in charge of the Seeds Branch, recommended a maximum of 12 per cent moisture in grain for export and 14 per cent for grain for local needs. The Under-Secretary stated the time had arrived to establish a large co-operative maize marketing

scheme with up-to-date facilities for drying, treatment and storage. The Wheat and General Agriculture Committee of the Council of Agriculture at its meeting in Toowoomba early in 1922 decided that orderly marketing for maize was possible and asked the Department of Agriculture and Stock to collect full statistical information regarding maize production so that the Committee could formulate a scheme to submit to the Council of Agriculture.

A move to establish a maize pool for the whole State failed but Atherton growers agreed and the Atherton Tableland Maize Pool was constituted to apply to all maize produced from seed sown after 1 July 1923 in the Petty Sessions districts of Atherton, Herberton and Chillagoe. It was constituted for ten years initially. The Board handling the Pool erected premises for drying and storing maize at Atherton and storage for 400 000 bushels was available in 1924, aided by a loan of £7000 from the Government. In that year maize was exported overseas for the first time for several years. These shipments saved the industry.

Meanwhile, C. J. McKeon, Assistant Instructor in Agriculture in charge of maize breeding and selection, had developed some high-yielding varieties for various districts of Queensland. During 1921–22 fresh importations of maize varieties were made from America. McKeon established thirty plots on farms at Tingoora, Murgon, Manyung, Goomeri, Imbil, Kilcoy, Yandina, Boonah, Beaudesert and Marburg. "Funk's Ninety Day" proved the best of the imported varieties. Selected grain from field propagation plots was offered for sale to farmers at a flat rate of 12s 6d per bushel.

In October 1925, N. A. R. Pollock, the Northern Instructor in Agriculture, drew attention to the declining yield and quality of Tableland maize. Fertiliser experiments showed that yields could be increased by additions of phosphorus and nitrogen but not in economic quantities. Pollock suggested the type of maize grown was the main barrier to increased yield and needed scientific investigation. (*QAJ*, Vol. 24, October 1925, pp. 352–357) McKeon had work in progress to develop a maize suitable for the wet Atherton Tableland, where the local variety was too soft and susceptible to mould, especially ear rot caused by *Diplodia zeae*, which Henry Tryon had reported as early as 1918 from Eudlo and Samford. Cobs sent from Atherton were examined by Tryon and he produced a pamphlet (based on *QAJ*, Vol. 25, March 1926, pp. 237–238) illustrated by I. W. Helmsing, recommending crop rotation and farm hygiene as a means of reducing the disease.

McKeon produced a harder "flint" type maize and made arrangements with S. Allen of "Burnside", Tolga, a competent farmer, to crop an area of 60 acres for the Department to this variety, isolated from other maize to prevent cross-pollination. The variety was named "Durum". The crop averaged 50 bushels 42 lb per acre on a 14 per cent moisture basis. Local maize was yielding in the same season an average of about 40 bushels per acre. The "Durum" maize was particularly free from Diplodia ear rot. (Pollock, N. A. R., *Rep. Dep. Agric. Stk*, 1926–27, p. 30) There was some red tinted and red coloured grain creeping into the "Durum" type by 1928, making it difficult to sell, and Quodling advised seedsmen and farmers to seek whole-coloured yellow seed. (*QAJ*, Vol. 30, July 1928, p. 2)

The maize harvest was gradually mechanised by the development during 1920–21 of a mechanical harvester by George Free, a farmer at Nobby, and one manufactured by the Eclipse Windmill Company in Toowoomba in 1925. Mechanisation had also extended to farm power, and the increase in tractor use led to the decline in draughthorses, traditional consumers of maize grain, so that overseas exports eased the situation. Another important

development was the use of maize grain for drought feeding of sheep in the north-western and central Queensland districts, begun during the 1925–26 drought. This demand was to continue, with arrangements made with graziers by the Maize Board to store grain on their behalf until it was actually needed for feeding, or to sell it if it was not needed before the next maize harvest.

A tribute was paid to McKeon's breeding and selection work and to the Department for its maize growing policy in the *Australasian*.

Maize-Growing in Queensland—Southern Appreciation of Departmental Activities

Commenting interestingly and informatively on the expansion of maizegrowing in Queensland, the "Australasian" (Melbourne) had this to say in a recent issue:-

The Department of Agriculture and Stock (Queensland) is doing everything possible to stimulate maize-growing, and farmers are appreciative of the encouragement they receive. Maize-breeding, which is one of its principal activities, is designed—(1) to improve the standard and type of Queensland-grown maize; (2) to increase the average yield and production on individual farms, and similarly of the State; (3) to produce varieties and types to suit the climatic conditions and soils common to different districts. The breeding and propagation of new strains of maize are carried on by the maize specialist of the department (Mr. C. J. McKeon), and strains of the standard varieties are grown under departmental supervision, and specially selected pure seed is distributed to farmers on application. Last season a flat rate of 11s. a bushel, including railage to the nearest railway station, was charged to enable applicants living at long distances to benefit. The use of good seed means bigger and better crops, and helps to reduce the cost of production. Extraordinarily high yields have been obtained from seed of high productivity, notably from T. O. Reid's Yellow Dent and Improved Yellow Dent, of which maximum yields of 116 and 117 bushels an acre respectively (five times the average yield of the State) have been secured under field conditions...The Department of Agriculture is performing work of the greatest significance, and its activities are an important factor, not only in expanding maize-growing, but also in placing the industry and the subsidiary industries on a more satisfactory footing, and assuring the prosperity of those engaged in them.

...In order to assist farmers in obtaining pure, pedigree seed, the Queensland Department of Agriculture and Stock, by arrangement with certain growers in the principal maize-producing districts, supplies them with selected seed, which is specially grown for the department under the supervision of its officers. These growers are located in isolated areas, where no other variety excepting the one in which they are specialising is grown near the crop, thus eliminating the risk of cross-fertilisation. The farms are periodically inspected, and the inspectors select seed for the following season's planting in the field, and that for sale from the crib. The growers are paid 1s. a bushel above the ruling top market rate on rails at their nearest railway station, and the fact that a number have been growing for the department for upwards of ten years proves that they are satisfied with the arrangement. Before the seed is distributed to farmers it is graded by the department, and the demand is so great that it has been impossible to supply all orders. Early in August stocks of early varieties were exhausted, although planting would not be general for another month. Last year there was sufficient seed to plant 2,000 acres, in addition to the departmental plots, of which there are approximately 200. New varieties are constantly being tried out in different districts to determine their suitability or otherwise for the conditions. This branch of the departmental activities is of the greatest benefit to farmers, as it enables them to secure the best seed at a reasonable price, and to the State by the increased yields of grain and fodder resulting from its use." (QAJ, March 1928, pp. 178–179)

During 1928–29 some 1400 acres of "Durum" maize were sown in the forest area of the Tableland and the crop was generally free from ear rot and yielded well. Agricultural Instructor Hassell selected seed for the 1929-30 planting from "low-bearing plants with well-covered ears which turned down during ripening". This latter habit was now fixed and growers were particularly impressed with the fact that fully 90 per cent of the ears in their crops turned down when ripening. (*Rep. Dep. Agric. Stk*, 1928–29, p. 26)

Rice

Upland rice had been shown to grow well at Tolga on the Atherton Tableland and in 1920 Quodling imported seed of several varieties from Japan. These were planted in small experimental plots in north Queensland by N. A. R. Pollock, Northern Instructor in Agriculture, during 1924–25. Some varieties showed promise. (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1924–25, p. 17) Trials during 1925–26 at Carruchan near Cardwell and at Waterson near Proserpine with Japanese varieties yielded 38 to 57 bushels per acre, the highest yielding variety being "Sencho". Pollock suggested growing lowland ("paddy") varieties under irrigation.

Pollock was somewhat ahead of his time in most of his thinking and during 1926–27 he tried controlling weeds in upland rice by spraying rather than hand-weeding. He tried sulphate of ammonia, washing soda, bluestone, caustic soda and sodium arsenite in measured areas. Intermittent showers diluted the spray but there was some control of star burr (*Acanthospermum hispidum*), pig weed and other weeds without affecting the rice. The sprays failed against *Panicum* species and crowsfoot grass (*Eleusine indica*), two of the most important weeds. (Pollock, N. A. R., *Rep. Dep. Agric. Stk*, 1926–27, p. 32)

Sorghum

Some thirty varieties of sorghum obtained from America and the Sudan were tested during 1920–21 by N. A. R. Pollock and made excellent growth. One variety of sweet sorghum, "Honey", obtained from the Bureau of Agriculture, Washington, yielded 25 tons 5 cwt 2 qr 12 lb of green fodder on O.T.M. Hansen's farm at Carbeen from the first cutting. It was decided to increase the seed supply. This variety later yielded 34 tons 9 cwt 1 qr 20 lb per acre on C. Daybell's farm at Proserpine. (Quodling, H. C., *QAJ*, Vol. 23, January 1925, p. 32) This variety, "Honey", was to find an enduring place in Queensland for green fodder and silage purposes.

The Australian National Power Alcohol Distillery staff imported twenty-five varieties of tall grain and sweet sorghums from Nigeria to test as raw material for alcohol production. They were tested by G. B. Brooks, the Agricultural Instructor for Central Queensland, at Archer and Pink Lily near Rockhampton, and by M. Hodge at the Callide Cotton Research Farm, Biloela. They grew to great heights—up to 18 feet 6 inches with green weights up to 62.84 tonnes per acre over the 1926–27 season. (Brooks, G. B., *Rep. Dep. Agric. Stk*, 1927–28, p. 33)

Canary seed

During World War I there was a strong demand for bird seed and growers did very well out of the crop. Prices dropped after the war and the difficulty of selling the seed caused growers to form the Voluntary Canary Seed Pool; to be administered by the Wheat Board. The estimated crop was 20 000 tons and the Board decided 800 tons would be sufficient to clear the financial guarantee and pay all the expenses of the Pool. Two hundred and ninety-six growers joined the Pool; not a few remaining outside sold their seed at a lower price, but the Pool prices were satisfactory. The general tariff on imported seed at the time was 1s 6d per cental, and 5s per cental with a preferential tariff of 4s per cental. The
imported seed came mainly from the Argentine Republic, Japan and Turkey. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1920–21, p. 13)

A preliminary executive consisting of D. R. Edwards (Nobby), Fitzgerald (Felton), Denning (Pittsworth), Hogg (Greenmount) and Cornford (Broxburn) handled the initial steps for the Pool.

An Order-in-Council constituting the Canary Seed Board for the seasons 1925–26 and 1926-27 received Executive Approval and a Board was elected to hold office from 8 January 1926 to 7 January 1927, consisting of T. P. Grimes, Clifton, Mrs Mier, Allora, and R. Walsh, Toowoomba, as Minister's Representative. (*QAJ*, Vol. 25, February 1926, p. 179)

The total Commonwealth requirement for canary seed was approximately 1500 tons in 1928. From data collected by the Department, even with a duty of £8 a ton on imported seed, the net returns to the grower of about £21 a ton revealed only a small margin of profit. (*Rep. Dep. Agric. Stk*, 1928–29, p. 4)

A new improved variety, "Giant Morocco", was planted on J. McLellan Jr's farm at Nobby by C. S. Clydesdale in 1929 as a seed increase plot.

Root crops

English potatoes

The English potato crop, widely grown for commercial and domestic use since Separation, was dependent on southern States for its supply of "seed" potatoes and occasional importations of new varieties. N. A. R. Pollock initiated a trial in 1924 in north Queensland, growing "seed" potatoes on the Atherton Tableland to supply the needs of coastal growers to obviate the heavy expense of purchasing southern seed. (Quodling, H.C., *Rep. Dep. Agric. Stk*, 1924–25, p. 16) This practice did not prove a success and Pollock admitted that the adage "plant potatoes grown in a colder climate rather than in a warmer" appeared to be exemplified.

Trials with eight new varieties of potatoes were carried out on A. E. Ernst's farm at Kandanga by C. J. McKeon, Instructor in Agriculture, during the latter half of 1924. "Scottish Triumph" and "Manhattan" varieties were the highest yielders, the former producing 5 tons 1 q 15 lb of tubers. (*QAJ*, Vol. 23, February 1925, p. 149)

Pollock encouraged farmers to grow more potatoes on the Atherton Tableland to supply northern requirements, conducting both variety and fertiliser trials. During 1926–27 he planted sixty-five different varieties on each of three farms located at Major's Creek, Woodstock, Evelyn Tableland and Tolga. Cyclonic conditions upset the results, but the white-skinned varieties "Carmen", "Up-to-date" and "Scottish Triumph" performed well. Pollock reported: "At the Herberton and Atherton shows, samples of forty-five varieties grown by S. E. Thomas of Evelyn were exhibited, which excited a great deal of interest as well as appreciation of departmental enterprise." They were later displayed at Townsville. Experiments were made in cold storage of seed potatoes for north Queensland and small quantities were sent to Brisbane in October, stored at 34°F until March, and railed back to

Townsville. They arrived in perfect condition for planting in April. (Pollock, N. A. R., *Rep. Dep. Agric. Stk*, 1926–27, pp. 31–32)

Sweet potatoes

G. B. Brooks, Instructor in Agriculture in the Central District, initiated experimental work at Alton Downs, near Rockhampton, on the collection, selection and classification of sweet potatoes with a view to recommendation of varieties suitable for different soils and districts. He had 45 varieties under test and the Agricultural Chemist, J. C. Brünnich, collaborated by undertaking the chemical analyses of tubers of each variety. He found that sweet potatoes, like English potatoes, required large amounts of potash. All the varieties were harvested at the one time and as their growing period varied there were marked differences in composition. The starch content varied from 10.1 per cent to 24.27 per cent. Brünnich believed the sweet potato had a future in the manufacture of alcohol. (*Rep. Dep. Agric. Stk*, 1920–21, pp. 4, 44, 57)

Brooks' completed classification of varieties was published in full, together with excellent colour plates of leaves and tubers in the August 1923 issue of the *Queensland Agricultural Journal* (pp. 124–148).

During 1925–26 sweet potatoes were considered as a possible source of starch for power alcohol production at Plane Creek Sugar Mill, Sarina. Comparative trials were made with cassava, arrowroot and sweet potatoes for this purpose by G. B. Brooks. However, sweet potatoes had to be eliminated because of the damage to the crop by bandicoots and sweet sorghum was substituted, but parrots promptly consumed the grain soon after the milk stage was reached! The demand for sweet potato varieties from southern States, Darwin, Java, South Africa etc. was heavy and the orders were sent to Messrs Pritchard and Warrup at Archer, who had for several seasons cooperated with the Department in carrying out variety trials. (Brooks, G. B., *Rep. Dep. Agric. Stk*, 1926–27, p. 28)

Arrowroot

The price for arrowroot rose during the war and this resulted in a new factory being built at Redland Bay. However, prices fell immediately after the war and interest in the crop slackened.

During 1922–23 the Department co-operated with growers in endeavouring to break into the London market. A sample from growers was packed by the Department in containers suitable for the trade and sent to London, but it met the same fate as previously. Starch from *Maranta arundinacea* (Bermuda or West Indian arrowroot) is the only official arrowroot in the British trade and that from *Canna edulis* (Queensland arrowroot or Tous-les-Mois arrowroot) is regarded only as a substitute, and because of the limited United Kingdom demand—little more than 500 tons per annum—it was not worth the cost of promotion of Queensland arrowroot as equal to its competitor. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1922–23, p. 5)

An Arrowroot Pool was the first pool established under The Primary Products Pools Act of 1922. It was constituted in December 1923, and applied to the whole State until April 1925. It did not handle arrowroot—its main duty was price-fixing and seeing that the

price it fixed was not undercut by any particular manufacturer. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1923–24, p. 10)

During 1925–26 arrowroot was considered, on the recommendation of N. A. R. Pollock, as a possible source of starch for power alcohol production and comparative plots were established on two farms, one at Koumala and one at Sarina, by G. B. Brooks. However, molasses was chosen as the raw material and interest in arrowroot for this purpose disappeared.

Cassava

Although cassava had been introduced to Queensland in 1864 its cultivation was limited mainly to pig feed until the Minister for Agriculture, the Hon. W. Forgan-Smith, in 1925 arranged for the introduction of a large consignment of cuttings from Java for planting an area of about 300 acres at Mackay. The roots were to be made available to the Plane Creek mill for the production of power alcohol. (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1924–25, p. 17)

From the middle of April to the end of June 1925, G. B. Brooks, Central Instructor in Agriculture, visited Java to study cassava growing. N. A. R. Pollock, the Northern Instructor in Agriculture, considered that sweet potatoes or arrowroot might be better than cassava for power alcohol production.

Some 750 000 feet of cassava sticks arrived in Queensland from July 1925 to January 1926, from the Government Plant Breeding Station, Buitengong, Java. Brooks arranged for the Plane Creek Sugar Mill Company to distribute the cuttings amongst its cane suppliers and over 100 acres were planted in the area extending from Flaggy Rock to Baker's Creek. By April some varieties had reached 12 feet in height. The crop maintained steady growth till June, when frosts affected the top of the tender branches of one or two varieties. In Java the variation of temperature is only a matter of 2 or 3 degrees. Plots were established on two other farms—Salter Estate at Koumala and P. C. Brooks Estate at Sarina—to compare cassava with arrowroot and sweet potatoes for power alcohol production. (Brooks, G. B., *Rep. Dep. Agric. Stk*, 1925–26, p. 23) Plots were also established at the Mackay and Bundaberg Sugar Experiment Stations. With the increasing interest in cassava for power alcohol production, Pollock published an illustrated article on its culture in the *Journal* for April 1925.

The weight of tubers from a single plant harvested at Bundaberg and Mackay of each of seven varieties varied from 7 lb to 27 lb, with an average of 17.25 lb, which was considered satisfactory.

The Sarina and Koumala plots yielded an average of 21.8 and 20.9 tons per acre respectively from eleven varieties. A trial with native varieties yielded 14.2 and 17.8 tons.

A British company, in conjunction with the Plane Creek Sugar Mill, formed a company for the distillation of power alcohol and a factory was built in 1926, to commence operations in 1927 with molasses. One ton of molasses was estimated to produce 60 gallons of alcohol. The Commonwealth granted a rebate in excise in connection with power alcohol produced from cassava. (*QAJ*, Vol. 26, July 1926, pp. 34-35) With the selection of

molasses as the raw material for power alcohol, interest in cassava waned. Planting material was retained at the Bundaberg Sugar Experiment Station and on farms at Sarina and Koumala. (*Rep. Dep. Agric. Stk*, 1928–29, p. 35)

Ginger

A. E. Gibson, Senior Instructor in Agriculture, drew attention to the boom in ginger growing on Buderim Mountain in late 1928. He said: "It must be remembered that the consumption of ginger within the Commonwealth is comparatively small, but by means of an advertising campaign, it could possibly be increased by double the quantity that is imported and consumed at the present time." For the period ending June 30, 1928, a total of 672 tons of ginger was imported to the Commonwealth from overseas, chiefly from China. Gibson said, "Unless the local grower is prepared to accept a price which is in accord with that at which the article can be imported, there appears to be very little hope of replacing the imported article by that produced locally." A. J. Burnett had been growing ginger on the western slopes of Buderim Mountain, at Glenmount, for twenty years. Gibson's final shot was: "The need for caution in the future to prevent over-production—as Queensland cannot hope to compete in an export trade—is imperative." (*QAJ*, Vol. 30, December 1928, p. 590)

The Department, however, was inundated with enquiries about ginger cultivation as a result of a press report so Gibson visited the Buderim area and collected two small consignments of ginger and submitted them to the State Cannery for trial. Some good quality-ginger was produced but generally the fibre content was too high compared with the Chinese imported material. It was decided to carry out manurial trials to see if the fibre content could be reduced. (*Rep. Dep. Agric. Stk*, 1928–29, p. 28)

Fibre crops

Cotton

In 1914 the Australian cottongrower received 1.65d per lb for cotton on the farm, in 1915 he obtained 2.54d, in 1917 3.58d, in 1918 4d and in 1920 5d. In 1920 the harvest was 923 000 lb, or 305 672 lb of ginned cotton in Queensland. Because imports of cotton and cotton seed were allowed in duty free, imports in 1919–20 totalled 611 394 lb of unmanufactured cotton valued at £44 476, so it was impossible to sell the ginned local cotton at a fair price in competition.

The Executive Committee of the Advisory Council of Science and Industry appointed a special committee comprising Messrs J. B. Henderson, E. G. E. Scriven (Under-Secretary), N. Bell, Daniel Jones (Instructor in Cotton Culture) and Professor B. D. Steele, Professor of Chemistry, Queensland University, to consider the possibility of re-establishing the cotton industry. This "Cotton-growing Committee" considered that the main causes of past failures were:

- 1. the cost of transport to the world's markets during periods when prices were low;
- 2. lack of a local market which would absorb the crops during such periods;

- 3. competition with other crops believed at the time to be more profitable, accentuated by the smallness of the agricultural population of Queensland;
- 4. the cultivation of unsuitable varieties of cotton.

Local markets for cotton could possibly be in the manufacture of nitro-cotton for explosives, the manufacture of mixed cotton and woollen goods or the manufacture of cotton goods, and the production of cotton seed oil and meal from the seed.

To encourage the development of the industry, the Committee recommended:

- 1. propagation of all imported seed in quarantine before distribution to eliminate pests, with limited ports of entry and all fitted with adequate fumigation chambers.
- 2. determination of the most suitable varieties to satisfy Australian consumers, to suit the varying climatic and soil conditions, and capable of mechanical picking when a machine was available.
- 3. encouragement of farmers to grow small acreage.

To bring about those objectives it was suggested that:

- i. propaganda be stepped up by the issue of suitable bulletins;
- ii. the State Department of Agriculture continue to gin and market the cotton on the owner's account;
- iii. a guarantee be made by the Commonwealth Government for five years of an amount certified to by the State Department of Agriculture that would enable the grower to receive 4d per lb for seed cotton on the farm. This was agreed to by the Commonwealth for the 1920 crop then varying with the price received for ginned cotton.
- 4. the industry be stimulated in other States to allow for sufficient production for manufacturing units;
- 5. experiments be continued to produce a cheap and efficient mechanical cotton picker.

An arrangement was made through the Agent-General with the British Cotton Growers Association, whereby that Association undertook to market Queensland-grown cotton, clean and of good quality, for five years from January 1920. It was shipped to Liverpool. (The boll weevil had devastated American crops.)

In May 1920, V. A. Wawn, the manufacturer of "Wawn's Wonder Wool" in Sydney, visited Queensland to encourage growers to take up cotton growing in earnest. He had purchased most of the 1919 Queensland crop and was looking for more. He was using 25 tons of cotton each year to make cottonwool and wished to step this up to 50 tons. (*QAJ*, Vol. 13, June 1920, p. 25)

In 1920 the Minister for Agriculture, Gillies, recommended to the Government a guarantee of 5½ d per lb for all cotton of good quality grown prior to June 1922 and delivered at the nearest railway station or port consigned to the Department. On receipt of this cotton the

supplier would receive an advance of 3d per lb, with a guarantee of a further 2½d per lb. The cotton was to be ginned, linted, baled and sold by the Department on account of the owner, the charges for this service being small. If the price of lint reached higher levels an increase in price would be granted. Seed could be obtained free from the Department. There was a demand for cotton throughout the world and Australia alone could absorb all the cotton lint that Queensland could grow for years. (*QAJ*, Vol. 13, July 1920, p. 11) Later Gillies stated that the guarantee should continue until the cotton industry was placed on a sound financial footing and until the farmers were able to gin and market their own crops individually and cooperatively in a sound and satisfactory way. (Gillies, W. N., *QPD*, 11 October 1923)

During 1920–21 an enquiry was made by Messrs Crawford Vaughan (ex-Premier of South Australia), Johnston and Armstrong on behalf of the British Cotton Growing Association into the cotton growing potential of the coastal and near-coastal lands of Queensland with special interest in the central district. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1920–21, pp.14–15) Daniel Jones, the cotton expert, accompanied them. Vaughan later made a second visit and concluded that Queensland held the best prospects for extension of the industry. (Boyd, A. J., *QAJ*, Vol. 17, January 1922, pp. 32–34)

The 1920–21 cotton crop was placed in the long staple Upland class, with a staple length of 11/8 inches, and sold well through the British Cotton Growing Association.

There was tremendous interest during 1921–22 in the Government's guaranteed price and the Department established seed propagation areas (in temporary quarantine) at Capella, Charters Towers and Cooktown. An outbreak of bacterial leaf disease on one farm was quickly quelled by the destruction of the crop on orders from the Chief Quarantine Officer.

In July 1921 the Department held a surplus of cotton seed and offered it for sale for feed purposes at £3 10s 0d per ton, bagged, by rail from Brisbane, advising that it should be crushed before use. Analysis showed it to contain 42 per cent protein. (*QAJ*, Vol. 16, July 1921, p. 10)

The Australian Cotton Growing Association (Queensland) opened modern ginning plants, at Rockhampton (Glenmore) on 18 March 1922 and in Brisbane (Whinstanes) on 1 April 1922, to treat the increasing production following the Government's guarantee, now extended to 31 July 1923. H. C. Quodling, Director of Agriculture, urged farmers, especially those on newly burnt scrub lands, to undertake cotton growing in association with dairying. Mechanical planters were not then available to plant seed with the lint (fuzz) still attached and he advised growers to roll the seed in puddled clay or flour paste or burn the fuzz off with a flame before planting. (*QAJ*, Vol. 17, June 1922, p. 280)

Daniel Jones, a cotton grower in West Moreton and later Instructor in Cotton Culture in the Department, invented a cotton picker during the American Civil War but it was not a success. In 1917 the "Stukenborg" cotton picker was marketed by the Cotton-Picker Company of America—it brushed the cotton towards the centre where the lint was combed from the brushes. (*QAJ*, Vol. 18, August 1922, pp. 99–100)

To make certain that the boll weevil was excluded from Queensland, the Queensland Government discussed the matter with the Commonwealth. The matter was also discussed

with the Tariff Commission by Messrs Crawford Vaughan, Daniel Jones and E. G. E. Scriven. Scriven (the Under-Secretary) also saw the Commonwealth Director-General of Health to ensure that the carriage of seed through the post be prohibited and that Brisbane be made the only port of entry. This was agreed to and customs officers experienced in cotton pests and diseases were located in Brisbane. (*QAJ*, Vol. 18, September 1922, p. 248)

On 5 April 1922 the Premier, Theodore, cabled the Director of the Empire Cotton Growing Association, Sir James Currie, through the Agent-General, asking him to secure a scientist and cotton culture expert for service in Queensland. On his recommendation, Colonel Godfrey Evans was appointed and became Director of Cotton Culture in Queensland on his arrival on 8 March 1923. During the previous three years he had been Director of Agriculture, Bengal. He had worked in the Central Province, the largest cotton growing area in India, for twelve years. During the 1914–18 war he was Director of Agriculture, Mesopotamia, while that country was under occupation by the British. He had full control of agricultural matters, having three to four thousand men under him. He was in charge of the original work conducted on the growth of long-staple cotton in Iraq and so had experience in both rain-grown and irrigated cotton production.

Evans was at one time Principal of the Agricultural College at Nagpur, India. He was created a Companion of the Indian Empire in June 1919. He possessed a Cambridge University Master's degree in Science and the Diploma in Agriculture; and he was the author of *A History of Experimental Cotton Cultivation on the Plains of Bengal.* (Gillies, W. N., *QPD*, 11 October 1923)

Evans was accompanied by a staff of assistants also selected by the Corporation. For the first two years their salaries would be paid by the Empire Cotton Growing Association, which had received a subsidy from the British Government of £1 000 000 to encourage the production of cotton within the Empire. After two years the Queensland Government would make direct arrangements with Colonel Evans. (*QAJ*, Vol. 18, December 1922, p. 17) Meanwhile, Walton Garrett Wells, an American, was appointed Cotton Expert on 10 November 1922.

In November 1922 Gillies announced that the Government guarantee of 52 d per lb only applied to the first harvest of cotton and not to ratoon cotton. That would be treated only after all the plant crop was ginned, would not be exported, would be accepted only at the grower's risk at a guarantee of 3d per lb for good clean cotton up to the 1923 harvest only, and branded "R" on the bales. (*QAJ*, Vol. 18, November 1922, p. 357) There was anger amongst the Rockhampton growers because of this decision.

Following the 1922 drought Quodling made a plea for a paddock of cotton to be grown by every farmer within economic distance of a ginnery, not only for lint, but also as a drought-resistant crop for grazing.

Demonstration plots that included cotton were established by Departmental officers in the newly opened Burnett and Callide lands so incoming settlers could assess the potential of these crops in these areas.

Lawrence Lionel Gudge, at the age of 28, was appointed Cotton Classer on 21 September 1923 to instruct in classing and grazing. By the time the 1923–24 crop was marketed, he

had trained seven assistants, mostly men who had experience in wool classing. For the first seven years of his career he was with Messrs J. J. Williams and Company, Cotton Merchants of Liverpool. He then spent a year with Chambers, Holder and Company of Liverpool in charge of their sales room. From here he joined O'Hea Bros, a Liverpool firm with branches in England and America and went to Texas for this company as a classer in 1921. He joined the Lower Rio Grande Farmers Society as cotton classer and buyer, becoming a cotton buyer on his own account in the Rio Grande Valley in Western Texas. He returned to England, applied for and was appointed to the position of cotton classer to the Queensland Government on the advice of Sir James Currie.

The Prime Minister, the Hon. W. M. Hughes, invited a British cotton delegation to Australia to advise on the type of cotton the spinners wanted. The delegation consisted of Crompton Wood (Managing Director, Messrs Smith and Rathbone), a Mr Ascroft (Director of the Australian Cotton Growing Association), Harold Parker (Managing Director, Messrs William Calvert and Sons) and H. C. Armstrong (a director of the Australian Cotton Growing Association). They visited several areas including Central Queensland, the Burnett, Darling Downs and Moreton. They all advised Queensland not to grow ratoon cotton because it produced inferior fibre, there was a danger of hybridisation of selected types, it perpetuated insect pests, and it lowered the standard of farming. (Wells, W. G. and Evans, G., Govt. Mem. 13.6.1923—*Qd Parl. Papers*, 11 October 1923)

The Hon. W. Forgan-Smith arranged a shipment of Upland ratoon lint, Durango lint and annual Durango to Messrs A. J. Bustom and Co., a private firm of cotton brokers in Liverpool for an unbiased opinion, separate from those of the various cotton corporations currently handling cotton. On 9 November 1923 three samples were sent per SS *Leitrim*. The resulting reports led Forgan-Smith to declare, "The results of all of these shipments emphasised the desirability of keeping the quality of Australian cotton to the highest pitch, because it will be realised that it is only by so doing that we can hope to make cotton growing a permanent industry in this State." (Forgan-Smith, W., *QAJ*, Vol 21, May 1924, p. 378) However, up to 16 June 1924 every grower was allowed to harvest all ratoon and standard cotton provided he gave full particulars to and consigned his cotton through the Department and destroyed his crop residues as required before 30 June 1924. The Department sold the lint on the owner's behalf and paid him any excess received over 3d per lb, less cost of ginning and marketing. (*QAJ*, Vol. 21, May 1924, p. 401)

The Cotton Industry Act of 1923 was assented to on 12 November 1923. In his address, during the second reading of the Bill which he introduced, Gillies said Queensland had no limit to successful cotton production if it grew the best article that the spinners required and took steps to prevent cotton pests entering Australia. The Government policy was protection of the industry. (See details earlier in this chapter.)

The Regulations under the Act were approved on 17 January 1924, guaranteeing inter alia until 31 July 1924 a price of 5d per lb for seed cotton of less than 1¼ inch staple, and 5½ d per lb for seed cotton of 1¼ inch staple or over. "Durango" was the only variety capable of producing a 1¼ inch staple and seed supplies of this variety were insufficient at the time. (*QAJ*, Vol. 19, April 1923, pp. 256–257)

By Order-in-Council on 17 January 1924, the Governor acquired for the Crown the whole of the seed cotton grown before 31 July 1924 and proclaimed the acquisition of this cotton

between 17 January and 31 July 1924. Gillies, Secretary for Agriculture and Stock, was to handle the matter.

In his 1922–23 annual report the Under-Secretary presented a table indicating the phenomenal growth of the cotton industry in Queensland since 1920.

He said the Government did not intend to continue the "guarantee" indefinitely and that by 1926 the industry should be sufficiently established to continue without it. Guarantees only applied to cotton from areas up to 50 acres.

An agreement between the Queensland Government and the British-Australian Cotton Growing Association (BACAL), dated 30 September 1922, provided for the company to erect ginneries and one cotton seed oil mill to handle all Queensland-grown cotton; provide railway connections between the premises and the Queensland railways; distribute good- quality seed to growers at a cost of 1d per lb paid by the Government; and become the sole agent of the Government for the shipping and sale of the lint. The Government would pay the company 1¹/₄d per lb for lint ginned, pressed, baled and delivered on trucks for shipping, and commission of 1¹/₂ per cent on all lint delivered to the British Cotton Growing Association and 2¹/₂ per cent on all lint sold by the company. The company undertook to spend at least £15 000 on the erection, equipping and completion before 31 July 1924 of ginning factories and oil mills in Queensland. The agreement was for two years, to 31 July 1924. All cotton seed other than planting seeds, all linters and by-products were to be the property of the company. (*QAJ*, Vol. 20, September 1923, p. 268)

By 30 June 1923 ginneries had been established at Whinstanes (Brisbane), where the cotton seed was also crushed in an oil mill, Glenmore (Rockhampton), Wowan, Dalby, Gladstone and Gayndah. Following the erection of the Whinstanes and Glenmore ginneries expansion was so rapid that these two ginneries were believed to be unable to cope with the crop and the assets of the Australian Cotton Growing Association, which had built the first two ginneries, were taken over by the British-Australian Cotton Growing Association (BACAL). Its Wowan and Dalby ginneries were never used, while the Gladstone one operated for only a short time. For the five years to 1926, BACAL was appointed agent for the Queensland Government to gin and market the cotton crop on behalf of the Government. (Lloyd, P., *The Australian Cotton Grower*, Vol. 3, January 1982, pp. 12–13)

After having travelled throughout the State to visit the cotton producing areas, and studied rainfall patterns, W. G. Wells, the Cotton Expert, arrived at the conclusion that adequate soil moisture at planting would be a major insurance against crop failure in Queensland's uncertain climate and aimed for at least 3 feet of subsoil moisture stored in the soil. Clean cultivation to destroy weeds and create a mulch to prevent soil cracking and attention to plant population and spacing were additional requirements. (*QAJ*, Vol. 19, March 1923, pp. 233–235)

In September 1923 Wells published a comprehensive article entitled "Cotton Cultivation in Queensland" including picking and forwarding to the ginnery and terms of the Government guarantee. (*QAJ*, Vol. 20, September 1923, pp. 239–267)

During 1923–24 experimental work in cotton culture was increased. Plots were laid out at the Queensland Agricultural College and on Roma State Farm and new cotton experiment

farms were starting at Melton in the Callide Valley in charge of Leslie Wylde Ball, and at Monal Creek in the Upper Burnett, in charge of Stanley Thomas John Clarke on 13 November 1924. To assist in the control of insect pests the Commonwealth Government borrowed the services of E. Ballard from the Empire Cotton Growing Association. Ballard was posted to Brisbane to work with the Departmental cotton staff, which by the end of 1923 consisted of Geoffrey Evans, C.I.E.M.A., Director of Cotton Culture, appointed 6 September 1923; Walton Garrett Wells, Cotton Expert, appointed 10 November 1922; Laurence L. Gudge, Cotton Classer, appointed 21 September 1923; Ross Rosebery Anson, Assistant Instructor, Cotton Section, appointed 4 October 1923; Alfred Nagle, Senior Field Assistant, Cotton Section, appointed 12 October 1923; James Carew, Senior Field Assistant, Cotton Section, appointed 2 November 1923; Reginald Walter Peters, Experimentalist, Cotton Section, appointed 1 December 1923; Ronald Eric Haseler, Assistant Grader (Senior), Cotton Section, appointed 2 December 1923; and three inspectors under The Cotton Industry Act of 1923—additional to the above officers who were also inspectors—Kenneth V. Henderson, Thomas Y. Bonar and Walter H. Franklin.

In February 1924 regulations were tightened on the import of cotton seed or lint into Australia under the Federal Quarantine Acts and W. N. Gillies successfully intervened to have all cotton seed by his permission landed only in Brisbane, disinfected or otherwise treated by the Chief Quarantine Officer, and after planting to remain in quarantine as a crop until released by the Chief Quarantine Officer. Imported raw cotton was to be imported only through Sydney. (*QAJ*, Vol. 21, 1924, p. 146)

On 12 February 1925 Gillies named the eleven members of a Cotton Advisory Board under The Primary Producers' Organisation Acts, 1922 to 1923. It consisted of R. L. Macgregor, Secretary, Primary Producers' Associations, and ten district members to hold office till 31 December 1925.

On 20 June 1925 a proclamation under The Cotton Industry Acts, 1923 to 1924 required the destruction of all old cotton debris by fire by 15 September 1925, all first growth cotton to be cut down within six inches of the ground and all second growth destroyed by 1 September 1925. (*Qd Govt. Gaz.*, No. 184) Easing of regulations had tempted some growers to cultivate ratoon cotton during 1924–25 but heavy weed growth militated against the crop. The general cotton crop was affected by a severe heatwave, which caused shedding of small bolls and squares and premature ripening of the larger bolls, resulting in much immature cotton.

The Callide Cotton Research Station was taken over from the Director of Agriculture during 1924–25 by Wells, the Cotton Specialist. L. W. Ball became Farm Manager and I. G. Hamilton became Assistant Plant Breeder. Cultural, manurial and rotation experiments were laid down and plant selection within the "Durango" variety started. Similar work was conducted at the Monal Cotton Demonstration Farm in the Upper Burnett, where S. T. J. Clarke was Manager and K. V. Henderson was Assistant. Owing to financial strictures this temporary farm was closed on 30 June 1925. Similar trials with the "Acala" variety were conducted by R. R. Anson at the Queensland Agricultural College, where Anson also lectured to students. The value of winter fallowing had been proved throughout the State and Colonel Evans declared: "One fact stands out clearly, and that is cotton is not going to become a profitable crop under the variable climatic conditions that obtain in this State unless careful and intelligent farming methods are employed."

The Ministerial Cotton Committee of the Commonwealth decided during 1924–25 to base the season's grades on the Universal Lint Standards and a large number of standard grades had to be prepared by Gudge, the Government Cotton Classer.

During 1925–26 a vigorous research programme was instituted at the Callide Cotton Research Station at Biloela, including breeding, cultural work, thinning and spacing trials. Seed selection work was widespread. Wells, Henderson and Nagle selected individual plants of "Durango" at Monal Creek to yield 220 lb of seed cotton, more than sufficient for next season's plantings: Peters, Carew and Goodchild selected "Durango" and "Acala" in the Burnett and Kingaroy; Wells and Nagle selected "Durango" in the Boyne Valley; and "Acala" was selected at Gatton College. Gudge trained several graders at the Gladstone ginnery.

Resignations to accept promotion were numerous during 1925–26. Colonel Evans resigned as Director of Cotton Culture on 17 February 1926, the British Cotton Growing Association deciding that Queensland was now well-equipped with staff and that Evans's expertise could be better used elsewhere. Ross Anson resigned on 12 November 1925 to become Cotton Instructor to the Fijian Government. The plant breeder at the Callide Cotton Research Station, F. G. Hamilton, resigned on 10 August 1925 to become Plant Breeder in the Cotton Section of the Southern Rhodesian Government. T. Y. Bonar and L. W. Ball resigned respectively on 14 June 1925 and 19 May 1926 to enter private enterprise. (Wells, W. G., *Rep. Dep. Agric. Stk*, 1925–26, p. 49)

Thinning experiments showed that the crop was best thinned when it was 4 to 6 inches high and the best population was achieved in $4\frac{1}{2}$ to 5 foot rows with plants 20–30 inches apart, but this should be adjusted according to local experience. Crossharrowing of a young crop improved weed control.

During the 1924–25 season, E. Ballard, the Commonwealth Entomologist, had success in planting trap crops of maize with the cotton from October to March: these attracted the corn earworm (*Heliothis armigera*) away from the cotton. (*QAJ*, Vol. 24, August 1925, pp. 146-147)

The 1925–26 season was the last under the system of Government-guaranteed advances. The industry was then placed in the hands of the growers through a Cotton Pool Board for five years from 1 January 1927. The Board to administer the pool consisted of seven representatives selected by the growers from the districts of (1) Lockyer, (2) Helidon, Downs and Maranoa, (3) Brisbane Valley, North and South Coasts, (4) Gayndah–Mundubbera, (5) Theebine to Gladstone, (6) Dawson Valley and Central West, (7) Gladstone, Boyne Valley and Rockhampton, plus a member appointed by the Minister. The Board handled the crop from the time it was placed on rail, the marketing, and the finance. The Department of Agriculture and Stock graded the seed cotton at the ginneries and the lint on delivery to the buyers, and handled the supply and maintenance of the pure seed requirements.

There was consideration necessary regarding the future of the cotton industry on the expiry of the Government guarantee and Colonel Evans, after he left the position of Director of Cotton Culture, submitted the following information to the Tariff Board:

1. That the establishment of the cotton-growing industry on a permanent basis depends on the capacity of the farmer to learn how to grow the crop properly, and that it is the duty of the

Government to help to forward this end by means of experiment and practical demonstration. I explained fully what the Department had been doing in this direction.

- 2. Until the grower had learnt how to grow cotton, financial assistance was necessary, especially in view of the low price of cotton.
- 3. I pointed out that the 2d bounty asked for was 50 per cent above the total value of the cotton, and that if a flat rate without reservation was given, it would be quite possible for growers to grow inferior growths of cotton which could not possibly pay when the bounty was lifted and the industry had to stand on its own feet.
- 4. To this end I gave my opinion that a limit with regard to length of staple and grade should be laid down. This limit need not be too high, but it should be insisted that any cotton coming below the required standard of staple and grade should not under any circumstances receive the bounty.
- 5. In order to keep up the quality also it will be necessary for the Department of Agriculture to have complete control of the seed.
- 6. In order that the main object of the bounty should not be defeated, it will be better to make the announcement that the bounty should be on a scale gradually decreasing in value each year, the idea being that the grower should continue to learn how best to grow cotton, and not be content to merely plant cotton and to make no attempt to better his efforts. I pointed out that unless every endeavour was made by the grower to overcome some of these difficulties, such as the high cost of picking, no progress will be made, and the industry might collapse if the bounty was suddenly removed.
- 7. I made no suggestion with regard to the size of the bounty, but gave it as my opinion that financial assistance would be required for at least five years. (*QAJ*, April 1926, p. 396)

The Commonwealth agreed to a system of bounties on seed cotton and on cotton yarn manufactured in Australia provided it was composed of one half of Australian-grown cotton. The bounty was granted for five years on both seed cotton and yarn, to develop a spinning industry in Australia. The Board arranged finance through the Commonwealth Bank whereby 65 per cent of the estimated value of the lint was advanced to growers on receipt of their seed cotton according to grade and staple length determined by the Departmental grader. A final payment was to be made when all the transactions had been made.

The year 1926–27 was a dry year with late rains, heatwaves and insect damage. Cotton-staining bugs caused serious damage for the first time and pink bollworm, cutworm and corn earworm were troublesome. E. Ballard, the Commonwealth Entomologist sponsored by the Empire Cotton Growing Corporation, completed his term of duty.

At this stage it was felt that results of experimental work carried out by the Cotton Section should be published and Colonel Evans, W. G. Wells and L. L. Gudge contributed results to the *Queensland Agricultural Journal* for January and February 1926. Wells and Ballard brought this material up to date in the November and December issues of 1927.

The 1928–29 cotton crop was disappointing, owing to late planting rains, heavy rain during growth, and early frosts. The crop in the Dawson Valley irrigation scheme was, however, a good one, averaging 1000 lb of seed cotton per acre. The Departmental-selected seed plots provided adequate seed for southern Queensland in 1929. The Premier announced a Government guarantee of 5d per lb for seed cotton from the 1929–30 crop, up to 10 000 bales.

Broom millet

A Pool was constituted for all broom millet produced in Queensland from seed sown after 1 July 1925 for a period of three years from 11 March 1926. The Board to administer the Pool would consist of two members elected annually by the growers and one appointed by the Minister. (*QAJ*, Vol. 25, April 1926, p. 394)

Owing to the importation of a corn borer in broom millet usually imported from Italy, the Commonwealth Government placed an embargo on its importation, leaving Western Australia without supplies. The Interstate Ministers' Conference in Brisbane on 7 June 1926 agreed to aid the Commonwealth to continue the embargo for five years and the New South Wales and Queensland Ministers agreed that growers in their States would supply the needs of Western Australia. (*QAJ*, Vol. 26, July 1926, pp. 13–14)

Sugar

In March 1919 Harry T. Easterby, General Superintendent, Bureau of Sugar Experiment Stations, wrote:

There are now so many persons in Queensland who in recent times have commenced the growing of sugar cane without a great deal of knowledge of the subject and so many others who write to the Bureau for information on the taking up of land and cultivating cane, that it is recognised that a Bulletin dealing with the topic is necessary. In addition, there are proposals for settling many of our returned soldiers upon sugar lands and instruction in cane growing will be needed by them if such schemes are given effect to. (*QAJ*, Vol. 11, March 1919, p. 115)

He then published articles in the *Queensland Agricultural Journal*, which later were combined in a bulletin for distribution, starting with the taking up of virgin scrub land and forest lands and their subsequent development in sugar cultivation.

The drought conditions of 1919 extended through 1920 in the southern sugar districts, with the result that five of the southern mills did not crush and foreign-grown sugar had to be imported. The total area under cane in 1920 was 162 619 acres, of which 89 142 acres were crushed. With the higher price for sugar a considerable area of new land was planted. About 94 per cent of Australia's sugar was produced in Queensland and the 1920 production was 250 000 tons, of which 20 000 tons came from New South Wales. Four thousand farmers were producing sugar in Queensland. Comparable figures for production in the previous two decades are shown in the following table from the twenty-first annual report of the Bureau of Sugar Experiment Stations, November, 1921.

	1899-1908	1909-1918
Av. tons of cane per acre	14.76	17.37
Av. tons of sugar per acre	1.60	1.99
Av. tons of cane per ton of sugar	9.20	7.66

The total value of land, premises and machinery used in the manufacture of sugar during 1920 was £3 958 013. There were two refineries and thirty-four mills. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1920–21, pp. 9–10)

In April 1922, Premier Theodore said £15 000 000 was involved in the sugar industry: the value of raw sugar manufactured in Australia in 1921 was approximately £9 000 000, of

which £6 000 000 was dispersed in wages. There were 25 000 persons directly engaged in the industry and 100,000 directly or indirectly dependent on sugar. (*QAJ*, Vol. 17, April 1922, pp. 209–210)

Sugar prices

The Sugar Agreement of 1920. The high prices of sugar on the world's markets during and immediately after the war were not handed on to the canegrowers and a deputation waited on the Prime Minister to request that the price of raw sugar should be increased from £21 per ton to £30 6s 8d and that this agreement continue for not less than three years. The rise in price was agreed to—£5 6s 8d to the growers and £4 to the millers. The rise in prices saved several mills and allowed new machinery to be installed. The agreement lasted for three years and expired in 1922. On 2 March 1923 Gillies (Minister for Agriculture and Stock) led a delegation whose members were G. H. Pritchard (Australian Sugar Producers' Association), T. A. Powell and W. H. Doherty (Canegrowers' Association), A. Innes (Mackay Sugar Producers' Association) and B. McDonough (New South Wales growers), which met the Prime Minister, the Hon. S. M. Bruce, seeking renewal of the agreement.

Federal Sugar Policy. The Commonwealth Government was anxious to decontrol those industries (including sugar) that it had handled during the war and declined to renew the agreement, but on 5 June 1923 the Prime Minister, Bruce, announced the Federal Sugar Policy. A surplus of sugar had been produced on greatly increased acreage as a result of the fixing of the higher price of £30 6s 8d per ton. The policy now would be that the Government would continue its embargo on black-grown sugar for a further two years if:

- 1. the industry formed a pool free from Commonwealth Government control to buy raw sugar for the 1923–24 season at not more than £27 per ton of 94 net titre f.o.b. mill;
- 2. the pool to negotiate with CSR Ltd and Millaquin to refine and distribute sugar, prices for such to be approved by the Commonwealth Government;
- 3. the pool to provide sugar for manufactured goods for export at world parity prices;
- 4. an authority, with Government representation, to determine export price;
- 5. the price for 1924-25 sugar to be determined by a tribunal, not to exceed £27 per ton;
- 6. the tribunal to take into consideration the high wages paid in the industry;
- 7. the pool to give the public advantage of any fall in price;
- 8. the Commonwealth Government to prohibit importation of black-grown sugar except to cover shortage or for special types of sugar until 30 June 1925. After 30 June 1925 the industry was to be protected by a Customs Duty.

On Friday 15 June the Prime Minister agreed to meet a delegation of three members of the Australian Sugar Producers' Association and three from the United Canegrowers' Association. A pool was formed, its members including W. Short (General Manager, Bureau of Central Sugar Mills), G. H. Pritchard (Australian Sugar Producers' Association) and T. A. Powell (United Canegrowers' Association).

The 1924 crop was a record one, yielding 409 136 tons, of which it was necessary to export 77 000 tons. This was the year of commencement of the export trade in sugar, which has continued ever since. (Easterby, 1933)

In January 1925 Bruce advised that the embargo on the importation of sugar into Australia would be extended for a further three years from 31 August 1925, subject to conditions of prices for domestic consumption, manufacturing, price concessions for sugar used in beer, biscuits, cakes, confectionery, cordials, condiments, jelly crystals, tanning, drugs etc. Sugar had to be sold in all main cities in Australia.

Imperial Preference. In June 1925 the House of Commons approved a preference on Dominion-grown sugar. The duty on sugar was formerly £25 13s 4d per ton. The Imperial Government agreed to a preference of one-sixth of this, i.e. £4 5s 7d per ton, reduced it to £1 18s 10d and then reverted to £4 5s 7d per ton. It applied also to the sugar content of jam and similar commodities of which sugar is a component. (*QAJ*, Vol. 24, July 1925, p. 2)

Royal Commission of 1922

In 1922 the Government appointed a Royal Commission to enquire into suitable locations for future sugar mills. Its members were W. Harris, Chairman, and H. T. Easterby (Director, Bureau of Sugar Experiment Stations) and a Mr Salisbury. The Commission reported on 30 December 1922 that the first mill should be erected in the Tully-Banyan area with subsequent mills, if needed, at (a) Bailey Creek and Daintree, and (b) Inkerman (Home Hill), the latter if increased production under irrigation took place. (Easterby, 1933) The Tully Mill tender was won by Walkers Ltd of Maryborough, the construction work being placed in the hands of Messrs Barbert and Sons of Ipswich in 1924. In December 1924 the railway line from Brisbane was completed to Townsville and Cairns by placing in position the last span of the Daradgee Bridge over the Johnstone River. (*Qd Parl. Papers*, 1923, Vol. 2, pp. 185–211)

Activities of the Bureau of Sugar Experiment Stations

Beginning in May 1922, H. T. Easterby, General Superintendent of the Bureau of Sugar Experiment Stations, began to summarise experimental results obtained by the Bureau over the first twenty-one years of its existence. Deep cultivation had proved beneficial for alluvial soils and those areas with clay subsoils at Mackay but was not recommended for the porous red soils of Bundaberg and Isis. Irrigation was proved to be generally uneconomic for the Mackay area as only two dry years out of ten could be expected. In drier areas such as the Lower Burdekin it was essential. In fertiliser experiments, both with and without irrigation, nitrogen and potash gave excellent response; complete fertilisers containing nitrogen, phosphorus and potash gave the best response at Mackay. Mixed fertilisers also gave the best results at Bundaberg. Ratoon crops responded markedly to mixed fertilisers. In the Mackay district, rows 4 feet apart with setts placed 6 inches or closer in the row gave the highest yields, but in drier areas 5 foot rows would be better.

Introduction of new canes had proved a great success. Between 1895 and 1904 one hundred and ten varieties had been introduced: 12 from New Guinea, by Mr Cowley; 74 from New Guinea, by Mr Tryon; 8 from Mauritius; 4 from Hawaii; 4 from Trinidad; 3 from South Africa; 1 from Barbados; and 4 were old Queensland canes. In 1909 eight new varieties came

from Mauritius. In 1910 one hundred and forty-three varieties were taken to Mackay from the Queensland Acclimatisation Society. In 1912 T. H. Wells collected 162 varieties from New Guinea; in 1914, two locally bred canes from Ayr; in 1915, one from India; in 1916, four from Mauritius, five from Java and two from Fiji; in 1917 three from Hawaii and 7 from West Indies; in 1919, five from Mauritius; and in 1921, eight from Mauritius. Field testing of these canes was done at Mackay and Bundaberg.

Staff training overseas

In January 1924 the Acting Premier and Minister for Agriculture and Stock (Gillies) announced that Executive approval had been given to a scheme which may be designated as the first practical steps towards the conjunction of the scientific training of the University with the agricultural industry. The proposal was first made by His Honour Chief Justice McCawley, who was also a member of the Senate of the University, and covered briefly the institution of three travelling scholarships for scientific research work for the benefit of the sugar industry. The proposal was accepted by the Government and to it was added the advice from the University, the Public Service Commissioner, the Central Sugar Cane Prices Board, the Council of Agriculture, the Australian Sugar Producers' Association, the United Canegrowers' Association, the Director of Sugar Experiment Stations and the General Manager of the Bureau.

Three scholarships valued at £300 per year, tenable for four years, were open to general competition but preference could be given to students of Queensland University who possessed a Science degree. One scholarship was for sugar engineering and chemistry (awarded to Norman Bennett), one for plant pathology (awarded to Arthur Frank Bell, who later became Under-Secretary of the Department) and one for research on soil problems (won by Henry William Kerr, who later became Director of the Bureau of Sugar Experiment Stations).

The holders of the scholarships were required to devote themselves for the first year to studying the sugar industry in Queensland, and thereafter to undergo training overseas. The cost of the passage overseas would be paid plus £300 per year. Each holder was required to sign an undertaking to enter, at the expiration of the term, the employment of the Department of Agriculture on work pertaining to the sugar industry, for at least four years, in any part of the State, with remuneration at a rate of not less than £300 a year. (*QAJ*, Vol. 21, 1924, pp. 1–2) Kerr's first report, "Soil Acidity", was published in the *Queensland Agricultural Journal* for June 1924, pp. 413–416.

In the meantime arrangements were made with the Queensland University to train cadets for entomological and pathological requirements, the Department of Agriculture and Stock paying these cadets an allowance on condition that they signed an agreement to remain in the service of the Bureau of Sugar Experiment Stations for a period of years after their training. In order that information might be obtained regarding the incidence of cane diseases, Mr. W. Cottrell-Dormer was appointed in 1924 to make a survey of the sugar cane areas for disease. He subsequently entered the University and graduated with the degree of Bachelor of Science in Agriculture at the end of 1929. He then joined the permanent staff of the Bureau as a Pathologist. (Easterby, 1933).

In 1928 Norman Bennett returned and visited all the Queensland mills except those of the Colonial Sugar Refining Company, advising mills where necessary and gaining a background for future activities.

Queensland Cane Growers' Council

The Primary Producers' Organisation and Marketing Act of 1926 provided that for the Sugar industry there should be constituted:

- (a) Mill Suppliers' Committees;
- (b) District Canegrowers' Executives;
- (c) the Queensland Cane Growers' Council.

The last named was authorised to convene an annual sugar industry conference. The first such annual Cane Growers' Conference was convened by the Queensland Cane Growers' Council in the Mackay Town Hall and was opened on 23 March 1927 by the Minister for Agriculture and Stock and Acting Premier, the Hon. W. Forgan-Smith.

Record crop of 1925

The sugar yield for the 1925 season was 485 585 tons, a record to date. This meant a big export, 211 000 tons. This large surplus having to be sold overseas at world prices caused considerable loss and gave rise to much discussion. It was suggested that quotas be allocated to the various mills. The large surplus was due to the large increase in the area growing cane, including new lands opened by the North Coast railway to Cairns, especially around the Tully area.

Fixing of cane assignments, 1927

During 1927 consideration was given by the Central Sugar Cane Prices Board to cane assignments and the Secretary visited a number of districts for the purpose of collecting information to enable the Board to determine the areas to be assigned to growers. During 1928 a record 520 620 tons of raw sugar were produced and the Under-Secretary foresaw the need for curtailment of plantings to reduce the surplus.

Production of power alcohol

Alcohol from the Sarina distillery attached to the Plane Creek sugar mill was made available during 1928–29 as a mixture of alcohol and petrol under the name "Shellkol". Cassava had been tried as a raw material but it was found that molasses was the best source.

Request for more field research

With low export values growers were looking more to the Bureau of Sugar Experiment Stations to advise them on the more economical use of fertilisers in a more intensive system of cultivation. Dr H. W. Kerr was made Acting Director of the Bureau as from 1 February 1929 during the absence on leave of the Director, H. T. Easterby. He stated that the main objective of the agricultural division would be determination of the fertiliser requirements of the various soil types. (*QAJ*, Vol. 31, April 1929, p. 272) The Bureau had also begun to produce new sugar cane seedlings suited to specific localities and resistant to major diseases.

Queensland Society of Sugar Cane Technologists

A conference of all interested in sugar manufacture was called by the Bureau at Mackay in March 1929 and the conference decided to form the Queensland Society of Sugar Cane Technologists to:

- 1. promote discussion of technical problems of the Queensland sugar industry by annual conferences held in the sugar centres of Queensland;
- 2. arrange for the publication and distribution of technical literature on all matters dealing with cane sugar;
- 3. affiliate and cooperate with the International Society of Sugar Cane Technologists.

The proceedings of this first conference of sugar mill technologists were printed by the Bureau of Sugar Experiment Stations at the request of the newly formed Society and distributed to all mill managers, mill engineers and mill chemists. Norman Bennett, Sugar Technologist to the Bureau, was the first Honorary Secretary.

Tobacco

The tobacco industry was languishing during 1920–21 through want of an instructor. Importations of special varieties of pipe and cigar leaf were made from USA, and a choice selection of seed of cigar varieties from Uruguay was tested at Bowen with promising results. (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1920–21, p. 57) Blue mould and wet weather affected crops during 1923–24. Only 276 acres of tobacco were grown in Queensland in that year and in both Bowen and Texas areas the acreage was dwindling. The crop was mainly in the hands of the Chinese, under a share farming system. There was a lack of buying competition, the British Australian Tobacco Company having a monopoly of manufacturing for pipe tobaccos. Melbourne brokers bought cigar leaf on behalf of manufacturers and these prices were also unsatisfactory. The Department periodically introduced choice pipe and cigar leaf seed for growers. In 1926 Quodling said: "There appears to be a promising field for work by an instructor in tobacco culture with a knowledge of both growing and curing." (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1925–26, p. 17)

In 1927 the British Australasian Tobacco Company approached the Commonwealth Government to instigate investigations into tobacco growing. In the first three years, £30 000 would be spent, of which £20,000 had been made available by the tobacco company and £10 000 by the Commonwealth Government, while the States would each be asked to contribute £1000. Of the first £10 000, the Development and Migration Commission would supply £5000 and the C.S.I.R. a similar amount. (*QAJ*, Vol. 28, July 1927, p. 40) An Executive Committee of three representing the Development and Migration Commission, the C.S.I.R., Dr Darnell-Smith, Director of the Botanic Gardens in Sydney, with the addition of the Chairman of the State and of the types of leaf grown and a Director of Tobacco Investigations, R. M. Howall, was appointed. (*QAJ*, Vol. 27, September 1927, p. 317)

Experimental work was started in 1928 at Mareeba and a modern treatment plant was installed there. The work was carried out with the cooperation of Commonwealth officers.

Abnormal rainfall affected the experiments. The Tobacco Agreement regarding research finance was given in the Department's annual report for 1928-29 (p. 17).

The Senior Instructor in Agriculture at Townsville, N. A. R. Pollock, was engaged in tobacco experimental work during the 1927–28 season at Harvey's Range and Charters Towers, where flue-curing barns were erected by private growers. Bright leaf of good appearance was produced. (*Rep. Dep. Agric. Stk*, 1928–29, p. 17)

Coffee

Coffee had been proved a suitable and profitable crop for tropical and subtropical Queensland by Howard Newport. The first Instructor in Coffee Culture appointed in December 1898, he later became Instructor in Tropical Agriculture. The average annual yield was 10 cwt of coffee per acre. Coffee cultivation declined with the increase in sugarcane cultivation and consequent diversion of labour to the canefields. There was also no marketing centre for the small growers.

About 1920 the Commonwealth imported 2 605 240 lb of coffee from overseas: Queensland could capture that trade if the industry could be encouraged. It was suggested that farmers, soldier settlers and others plant a few acres each or that co-operatives should cultivate more.

In 1920 the Minister for Agriculture, the Hon. W. N. Gillies, instituted a system similar to that organised for cotton, that is, to make advances on coffee in parchment (bearing the inner skin) consigned to the Under-Secretary for further treatment (hulling, grading and marketing). The Minister proposed an advance of 7d per lb for properly prepared, clean parchment. Reckoning the yield at 1000 lb per acre, the gross return would be £29 3s 4d per acre. The Minister appointed T. A. Bromiley, a coffee grower of many years' experience, as Instructor and Inspector of Coffee Production. (Bromiley, T. A., *QAJ*, Vol. 14, December 1920, pp. 280–281)

Peanuts

Peanuts first came into the agricultural statistics in 1919, with an area of 153 acres harvested for a yield of 127 708 lb, or 835 lb per acre. In the same year almost 4 000 000 lb of peanuts, to the value of £96 056, were imported. In the following year, 272 acres yielded 274 916 lb at an average of 1011 lb per acre, while imports of nearly 7 000 000 lb cost £271 087. In 1921 almost 5 000 000 lb were imported. They were used almost wholly for edible purposes.

A Peanut Growers Association was formed at Cooktown, mostly of soldier settlers; and the Cooktown Plantations Company, formed principally of Melbourne shareholders, acquired 6000 acres of land for peanut growing. Both groups imported labour-saving machinery. The Chinese handled the distribution of the peanuts after harvest as these people were the importers of peanuts.

In the July 1922 *Queensland Agricultural Journal*, Pollock, Northern Instructor in Agriculture, published a comprehensive article entitled "The Cultivation of the Peanut". This was repeated in the August 1925 edition.

One of the early problems in the peanut industry was the disposal of the small, broken, discoloured and shrivelled nuts, unfit for the edible trade. An oil mill was established at Marrickville in Sydney in 1922 to treat these lower-grade peanuts.

The Australian grower was protected in 1922 with a tariff of 4d per lb for peanuts in the shell and 6d per lb for peanut kernels. (*QAJ*, Vol. 17, June 1922, p. 266)

The Department recommended growing the China variety for roasting, the Valencia for confectionery and the Spanish for oil.

In 1925, with the assistance of the Department, a peanut-shelling machine was secured and installed by the Peanut Pool Board at Kingaroy, which was duly constituted. Prior to this the marketing of the crop was done in the shell and although the growers got a fair return, the profit went elsewhere. An electrically driven cleaning, grading and shelling plant was installed at a cost of £1500. In 1924–25, 691 acres of peanuts were cropped throughout the State. In 1925–26 it was estimated that 3000 acres would be cropped in the Kingaroy district alone. (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1925–26, p. 17)

As the peanut industry was developing rapidly, especially in the Kingaroy area, C. S. Clydesdale, Assistant Instructor in Agriculture, initiated variety and fertiliser trials on "scrub" and "forest" soils which represented the main soil types being cultivated to the crop. Soil samples were analysed by the Agricultural Chemist, and the plots were planted in November–December 1926.

Soybeans

Soybean attracted attention as a possible Queensland crop in 1925–26 when four varieties were tried in the Dawson Valley by G. B. Brooks, Central Instructor in Agriculture. Grain ripening was uneven and the varieties did not do well (probably because of lack of effective nodulation and unsuitable varieties). (Brooks, G. B., *Rep. Dep. Agric. Stk*, 1925-26, p. 26)

Fruit

Bananas

The banana industry, which earlier had been in the hands of the Chinese in north Queensland, had by 1920 moved into south Queensland, where it was in the hands of European growers. Customs tariffs on imported bananas had almost excluded the Fijian trade.

Banana weevil borer. A deputation of banana growers waited on the Minister, the Hon. W. N. Gillies, requesting the appointment of an entomologist to investigate the ravages of the beetle borer and on 28 October 1920, J. L. Froggatt was appointed. He submitted monthly reports to the Minister.

A banana experimental plot of twelve acres was established on Bribie Island to raise disease-free bananas and act as a quarantine station. James Mitchell, Assistant Instructor in

Fruit Culture, was appointed officer in charge. Planting began during the 1922–23 year with bananas and also some avocado pears, pecan nuts and thin-shelled Queensland nuts.

A. H. Benson, as well as being Director of Fruit Culture was also Chief Quarantine Officer for Plants, State Supervising Officer for Export as an officer of Customs and Commerce, and Federal Officer in Charge of the Pineapple Pool. The banana weevil borer (*Cosmopolites sordidus*) was widespread in south Queensland and the Department's plot on Bribie Island, planted with insect-free single eyes, was able to offer beetle-free corms in 1924 at 50 shillings per 100. These were propagated in bushhouses and many were distributed to growers. (Benson, A. H., *Rep. Dep. Agric. Stk*, 1924–25, pp. 50–54). Ten thousand plants were available in 1925. In January 1926, J. L. Froggatt published *Bulletin* No. 4, dealing with the present knowledge of the life history and control of the banana weevil borer. However, means of control were not reassuring and during 1926–27 the Committee of Direction of Fruit Marketing offered a reward of £5000 for an economic remedy for the control of the borer.

Banana experiment stations were established in late 1928. One for south Queensland was established on 15 acres at east Kin Kin under H. J. Freeman, Acting Manager. Experiments were undertaken in steeping (dipping planting material in various solutions), spacing, depth of planting, trimming, fertilising, baiting for beetle borer and weed-killing sprays and 4820 bananas representing six varieties were planted. The north Queensland station was established at Bartle Frere (Pawngilly) on 12 acres, under the supervision of W. J. Ross, Assistant Instructor in Fruit Culture. Spacing trials with the Gros Michel variety were established. Later the Bribie Island nursery was closed and T. R. E. Mitchell was transferred to Pawngilly as Acting Manager. The avocado varieties from Bribie Island were transferred to Pawngilly. Six new banana varieties were obtained from Java and planted in quarantine at Palm Island. The above two experiment stations were established in conjunction with the Committee of Direction of Fruit Marketing.

S. E. Stephens, Inspector under the Diseases in Plants Acts, made a sound suggestion to northern banana growers that "waste" land within their plantations should be planted with papaws, passion fruit, granadillas and pineapples. (*QAJ*, Vol. 29, January 1928, p. 35)

Bunchy top. Bunchy top in bananas had begun to concern growers who had lately successfully petitioned to have Fijian bananas excluded. Investigations into the cause of bunchy top were instituted jointly by Dr Darnell-Smith (Vegetable Pathologist, New South Wales) and Henry Tryon, his counterpart in Queensland. A report in January 1923 showed that confusion existed as to its cause. (*QAJ*, Vol. 19, January 1923, pp. 32–33) Poor nutrition, monoculture, soil acidity, soil "contagion", plant parasites, animal parasites and climatic factors were ruled out as causes. Bunchy top in bananas appeared in New South Wales about 1910–12 and was first noticed in Queensland by A. H. Benson, Director of Fruit Culture, in 1916. It was not regarded seriously till 1919 when investigations were started at Currumbin. (See "Bunchy Top in Bananas Committee".)

In February 1924, in order to prevent the spread of bunchy top in bananas northwards in the State, a proclamation was issued quarantining an area bounded on the north and west by the Logan and Albert Rivers, and also declaring a buffer area south and east of the Logan and Albert Rivers in which no bunchy top disease was known to exist. (*QAJ*, Vol. 21, 1924, p. 15)

The Fruit Branch was not able to undertake much research work before 1926 but in that year arrangements were made for three officers to be given special training at the Queensland University and Benson made a plea for a fruit research station. Bananas had become the most important commercial fruit but Benson said more attention was needed to selection of land, cultivation and manuring the land, the systematic suckering of stools and keeping plantations free from disease and insect pests. Neglected and abandoned plantations were major problems. The Bunchy Top Investigation Committee had proved that the disease was caused by a virus transmitted by aphides and control was by destroying affected stools. An outbreak had occurred at Dayboro and suckers were sent to Innisfail so two additional inspectors were appointed and sent to Innisfail to identify and destroy infested stools. Transfer of suckers to any part of the State was then totally prohibited until the extent of the spread of the disease was ascertained.

In November 1925, the Bunchy Top Control Board, consisting of Sir George Kribbs (representing the Commonwealth Government), G. Valder (Under-Secretary for Agriculture, New South Wales) and E. Graham (Under-Secretary for Agriculture and Stock, Queensland), received from the Supervisor of the Bunchy Top Investigation (Professor Goddard) the report of Goddard, Magee and Collard on the bunchy top disease. The disease is a virus disease transmitted by the common dark banana aphid, *Pentalonia nigronervosa*. The affected plants should be sprayed with "Black Leaf 40" to kill the aphides, and the infected stool dug up and cut into small pieces. New plantings should be made with disease-free material. (*QAJ*, Vol. 24, November 1925, pp. 424–429)

To prevent the further spread of bunchy top a Proclamation was issued early in 1926 prohibiting the removal of any banana material other than fruit into or out of the area bounded on the south by the Brisbane River, west to D'Aguilar Range, north to the Caboolture River and east to the shores of Moreton Bay. (*QAJ*, Vol. 25, February 1926, p. 179) Seven plant inspectors of the Department were exclusively engaged on bunchy top investigational work, while two officers in the far north were brought to Brisbane to gain field knowledge of the disease. During 1924–26 the Queensland Department spent £2000 on the investigation and in 1926 approval was given to continue the investigation with the Commonwealth, New South Wales and Queensland Governments contributing equal amounts. (*QAJ*, Vol. 25, March 1926, p. 200)

A report from the Bunchy Top Investigation Committee was published in March 1926 and reproduced in the *Queensland Agricultural Journal*, Vol. 25, March 1926, pp. 259–268, with photographs. On 20 December 1925 some 400 acres of bananas were found infested on the Rush Creek and Moorina districts around Dayboro and were destroyed under the supervision of the inspectors.

The final report of the Bunchy Top Investigation Committee was published in the June 1926 issue of the *Queensland Agricultural Journal*, pp. 506-510. The members of the Committee were Professor E. J. Goddard (Supervisor), C. J. P. Magee (Assistant Plant Pathologist) and H. Collard (Horticulturist) to the Bunchy Top Board of Control, now made up of Professor E. J. Goddard (University of Queensland), Professor R. D. Watt (University of Sydney), Professor F. G. B. Osborn (University of Adelaide), E. Graham (Under-Secretary for Agriculture, Queensland), G. D. Ross (Under-Secretary and Director

of Agriculture, New South Wales) and G. Lightfoot (Acting Director of the Commonwealth Institute of Science and Industry).

The disease was caused by a virus transmitted by the Banana aphis (*Pentalonia nigronervosa*) only to species of the *Musa* genus. It was present in Australia in New South Wales, south-east Queensland and north Queensland. Its spread had been primarily due to the propagation of infested suckers. No protectionary measures were available, no resistant or immune banana stock was available and no remedial measures were at hand.

The Committee recommended joint legislative action by the Governments of Queensland and New South Wales for policing banana-growing areas, destruction of affected plants, registration of all banana, plantain and Manila hemp plantations, destruction of all backyard and garden plants in unregistered places, restrictions on the transport and sale of banana suckers and the imposition of other responsibilities on Governments and growers for the control and eradication of bunchy top. (*QAJ*, Vol. 25, June 1926, pp. 506–510)

Banana rust. Banana rust was proclaimed a disease after a serious outbreak at Chatsworth near Gympie. This prevented the removal and distribution of planting material until it could be checked by inspectors appointed for this work. Farmers cooperated with the Department in trials with tobacco dust to control the banana rust mite in north Queensland in 1928–29. Girault of the Entomological Branch showed pyrethrum powder would destroy the insect.

"Squirter". "Squirter" disease in bananas also attracted Commonwealth-State finance for research in its control. The Queensland Government co-operated with the Commonwealth Government, and each contributed £500 towards the cost. (*QAJ*, Vol. 25, March 1926, p. 200) Professor Goddard, following his bunchy top research, was co-opted to supervise the research on "Squirter".

A detailed illustrated article on banana packing for market, written by W. Rowlands, was published in the *Queensland Agricultural Journal* of April 1925. Rowlands died soon afterwards and W. Ellison was appointed temporarily as Banana Packing Instructor. In early 1924 the regulations with reference to Cavendish bananas were altered to provide for "choice", "first" and "seconds" grades.

George Williams updated the 1919 bulletin, "The Banana in Queensland", in the *Queensland Agricultural Journal* of May 1928. Meanwhile, an attempt by referendum on 12 February 1929 to establish a banana board failed.

Pineapples

Pineapple growing increased after World War I, especially amongst soldier settlers at Beerburrum where about 1000 acres were planted. Interest in the canning of pineapples was increasing and the Federal Government provided an advance of £20 000 against the output of canned fruit of sufficient quality, the balance being paid when the product was finally sold. The cannery had also to be under the constant supervision of officers of the Department. The results were excellent. Samples were periodically analysed by the Agricultural Chemist to ensure the standard of the pack was acceptable. Four private canneries and the State cannery took advantage of the advance and modern machinery for

coring etc. was used for the first time. Some pineapple pulp was converted into jam. (*Rep. Dep. Agric. Stk*, 1920–21, pp. 46–49) Following the failure of the State's pineapple growers to form a pool, the soldier settlers at Beerburrum approached the Premier (the Hon. E. G. Theodore) for assistance and he agreed to subsidise them to the extent of one shilling per case on their pineapples delivered to the State Cannery for 1922 and 1923. (*QAJ*, Vol. 19, February 1923, p. 154)

At the Bribie Island nursery the selection of a smooth-leaf pineapple was proceeded with. The improvement in pineapple size and shape to fit the can helped growers and the canners—a cylindrical fruit 5 inches in diameter was desired.

A dehydration plant was erected at Nambour in 1923 where dehydration of pineapples was successfully accomplished, but a market had to be found. The supervision of the canning of pineapples for export was removed from the Department of Agriculture and Stock during 1923–24 and taken over by the Customs Department.

Experiments with the use of paper mulch to reduce weed competition were begun in the 1923–24 year. Henry Tryon had found mealy bug damage to the shallow pineapple roots as early as 1920. (*Rep. Dep. Agric. Stk*, 1920–21, p. 469)

Stone and pome fruits

Temperate fruit production in the Granite Belt had increased due to soldier settlement after World War I. Fruit fly, codling moth, black peach aphis and brown rot of stone fruit were troublesome. Demonstrations in the pruning of both fruit trees and vines were given to growers. Downy mildew of the grape was widespread at Myrtletown and Coominya, but spraying with Bordeaux mixture had given satisfaction.

The Annual Meeting of the Australian Fruitgrowers Association was held in Brisbane in August 1920. A conference of local growers took place in Brisbane in April 1921, forming the Queensland Fruitgrowers Federation, which requested amendment of The Diseases in Plants Act of 1916 to give power to collect a registration fee for all orchards, the income being devoted to more efficient policing of the Act.

In November 1921 A. H. Benson stated that the difficulty confronting growers at that time was not how to grow fruit, but how and where to sell it. Although growers at conferences framed and passed resolutions little came of it. Growers did not co-operate and were too conservative. The failure to properly organise distribution affected both grower and consumer, as fruit was a dietary essential. Following World War I there was a large increase in irrigation, and settlement of several returned soldiers in the fruit industry. This increased production and demanded market organisation to deal with gluts and scarcities. Organisation, stabilisation and judicious advertising were essential for successful marketing and each could be accomplished by cooperative effort. Queensland tropical fruits had no competition and yet were unknown outside the capital cities of the south. Benson suggested that railways should be used more, every railway station to be a distributing centre.

Where warranted, a receiver or distributor would be appointed on a commission basis preferably a returned soldier, who would canvass orders from retailers and advise the secretary of the Fruitgrowers Association and arrange a fixed date for distribution. He would remit by draft proceeds of sales and growers would be protected by a fidelity guarantee bond. In other areas arrangements could be made with the railways for a distribution of case lots by C.O.D. (*QAJ*, Vol. 16, November 1921, pp. 311–313) However, before the fruit could be satisfactorily transported and sold, it had to be properly packed. The fruitgrowers had successfully organised rail transport of fruit to southern States instead of shipping the produce. For the week ending 9 April 1921, three special fruit trains were despatched by the Southern Queensland Fruitgrowers Society via Wallangarra to Sydney and Melbourne. (*QAJ*, Vol. 15, May 1921, p. 208)

An interstate conference of fruit growers and Government fruit experts convened by the Commonwealth Government was held in Melbourne early in 1921. Mr Wayman represented Queensland growers. Its main business was standardisation of grading and packing apples and pears for export. During the 1921-22 fruit season the Stanthorpe District Council of Fruitgrowers arranged for lessons in fruit packing from Mr Rowlands, Chief Packing Officer of Tasmania. He was to be appointed Fruit Packing Instructor in the Fruit Branch of the Queensland Department on 17 January 1923. (QAJ, Vol. 19, February 1923, p. 152) Rowlands had had considerable experience in fruit packing previously in New Zealand as well as Tasmania. He prepared an illustrated bulletin on the commercial grading and packing of apples, pears, tomatoes and plums, which appeared in the Journal. (QAJ, Vol. 19, May 1923, pp. 387-408) He then travelled through the State fruit districts giving demonstrations and conducting classes for schoolchildren. The position of Fruit Packing Instructor in the Fruit Branch was abolished from 29 February 1924 and Rowlands was appointed Fruit Packing and Marketing Instructor for three years from 1 March 1924. The packing instructions given by him to growers and schoolchildren before his untimely death at the age of 35 years proved of great value in improving the marketing of fruit.

During the 1925–26 season a special officer was appointed to give instruction in fruit packing at Stanthorpe to replace Rowlands. On 23 December 1925 James Brownjohn was appointed Temporary Instructor in Fruit Packing and Grading for three months to replace Rowlands, and on 27 June 1929 James Henry Gregory was appointed Instructor in Fruit Packing on probation.

Benson also emphasised the need for cool storage of fruit and experiments were set in train to determine the best temperatures. He said that only high-quality fruit and only fruit which could be held for some time after release from the cool store should be stored. The fruit must be fully developed but not fully matured when stored. Selection of varieties which were good keepers was paramount and handling and packing must be done carefully. Preserving fruit for export could be done by drying, canning, jam making, pulping, candying and crystallising, cider making and producing sterilised fruit juice. (*QAJ*, Vol. 17, 1922, pp. 47–50) A dehydration plant was erected at Glen Aplin, where various fruits were successfully dried.

Joseph Mansfield Ward, Fruit Expert for Tasmania, who had previously visited Queensland and lectured in fruitgrowing districts and on two occasions had visited Brisbane in charge of a Tasmanian exhibit of apples, was appointed Chief Instructor in Fruit Culture in the Queensland Department of Agriculture and Stock from 1 June 1923. He advised the Stanthorpe growers to spray apples to control codling moth with an arsenate of lead spray before the closing of the floral calyx, again when the fruit was the size of a pigeon's egg, with a third spraying applied later. (*QAJ*, Vol. 20, October 1923, p.

327) His stay was very brief as he accepted the position of Director of Horticulture in Victoria on 2 December 1923. He published a series of articles on fruit culture in the January 1923 issue of the *Queensland Agricultural Journal*, beginning with peach culture.

Fruit fly. The Queensland fruit fly (*Dacus tryoni*) was causing considerable damage to stone fruit in the Granite Belt and on 11 February 1922 Hubert Jarvis of the Entomology group in the Department was appointed to investigate the fruit fly problem (see "Entomology"). A. H. Benson visited the Victorian Department of Agriculture concerning restrictions on the entry of Queensland fruit owing to the danger of introducing the Queensland fruit fly and a new arrangement was arrived at: the grower, on giving a certificate to the effect that the fruit had been sweated for seven days prior to forwarding, would not have his fruit rejected outright, only diseased fruit being discarded. To combat the codling moth and fruit fly two entomologists were stationed at Stanthorpe. (Benson, A. H., *Rep. Dep. Agric. Stk*, 1923–24, pp. 69–73) In 1925 seven temporary inspectors were employed during the fruit season to see that the regulations governing the gathering of fallen fruit and destruction of diseased fruit were carried out. (See "Stone and Pome Fruit Pests".)

Tomatoes

A Tomato Pool was constituted for the tomato-growing district of Stanthorpe and it operated from 8 January to 14 April 1923. It was successful and it was anticipated that it would continue. In February 1923 the Minister for State Enterprises, the Hon. W. Forgan-Smith, visited the Stanthorpe district and reported that the estimated crop under the Pool was 250 000 cases. Of these some 80 000 would be made into tomato pulp at Stanthorpe and the balance marketed as fresh fruit. He told the Stanthorpe Tomato Pool Board that the State Government had agreed to guarantee the pulping operations to the extent of £8000, pulping to commence in the next two weeks. (*QAJ*, Vol. 19, February 1923, p. 154)

The Bowen district, where the crop is harvested from May to October when southern producing areas such as Stanthorpe are too cold, had become a most important area for tomato production. At Bowen plants for the first pickings in May are set out in February and planting extends till July, with the main crop set out in May or early June. The Department produced the wilt-resistant varieties "Denisonia" and "Bowen Buckeye", which greatly extended the area under cultivation to the crop and attracted requests for seed from several overseas countries. An arrangement was made with J. T. Moore at Bowen to grow stud plots under Departmental supervision. Fertiliser trials using a complete mixture at 195 lb per acre produced 33 514 lb of tomatoes per acre from "Denisonia", with an average yield of 64.45 lb per plant. "Bowen Buckeye" yielded 29 354 lb per acre and 56.45 lb per plant. (Pollock, N. A. R., *Rep. Dep. Agric. Stk*, 1925–26, p. 31) During 1926–27 Pollock had success growing these wilt-resistant tomatoes on the Atherton Tableland during the summer months when it was too hot on the coastal areas.

As a result of a request from growers, A. H. Benson, Director of Fruit Culture, in November 1926 published an article in the *Journal* to be also reproduced in pamphlet form, dealing with all aspects of tomato culture. The tomato is always in season in Queensland. In the Bowen–Townsville and northern coastal districts, it is grown in winter and early spring; the Brisbane district provides a heavy spring and early summer crop; and this is followed by a summer and autumn crop from Stanthorpe. (*QAJ*, Vol. 26, November 1926, pp. 387–395)

Citrus

Citrus growing was stimulated by World War I and attention was given to improved culture by the appointment in 1920–21 of an Assistant Instructor in Fruit Culture to deal specifically with citrus fruit. Problems were fruit fly infestation, lack of care in manuring, spraying, pruning, cultivation and harvesting. (Benson, A. H., *Rep. Dep. Agric. Stk*, 1920-21, pp. 48–49)

In April 1926 Benson recommended the appointment of a citriculturist to supervise the citrus industry of Queensland and liaise with the Local Citrus Producers Associations. (*QAJ*, Vol. 25, April 1926, p. 371) At the same time Percy Rumball, the Poultry Instructor, recommended that fruit growers combine poultry with the fruit operations, and provided plans for setting such a sideline in operation. (*QAJ*, Vol. 25, April 1926, pp. 380–385)

In June 1927 George Williams, Director of Fruit Culture, declared that Queensland had raised the first entirely seedless orange of prime quality. (Williams, G., *Rep. Dep. Agric. Stk*, 1926–27, pp. 53–54) Cooperation in citrus research with growers at Flaxton, Palmwoods and Gayndah in the training of young trees, the use of fertilisers and the control of scale insects by cyaniding was arranged by Departmental officers.

Miscellaneous fruit

At the Bribie Island nursery pecan nuts and avocados had been acclimatised and thin-shelled Queensland nuts had been propagated. The avocado varieties were later transferred to the Banana Experimental Station at Pawngilly. Selection of good strawberry varieties from local sources and importation of seed from England and USA had been practised. A Strawberry Board was constituted by Order-in-Council dated 25 March 1929 as a result of a successful referendum amongst growers. The members of the Board were three elected growers' representatives, and the Director of Marketing. Selection of passionfruit varieties was practised at Bribie. Custard apples from Redland Bay were finding a ready market. Papaws were entering the southern markets in increasing quantities, and Cape gooseberries were being promoted.

Committee of Direction of Fruit Marketing

On 19 July 1923 a Fruit Growers Conference attended by over 100 delegates from Local Producers Associations was held in Brisbane to consider proposals for the reorganisation of the fruit industry, as recommended by a special committee of the Council of Agriculture. The Chairman of the Fruit Standing Committee (W. Ranger, B.Sc., Stanthorpe) presided and with him on the platform were the Director of Fruit Culture (A. H. Benson), State Trade Commissioner (W. H. Austin), the Director of the Queensland Producers' Association (R. L. Macgregor) and members of the Council of Agriculture. It was agreed that a Committee of Direction of Fruit Marketing be established and a Provisional Committee of Direction was appointed representing five sections—banana, pineapple, citrus, deciduous and "other fruits". (*QAJ*, Vol. 20, August 1923, pp. 96–101) (See The Fruit Marketing Organisation Act of 1923.) It was an organisation entirely separate from the Council of Agriculture and the Department of Agriculture and Stock. The Committee of Direction (C.O.D.) does not have complete ownership of the commodity

as do the Pools, but by "Direction" its legal powers can be applied to any crop or portion of any crop constituting a marketing problem—mainly the control of the factory portion of the crop.

An Order-in-Council constituted the first Committee of Direction of Fruit Marketing for twelve months from 12 June 1924. Its members were:

- Banana Sectional Group Committee—William Alexander Cathcart, Landsborough, and William Bede Christie, Currumbin;
- Pineapple Sectional Group Committee—Joseph James Thomas, Montville, and William Chataway, Cleveland;
- Citrus Sectional Group Committee—Leslie Garforth Swain, Flaxton, and James Collins, Redland Bay;
- Deciduous Sectional Group Committee—Jack Stephen Mehan, Broadwater, and David Pfrunder, Applethorpe;
- Other Fruits Sectional Group Committee—Clement Charles Boulter, Bowen;
- Nominee of the Council of Agriculture—Richard Lewis Macgregor, Brisbane.

In July 1925 a deputation representative of the Fruit Standing Committee of the Council of Agriculture, whose personnel were T. M. Ruskin (Chairman), J. A. Granside, T. W. McEwan, C. Batman and C. W. Fielding, approached the Hon. W. Forgan-Smith to ask that the Fruit Branch of the Department of Agriculture be reorganised and that experts be appointed for the citrus, deciduous, pineapple and banana sections of the industry. (*QAJ*, Vol. 24, August 1925, p. 201)

The appointment of three permanent assistant instructors for Stanthorpe and six temporary seasonal inspectors and two permanent instructors for coastal districts during 1924–25 allowed assistant instructors to specialise in individual major fruit crops. Cooperation between the Department, the University and the growers in combating the fruit fly was also attained.

Examinations for Inspectors under the Diseases in Plants Acts

During 1928–29 the Chief Entomologist (R. Veitch), the Agricultural Chemist (J. C. Brünnich) and the Director of Fruit Culture (G. Williams) conducted the examinations for appointments under the Diseases in Plants Acts, and Instructors, Senior Instructors and other necessary personnel were selected.

Drought and fodder conservation

The 1925–26 drought was very severe and farmers were again found wanting in conserved fodder. Agricultural Bank loans were available but cheaper money was evidently sought. Many sheep were moved to agistment—some 1 000 000 sheep were taken to the Cloncurry area from the Central districts for agistment. The Registrar-General gave the number of sheep in the State on 1 January 1926 at 20 663 323, and at 1 January 1927 at 16 880 772, the decrease being 3 802 551. But if the natural increase of 1926, approximately 2 000 000,

were taken into account, the loss would be estimated at 3 802 551 plus 2 000 000, or 5 802 551. Cattle decreased from 6 436 465 for 1925 to 5 464 845 for 1926. (Cory, A. H., *Rep. Dep. Agric. Stk*, 1926–27, p. 135)

Maize grain for drought feeding sheep was in heavy demand from the Atherton Tableland Maize Board and Pollock, the Northern Instructor in Agriculture, recommended feeding 2 parts of linseed oil cake to 10 parts of maize at the rate of 6 to 9 oz per sheep per day. (*Rep. Dep. Agric. Stk*, 1925–26, p. 27)

Fodder conservation

Fodder crop trials for dairying and pigraising were carried out in north and south Queensland from 1920 onwards, concentrating on winter fodders such as oats, wheat and barley with leguminous crops such as field peas, tares and vetches. Pig fodders tried were winter root crops (mangels, swedes and carrots) and winter-growing succulents—silver beet, kale, rape and cabbage. Fodder crop trials were in the charge of C. S. Clydesdale, Assistant Instructor in Agriculture for southern Queensland, and during 1921–22 he had cooperative trials with farmers at Yandina, Bridges and Beaudesert. The drought of 1922 stimulated more interest in fodder conservation but there was little growth in fodder crops to enable fodder to be saved. Clydesdale and his assistant actively canvassed dairying areas in 1923 to demonstrate silage making.

In 1925–26 Quodling reported dismay at the lack of fodder conservation and waste due to uncovered stacks and deplored the lack of silos to take failed maize crops. Some new silos had been erected in the Dawson Valley. Money was available from the Agricultural Bank for this purpose. (*Rep. Dep. Agric. Stk*, 1925-26, p. 15)

The three Instructors in Agriculture—A. E. Gibson (Southern), G. B. Brooks (Central) and N. A. R. Pollock (Northern)—seized every opportunity to encourage fodder conservation in the form of silage and hay. Headway with silage was very slow, the farmers generally feeling that the cost of labour was the main problem. After the 1926 drought there was a prolific growth of pastures and crops and Gibson secured the cooperation of H. Muller at Harrisville where a crop of saccaline sorghum was cut and ensiled in the presence of dairy inspectors from Beenleigh, Brisbane, Esk and Harrisville, so that they could carry the message and the expertise to farmers in their districts. Following a request by the Economic Committee that certain investigations be made into the cost of dairying on the Darling Downs, the Supervisor of Dairying (C. McGrath) and A. E. Gibson visited the Oakey, Pittsworth, Warwick and Toowoomba districts and reported thereon. (Gibson, A. E., *Rep. Dep. Agric. Stk*, 1926–27, p. 24)

Fodder for the far west

Pollock wrote on fodder:

Attempts in growing fodders for conservation or otherwise on the rolling downs country of the North, where sheep are almost wholly depastured, have been conspicuously absent. The only months in which success with crops under a natural rainfall would be possible are from December to March or April. Mr. A. B. Docker of "Blairmoor" some 38 miles westwards of Olio in the western district, had previously some success in experiments with sorghums, including Sudan grass, and was able under irrigation by natural gravitation from a bore drain to

provide a certain amount of sorghum during the latter part of 1926 to feed to his sheep. (Pollock, N. A. R., *Rep. Dep. Agric. Stk*, 1926–27, p. 30)

Pollock reviewed the fodder scene in "Dry Season Safeguards for the Grazier" in 1927, including the making of bush hay from native grasses on the Western Mitchell grass downs and on near coastal areas. (*QAJ*, Vol. 27, May 1927, pp. 410–429)

Pastures

Elephant grass or Napier grass (*Pennisetum purpureum*) attracted some attention from dairy farmers because of its high yields. J. C. Brünnich, the Agricultural Chemist, analysed various stages of growth and found that only very young growth was of good quality, later growth being of less value than sorghum, sudan grass or sugar cane tops, and about equal to cowcane. In these early days heavy dressings of nitrogen fertiliser to grass were unusual. Elephant grass, however, was free from hydrocyanic acid. It was tested for pulping purposes but found to be of limited value. (Brünnich, J. C., *QAJ*, Vol. 16, July 1921, pp. 6–8)

Pollock drew attention to the value of *Stylosanthes humilis (mucronata)*, or wild lucerne, of the Townsville district, as a fodder. He had trials "in all my districts as far out as Burketown, where it is reported to be doing well. It is proving of immense value to the North Queensland coast, as a mixture in pasturage, but, unfortunately appears to be of annual habit. A perennial would be worth a good deal more. A figure of this plant will be found in this *Journal* for August 1913." (Pollock, N. A. R., *QAJ*, Vol. 16, August 1921, p. 103)

Although Red Natal grass (*Rhynchelytrum repens*) was hailed as a valuable grass in the early days of the Department, by 1921 its true value had been assessed—it was palatable and eagerly sought after but was too easily pulled out and disappeared under grazing. (White, C. T., *QAJ*, Vol. 16, August 1921, p. 114)

When Brooks summarised the existence of introduced pasture grasses in 1921, about 40 000 acres of introduced grasses were sown in the district; of this 95 per cent was Rhodes grass, sown in cleared scrub country, the remainder being paspalum, para grass, *Chloris virgata*, guinea, prairie, Toowoomba canary grass, Red Natal grass, buffalo and Kikuyu (introduced into Australia in 1919). (*QAJ*, Vol. 16, October 1921, pp. 242–244)

In his annual report to June 1923, C. T. White, Government Botanist, made a plea for the appointment of a Departmental agrostologist to carry out field experiments with grasses and forage plants and generally to advise farmers on the best means of laying down pastures or improving old ones. Some of the problems he could deal with would be:

- 1. the eradication of sour grass or yellow grass (*Paspalum conjugatum*) on the Atherton Tableland;
- 2. the improvement of worn-out pastures on the Darling Downs and near west;
- 3. the possible improvement of poor coastal tracts with grasses and legumes;
- 4. introduction, distribution and trial under cultivation of new grasses and forage crops;

- 5. the collection, cultivation and trial of native grasses and fodders and their possible improvement;
- 6. the trial, by feeding experiments, of plants suspected poisonous or harmful to stock. (White, C. T., *Rep. Dep. Agric. Stk*, 1922–23, p. 97)

In the early 1920s sour grass (*Paspalum conjugatum*) was over-running the Millaa Millaa and Ravenshoe country and White suggested that the grass be smothered by sowing *Leucaena leucocephala*, Kikuyu or elephant grass, and velvet bean (*Stizolobium deeringianum*).

The *Paspalum dilatatum* pastures throughout Queensland were losing their productivity owing to the formation of a dense sod which inhibited air and water penetration, and also to declining fertility. During 1924–25 C. S. Clydesdale initiated renovation experiments at Maleny and Cooroy. Ploughing and the application of fertilisers had a stimulating effect, greatly increasing productivity. (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1924–25, p. 17)

During 1924–25 a heavy crop of the annual Phalaris minor yielded 1.75 tons of hay per acre at Hermitage State Farm. On the Atherton Tableland black medic (Medicago lupulina), an annual, appeared on McGeeham's farm at Kairi and grew very well. It was brought in in hay from southern Australia and Pollock had it identified. He also reported that Stylosanthes mucronata, which had appeared around Townsville twenty years earlier and had been distributed by him in several districts and by seed falling from railway carriages, now could be found from Proserpine to Princess Charlotte Bay, at Mareeba and Atherton "so that it may be expected shortly to become universal in the pasturages there and to spread to drier areas". A large plant of this so-called "Townsville lucerne" (Stylosanthes humilis) was exhibited in the Agricultural Department's exhibit at the Royal National Show in August 1925. Pollock also sowed pearl millet, which did well under grazing at Charters Towers and as cut fodder at Malanda, and horse gram (Macrotyloma uniflorum); the latter was "fine in the vine and gives promise of being a useful addition to Northern legumes". Pollock realised the need to renovate pastures on the Atherton Tableland but said much of the pasture land was too steep-perhaps a rototiller might handle some of it. (Pollock, N. A. R., Rep. Dep. Agric. Stk, 1924–25, pp. 25–28)

In 1927 Pollock drew attention to the deterioration of natural pastures, including the disappearance of naturally occurring legumes, and recommended rotational closure of paddocks on pastoral properties to allow pastures to regenerate. He pointed out that adequate land tenure was needed in pastoral areas to attempt improvement. (*QAJ*, Vol. 27, May 1927, p. 429)

Pollock also drew attention to the need for bush hay conservation on the Mitchell grass downs in western Queensland. A sample from "Stanley Downs", Stamford, made up of Mitchell grass, Queensland blue, *Panicum decompositum* and Flinders grass plus herbage, contained 8.3 per cent protein in the dry matter. Pollock agreed that the tussocky nature of the grass and the thin stand yielded less than would normally be expected. He also drew attention to the presence of "Feathertop", *Aristida leptopoda*, in the rolling Downs pastures, the seeds of which were a menace to wool, and to *Psoralea cinerea*, a valuable native legume, along with *Rhynchosia* and *Glycine* spp. (*QAJ*, Vol. 29, April 1928, p. 302)

By June 1928, the Under-Secretary wrote:

Top-dressing of pastures is a subject of continuous research, but from an analytical standpoint results so far have been largely negative. As a counter to the effect of these findings and as a measure of economy, the more extensive use of suitable stock licks is generally advocated. Grass experiment plots have been established in suitable localities and on these a number of imported grasses, including the South African varieties of Woolly Finger grass (*Digitaria eriantha* var. *stolonifera*) and Perennial Veldt grass are being tested. (*Rep. Dep. Agric. Stk*, 1928–29, p. 4)

The Manager of the Home Hill State Farm, Mr Munro, planted pasture seeds provided by Pollock on 6 March 1929. They included Panicum purple buffalo grass, *Panicum maximum* (fine stem Guinea grass), *Setaria aurea, Brachiaria humidicola, B. brizantha, Urochloa trichopus, Paspalum scrobiculatum* and *Themeda triandra*, with legumes *Glycine javanica* and *Indigofera* sp. *Brachiaria humidicola. B. brizantha, Urochloa trichopus* and *Themeda triandra* failed to germinate, but the others grew well. (*Rep. Dep. Agric. Stk*, 1928–29, p. 22)

Two acres of land were made available by Archer Bros. of Archer for pasture experiments and Brooks, Senior Instructor in Agriculture, Central Division, made sowings of the following species during December 1928 and March 1929:

Summer species: Rhodes grass (*Chloris gayana*), Woolly top rhodes (*C. virgata*), Purple Top Rhodes (*Chloris barbata*), Paspalum (*Paspalum dilatatum*), Carpet grass (*Axonopus compressus*), Russell River grass (*Paspalum paniculatum*), Kikuyu (*Pennisetum clandestinum*), Buffel grass (*Cenchrus ciliaris*), Para grass (*Brachiaria mutica*), Blue couch (*Digitaria didactyla*), Couch grass (*Cynodon dactylon*), Blue grass (*Dichanthium nodosum*), and indigenous Curly Mitchell (*Astrebla lappacea*), Barley Mitchell (*A. pectinata*), Bull Mitchell (*A. squarrosa*), Satintop (*Bothriochloa erianthoides*), Queensland Blue grass (*Dichanthium sericeum*), Coolah grass (*Panicum coloratum*), Bulbous panicum (*P. bulbosum*), Shot grass (*Paspalidium globoideum*), Early Spring Grass (*Eriochloa punctata*) and Parramatta grass (*Sporobolus capensis*).

Winter growing species: Perennial veldt grass (*Ehrharta calycina*), Toowoomba canary grass (*Phalaris tuberosa*), Lesser Canary grass (*Phalaris minor*), Prairie grass (*Bromus unioloides*), Bulbous poa (*Poa bulbosa*) and the legumes - Lucerne (*Medicago sativa*), Berseem clover (*Trifolium alexandrinum*), Button medic (*Medicago orbicularis*), King Island melilot (*Melilotus indicus*), Burr medic (*Medicago polymorpha*), Black medic (*M. lupulina*), Subterranean clover (*Trifolium subterraneum*), Alside clover (*T. hybridum*), White clover (*T. repens*), Red clover (*T. pratense*), Crimson clover (*T. incarnatum*), Strawberry clover (*T. fragiferum*), Birdsfoot trefoil (*Lotus corniculatus*), Greater lotus (*L. uliginosus*) and Korean lespedeza (*Lespedeza stipulacea*)

Kikuyu, Rhodes, buffel, para, blue couch and the native grasses did very well. Of the winter grasses, Toowoomba, canary grass, lesser canary, prairie grass and Wimmera rye performed well. Of the legumes, Subterranean clover was very good. Berseem clover, button medic and King Island melilot did well.

Wallum lands. In connection with later pasture research it is interesting to note that in 1928 the Maryborough Chamber of Commerce, which had frequently contacted the Department

regarding the possible use of the Wallum lands for agriculture, suggested that they might be used for tobacco growing. Mr Stagg, in charge of Commonwealth Tobacco Investigations, Dr Darnell-Smith, New South Wales Government Pathologist, and A. E. Gibson, Departmental Instructor in Agriculture, inspected Susan Creek and Boonooroo Plains and decided the lands were unsuitable for tobacco production. (*Rep. Dep. Agric. Stk*, 1928–29, p. 29)

Lucerne

Lucerne hay and chaff were always in demand for feeding dairy cows and horses and were regarded as the "King of Fodder". Ample moisture was required to grow the crop for this purpose and where irrigation was possible and economic it was adopted. In drier areas lucerne was adopted for grazing by dairy cattle and British-bred sheep and fat lambs. There was always the danger of "bloat" amongst dairy cattle and the use of the knife or trocar and cannula was the main relief for bloated cattle at that time. "Hunter River" was the sole variety planted.

Weeds

Pollock instituted experiments in the control of ink weed (*Phytolacca octandra*) on newly cleared scrub areas in the tropical rain forest areas of Queensland in January 1928, with the help of R. A. Tarrant, Field Assistant. Roberts's prickly pear poison killed the weed but the cost, £3 8s 9d per acre, was considered uneconomic, especially as the dead inkweed was superseded by Billygoat weed (*Ageratum haustorianum*), a weedy annual. Arsenic pentoxide killed young inkweed at a cost of 5s 6d to 5s 8d per acre without the cost of labour, and it was not sure whether accompanying grasses had been killed. (*QAJ*, Vol. 30, December 1928, pp. 587–88)

Weeds were displayed at the Royal National Exhibition in August 1928:

A representative collection of weeds was a very interesting feature of the Departmental Court. Many of these weeds have been introduced with seeds of economic plants from abroad, and so demonstrate the necessity for the Pure Seeds Act now in force in the State and through which the farmer is well protected. Some have been introduced with straw packing; others, such as Khaki weed, with imported fodders; others, such as the Wild Heliotrope and the Billy Goat weed and Lantana, were imported as garden plants; and others again, such as the Box Thorn and Prickly-pear, for hedge-making. Some, such as the Galvanised Burr, are native plants, which, being left untouched by stock and seeding freely, have taken possession of some Western pastures and stock routes to the exclusion of useful grasses and herbage. Among the collection were some of these, such as the Mustard weed and Fish weed, that give a very offensive taint and taste to milk and butter. Some, such as the Thorn Apple or Stramonium and the Stagger weed, are known to be poisonous or harmful to stock. The question of plants poisonous or injurious to stock is one of the most complex that faces the veterinarian and chemist alike, and one that calls for searching scientific investigation in the State. Representative specimens were shown of the White wood, now regarded as the cause of "Walkabout" in horses in North Queensland, the Northern Territory, and the Kimberley district of Western Australia; the Heart-leaf or Desert Poison Bush; Lantana, which causes the disease known as "Pink-nose" in cattle; Caustic Creeper; and the Fuchsia Bush, which contains a prussic-acid-yielding glucoside. Farmers were informed of the willingness of the Department to report free of charge on any specimens of weeds, suspected poisonous plants, and other growths submitted by them. (*QAJ*, September 1928, p. 239)

Land settlement

During 1923–24 officers of the Department of Agriculture and Stock joined with those of the Lands Department in a committee to deal with land settlement schemes. Several inspections of proposed lands were done, and reports on their qualities and capabilities were furnished. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1923–24)

In 1924–25 H. C. Quodling, Director of Agriculture, acted on a Land Settlement Committee which dealt with upwards of 2000 applicants. He also helped to prepare information on agricultural possibilities for an informative publication dealing with the areas in question. Under the above schemes, several hundred new settlers were added to the State's quota in the first six months of 1928.

Electro-culture

During 1927 and 1928, A. E. Gibson, Senior Instructor in Agriculture, Southern Division, experimented with electro-culture to determine whether any advantage was obtainable from the use of Christofleau's apparatus, "it obviously being the duty of this Department to carry out tests for the protection of the farming community and to prevent possible exploitation". Gibson reported:

The tests having conclusively proved that the claims put forward by the inventor of the process were not capable of substantiation, it was deemed advisable to bring the tests to a conclusion and with this view the apparatus was dismantled and returned to the Australian Distributors, Messrs A. Truchet and Sons, Perth, West Australia. (*Rep. Dep. Agric. Stk*, 1928–29, p. 27)

Crop protection

Entomology

The major entomological problems encountered and investigated by Departmental staff in the early 1920s were the cane grubs in sugarcane, the fruit fly in stone and other fruit, the codling moth in apples, the corn earworm in cotton and maize, the banana weevil borer and rust thrips, and scale insects and the bronze orange bug in citrus. Minor problems were beetle borer and termites in sugarcane, lawn grubs, webworm, coccids and army worms in grasses, the ironbark sawfly, the leaf-eating ladybird, the Rutherglen bug and the blue oat mite.

In the Queensland Agricultural Journal of August 1921 it was announced:

A chart of vegetation diseases and insect pests, illustrated in colour, is on sale at the Department of Agriculture and Stock, Brisbane, at the nominal price of 2s 6d. The chart is suitable for framing and should be a useful adornment for the walls of schools and meeting places of public bodies.

Henry Tryon, appointed Government Entomologist in 1894 and later Entomologist and Vegetable Pathologist, assembled a considerable amount of unpublished and published information on all manner of vegetable pests and diseases almost single-handed until 1920. But then staff numbers were increased to deal with special problem areas and Tryon kept a

fatherly eye on the new arrivals, as well as being deeply involved himself until Robert Veitch was appointed Chief Entomologist on 15 May 1925. Tryon retired as Entomologist and Vegetable Pathologist on 31 December 1925, but was retained as Temporary Vegetable Pathologist till 30 June 1929.

Tryon had welcomed the despatch of insects and other specimens to him for identification from all parts of Queensland, and Veitch further encouraged the practice. In the May 1926 *Journal* he described how specimens should be captured, killed and suitably mounted, and, together with a sample of the damage caused and a full account of the nature, extent and duration of the outbreak, forwarded to the Department, preferably in the early stages of the attack. Special notes for infested fruit etc. were added. (*QAJ*, Vol. 25, May 1926, p. 425)

Sugarcane pests

The control of cane grub investigations was in the hands of Dr F. J. Illingworth of the Bureau of Sugar Experiment Stations. The cane grubs included the greyback beetle (*Dermolepida albohirtum*), *Lepidiota frenchii, Anoplognathus boisduvali, Anomala antigua* and *Lepidiota rothei*, but the greyback was the major problem. A Tachinid parasite (*Lixophaga sphenophori*) had spread widely since its release in 1920 at Mooloolaba. Arsenic at 80 lb per acre had a controlling influence at Greenhills Estate.

Edmund Jarvis had been transferred to the Sugar Bureau especially to tackle the cane grub. By July 1923 he was able to report the success of paradichlorobenzene as an effective fumigant against the grubs. (*QAJ*, Vol. 20, July 1923, pp. 15–16) It was first used at Gordonvale from February to April 1915, the first trial with this material in sugar-growing countries. In 1924 treated cane yielded 27.2 tons per acre, while untreated cane yielded 14.0 tons per acre. (*QAJ*, Vol. 29, February 1928, p. 97) Some success was also achieved with carbon bisulphide. Jarvis published coloured plates of the various sugarcane beetles in 1924 (*QAJ*, Vol. 21, April 1924, p. 324) and their life histories occupied a good deal of research time. (*QAJ*, Vol. 16, July 1921, pp. 46–50)

Dr Illingworth had success with Tachinid fly (*Lixophaga sphenophori*) parasites of the sugarcane beetle borer (*Rhabdoscelus obscura*). These were bred at the Meringa laboratory. On 22 May 1925 R. W. Mungomery, Assistant Entomologist, released these at South Johnstone and Babinda. In June 1921 Illingworth reported a giant termite (*Mastotermes darwiniensis*) attacking cane in the sandy Burdekin soils. (*QAJ*, June 1921, p. 281)

Stone and pome fruit pests

The Queensland fruit fly (*Dacus tryoni*) was the main insect problem associated with stone fruit, although it also affected several other fruit, while the codling moth (*Cydia pomonella*) was destructive in apples during the decade under discussion.

The Queensland fruit fly was causing so much concern that the growers asked the Government for amending legislation to the Diseases in Plants Acts to provide for the payment of an annual orchard registration fee in all fruit districts to provide funds to employ more inspectors to ensure that orchardists kept their trees or fruit-producing plants clean and free from disease.

In February 1921 tests conducted by Henry Tryon (Entomologist and Vegetable Pathologist) and A. H. Benson (Director of Fruit Culture) with Harvey's fruit fly lure were completed, proving that the lure was useless in attracting the true fruit fly (*Dacus tryoni*).

On 11 February 1922, Hubert Jarvis of the entomological staff of the Department was appointed to investigate the fruit fly problem in the Granite Belt. His first monthly report (12 February to 12 March 1922) was published in the *Queensland Agricultural Journal* for May 1922. He recorded the appearance in time and place of egg oviposition on peaches, the hatching of the maggot and the numbers involved, the pupa and the adult fly. He made a collection for future research, which he suggested should cover:

- 1. the depth to which the maggot will penetrate the soil;
- 2. the longevity of the adult fly;
- 3. the duration of the pupal stage during the winter months;
- 4. the possibility of breeding the fly during the winter;
- 5. in which stage or phase of its development the fly overwintered, and where.

Meanwhile, he recommended collection of all infested fruit and destruction by boiling, burying or burning—preferably boiling. Burning was later proved unsatisfactory. As a prelude to Jarvis's second report in June 1922, Tryon recorded that he had released in the Stanthorpe district a Braconid wasp parasite (*Diachasma tryoni silvestri*) that he had first recorded in 1892 and that was taken by F. Silvestri to Honolulu where it was used successfully against the coffee fruit fly. Subsequent reports from Hubert Jarvis indicated the larvae of the fruit fly needed darkness to pupate, preferred to pupate in soil, and could be killed in fruit by cold storage. Cooperation with Froggatt, Chief Government Entomologist of New South Wales, in discovering the overwintering of the fruit fly was sought by Hubert Jarvis in June 1922 and a joint survey of New South Wales orchards adjacent to Queensland was made. Surveys in the Toowoomba district showed that loquat fruit contained the larvae on October 11. Oranges taken into the Granite Belt were also found to be infested, suggesting that rigid control of fruit movements would be necessary.

On 1 July 1922, F. A. Perkins, a research scholar financed by the Queensland University and the Stanthorpe Fruit Growers' Association, went to Stanthorpe to carry out research on the Queensland fruit fly and there was local collaboration and exchange of ideas.

In January 1923, Hubert Jarvis recorded fruit fly in early cherries and apples at Stanthorpe and studied egglaying habits. This research showed the need to collect and destroy infested fruit and undertake trapping of the fly early in the season, and to inspect fruit trees in home gardens in the Stanthorpe area.

Perkins suggested that all fruit (except grapes and tomatoes) should be sent out of the Granite Belt by 7 April to ensure freedom from the fruit fly in the area in the spring, and a Proclamation was issued to this effect on 1 March 1924. In July 1925, Hubert Jarvis stated that this practice was unsuccessful. However, the cold storage requirement before despatch for all fruit coming into the district from Brisbane and its subsequent inspection at Warwick before going south had been effective.

It was shown that alternate hosts of the fruit fly, especially native fruits such as the native pomegranate (*Capparis mitchellii*), were an important source of infestation, and the migration
or immigration of the adult fly from outside areas into the Granite Belt was the principal source of the yearly infestation by fruit flies. (*QAJ*, Vol. 24, July 1925, pp. 48–52)

A "Fruit Fly" Week was organised by Professor E. J. Goddard of the Queensland University (he was in charge of the University research plan for fruit fly control) in cooperation with the Department of Agriculture and Stock and the Department of Public Instruction during November 1924. Its object was to inform State school children in the Granite Belt of the life history and habits of the Queensland fruit fly. At every school in the district a daily lesson was given on the fruit fly, its life history, the meaning of the fruit fly campaign and recommendations for checking any local invasion. (*QAJ*, Vol. 25, November 1924, p. 339)

On 17 June 1925 a Conference attended by W. B. Gurney (Government Entomologist, New South Wales), W. J. Allen (Chief Instructor in Fruit Culture, New South Wales), F. A. Perkins (Entomologist, Queensland University), T. W. Lowry (Chief Inspector of Fruit, Stanthorpe), J. Henderson (Instructor in Fruit Culture), S. M. Watson and Hubert Jarvis was held at Stanthorpe to discuss all aspects of the fruit fly problem. (*QAJ*, Vol. 24, September 1925, p. 235)

In April 1926 Hubert Jarvis reported that Dr Bancroft had bred the Queensland fruit fly from the native passion vine, *Passiflora aurantia*, at Emerald, but he himself had proved that the fruit fly could overwinter at Stanthorpe, though this was not an important factor in annual infestations. In August he published an article in the *Journal*, accompanied by an excellent colour plate prepared by I. W. Helmsing, Illustrator, Science Branch.

The Assistant Entomologist, S. M. Watson, was transferred from Brisbane to Stanthorpe to assist in fruit fly investigations from 13 August 1927. Hubert Jarvis also gave some attention to the codling moth (*Cydia pomonella*) and the woolly aphis parasite (*Aphelinus mali*) during this period and published information in the August 1926 Journal. New laboratory facilities had been provided by the Department at Stanthorpe during 1926–27.

Banana pests

In September 1921, John L. Froggatt, Entomologist in charge of Banana weevil borer (*Cosmopolites sordidus*) investigations, published his first report in the *Journal* dealing initially with the pest's life history and feeding habits (*QAJ*, Vol. 16, September 1921, pp. 200–208); in his second report (*QAJ*, Vol. 17, January 1922, pp. 39–45) he recommended baiting old corms with Paris green as a means of control. In 1926 Robert Veitch received from Java a colony of beetles (*Plaesius javanus*), which were predators on the banana weevil. Froggatt liberated the colony at Yandina for trial. (*QAJ*, Vol. 25, May 1926, p. 485) The Committee of Direction of Fruit Marketing offered a reward of £5000 for an economic control measure for the pest.

The banana rust thrips (*Chaetanaphothrips signipennis*), which had occurred at Chatsworth near Gympie causing the area to be quarantined, was under study in north Queensland and some success was achieved by covering the bunches with stockingette bags. In January 1927 Froggatt advised dusting with calcium cyanide for thrips control. (*QAJ*, Vol. 27, January 1927, pp. 67–72) Meanwhile, from May 1927 to September 1928, A. A. Girault was engaged in a taxonomic study of Australian thrips (*Thysanoptera*),

publishing his papers in the *Queensland Agricultural Journal* during that period. During 1926–27 J. A. Weddell and Miss Temperley investigated the plague of banana-fruit-eating caterpillars, and in January 1928 Froggatt summarised in the *Journal* the current status of banana insect pests.

In connection with the study of parasitic wasps, Girault also did a good deal of taxonomic work on parasitic Hymenoptera. (Veitch, R., *Rep. Dep. Agric. Stk*, 1926-27, pp. 69–70)

Cotton pests

The corn earworm (*Heliothis armigera*), reported as a pest of maize in Queensland and described by Henry Tryon in 1899, became abundant in cotton over the 1922–23 summer and Tryon released a press report in the *Queensland Times* on 17 January 1923. He recommended that maize be used as a trap crop to attract the insects away from cotton, that early-maturing cotton varieties be planted, that cultivation be clean, and that possible parasites be searched for. A little later in 1923, W. A. T. Summerville, Assistant Entomologist, reported a Braconid fly (*Microplitis nigripennis*) parasitising the caterpillar near Ipswich. The corn earworm was reported by Robert Veitch in December 1927 as also affecting tomatoes.

E. Ballard, Commonwealth Cotton Entomologist, working in collaboration with Departmental officers published two pamphlets for the Home and Territories Department for circulation in Papua and Mandated Territories, entitled "The Pink Boll Worm" (*Platyedra gossypiella*) and "Cotton Stainers". These were reproduced in the *Queensland Agricultural Journal* in January 1926. In 1927 Ballard wrote "Cutworms in Cotton".

Citrus pests

Henry Tryon visited the citrus groves at Mapleton in January 1923 at the request of the Mapleton Local Producers' Association to investigate the bronze orange bug (*Musgravia suleiventris*), presenting a detailed report which was subsequently published. (*QAJ*, Vol. 19, February 1923, pp. 103–109) He recommended beating the branches and destroying the fallen bugs.

Grass pests

After visits to the Atherton Tableland by Dr Illingworth in September–October 1920 and by A. P. Dodd in March–April 1921, moths of larvae destroying grass roots were collected and identified by Dr A. J. Turner of Brisbane as being *Oncopera mitocera*, the flatheaded pasture webworm, which normally attacked tree roots but adapted to pasture feeding after scrub clearing. (Dodd, A. P., *QAJ*, Vol. 16, August 1921, pp. 79–81)

In November 1921 Tryon published a detailed article on the caterpillar plague, chiefly *Mythimna convecta* and *Spodoptera mauritia*, the lawn armyworm larvae feeding on grasses, and crops of oats, rye, barley, wheat, maize and sorghum. He suggested control by Paris green baits laid in the path of the caterpillar. (*QAJ*, Vol. 16, November 1921, pp. 331–349) During 1926–27, W. A. T. Summerville investigated the Coccidae attacking plant roots, and also discussed the prevalence of mealy bugs attacking paspalum in the Cooroy district in November 1926. They spread during the next two years along the

northern slopes of the area. Some control was effected by natural enemies, and burning and then ploughing affected areas in rotation was suggested to rejuvenate the pasture.

Timber pests

In September 1922 Tryon described the silverleaf ironbark sawfly (*Lophyrotoma analis*), which feeds on the ironbark leaves. Larvae, when full-grown, accumulate at the base of the tree in July and form cocoons if they enter the ground. Cattle have a craving for these and eat the dead larvae in quantity. The adults emerge from the ground in August. Death of the cattle eating the dead larvae is the result of poisoning. Destruction of opossums enhances sawfly numbers. The problem was very prevalent in the Maranoa district in 1911, 1913, 1914 and 1921. (*QAJ*, Vol. 16, September 1921, pp. 208–216) Interestingly enough, in July 1929 a portion of Warrinilla holding, north of Injune, was declared an animal and bird sanctuary because opossums therein were doing valuable work in the destruction of the caterpillars of the sawfly, which poisoned many stock in the district. (*QAJ*, Vol. 31, July 1929, p. 10)

Miscellaneous insects

In June 1927 Hubert Jarvis dealt with the San José scale insect (*Comstockaspis perniciosus*). J. H. Smith described the blue oat mite in February 1928, and published a detailed study of the life history of the Rutherglen bug in the *Queensland Agricultural Journal* in April 1927.

Miss Temperley discussed the leaf-eating ladybird (*Henosepilachna vigintioctopunctata*) in July 1928, the article being illustrated with colour plates prepared by I. W. Helmsing. During 1926–27 Helmsing prepared twenty-one pen and ink plates, four coloured plates, two maps, and four exhibition cases, each containing seven figures in colour.

Plant pathology

Henry Tryon was appointed Government Entomologist on 1 August 1894 but such was his scholarship that he was given the additional oversight of plant diseases in 1902, under the title Entomologist and Vegetable Pathologist which he held until his official retirement on 31 December 1925. He was retained as Temporary Pathologist after his retirement, until June 1929. He handled all manner of plant diseases and also assisted with some animal diseases during an illustrious scientific career.

John Howard Simmonds, B.Sc., also began his Departmental career as Assistant Entomologist to Henry Tryon and was promoted to Plant Pathologist on 1 January 1926 for a period of five years. Roy Bilbrough Morwood was appointed Assistant Plant Pathologist on 1 January 1926. Professor E. J. Goddard and Dr D. A. Herbert of the Queensland University staff acted as consulting plant pathologists to the Department.

During the 1926–27 season a disease previously unrecorded in Queensland caused serious losses in tomatoes. It first appeared in Victoria in the 1915–16 season and was later described by C. J. Battlebank, who named it "Spotted Wilt". By 1927 it had been found in all States and in Queensland it was mainly prevalent near Brisbane, causing up to 50 per cent crop loss. It is probably caused by a virus. J. H. Simmonds, Plant Pathologist,

recommended burning infected material and spraying to control sucking insects which might disseminate the disease. (*QAJ*, Vol. 28, July 1927, pp. 28–30) Simmonds dealt with Irish Blight in potatoes in the November 1927 *Journal*, and Veitch discussed root knot or nematode root gall in the December 1927 issue.

In July 1928 Tryon summarised pineapple disease investigations in an interim report (*QAJ*, Vol. 30, July 1928, pp. 26–32), dealing with:

- i. agencies (generally harmful) including top rot, base rot, chloris or leaf pallor, root tangle, wilt, club rot (caused by a nematode, *Heterodera radicicola*), White soil fungus, bottleneck;
- ii. agencies injuring the fruit such as fruitlet core rot, brown rot, black spot etc., sun scald, cripples, fruit storage rots (*Thielaviopsis paradoxa*), watery core;
- iii. injurious insects such as root-destroying beetle larvae (Scarabaeidae), mealy bug or white louse (*Pseudococius* spp.) and the pineapple scale insect (*Diaspis* sp.). (*QAJ*, Vol. 30, July 1928, pp. 26–34)

In 1928 Simmonds reviewed diseases in Queensland bananas including bunchy top, leaf spot, panama disease, dry rot, fruit rots (stem end, anthracnose, cigar end and squirter). (*QAJ*, Vol. 30, November 1928, pp. 438–457)

A widespread occurrence of flag smut (*Urocystis tritici*) was found in all wheat-growing districts during 1928–29. The Director of Agriculture, Quodling, had an urgent meeting with the Wheat Board and Simmonds wrote a leaflet describing the disease so that growers could take the necessary steps to burn all wheat stubble immediately after harvest to control the disease. A comprehensive series of experiments was laid out by the pathologists at the Roma State Farm in cooperation with field officers to investigate the disease and its control. (*Rep. Dep. Agric. Stk*, 1928–29, p. 15)

The animal industries

Native fauna and birds

The Department administered the Acts relating to native fauna and birds, declaring sanctuaries and open seasons for hunting and generally protecting the useful native fauna and bird populations. The Under-Secretary drew attention to the need to register all dealers in birds and animals, with power to regulate the business. Too many native birds and fauna were being destroyed. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1920–21, p. 18) Inspection of aviaries was instituted during 1928–29 and some three hundred were registered in the metropolitan area. Supervision of these aviaries was responsible for a marked improvement in the conditions under which native birds were kept in captivity. (*Rep. Dep. Agric. Stk*, 1928–29, p. 11) Departmental inspectors administered the Acts. The open seasons were declared for respective districts by Order-in-Council; for example, for No. 2 district in 1929 the open season for ducks and geese was from 1 July to 31 October.

The Acting Premier and Minister for Agriculture and Stock (the Hon. W. N. Gillies) announced that there would be no open season for opossums and native bears (koalas) during 1924 as there had been a heavy slaughter the previous season. In 1922 over a million opossum skins were marketed from Queensland and in 1923 the number was 1 200 000—"to such an extent that their number has been reduced so that they were in danger of extinction in very many districts where they were formerly quite numerous". The season was also closed for 1925. Reports in favour of full protection for koalas were becoming more numerous. (*QAJ*, Vol. 21, April 1924, p. 336)

Sanctuaries for native birds and animals were declared from time to time. All national parks were sanctuaries. Others were declared by proclamation, including many private holdings which the owners wished to be declared as such.

Dingo and marsupial destruction

The Department continued to administer the Act in connection with dingoes and marsupials during the 1919–29 decade. The increasing number of dingo scalps taken led the Under-Secretary to recommend compulsory legislation for the destruction of dingoes.

During 1928–29 a total of 37 768 dingo scalps and 9253 fox scalps were paid for. Only six Boards in the State paid for marsupials, as this payment was optional.

The Department's annual report for 1928-29 produced a table of operations (p.12) in connection with dingo and marsupial destruction since the inception of legislation dealing with these pests.

Brands

The Brands Branch of the Department advised through the *Queensland Agricultural Journal* of March 1929 that horse and cattle brands from a new series were being issued. The brands were composed of two block-type letters similar to those issued in the first series and a design. There were four designs included in the series and, for the purposes of identification, are referred to as the "Cranking handle", "Spur or rowlock", "Tent" and "Triangle".

The "G" series of brands, which had just been exhausted, contained similar-shaped letters and numerals, but in that series the designs were "Diamond", "Heart", "Spade" and "Cross".

Both the "G" and "H" series (the new one) contained 12 096 brands and up to the end of February 1929 over 80 150 three-piece brands had been registered in Queensland since the first brand, CA1, was issued in the name of the Hon. Louis Hope, Kilcoy, on 1 May 1872. (*QAJ*, Vol. 36, March 1929, p. 241)

Stock diseases

A large number of stock diseases, most of which had been encountered previously, were dealt with during the 1919–29 decade. Pleuropneumonia was the most frequent and the Stock Experiment Stations were kept busy providing vaccines.

Interstate Veterinarians Conference

In April 1922 a conference of Chief Veterinarians in each State was held in Sydney and discussions took place relative to:

- uniformity with regard to stock and stock disease legislation;
- the adoption of a uniform schedule of diseases in animals throughout the States;
- each State undertaking an educational programme with the aim of eliminating pleuropneumonia from Australia (achieved in the late 1970s);
- the diagnosis and control of swine fever and the restriction of interstate traffic in pigs;
- control of sheep louse and sheep tick;
- the disposal of actinomycotic, tubercular and cancerous cattle;
- conditions governing the export of cattle to Java and other countries;
- rabbit and vermin suppression;
- railways and their importance in suppressing the spread of diseases;
- certification and registration of stallions;
- the passage of legislation governing the veterinary profession;
- consideration of the form of certification and notification in connection with interstate traffic in stock.

Tetanus, lantana poisoning and hookworm

Tetanus was common in country areas of north Queensland during 1921–22, lantana poisoning occurred around Cairns, and the human hookworm (*Ankylostoma duodenale*) was present in pigs. (Legg, J., *Rep. Dep. Agric. Stk*, 1921–22, pp. 85–86)

Ticks

During 1921–22 the Tick Board concentrated on suppression of ticks in areas where sporadic outbreaks occurred, to minimise the tick load in ticky areas and prevent an extension of presently infested areas. The work of the tick cleansing areas had been so successful that the Chief Inspector of Stock was able to recommend the removal of restrictions from a portion of the Helidon–Miles–Chinchilla and Burnett areas. Attention was then given to the Coolangatta district. (*Rep. Dep. Agric. Stk*, 1920–21, p. 7) A new cleansing area was proclaimed between the Logan River and the New South Wales border. A caretaker was appointed to prevent stock movements from Tugun into the area and the Coolangatta Shire Council was asked to deal with straying stock.

The Gulf areas were given cleansing facilities by erecting dips at Muttaburra and Donor's Hill, but one was still needed at Sedan or Taldora. The Kynuna–Winton route had been declared clean and the Elderslie–Winton stock route appeared to be clean. An inspector was stationed at Mackinlay to attend to cattle from the Williams and Fullerton Rivers. Two dippings, ten days apart, were insisted on at Lake Nash on the Queensland–Northern Territory border. With the provision of the Donor's Hill dip, Gulf cattle had to be dipped at Donor's Hill and then 7 to 10 days later further south before reaching the northern railway for trucking. One stock inspector was stationed at Wondai to deal with cattle from the parishes of Peronne et al and one at Toogoolawah to prevent cattle moving into the Crows Nest area, which was a buffer for the Darling Downs. The cleansing areas were effectively reducing the infestation and freeing cattle of ticks before they entered clean areas. (Cory, A. H., *Rep. Dep. Agric. Stk*, 1921–22, pp. 70–72)

Dr John Legg, in charge of the Stock Experiment Station at Townsville, in his annual report for 1920–21 said he believed there were two species of the parasites, *Piroplasma bigeminum* and another. This needed to be substantiated. Dr Legg also believed that the blood of most animals loses its infectivity and the animal its immunity when kept free of ticks for a year or two. The Stock Experiment Stations at Townsville and Yeerongpilly were kept busy providing for inoculation of cattle against tick fever. Twenty-five "bleeders" were sold by Yeerongpilly during 1920–21.

During 1923–24 investigations were made on behalf of the Commonwealth Institute of Science and Industry to determine the action of standard arsenical dipping fluids on ticks during the moulting stage, the protective action of arsenical dipping fluid against reinfestation of larval ticks applied to cattle after dipping, and the effect of rain on the efficacy of treatment with dipping fluid. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1923-24, p. 11)

At the request of the New Zealand Government, experiments were conducted at Townsville during 1925–26 to ascertain if the New Zealand tick (*Haemophysalis bovis*) was capable of carrying and transmitting the *Babesia bigemina* parasite of tick fever. The results were in the negative. (*Rep. Dep. Agric. Stk*, 1925–26, p. 67)

Buffalo fly

An Order-in-Council under the Diseases in Stock Act was issued in October 1928 declaring that the buffalo fly is and shall be a disease under and for the purposes of The Diseases in Stock Act of 1915. Dr John Legg of the Stock Experiment Station at Townsville had been sent in July 1928 to report on the progress of the fly towards the Queensland border from the Northern Territory and he had reported that the fly had now become a direct menace to the cattle and horses in this State. Representations to the Federal Government to take measures to restrict the fly had been unsuccessful. (*QAJ*, Vol. 30, November 28, p. 500)

The stock-crossing place near Wollogorang was closed so that no stock could enter Queensland from the Territory north of Camooweal. Consideration was being given to the closure of other crossing places. The Prime Minister, the Hon. S. M. Bruce, was notified and asked that certain properties be resumed by the Federal Authorities and an effective buffer be established. Messrs J. H. Smith, Entomologist, and Clegg, Stock Inspector, were sent to the area and confirmed that buffalo fly was present on Queensland holdings; these were placed in quarantine and the movement of stock from such holdings was prevented.

The Department expressed willingness to cooperate with the Council of Scientific and Industrial Research in investigating biological control. (*QAJ*, Vol. 31, April 1929, p. 300) Meanwhile, the Westmoreland crossing place was closed against entry of stock. The buffalo fly's scientific name at the time was *Lyperosia exigua*, but currently (1983) is *Haematobia irritans exigua*.

Gidgea pod poisoning

In May 1922, Inspector Comiskey of Urandangie reported that cattle were dying in the district, apparently from eating either gidgea pods or green leaves. The toxic principle was not discovered until 1961, when Departmental research officers Oelrichs and McEwan found that it was fluoracetic acid in the pods.

Swine fever

In March 1923 meat inspectors reported finding swine fever lesions in pigs from the Boonah district. An Order-in-Council was issued providing for the quarantine of all pigs within a radius of twelve miles from the Boonah post office. No further cases were discovered and quarantine was lifted in June. (*QAJ*, Vol. 19, March 1923, p. 192) Owing to the existence of swine fever in other States an Order-in-Council was issued on 14 July 1927 prohibiting, for a period of twelve months, the introduction into Queensland of infected or suspected swine from New South Wales, Victoria, South Australia, Western Australia and Tasmania. This was extended to 14 July 1929. (*QAJ*, Vol. 30, August 1928, p. 169)

Diseases in swine

With the appointment of the first Instructor in Pigraising, E. J. Shelton, pig diseases claimed more attention. Shelton took over the main extension work in relation to such diseases, cooperating with the veterinary profession.

Impaction paralysis in cattle

In June 1923 Dr John Legg, Director of the Stock Experiment Station at Townsville, reported the first occurrence of impaction paralysis of cattle produced by the ingestion of powerful toxins as a result of bone-chewing. Burning all carcasses and adding lime to the water troughs was suggested as a control measure. (Legg, J., *Rep. Dep. Agric. Stk*, 1922–23, p. 93) When Sir Arnold Thieler of South Africa visited Australia a few years later he advocated feeding phosphorus to cattle to eliminate bone-chewing.

Rinderpest

An outbreak of rinderpest in Western Australia in December 1923 resulted in an embargo being placed on the introduction of all stock, fodder and fittings from that State. The embargo was lifted in March 1924.

Sheep Louse

The sheep louse (*Linognathus ovillus*) was reported for the first time in Queensland on sheep at Hughenden in October 1923. The property was quarantined and the sheep were jetted. By March 1924 the problem had been overcome and the quarantine lifted. (Cory, A. H., *Rep. Dep. Agric. Stk*, 1923–24, pp. 96–97)

Tumours in horses

Dr Legg reported several cases of tumour formation in horses in north Queensland, associated with the *Membrana nictitans*, in some cases simple, in others malignant. (Legg, J., *Rep. Dep. Agric. Stk*, 1923–24, p. 105)

Additional veterinary help

In September 1923 two part-time veterinary officers were appointed to the Departmental staff: J. S. Penrose, B.V.Sc., M.R.C.V.S., to the Central District, and M. J. Reidy, M.R.C.V.S., to the Northern District.

Oedema of the head of lambs

Dr John Legg reported cases of oedema of the head of lambs in north-west Queensland during 1924–25; the cause was unknown. (Legg, J., *Rep. Dep. Agric. Stk*, 1924–25, p. 70)

Diseases dealt with by departmental officers

Abortion, actinomycosis, anaemia, arsenical poisoning, debility, dropsy, fungoid poisoning, hoven or bloat, impaction influenza, lantana and other vegetable poisoning, lymphangitis, malignant growths, mammitis, melanosis, meningitis, neuritis, osteomalacia, paraphymosis, phosphorus poisoning, pleurisy, pleuropneumonia, pneumonia in calves, sterility, scour in calves, tick fever, traumatic pericarditis, urticaria, verminous bronchitis were attended to. (Cory, A. H., *QAJ*, Vol. 21, 1924, p. 118)

Incidence of diseases found at slaughterhouses

An idea of the incidence of disease in stock slaughtered in Queensland as indicated by stock condemned by Departmental slaughtering inspectors at twenty-seven metropolitan and regional centres during 1926–27 is given in the Departments annual report for 1926-27 (p. 134). The figures for swine excluded those treated at bacon factories.

Government Bacteriologist

In addition to tick fever work, the year 1920–21 saw analyses of water samples for butter factories, condensed milk for mould fungi, pathological specimens, milk for contagious mammitis, tuberculosis of the udder, brine from factories, pleuropneumonia virus (18 000 cattle treated) and vaccine for blackleg. At Townsville analyses were carried out by the chemist on dipping fluids, limestones, water, viscera, poisonous plants, dip concentrate, arsenic, salt poisoning in pigs and sheep, bacterial necrosis of pigs, stomach worms in cattle, parasitic mange and swine fever in pigs. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1920–21, pp. 7–8)

Bacillary white diarrhoea of young chickens, caused by *Bacillus pullorum*, occurred in the Returned Soldier Settlers' Poultry Farm at Enoggera under P. Rumball as Superintendent. Disinfection of premises, and of eggs for hatching, burning dead carcasses and digging up and liming the soil were recommended treatments. Agglutination tests for infected birds were recommended. An agglutination test for contagious abortion in cattle had been devised.

During 1922–23 contagious mammitis was prevalent and the Bacteriologist recommended thorough cleanliness of the dairy milkers' hands, sterilisation of the milking machines and examination of the first milk from each teat of the cow before proceeding with the milking, and then isolation of infected cows. He had prepared a vaccine for inoculation but recommended, for better control, an autogenous vaccine—one specially prepared from the organism causing the outbreak. (Pound, C. J., *Rep. Dep. Agric. Stk*, 1922–23, p. 89)

During 1925–26 mammitis vaccine was supplied for 168 dairy cattle with satisfactory results. C. J. Pound, under the auspices of the Council of Agriculture, gave a series of three radio broadcasts on Station 4QG.

Mammitis—Departmental service appreciated

Mr. J. W. Newbery, Clovelly, Kowguran, writes:- "...Many dairy farmers suffer great loss through contagious mammitis, about the worst scourge that can befall his dairy herd. I was badly hit by this scourge two or three seasons ago, but stamped it out of my herd by inoculating all my cows—about 100 altogether—with an autogenous serum prepared from milk from affected cows in my herd by the Government Bacteriologist, Mr. C. J. Pound, and I would strongly advise any dairy farmer similarly afflicted to adopt this remedy. The Agricultural Department acts most generously in supplying the serum at a nominal cost, and the inoculating process is so simple that any farmer can do it if he takes ordinary precautions as to sterilisation and follows the instructions so clearly set out in the leaflet supplied with the serum." (*QAJ*, December 1929, p. 649)

Pound reported in June 1925 that no deaths among stud cattle had taken place at the Yeerongpilly Stock Experiment Station during the period since 1922. The local blackleg vaccine, autogenous vaccine for contagious mammitis, lactic cultures for dairy factories and bleeders for tick fever inoculation had all performed excellently.

Livestock

Dairying

During 1920–21 the production of butter increased by 14 500 000 lb, that of cheese by over 3 000 000 lb and that of condensed milk by over 4 000 000 lb, making production during this year the highest ever for Queensland.

The Dairy Produce Act of 1920 made some new regulations and A. E. Graham, the Chief Dairy Expert, lectured dairymen about the new Act during the Royal National Exhibition. The Queensland Butter and Cheese Managers' Association commenced its annual

conferences in Brisbane at this time. At these conferences Departmental experts presented papers along with those of the members, and Departmental graders usually graded competitive entries of butter and cheeses at the associated shows.

Cold storage

During 1921–22 the Imperial authorities offloaded large stocks of butter accumulated over the war years and prices of new butter collapsed to the lowest level for ten years. However, the lower prices in England led to heavy consumption and the huge stocks were cleared. With the large 1920–21 production the Government decided to improve and increase cold storage not only for butter, but also for fruit, eggs and other products by building new stores at Hamilton. Increased shipping with cold store facilities assisted trade and interstate trade in "fresh" butter increased.

Dairy Industry Advisory Board

By 1922 the value of the dairying industry to Queensland was approximately £6 500 000, approaching that of sugar. A conference of representatives of dairying interests within the State convened by the Premier, the Hon. E. G. Theodore, was held in the Land Court Room, Executive Building, Brisbane, on 24 March 1922. The Minister for Agriculture and Stock, the Hon. W. N. Gillies, presided. Representatives of twenty-eight butter factories, twenty-five cheese factories and twenty other dairying concerns attended. The Minister suggested that an advisory board be elected to advise the Government on improvement in the dairying industry. After much discussion, W. G. Winnett (South Queensland Co-operative Dairy Company) moved: "That an Advisory Board for the dairying industry in Queensland be elected, and that such board be elected by the directors of existing companies." This motion was carried unanimously.

W. T. Harris, Secretary of the Queensland Co-operative Dairy Companies Association, moved:

That the objects of the advisory board include the following-

- (a) To consider the question of investigating, in conjunction with the Department of Agriculture and Stock, the problems relating to the dairying industry of this State.
- (b) To investigate the methods of production, manufacture, marketing, storage and distribution of dairy produce.
- (c) To consider the question of the establishment of pools for dairy produce.
- (d) To consider the question of the co-ordination of the activities of existing co-operative companies.
- (e) To consider the question of the improvement of the productiveness of the individual dairy herds by general application of systematic herd testing or any other efficacious means.
- (f) To consider the question of the purchase of all factory and farm requisites through co-operative channels.
- (g) To consider the question of fodder conservation.
- (h) To consider the question of extending the benefits of the Co-operative Agricultural Production and Advances to Farmers Act, or any other means for the establishment of rural credit.

The next motion was that the advisory board be given authority to appoint an administrative staff consisting of a manager, a business expert, and such other skilled investigators as might be considered necessary by the board. The motion was passed.

Regarding legislation, a motion "That if necessary the advisory board shall be invested with statutory authority, and in such case the board shall advise as to the authority necessary" was agreed to.

With regard to finance, it was agreed: "That during the first twelve (12) months of its existence the cost of the advisory board shall be defrayed by the Government; that thereafter the scheme shall be financed by contributions from suppliers in the industry, and that the rate of such contributions and the manner in which they are to be collected shall be determined hereafter."

The Premier suggested that a scheme such as that adopted by the Sugar Cane Prices Board could be arranged, i.e. a levy on every pound of butterfat supplied to butter factories, and on every gallon of milk supplied to cheese factories.

Regarding the membership of the Advisory Board it was finally decided: "That the Board be constituted of seven members, three to be elected by the butter people, two by the cheese people, one by the condensed milk people, and one by the Government." The representatives of the butter, cheese and condensed milk branches of the industry, respectively, would meet separately to elect the members of the Provisional Advisory Board. Voting under this scheme, an Advisory Board was elected, consisting of butter representatives W. T. Harris, T. Flood Plunkett and J. E. Dean; cheese representatives, William Purcell and Henry Keefer; and condensed milk representative G. Burton. A. E. Graham, Chief Dairy Expert in the Department, was appointed Government representative and Chairman.

The Premier then outlined his scheme to have Local Producers' Associations and District Councils formed, with representatives from the District Council to form a Council of Agriculture. The conference therefore elected five of its members to be members of the Council of Agriculture when formed: H. McNally (Dalby), A. S. Douglas (Cooroy), J. Purcell (Toowoomba), W. J. Sloan (Atherton) and J. T. Tod (Warwick). W. J. Sloan's son, W. J. S. Sloan, M.Agr.Sc.(Qd.), was later to become Director-General of the Department.

Butter

Wood taint. A wood taint in butter was a serious problem in the early 1920s and approaches were made to sawmillers to exercise care in the selection and seasoning of pine used for boxes and to reject "sinker" or "brown-heart pine". By 1924–25 there was virtual freedom from this taint in packed butter due to dry papering as advocated by the Department, better selection of butter box timber, and the covering of the box timber with paraffin wax.

Preservatives. Boric acid was first used as a preservative in butter and the legal limit was fixed at one half of one per cent to avoid rejection in London. The decision of the Ministry of Health in the United Kingdom to prohibit preservatives in butter in 1924 led the

Australian Dairy Council, with the help of the States, to experiment with salted and nonsalted butter with no preservative, 0.25 per cent and 0.5 per cent preservative.

Pasteurisation of cream. In 1920–21 A. E. Graham predicted that there would be greater improvement in the dairying industry through the universal adoption of neutralisation and pasteurisation of cream in factories. From August 1924 the export of choice and first-grade butter was prohibited by the Commonwealth Government unless it was made from pasteurised cream.

Cream transport. Motor transport of cream from farm to factory gradually replaced horse-drawn vehicles, and insulated rail wagons and more frequent rail services improved the resulting product.

A. S. Clayton, Inspector of Dairies, advocated the co-operative cartage of cream to reduce cost of transport and deliver cream more regularly. He suggested that the factory take control of the whole of the cream; split the supply up into convenient units, making the supply to each unit as nearly equal as possible; and set out conditions of cartage, time of starting route, etc. Cream carters would be invited to tender for each visit. (*QAJ*, Vol. 30, September 1928, p. 304)

Butter marketing. The Queensland Butter Marketing Board was constituted in February 1925 to control the sale of butter intrastate and the Kangaroo brand was adopted for all high-grade butter exported to Britain. This move improved butter sales.

Hamilton Cold Stores. Because of increasing dairy production the Hamilton Cold Stores began operating ahead of the official opening. (Cameron, M. L., *Rep. Dep. Agric. Stk*, 1924–25, pp. 56–61) In January 1926 they were officially opened by His Excellency the Lieutenant-Governor (the Hon. W. Lennon). In the course of introductory remarks as Chairman, the Minister for Agriculture and Stock (the Hon. W. Forgan-Smith) paid a graceful tribute to Mr Lennon (a predecessor in office, as Minister for Agriculture and Stock from 1915 to 1919) for his great work for the agricultural industry. Mr Lennon's term as Minister, he said, had been marked by the planning and laying of much of the foundation of the great advance in rural organisation that had taken place in recent years. As the originator of the idea of providing adequate shipside cold storage for dairymen and other primary producers, it was a fitting and happy circumstance that Mr Lennon should declare the stores open for business. (*QAJ*, Vol. 25, January 1926, pp. 1–2)

The Paterson Price Stabilising Scheme. Owing to severe fluctuations in price, the Paterson Scheme, suggested by Mr Delroy of Murgon and pursued by Mr Paterson, M.H.R., was brought into force from 1 January 1926. Although the scheme was voluntary, most butter and condensed milk manufacturers joined. The Paterson Scheme provided for a levy to be imposed on all butter and cheese produced in Australia and bonus payments on exports. It was the forerunner of the voluntary Equalisation Scheme which came into effect in 1934. (Rice, 1959) By June 1926 the Director of the Queensland Producers' Association (R. L. Macgregor) showed that in the four months since the scheme's adoption local prices of butter were higher than prices on the London market—9s 4d per cwt (112 lb), or 1d per lb higher. The local prices at the beginning of 1926 were 56s per cwt higher than in 1925, but a levy of 1d per lb to effect equalisation was involved. (*QAJ*, Vol. 25, June 1926, p. 495)

Conference of State Ministers for Agriculture

The Conference of State Ministers for Agriculture held in Brisbane on 7 June 1926 dealt with:

- (a) standardisation of the grading and examination of dairy products placed on the interstate and intrastate market. Choicest butter must score 92 points and over, first grade 89–91 points, second grade 86–88 points, pastry grade 85 points and under (and branded "PASTRY"). Cheese grades were similar;
- (b) coordination in experimental and research work relating to the dairy industry;
- (c) the question of the compulsory installation in dairy produce factories of thoroughly tested and approved machinery;
- (d) Commonwealth financial assistance to the States in regard to the dairying industry;
- (e) defrayment by the Commonwealth Government of shipping, rail and quarantine charges on approved purebred farm and dairy stock imported from overseas;
- (f) legislative control of the use of sires for improvement in the breeding of grade dairy stock.

Cheese

By 1921 most of Queensland's cheese was exported and the Chief Dairy Expert urged factories to pasteurise all the milk to improve cheese yield and quality and to enable the successful transport of cheese. This year saw the first Queensland cheese factory install pasteurisation. Queensland cheese constituted almost the whole of the cheese exports to Britain during 1923–24.

The one and a half ton Pittsworth cheese. With a view to advertising Australian cheese and to encouraging and fostering that branch of the trade, a mammoth cheese weighing one and a half tons, made by the Pittsworth Cheese Factory from 3400 gallons of pasteurised milk, was exhibited as a centrepiece in the Australian Court at the Wembley Exhibition in England in 1924. This was the largest cheese made from pasteurised milk in any country. Special equipment was needed to make the cheese and a special device was necessary to turn the cheese periodically as it was maturing.

Cheese Board. A new Cheese Board was constituted on 1 July 1924 to sit to 30 June 1927, consisting of five members together with a person to represent the Council of Agriculture. Henry Keefer (Pittsworth), Henry Thomas Anderson (Biddeston), Albert George Tilley (Rosehill), Mads Peter Hansen (Malling) and Daniel Gabriel O'Shea (Southbrook) were elected.

Milk marketing

Pasteurisation of milk for city consumers was begun in 1919 in a factory at North Quay owned by Brisbane Milk and Ice Company, and at Ipswich by Pommer Brothers.

In 1924 a notice was gazetted that it was the intention of the Government to create a Pool for cold milk produced in that portion of Queensland within a radius of 37 miles from the

General Post Office, Brisbane, and delivered to any portion of Brisbane within a radius of 5 miles from the General Post Office. It would be for cold milk only. "Hot milk" was defined as milk delivered by dairymen direct to consumers within five hours after milking.

The Pool would be for five years from 1 September 1924 and would apply to milk and cream for consumption. The Board would consist of five elected representatives of the producers, one from the Council of Agriculture, one Government representative and one from the Primary Producers' Bank of Australia, which was financing the Pool. The Pool would be subject to the Health and Dairy Produce Acts.

Herd testing

By 1920 herd testing had been accepted by dairy farmers and some improvement in production had resulted, but Queensland still had a long way to go in production per cow compared with the other main dairying countries.

Herd testing of purebred dairy cows for a 273-day lactation period was commenced in 1921 but owners tested only selected cows. It was decided to take five tests, each over a twenty-four-hour period, during the lactation.

The official Registered Purebred Dairy Cattle Production Recording Scheme began on 1 July 1923. In a stud herd entered under this Scheme at least twenty-five per cent of the registered purebred cows were required to be submitted for testing. The prescribed production standards for entry to the Advanced Register of Dairy Cattle Breed Societies ranged from 200 lb for junior two-year olds (calving before 30 months of age at the beginning of the lactation) to 350 lb for mature cows (calving at more than 5 years of age). (Rice, 1959)

Interest in herd testing of grade cattle was also expanding and during 1923–24 five hundred herds comprising 12 413 cows were tested.

During 1925–26 each farmer applying for the service of a herd testing officer was asked to sign an agreement to the effect that he would submit his herd at least four times during the lactation period, to provide better records of production. (McGrath, C., *Rep. Dep. Agric. Stk*, 1925–26, pp. 58–67)

The range in production between individual cows and herds tested during 1924–25 is provided in the following figures:

Mean Highest Lowest Daily yield of milk per cow in tested herds (lb) 16.79 46.1 6.5 Butterfat content of herd milk 4.08 6.25 2.3 Daily amount of butterfat per cow per herd 0.68 1.60 0.29 (once a day milking) Amount of milk yielded per cow daily (individual) 65.25 2.0 Amount of butterfat yielded per cow daily (individual) 2.28 0.13

Number of herds tested—994, totalling 21 918 cows

The Better Bull Campaign

In December 1925 the Hon. W. Forgan-Smith, Minister for Agriculture and Stock, announced that the Government wished to help dairymen to increase production. Herd testing had revealed the poor producers amongst the cows. Now the Government wished to encourage dairymen to use better bulls, and Cabinet had agreed that the Department of Agriculture and Stock would make available to an approved purchaser of an eligible bull in dairying districts proclaimed under The Dairy Produce Act of 1920 a subsidy not exceeding £50, or fifty per cent of the purchase price. This would be known as "the Better Bull Campaign". The bull must have passed a tuberculin test done by a veterinary officer, must be in good health, well-grown and true to type, be registered in a recognised herd book or be eligible therefor, be not less than twelve months or more than six years old, fertile, and the progeny of an approved sire and an officially tested dam eligible for admission to the advanced register for production. The bull, if required, was to be made available to other dairymen at a fee not exceeding 10 shillings per cow, for disease-free cows only. Preference would be given to dairymen who had submitted their herds to the Herd Testing Scheme. (QAJ, Vol. 24, 1925, p. 603)

Departmental staff

C. F. McGrath succeeded A. E. Graham, Chief Dairy Expert, on 1 April 1926 under the title Supervisor of Dairying. R. W. Winks, Chief Grader of Dairy Produce, who had joined the staff as an assistant to John Mahon in the Travelling Dairy in 1893, retired on 30 June 1927.

Departmental inspectors, testers and graders were involved in administering the Dairy Produce and Other Acts. Examinations for certificates of competency were carried out by the Department and successful candidates were appointed as needed to the Departmental staff and to private enterprise. There had been a gradual shift of emphasis amongst inspectors from policing the Dairy Produce Acts to a more helpful advisory role to improve hygiene in the bails and in transport, and to enourage the use of better cattle and better nutrition. (Graham, E., *Rep. Dep. Agric. Stk*, 1923–24, pp. 89–95)

In 1927 the Dairy Produce Act regulations were changed to require certification of butter and cheese makers, and testers and graders of dairy produce. (*QAJ*, Vol. 27, May 1927, p. 486)

The dairying industry in 1929

In April 1929 the Hon. W. Forgan-Smith stated that there were 52 butter and 73 cheese factories and 22 500 dairying establishments (farms) in Queensland, and it was estimated that 90 000 persons, or 10 per cent of the population in the State, were dependent on dairying for their livelihood. The capital invested in the industry in Queensland alone was approximately £35 000 000.

The year 1928 had been the biggest year in production in the history of the industry. The value to the State of the industry in 1914 was £2 393 402, and in 1927 it had increased to £7 250 000. That increase was brought about by butter, cheese and other dairy products. In 1925-26 the Queensland percentage of first-grade butter and cheese was 68.3 per cent of the total output, but in 1927–28 it had reached 82.1 per cent. (*QAJ*, Vol. 31, April 1929, p. 287)

Pigs

With the imminent transfer of the control of the Queensland Agricultural College to the Department of Public Instruction, the Department took a greater interest in promoting pig raising along with dairying. In 1922, A. E. Graham (Director of Dairying) and H. C. Quodling (Director of Agriculture) produced a publication entitled "Pig Raising in Queensland", covering what was then known expertise on the industry.

In August 1922 it was announced that, on the recommendation of the Council of Agriculture, the Atherton Tableland Pig Board had been constituted, of five pig raisers. It would administer pig affairs till 30 June 1924, later extended to December 1930. It was to handle all pigs grown in the Petty Sessions districts of Atherton, Herberton and Chillagoe.

With the appointment of Ernest James Shelton, a former Hawkesbury College student and lecturer, as Instructor in Pig Raising from 17 August 1923, the Department moved its pig instruction from Gatton College to Head Office and the Pig Section came into being within the Agriculture Branch. Shelton first travelled the State as an instructor and then published a series of articles in the *Queensland Agricultural Journal*, commencing with "Classification in Pigs" in the November 1923 issue. He was to prove a most prolific writer and tireless traveller and speaker.

In his 1924–25 annual report, Shelton drew attention to the backwardness of the pig industry in organisation, sanitary regulations and its subsidiary nature to dairying. The main faults with bacon pigs were that they were kept too long before marketing and became overfat, although overfeeding immediately before marketing, coupled with poor transport and lack of water supplies, led to losses from heat apoplexy and excessive bruising. Losses of young pigs under the age of six months were generally due to poor housing, lack of hygiene and inadequate feeding. Shelton also advocated fire-branding of all bacon pigs before marketing so that disease could be traced back to the farm and remedies set in train. Lantern slides were prepared on pig raising for showing to country audiences.

With the introduction of new breeds of pigs such as the Poland China, Gloucester Old Spot, Duroc-Jersey and British Large Black, Shelton urged the necessity for experiments in breeding, crossbreeding and feeding to give accurate information to farmers in the face of promoters of the new breeds. Importations of pigs from Great Britain were forbidden at the time because of the danger of transmission of foot and mouth disease to Australia.

Shelton also kept in touch with the pig sections at the State Farms and the stud piggeries controlled by the Home Secretary's Department at Dunwich, Ipswich and Willowburn. He sought advice from the co-operative factories to improve the type and quality of pigs sent to them and urged a more humane method of slaughter than some of the methods then in vogue. He discussed with several show society officers the introduction of Young Judges Competitions at shows and suggested annual pig crop statistics as a guide to developing exports. To cover all this work, Shelton made a plea in his 1924–25 report for the appointment of an assistant instructor in pigraising. (Shelton, E. J., *Rep. Dep. Agric. Stk*, 1924–25, pp. 44–48) Frederick Bostock was appointed on 7 May 1926.

The North Queensland Co-operative Company's Bacon Factory at Florent Siding, Mareeba, was opened on Saturday, 17 March 1924, at a cost of £13 500, its aim being to stabilise the pig industry on the Tableland. (*QAJ*, Vol. 24, June 1924, pp. 421–422)

Shelton produced a great many pamphlets (see below) and reprints of articles from the *Queensland Agricultural Journal* for public distribution; arranged with the Council of Agriculture and Station 4QG, Brisbane, for a series of broadcasts in pig raising; organised pig-judging competitions; and encouraged pig clubs at schools. This publicity led to greater interest in pig raising and better-quality pigs.

In 1925 Shelton examined pig-marketing systems existing in Queensland:

- 1. the sale of store pigs from farmer to farmer, either direct or through auctions—he recommended considerable expansion in this enterprise;
- 2. the sale of porkers direct to butchers or by auction (a good but limited market), classed as light porkers (50–60 lb dressed), medium (60–70 lb dressed) and heavy (95–100 lb dressed) Farmers close to market could benefit from this enterprise;
- 3. selling pigs over the scales at country saleyards or railway stations to buyers from proprietary bacon factories and receiving immediate payment, based generally on 30 per cent loss in dressing—this was popular with farmers needing ready money;
- 4. consigning pigs direct to co-operative or proprietary factories for slaughter, with payment on result. This was usually done by shareholders in a co-operative factory and gave the best return but payment could be somewhat delayed. It involved firebranding or earmarking before consigning;
- 5. selling pigs through a Pool, as on the Atherton Tableland;
- 6. selling stud pigs for breeding. (Shelton, E. J., QAJ, Vol. 23, June 1925, pp. 532–540)

In August 1925 the Department announced that the following pamphlets on pig raising, all from the pen of E. J. Shelton, could be secured gratis on application: "The Dentition of the Pig", "Weaning the Pig", "Feeding Pigs—Feeding Problems", "The Berkshire Breed", "Litter Records", "Concrete Feeding Floors", "Mineral Mixtures for Pigs", "Pure-bred v Mongrel—A Striking Contrast", "Diarrhoea or White Scour in Pigs", "Paralysis of the Hindquarters in Pigs", "Pig Breeding: Root Crops for Pigs", "A Peculiar Disease Affecting the Ear of Pigs", "Early History of the Pig", "Gestation Chart for Pigs", "Selecting the Boar—Points Worthy of Note", "Farm Bacon Curing", "Marketing Pigs in Queensland", "Various Breeds of Pigs", "Queensland Hams and Bacon", "The Australian Stud Pigbreeders Society", "Maize for Pigs", "Pig Clubs for Scholars—School Pig Clubs", "Plan and Detail of Movable Hurdle for Pigs".

On his return from America, J. D. Story, Public Service Commissioner, brought with him complete plans and details of the American and Canadian Home Project Scheme, which included Pig and Poultry, Calf and Garden Clubs. The Pig Club Scheme was adopted and J. C. Stubbin, Instructor in Agriculture in the Department of Public Instruction, was appointed supervisor. When Shelton was appointed Instructor in Pig Raising in the Department of Agriculture and Stock, control of the Pig Club Scheme was transferred to

the Department and included in the activities attendant upon the organisation and development of the pig industry. (Shelton, E. J., *QAJ*, Vol. 27, May 1927, p. 463)

Shelton encouraged pig clubs and soon had clubs in a number of State Schools in the Maroochy district, on the North Coast, and in the Fassifern and Brisbane Valley districts, and at the Nambour Rural School. Cooperation from the principals of these schools was sought and the work was encouraged by F. E. Watt, Organiser and Instructor in Agriculture in the Department of Public Instruction, whose itineraries included travelling thousands of miles visiting hundreds of schools.

An interstate conference convened by the Minister for Markets and Irrigation was held in Sydney during 1926–27. Queensland was represented by Shelton. The outcome of the conference was the decision to organise State Pig Industry Committees in each of the States, and from these Committees to form the Federal Council, to deal mainly with overseas markets and the expansion of local trade.

The Assistant Instructor in Pig Raising, F. Bostock, was occupied mainly in Pig Club work during 1926–27. (Shelton, E. J., *Rep. Dep. Agric. Stk*, 1926–27, pp. 65–66) He came from the staff of the Hawkesbury Agricultural College, Richmond, New South Wales. He was born in 1902, into a well-known Meadowbank family. His early education was at the Ashfield Technical School and Sydney Technical College, and he then received a sound training in general farming practice at the Bathurst Experiment Farm. There he also made a special study of pig raising, as a result of which he had no difficulty in qualifying by examination for the Piggery Certificate of the Hawkesbury College. In 1922 he was appointed Assistant Piggery Instructor at that institution and returned in 1928 as Instructor in Pig Raising. (*QAJ*, Vol. 25, June 1926, p. 540)

After Bostock's resignation L. A. Downey was appointed Assistant Instructor in Pig Raising from 5 June 1928, and Instructor in Pig Raising from 1 July 1928.

Queensland's first pig farmers' school was held at the Queensland Agricultural High School and College at Gatton during the middle of June 1928, the outcome of a suggestion from Shelton. Lectures occupied the morning and demonstrations in the piggery the afternoons, with visits to bacon factories at Oxley (Foggitt Jones Ltd) and Murrarie (Queensland Co-operative Bacon Company). Lecturers included College and Departmental personnel, bacon factory staff, the Pig Breeders' Association President, the Pig Club Organiser (Department of Public Instruction), the Editor of *The Livestock Bulletin*, Professor E. J. Goddard, the Royal National Association Secretary, and commercial pig breeders. Twenty-one pig farmers attended from various parts of southern and central Queensland. The cost of board and tuition for the two weeks, exclusive of fares and the cost of the factory trips, was £2 13s 6d. (*QAJ*, Vol. 30, July 1928, pp. 60–62)

Horses

Queensland continued its long record of exporting horses overseas, mostly to India, and 2298 horses were exported during 1923–24; of these, 765 were mares. (Cory, A. H., *QAJ*, Vol. 21, 1924, p. 116)

In 1926 the Minister for Agriculture and Stock was advised that the Indian Government would still require horses from Australia for some years to come. The annual requirement would be around 1000 cavalry mounts and 1000 draughthorses. (*QAJ*, Vol. 26, November 1926, p. 375)

The advent of the tractor was to lead to a decline in demand for draughthorses, but in 1920 there was still need for selection, registration and use of a better class of stallion. The Department for many years past had required that agricultural societies receiving Government subsidies should not give prizes to any stallion which had not received a certificate of soundness from a Government veterinary surgeon. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1920–21, p. 16) Rejections of stallions were mainly because of spavin, "roaring" and lack of conformation. (Cory, A. H., *Rep. Dep. Agric. Stk*, 1920–21, p. 64)

During 1922–23 the Government purchased six Clydesdale draught stallions to breed improved draught stock for the farming community. The Stallions Registration Act was passed in 1923, and E. Baynes, J. Tait, A. H. Cory (Chief Inspector of Stock), H. C. Quodling (Director of Agriculture) and E. G. E. Scriven (Under-Secretary) were appointed members of a Board to arrange for the service of the stallions. (*QAJ*, Vol. 20, August 1923, p. 117) The photographs and pedigrees of the six stallions were published in the September 1923 issue of the *Journal*, and applications for service of mares at a fee of two guineas per mare were called. The six stallions were allocated as follows:

- "Glenalla"—Rosewood, Marburg and Rosevale;
- "Fabrics Heir"—Boonah and Harrisville—58 mares;
- "General Wallace"—Clifton, Allora, Warwick, Nobby—65 mares;
- "Premier Again"—Wallumbilla and Roma—62 mares;
- "Bold Wyllie"—Nanango, Kingaroy, Wondai, Murgon—63 mares;
- "Baron Again"—Gympie and Mary Valley—48 mares.

All the mares submitted for service were inspected and some were rejected, either because of inferior quality or because too many applications had been received for the stallion involved. (*QAJ*, Vol. 20, November 1923, p. 385)

In addition to the Clydesdale breeding programme, some fifteen purebred draught mares were transferred from the Queensland Agricultural College to Gindie State Farm, where there was also a purebred stud of Suffolk Punch horses. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1922–23, p. 16)

To cope with the increasing need for stallion inspection, arrangements were made for a veterinary surgeon to be placed at Rockhampton with a retainer from the Government and the right of private practice. It was anticipated that veterinary surgeons would soon find it advantageous to undertake private practice in country districts.

A Stallion Board for Southern Queensland was inaugurated on 1 July 1925, with Veterinary Surgeon McGown as Chairman.

During 1926 six Clydesdale mares were sent from Gindie State Farm to Ellinthorpe to be mated with the imported stallion "The Intent"; three colts and one filly were born as a result.

The first published full list of registered stallions under The Stallion Registration Act of 1923 appeared in the *Queensland Agricultural Journal* in October 1927. It included 242 blood stallions, 150 draught stallions, 144 trotting stallions and 126 pony stallions certificated for life; and 31 blood stallions, 75 draught stallions, 28 pony stallions and 9 trotting stallions certificated for the 1925–26 year. (*QAJ*, Vol. 28, October 1927, pp. 377–393)

Summarising the record of the six Clydesdale stallions imported by the Government for use in 1923–24 and subsequent years, the Director of Agriculture, Quodling, stated in 1929 that an average number of five stallions had been used each year. A total of 1670 mares had been served. Of the original six stallions purchased by the Government in 1923, three remained. "Fabrics Heir" had died, and "Glenalla" and "Baron Again" had developed unsoundnesses and were gelded (and used as farm horses for several years afterwards at Gatton College). The demand for these stallions was very poor during 1928–29 owing no doubt to the increasing use of the tractor, and Quodling was led to remark: "a stage has now been reached when it may be considered that these horses have fulfilled the purpose for which they were purchased...Their introduction and subsequent use has undoubtedly provided a stimulus to Clydesdale breeding with a marked increase in the number of privately-owned stallions." (*Rep. Dep. Agric. Stk*, 1928–29, p. 17)

Sheep and wool

The Farmers' Wool scheme expanded during the 1920s although a lot of wool came from crossbred sheep and was in limited demand. Stomach worms and nasal fly occurred further west than thought and instructors were advising sheepmen on the control of these pests. W. G. Brown, acting for the Science and Industry Council, advised that jetting sheep with a poisonous solution was the best means of control of the sheep blowfly.

In June 1921 Professor T. Harvey Johnston, of the University of Queensland, said the estimated annual loss of sheep due to natural causes (old age, lambing, disease, accidents) was about 5 per cent and that the losses as a result of fly attack in Queensland also averaged about 5 per cent. (*QAJ*, Vol. 15, June 1921, p. 244)

The work of the Special Blowfly Committee appointed by the Commonwealth Institute of Science and Industry commenced in February 1918 on W. A. Russell's station, "Dalmally", near Roma. This work was an extension of earlier activities of the Department of Agriculture and Stock towards checking the ravages of the blowfly in the flocks of the State at Gindie, under the direction of W. G. Brown (Sheep and Wool Expert). It consisted of a swim dip, shower dip and jetting. The work and life history of the Chalcid wasp, a natural enemy of the blowfly discovered by Edmund Jarvis (Entomologist, Bureau of Sugar Experiment Station, Meringa) at "Talleyrand" near Longreach in October 1913, was also closely studied. The members of this Special Blowfly Committee were S. P. Fraser (representing pastoralists) as Chairman, W. G. Brown (State Sheep and Wool Expert), J. B. Henderson (Government Analyst) and Major A. H. Cory (Chief Inspector of Stock), with Miss Todd as Secretary. A field day was held on Friday, 13 May 1921, at "Dalmally", attended by some 200 representative graziers and others interested in pastoral pursuits. Brown conducted the dipping and jetting experiments using arsenic-based fluids. (*QAJ*, Vol. 15, June 1921, pp. 249–253)

At the above field day and later, Brown drew attention to the problem of stomach worms in sheep (*Haemonchus contortus*). He pointed out that they were widespread in Queensland, attacking sheep in the western areas as well as in higher-rainfall belts. He recommended burning pasture paddocks one at a time and drenching sheep before admitting them to the paddock again; quarantining a paddock for a year, and drenching with a mixture of white arsenic (2 oz), epsom salts (6 lb) and water (5 gallons), administered at the dose rate of 2 fluid ounces per adult sheep, which had been starved for 24 hours before drenching. A second drenching from 7 to 10 days later was advisable. (Brown, W. G., *QAJ*, Vol. 16, July 1921, pp. 11–13)

In July 1923 Brown summarised the results of sheep blowfly control by the Department and subsequently by the Commonwealth Institute of Science and Industry since 1913. After seven years' continuous research it was found that by jetting sheep in the breech with a solution of 5 to 7 lb of arsenic per 100 gallons, the arsenic being dissolved in either equal parts of carbonate of soda or half that quantity of soda ash, the animals would be protected for three months. Pressure up to 150 lb per square inch was needed to penetrate all wool. Ninety per cent efficiency was claimed. (*QAJ*, Vol. 20, July 1923, pp. 13–14)

The blowfly investigations done by the Institute of Science and Industry were closed down, and in 1922–23 Brown and the Assistant Instructor in Sheep and Wool, Mr Wynne, travelled widely lecturing and demonstrating techniques to new farmers in the Biggenden area and the coastal districts and to established woolgrowers in the Central West of the State.

In November 1923 the Editor of the *Journal*, J. F. F. Reid, under the title "Co-operation at Work", had this to say:

A comparatively little known 100 per cent co-operative undertaking, instituted by the Oueensland Department of Agriculture and Stock for the disposal of farmers' wool from small flocks, provides an excellent illustration of co-operation at work. The scheme enables the small sheep farmer to sell his wool without the intervention of any intermediary. The only charges are 10s. per bale for classing, freight, dumping, retailing and any other out-of-pocket expenses. The numerical flock limit of farmers availing themselves of the marketing facilities under the scheme is 1,500 sheep. Sixty per cent of the estimated value of the clip is payable to the farmer immediately on receipt of his consignment in the departmental woolroom. Each bale is classed and marketed so that it may not be offered under the "star lot" conditions usually applied to small consignments. The scheme has been in operation for several years, and has proved an unqualified success, and therefore satisfactory to all concerned. With the farmers whom it was designed to benefit it is very popular. It is simply a plan by which the farmer sells his wool through the Department, obtains the highest possible price, and avoids the customary brokerage charges...The Department makes neither profit nor loss on the transaction. Costs are closely watched, and since 1916, the year of its inception, income and expenditure have balanced. Last year [1922] £13,000 worth of wool was sold. This was the produce of about 250 small flocks in many parts of the State,...As the Department works on a margin of 40 per cent of profitable market value, it is able to make the first valuation on a fairly liberal scale, and the first advance to the farmer a correspondingly high one. (QAJ, Vol. 20, November 1923, pp. 335–336)

During 1924–25 the *Sheep Brands and Earmarking Directory* was revised, the first revision since the first Directory was issued in 1895. (Iliff, H. S., *Rep. Dep. Agric. Stk*, 1924–25, p. 71)

At the end of 1925 there were 20 663 323 sheep in the State. At the end of 1926 there were 16 860 772—a loss of 3 802 557, owing mainly to drought. There had been practically no lambing for two years, and normally 700 000 sheep per annum were slaughtered for food.

With the movement of sheep to agistment to wetter, worm-infested areas it was expected that parasitic infestation by stomach worms (*Haemonchus contortus*) would become more widespread. (Brown, W. G., *Rep. Dep. Agric. Stk*, 1926–27, p. 139)

Brown's instructional work in Queensland as an officer of the Department was mainly directed to the small woolgrower. He had, however, had extensive experience with large flocks before joining the Department. Frederick Bracker brought a flock of sheep to Queensland in the 1840s. The North British Australian Investment Company stocked "Rosenthal" and "Toolburra" in the Warwick district with sheep. These were all Saxony-type sheep, with superfine wool and small bodies. Brown handled descendants of these sheep at "St. Ruth", Dalby, between 1892 and 1896. The average fleece weight was 51/2 lb greasy or 21/4 lb clean scoured wool. Uptil the 1870s these short-wooled sheep prevailed, but they were then ousted in Queensland by the Ramboullet or Wanganella type, with an infusion of Tasmanian merino. The weight of the fleece doubled and these sheep could stand hard conditions which were fatal to the Saxony short-wooled type. In the Departmental wool rooms where the fleeces from the Dunedin Exhibition in November 1925 were held, there were some fine fleeces. During World War I the British Government paid a flat rate of 151d per lb for Commonwealth wools. Queensland wools received 161d per lb and headed the Commonwealth prices. At a Bradford enquiry in 1925 Queensland wools took pride of place in nearly every respect. (Brown, W. G., QAJ, Vol. 27, February 1927, pp. 132–133)

In 1927 Brown visited the Atherton and Evelyn Tablelands to gauge their potential for sheep raising. He suggested that 5 sheep per acre could be safely carried on the paspalum pastures if Romney Marsh cross sheep were kept, mineral licks provided, stomach worms eliminated, and lambing aimed at August–September. Sheep should find a place in mixed farming. (*QAJ*, Vol. 27, September 1927, pp. 310–311)

Poultry

The main Government work in poultry until 1923 was conducted through the egg-laying competitions held at the Queensland Agricultural College and by the Travelling Instructor (Lecturer) in Poultry Husbandry, Matthew Fern, appointed on 1 January 1904 and succeeded by John Beard on 15 February 1917. He took over the preparation of articles on poultry husbandry, including poultry diseases, published from time to time in the *Queensland Agricultural Journal*, as well as instructional work as he travelled the State visiting and judging at shows and calling on poultry farmers.

In 1922 Beard reported that the Queensland poultry industry was in a flourishing condition. In the second half of August 1921 over three-quarters of a million eggs were consigned to southern markets. Prices in Australia were as good as those in London and there was no surplus of eggs for export. Fully eighty per cent of Queensland fowls were of the White Leghorn breed, unsuitable for the export table bird market. The main problem at the time was the cost of feed and offal.

A notable development in the Queensland industry in 1922 was the formation of the National Utility Poultry Breeders Association (N.U.P.B.A.) Co-operative Society Limited, an offshoot of the Queensland Branch of the National Utility Poultry Breeders Association

of Australia. It widened the local poultry club interests from show birds to the development and advancement from the commercial standpoint of the poultry business. It was to supply the wants of the poultry farmer and to handle his products to the best possible advantage. It commenced to handle eggs for export, branded "Produce of Queensland". It established egg-laying competitions and results were published monthly in the *Queensland Agricultural Journal* from September 1922. The value of these egg-laying competitions in revealing productive breeding lines resulted in their extension to provincial areas throughout the State.

The steamer *Leitrim* sailed for England in late 1922 with 400 cases containing 150 000 eggs consigned from the N.U.P.B.A. Society to the Overseas Farmers' Co-operation in London. This shipment was the commencement of a new era for the Queensland poultry farmers. (*QAJ*, Vol. 18, November 1922, p. 353)

An Egg Pool was constituted in 1923, the initial one operating until 31 May 1925 and extended from 1 January 1926 to 31 December 1928. It handled all eggs (exclusive of those for breeding purposes) produced by flocks of 100 fowls or more east of a straight line drawn from Bundaberg to Goondiwindi. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1922–23, pp. 2–3). Percival Rumball, later to become Poultry Instructor with the Department on the death of Beard, was a district representative of the first pool.

The Diseases in Poultry Act, modelled on the Diseases in Stock Act and aimed at the supervision of poultry offered for sale in the market, became law during 1923. It resulted in the disappearance of diseased birds from the market, the most common disease at the time being tuberculosis. It also resulted in an improvement in the general quality of the poultry kept. Beard, the Poultry Instructor, died before the impact of the Poultry Diseases Act that he helped prepare had become apparent.

Because of the growth of the poultry industry in north Queensland, William Christian Keany was appointed Northern Instructor on 2 November 1923. He visited some forty settled districts in his first six months in office, contacting poultry farmers and delivering lectures.

Rumball visited several districts in southern and central Queensland, visiting farmers during the day and giving evening lectures in several centres. He urged farmers to make an annual purchase of day-old chickens from well-bred flocks, the easiest way to improve production. He warned day-old-chick hatcheries to beware of eggs carrying the "small egg" characteristic. He also wrote monthly on poultry matters, including diseases such as contagious catarrh, poultry tick, coccidiosis, roundworms and eye worm, for publication in the *Queensland Agricultural Journal*. Housing and sanitation also figured largely in his advice. Poisoning from arsenical residues was common, indicating a need for care in using empty poison drums as feed containers or dispensers.

By 1926 the annual overseas export of eggs had advanced from a few hundred pounds to £800 000 in value. The Queensland Egg Board received, candled, graded and packed its export eggs under Rumball's supervision and received a bonus because of the satisfactory way the egg packages opened up. Other eggs, amounting to 220 000 dozen in 1925–26 were placed in cold storage in the Government Cold Stores at Hamilton for winter use. Export and cold storage helped to stabilise the industry and allow for expansion.

J. J. McLachlan was appointed Poultry Inspector on 6 February 1928. A poultry experiment station was established at Mount Gravatt during 1928–29, mainly to conduct feeding tests as little was known of the influence of feed on poultry production and Queensland companies were beginning to produce the prepared rations which had formerly come from the south.

An interstate conference of Ministers for Agriculture was held in Brisbane in June 1926. Agreement was reached on uniform grade standards for eggs sold intrastate and interstate and for export. Until that time eggs for export had not come under the Commerce Act and eggs could be exported without inspection or without a uniform grade being insisted upon. A Departmental committee was instructed to draft uniform standards. (*QAJ*, Vol. 28, June 1926, p. 495)

An overall account of the poultry industry in Queensland was published in the *Queensland Agricultural Journal* in March 1929, with particular emphasis on egg production and economics. Recently the purchase of day-old chicks had made rapid headway. It was pointed out that the essentials for successful poultry keeping now were:

- 1. proper housing to afford protection from unfavourable weather conditions;
- 2. economy and efficiency in rearing young stock;
- 3. use of birds of suitable type with heavy producing capacity and laying standard-sized eggs;
- 4. close attention to market requirements to ensure remunerative prices;
- 5. feeding to induce maximum production.

In addition to articles published in the *Queensland Agricultural Journal*, bulletins on poultry subjects were available free of charge on application to the Department.

At the Queensland Agricultural High School and College, Gatton, many of the commercial breeds of poultry were maintained and stud birds could be purchased at reasonable prices by established poultrymen or beginners in the industry. (*QAJ*, Vol. 31, March 1929, pp. 211–228)

During 1928–29 a good deal of time was devoted to juvenile poultry club work. These clubs were organised by the Department of Public Instruction, and officers of the Department of Agriculture and Stock provided technical information. Clubs with a membership slightly over 300 were formed during 1928. Subsequently many more clubs were formed and Departmental officers made every effort to visit the farm or club member's home, as well as to officiate as judges at shows and club competitions.

Bees

There was little instruction in beekeeping in the early days of the Department, but the Queensland Agricultural College kept an apiary supervised by interested members of staff from time to time.

In January 1926 referendum papers and ballot papers were sent to beekeepers by the Department to vote for a honey pool to be formed and continued for two years, and calling for nominations for membership.

The necessary two-thirds majority in favour of the pool was not obtained and the proposal lapsed. (*QAJ*, Vol. 24, February 1926, p. 178) However, a later ballot was successful and a Honey Pool was constituted on 7 March 1929 for a period of five years. The personnel of the Pool Board were four representatives of beekeepers and the Director of Marketing. Instruction in beekeeping was in the hands of the Poultry Instructor at the Queensland Agricultural High School and College, Rupert Holmes, who also contributed articles on beekeeping to the *Queensland Agricultural Journal*.

Meat

Public abattoirs

A Royal Commission, its members W. H. Campbell, G. E. Bunning and W. W. Hood, was appointed on 20 July 1912 to enquire into the alleged deterioration in beef cattle, the facilities for treatment and marketing of meat at home and abroad, and the necessity for establishing abattoirs or meatworks. The Commission found that the standard of export beef had been maintained. It discussed the insanitary facilities for inspecting and slaughtering stock, and listed the existing cold stores and meatworks in Queensland which seemed to be sufficient for the State's needs. The Royal Commission suggested the pastoralists approach the meatworks companies to gain better services. It appeared to the Commission that many of the difficulties in improving the marketing of meat would be overcome by the establishment in Brisbane of public abattoirs, which would serve the metropolitan area. The Department costed one at £150 000. At the proposed abattoirs, all meat for local and overseas consumption would be inspected and graded under sanitary conditions in one central location. Finally, the Commission discussed the possibilities of raising crossbred sheep and lambs as alternatives to beef, and listed the rates of overseas and local consumption of meat and the prices available to the Queensland producer, exporter and consumer. A minority report stressed that the condition of the meat industry would improve only if facilities for cold storage were established in conjunction with public abattoirs at main centres of population. (Qd Parl. Papers 1913, V. 2, pp. 671-1406). (Borchardt, D. H., 1978, Checklist of Royal Commissions Select Committees of Parliament and Boards of Inquiry, Bundoora, La Trobe University Library)

When Gillies became Minister for Agriculture and Stock in 1919, there were 38 slaughteryards in the metropolitan and suburban areas. In 1924 there were forty-one, and nearly all the premises which had not formerly complied with the Slaughtering Act had been rebuilt or improved to meet its requirements. Three new inspectors had been appointed, two veterinary officers deputed to make periodical inspections, and four officers detailed for duty at bacon factories. Gillies forecast that public abattoirs would be provided when the Greater Brisbane Bill came into force and that a site at Wolston of 2600 acres set apart by the Government might be suitable. (*QAJ*, Vol. 22, August 1924, p. 122)

On 8 December 1927 a Commission whose members were W. H. Austin (Chairman), E. F. E. Sunners and E. E. D. White was appointed to enquire into certain matters in relation to the Queensland beef cattle industry. Its reports were presented on 4 December 1927 (unpublished) and 30 April 1928. The first report suggested leasing the domestic

killing at Rockhampton to the Central Queensland Meat Export Company Ltd. The second report recommended the establishment of public abattoirs in Brisbane with facilities for the killing, inspection and chilling of meat for export, interstate trade and local consumption. The abattoirs would be administered by a Board of three members responsible to Parliament. (Borchardt, 1978)

Slaughtering statistics, 1922–23

During 1922–23 there were 17 slaughtering establishments operating for export, but the number of people employed dropped from 3641 in 1921 to 3161 in 1922, a drought year. The Department's annual report for 1922-23 showed stock treated during those two years (p. 6).

Extension of the northern railway

The extension of the northern railway to Townsville in 1924 provided northern cattlemen with an opportunity to take advantage of the southern markets.

Bruising

On 22 October 1924 J. Barr was appointed a Royal Commissioner to look into the bruising of cattle in Queensland. His report was submitted on 15 May 1925 but not printed. (Queensland State Archives PRE/A845: In-letter 6776 of 1925) His recommendations included the keeping of statistics of bruising, improvement in construction of trucking yards and of the inside of cattle trucks, the abolition of pig sales adjacent to trucking yards, the installation of an electrical contrivance to get up cattle that went down in the trucks, the presence of a producer representative at the meatworks during killing operations, and weighing of cattle on a liveweight basis. While dehorning would be beneficial in preventing bruising, this practice would put cattle at a disadvantage when they had to break down trees for food. (Borchardt, 1978)

Forgan-Smith, Minister for Agriculture and Stock, advised that the Government had arranged a grant of $\frac{1}{2}$ d per lb up to £150 on a consignment of 150 hindquarters and fifty crops of beef to be treated by the Perfect Food Process Pty Ltd shipped on the *Port Huon* from Brisbane on 1 September 1927 to Hull, England. Sixty hinds and thirty-five crops were sent from there to Smithfield Market. The Agent-General and others inspected the beef. It was agreed that the consignment had carried remarkably well and as chilled meat it compared favourably with, although it was somewhat below, the usual quality of Argentine beef. The engineer in charge of the *Port Huon* believed the problem of shipping chilled meat from Australia to Great Britain had been solved. There were two other problems—regular supplies and uniform quality. (*QAJ*, Vol. 29, February 1928, p. 158)

The Queensland Agricultural Journal

In his editorial in the Journal in January 1919, A. J. Boyd wrote:

In July 1897, the 'Queensland Agricultural Journal' was launched by the then Minister for Agriculture, the Honourable A. J. Thynne, and the New Year 1918 seems a fitting occasion for a short review of its career of over twenty-one years. We are justified in believing that during that period the Journal has met with the unqualified approval of its readers, who comprise not only

Queenslanders, but residents in every part of the globe. Thus we hear of its being found on the tables of North and South American and Canadian farmers, in the town and country homes of India, China, many European countries, in Africa, and in the Dominions of the British Empire, where it is greatly appreciated. The sole aim has been from the outset to fill the pages of the Journal with useful and instructive articles bearing upon agricultural, pastoral, horticultural and other rural pursuits and those mainly from the pens of contributors who are specialists in the various subjects they have written upon. Many very valuable contributions have been received from pastoralists, farmers, and others giving their own experience of new methods of cultivation, of the effects of different manures, irrigation, etc., and also on experiments with new products. Many good inventions and ingenious contrivances for labour-saving have thus emanated from workers on the land. Information on such and kindred subjects have been and will be welcomed by the editor. Farmers are a busy people, and are apt, after a hard day's work, to be more inclined to rest than to sit down and write. There are also some who do not like to write because they think they are not equal to writing a newspaper article. We do not ask for an elaborate article. Just give us the rough idea, and we will do the dressing-up part. There is many a gem of thought, many a brilliant idea lost to the world because the originator of it is possessed with the idea that he cannot clothe it in sufficiently fine language. If you have the good idea, never mind the language or the composition or the spelling. Leave that to us, and let your ideas be given to the world...Every month the Department sends out several thousand copies of the Journal to various households all over the State, at the price of postage only. We may sum up the whole matter of agricultural education by the State, by saying that the objects the Department chiefly desires to promote are:-The education of both young and old in the technical and practical knowledge of Agriculture, Dairying, Poultry-raising, Stock-breeding, Fruit-growing, and kindred industries, and the formation of associations and bodies of farmers both for the attainment of objects of material importance to their welfare, and for providing an adequate means of giving expression to the general sense of that important section of the community. (QAJ, Vol. 11, January 1919, pp. 1–2)

John Francis Ferguson Reid, Inspector of Stamps, Brisbane, was appointed Editor, *Queensland Agricultural Journal*, to succeed Major Boyd, on six months' probation from 18 April 1921.

The Queensland Agricultural Journal under Reid

During 1920–21 monthly reports from the Southern Field Assistant (J. C. Murray) appeared in the *Journal*. A series of scientific articles on dairy technology was provided by Hamilton. Professor T. Harvey Johnston, of the University of Queensland, contributed scientific articles, "Biological Control of the Prickly Pear Pest" and "Nodule Parasite and Allied Worms from Queensland Cattle", in the August and September 1921 issues, and Dr H. I. Jensen was responsible for articles "Soils and Forest Flora of the Dividing Range North of Roma" in the October, November and December issues. Cuthbert Potts, Principal of the Queensland Agricultural College, Gatton (under the control of the Department), contributed a series of articles on stock feeding.

During 1922 a good deal of space was given to bringing the organisation of the agricultural industry before the public, but in 1923 the Council of Agriculture began its own newspaper, leaving more space for normal *Journal* material and a regular series on elementary agriculture, with a monthly survey of technical exchanges covering abstracts and reviews. The monthly circulation of the *Journal* reached 5500 copies in 1923. (Scriven, E. G. E., *Rep. Dep. Agric. Stk*, 1922–23, p. 7)

Extension and public affairs

Publicity Branch

On the recommendation of Public Service Inspectors Irwin and Giles in 1922, J. D. Story, the Public Service Commissioner, recommended that a publicity branch be formed in the Department. The functions of the branch were to be as follows:

- i. the enquiry into, and the study of, marketing problems generally;
- ii. the establishment of a comprehensive and useful agricultural library;
- iii. the organisation of regular Departmental bulletins for weekly publication in the press throughout the State and the compilation, printing and publishing of Departmental bulletins and pamphlets generally (including the *Queensland Agricultural Journal*);
- iv. the preparation of leaflets on agricultural, dairying, veterinary and entomological subjects for use in primary and rural schools;
- v. the organisation of publicity about the whole of the Department's activities, and of the activities of the Council of Agriculture, District Councils, Local Producers' Associations and Advisory Boards associated therewith, and the regulation of distribution of printed matter in connection with such activities;
- vi. co-operation with other branches of the Department and existing organisations, and general dissemination, for the benefit of the rural industries, of information regarding the best methods of production, manufacture and distribution of primary products.

A series of excellent colour plates prepared by Edmund Jarvis, Entomologist, Bureau of Sugar Experiment Stations, dealing with parasites of sugarcane grubs appeared in the February 1923 issue, launching a new departure in extension work in the *Journal*. As a foreword to the March 1923 issue of the *Journal*, the editor, Reid, wrote:

Readers should find the current Journal a most interesting one. Foremost among the special articles is the first of a series on agricultural organisation, covering an account of American co-operative associations and a comparison of them with the Queensland Producers' Association, written from on-the-spot studies by Mr. J. D. Story, who visited California recently on behalf of the Queensland Government. Cotton-growing is served with comprehensive and seasonable matter. As our greatest agricultural interest sugar is, as usual, well covered. Mr. Easterby contributes a timely comment on the industry, and Mr. Edmund Jarvis's science notes are particularly interesting. The first instalment of a special series on fertilisers and manures is very informative, and is designed as a source of material for a course of lectures to farmers to be inaugurated shortly. A review of a year's activities in the Stock Division and the Pure Seeds and Stock Foods Section throws a strong light on the doings of industrious and little-advertised branches of the Department. "Stud Stock Studies" is a new illustrated feature designed to present pictorially types of leading dairy cattle breeds with the object of, in a measure, stimulating and maintaining interest in dairy herd improvement. Illustrated notes on Queensland trees and weeds are also, among numerous other matters, of current importance. (QAJ, Vol. 19, March 1923, p. 163)

During early 1923, J. D. Story, as Chairman of the Administrative Committee of the Council of Agriculture, and Reid, Editor of Publications, Department of Agriculture and Stock, combined to prepare and publish a series of comprehensive articles entitled

"Organisation of the Agricultural Industry in Queensland", based on Story's experience of American practices studied while he was on a visit to that country and on their combined experience with Queensland's producer organisations and their cooperation with the Department of Agriculture and Stock. (*QAJ*, Vol. 19, March, April May and June 1923) These no doubt played a major part in the subsequent organisation of the State's agriculture and of the Department of Agriculture and Stock. A concerted effort was made to have farmers conserve fodder, particularly following the 1919 and 1922 droughts, under the direction of Quodling, Director of Agriculture. The *Journal* published a detailed article on silage making prepared by him, and C. S. Clydesdale (Assistant Instructor in Agriculture) and S. M. Smith (Field Assistant) visited several districts to instruct farmers, particularly on making stack silage from maize.

The July 1923 issue gave prominence to agricultural education, with the Minister for Agriculture and Stock declaring the changes at Gatton College with the addition of a high school, and views on science in agriculture by Professor Goddard of the University. Articles appeared on the work of the sugar experiment stations, cream grading, the marketing of Queensland fruit, water storage, the development of the new Burnett lands, and a series "Irrigation in Queensland" was commenced.

In the February 1927 issue, the first full list was published of pamphlets and other publications available for free distribution (30 pamphlets and 28 leaflets), and of books for sale (including Bailey's *Queensland Flora*, six volumes at 30 shillings).

In 1927 the answers to correspondents were enlarged, with answers being supplied by the Government Botanist and on veterinary, sheep and wool, and pig matters. Publications received were summarised.

A North Coast farmer expressed his feelings thus: "Permit me to express how much I feel indebted to the *Journal*. Each month it comes without fail laden with information direct from the man of science and the expert, and its general setup is excellent. The farmer is well and truly catered for in the *Journal* and it is ours practically for the asking." (*QAJ*, Vol. 27, April 1927, p. 370)

During 1926–27 monthly notes in the *Journal* dealt with the proceedings of the Royal Society of Queensland. With the displacement of the horse, tractor notes began to appear monthly and at the RNA Exhibition a special *Journal* alcove in the court of the Department became a clearing house for Departmental information.

The Minister for Agriculture and Stock, the Hon. W. Forgan-Smith, made a health visit to New Zealand early in 1928 with his wife and two sons and his private secretary, T. G. Hope. On his return he described in the April 1928 issue of the *Journal* interesting sidelights on New Zealand's agriculture he had seen as the guest of that country's Government. He made particular mention of dairying and fodder conservation. (*QAJ*, Vol. 29, April 1928, pp. 284–290)

Sir Arnold Thieler, K.C.M.G., D.Sc., Dr.Med.Vet., Director of Veterinary Education and Research in South Africa, visited Queensland in 1928 and stressed the need for phosphorus in the nutrition of cattle, especially in coastal districts. The September 1928 issue of the *Journal* reproduced in full an illustrated article, "Phosphorus in the Live Stock Industry",

by Sir Arnold Thieler, H. H. Green and P. J. du Toit, taken from the *Journal of the Department of Agriculture*, Union of South Africa. This article was to have a marked impact on animal nutrition in Queensland. Its conclusions were:

In all areas where the soil and pasture are known to be deficient in phosphorus, it is profitable to feed bone-meal to practically all stock for the sake of improving condition and facilitating rapid growth...When insurance against disease, increased beef production, increased milk yield, and more rapid growth of young cattle are all taken into consideration, it will be found that any expenditure on bone-meal is repaid many times over. (*QAJ*, Vol. 30, September 1928, p. 293)

The Home and Garden section of the *Journal* catered mainly for rural women, who either did the gardening themselves or supervised a gardener cum cowboy in the larger station homesteads.

Contents of the Queensland Agricultural Journal, July 1928

Event and Comment—Dairying in Queensland. Colour Prejudice in Corn. The position of the Sugar industry—The present seasonable outlook.

Bureau of Sugar Experiment Stations—Fertiliser results at Bundaberg. The Bundaberg Experiment Station and the Gumming Disease Situation.

The Atherton Tableland.

Cane Culture in the Philippines.

Field crops for dairymen

The leaf-eating ladybird (with colour plate)

Australian Rural Problems

Photo British Breeds of Livestock-Shire mare -Guernsey cow

Pineapple disease investigations

The Large Fruited Granadilla

The late Major A. J. Boyd

Observations on eye worm of birds

Turkey rearing

Maize and lucerne

Classing small clips

Drought feeding of Stock

Some aspects of stockfeeding in Australia

Photo—A green manure crop (Cowpeas) at Palmwoods

The Principles of Beekeeping

Rainfall in agricultural districts

Sheep in the wheatgrowing programme

Pig Farmers' School at Gatton

Care and handling of pigs

Pig hygiene

Answers to Correspondents—Fruit, Botany, Pigraising

General Notes—Broom millet board election. Regulation Announcements. Wheat Pool Sugar assessment. Wire and wireless. Cotton Board. A distinguished visitor from South Africa. Wheat Board. Points in citrus marketing. The orchard ladder. Staff changes and appointments. The Royal Society of Queensland. Clean up the Packing Shed. Scab in potatoes. Objectionable flavours in cream. A bad practice. Five functions of food for mulch cows. Points in maize seed selection. Milking machines and cleanliness. Roughage for dairy cows.

The Home and Garden—Landscape gardening. Animal manures. Flowering Shrubs. Kitchen garden, Flower garden.

Farm notes for August

Orchard notes for August. The Coastal Districts. The Granite Belt, Southern and Central Tablelands.

Astronomical Data for Queensland.

The Journal and Departmental publicity

After covering the whole range of agricultural activity, the Report goes on to say:

Additional information on the science, economics, and practice of agriculture is being collected continuously by the Department through research, field observations and experiments, and laboratory work, and this knowledge would be of little value to farmers and others concerned if it were not made available to them in a readable and digestible form. In this connection the "Queensland Agricultural Journal" and Departmental publications perform a useful service.

Officers engaged in directive, educative, and specialised work have made full use of the media at their disposal, and it is due to the regularity and practical value of their contributions that the Journal has become an acknowledged authority on the industry it efficiently serves; and that this and other Departmental publications have an ever-widening circulation. As a publication

dealing with the principles and practice of agriculture in this State the Journal has proved of definite value to those engaged in primary production, and there is evidence that it is appreciated accordingly.

Many new or revised bulletins and pamphlets on subjects of especial cultural or scientific importance were published by the Department in the course of the year.

Departmental officers have also contributed to a comprehensive radio programme in co-operation with the Queensland Government Radio Service. Lectures so delivered consisted of brief digests of seasonal information, facts, and general educational matter prepared in narrative form and covering a wide range of topics.

The making and releasing of a series of cinematographic films, showing the development, progress, and present standards of our chief primary industries, was also an important feature of the Department's publicity work. In addition numerous photographic prints, depicting the various phases of country life and its wealth and progress in Queensland, were also distributed through approved channels.

Information of a strictly news nature relating to the agricultural situation, Departmental activities, and seasonal notes on farming practice, plant and animal pests and diseases, is prepared and issued regularly to the metropolitan and country Press.

There is ample evidence that agricultural news is regarded as of general and increasing importance, and more space is being apportioned by the daily Press to notes and informative articles on the industry. This is a very healthy sign. (*QAJ*, October 1928, p. 317)

Agricultural extension services

The Journal was used to promote the Department's services.

Through the medium of correspondence and personal interviews dealing with every phase of the industry and with the activities outlined above, the services of the Department are made available to farmers in every portion of the State. The "Queensland Agricultural Journal" and the city and country Press provide media through which valuable information is conveyed to the farming community. The aim is to provide every farmer with the most up-to-date information it is possible to secure. The Instructors in Pig Raising invite you to communicate with them regarding your problems, whether they have reference to the control of stock in health or in disease or on any other aspect of the business. You are urged to avail yourself of their advice and assistance. (*QAJ*, February 1929, p. 145)

Exhibitions

The British Empire Exhibition at Wembley in 1924 gave Queensland an opportunity to display its agricultural products and resources. The Queensland Department of Agriculture and Stock seized this opportunity. At a meeting of the Agricultural, Viticultural and Horticultural Committee of the Queensland State Commission of the British Empire Exhibition, comprising H. W. Mobsby (State Organiser), H. C. Quodling (Director of Agriculture) as Chairman, E. W. Bick (Curator, Botanic Gardens), W. G. Wells (Cotton Expert), H. T. Easterby (Director, Sugar Experiment Stations), W. G. Brown (Sheep and Wool Instructor), with H. Hunter as Secretary, it decided to provide wool, cotton, sugar, cereals, grasses and edible shrubs and fresh and dried fruit exhibits. The Pastoral and Refrigerated Products Committee was chaired by E. Graham (Director of Dairying), with A. H. Benson in charge of fruit, J. Beard and W. Hindes (Poultry and Game), M. L. Cameron, Secretary, and H. W. Mobsby, State Organiser. (*QAJ*, Vol. 19, May 1923, pp. 379–380)

A series of films showing Queensland rural industries was prepared and exhibited by the Department, and at the invitation of the Minister for Agriculture and Stock a large

gathering of people interested in agriculture was invited to view the films before they were sent to Wembley. The great wool and sugar industries were shown in every phase of operation. (*QAJ*, Vol. 21, June 1924, p. 412)

On 27 August 1924 Harry Mobsby, Queensland Officer, Australian Pavilion, British Empire Exhibition, Wembley, England, and also of the Department of Agriculture and Stock, wrote:

The attendance at Wembley to date has reached 11,572,997 people. The attendance at our Australian pavilion has been 6,500,000...With regard to the big "Pittsworth Cheese" (bought by the Home and Colonial Stores)when cut up, it weighed 1 ton 5 cwt. 1 gr. 23 lb. One of their branch stores sold 600 lb. in one evening! They still have people asking for more of our "big cheese", the flavour was so good. Sales were good for cheese, butter, canned fruit, pineapples, pineapple jam, honey, apples, oranges, dried fruits (sultanas especially) and timber. (*QAJ*, Vol. 22, November 1924, p. 398)

In November 1925 Mobsby was officer in charge of the Queensland Exhibit at the New Zealand and South Seas Exhibition at Dunedin. A total of 3 200 498 visitors viewed the exhibit. Mobsby arranged for cinema films of the cotton and banana industries; radio talks on Queensland; publicity on the purchase of Queensland goods; the distribution of literature including the *Queensland Agricultural Journal*; Queensland news in the daily press; information on opportunities for new settlers and trade opportunities, with the removal of all tariff anomalies urged. The Queensland Court contained wheat, other grains, chaff, wool, fibre, cotton, forestry, mining, canned fruits, tropical agriculture, native grasses, dairy products, canned meat and wool fleece exhibits. He was praised by the *Journal*.

The following appreciation of Mr. Mobsby is taken from the "Evening Star" (3rd June, 1926), Dunedin:- "To those who have been constantly in touch with affairs at the Exhibition from the opening to the close have been revealed some officials who, though not happening to wander overmuch into the spotlight's magic circle, have done invaluable work for the department or the country which they represent.

"One of these is Mr. H. W. Mobsby, F.R.G.S., specially appointed to look after the interests of Queensland at the Exhibition just closed, and in whose hands the striking exhibit of the `Banana State' was made the feature of the Australian Court. Queensland, indeed, was the only Australian State that was adequately represented so far as a comprehensive exhibit is concerned, and Mr. Mobsby's good taste and experience made the most of the opportunity. He, on several occasions, broadcasted, in interesting fashion, information regarding the products of the State, and in diverse ways kept it constantly before the New Zealand public.

"As we have indicated, Mr. Mobsby, while jealous of the reputation of his State, does not seek personal aggrandisement. He `did his job', and is satisfied with the result. It came as something of a surprise, therefore, when, in the course of a chat at the close of the Exhibition, a `Star' representative drew from the Queensland Commissioner some details regarding his career. It appears that Mr. Mobsby is easily one of the most experienced and trusted of the overseas representatives, in that he has been associated with exhibition work all his life.

"It was as a lad that Mr. Mobsby got his first taste of the work when he accompanied his father in his official capacity to the Agricultural Exhibition on the Goldsmid Estate at Hove, Brighton, England. But his first personal connection with any exhibition was when he assisted Mr. A. G. Graysmith, artist, at the Royal Pavilion Building in Brighton. And after studying in art and design and in chemistry, and following a course of general commercial training, he practised as an artist and designer, and was on the instructional staff in decorative art and photography at the Central Technical College.

"But this is not all. Mr. Mobsby's success at home qualified him for similar work abroad, and he has had charge of Queensland's interests at the Franco-British Exhibition, London; at the

Panama-Pacific Exposition, San Francisco; at the British Empire Exhibition at Wembley; and now at the New Zealand Exhibition at Dunedin.

"Since 1897, however, Mr. Mobsby has been attached to the Department of Agriculture and Stock in Brisbane as Government Artist and Photographer, and it is during that period that he has became so closely connected with his State's representation at various exhibitions. Not only has he looked after Queensland's interests at the Australian Natives' Association's Exhibitions at Melbourne for several successive years, but also at Adelaide and Sydney, and at the Annual National Show at Brisbane.

"That he has not held these positions except on merit is proved by the fact that he holds a number of diplomas, certificates, and fellowships which have been gained in fields which have fitted him for his work. These include senior diploma, Chamber of Commerce (England); senior diploma, City and Guilds Institute (London); senior diploma, Cripplegate Institute (London). For Theoretical and Practical Photography: Certificate for drawing, South Kensington School of Arts (Brighton); certificate for motion picture work (San Francisco). He is also a medallist at the World's Photographic Competition, 1906; grand prix, Franco-British Exhibition, 1908; diploma and medal for photography at P.P.I. Exposition (San Francisco), 1915; and diploma and medal for distinguished services at the P.P.I. Exposition, San Francisco.

"It is safe to say that the many friends Mr. Harry Mobsby has made in Dunedin did not realise that the little gentleman from Queensland with the grey moustache and the friendly, unassuming manner was such a much-travelled and widely-experienced man of the world. He did not tell them of his successes; it is not his way. But, nevertheless, those with whom he came in contact felt they had made a friend, and, now that the Exhibition is at an end, they will part with him with regret." (*QAJ*, November 1926, pp. 401–403)

Royal National Exhibition

The Department of Agriculture and Stock annually provided a "Departmental Court" at the Royal National Show in Brisbane. Each branch of the Department displayed its activities in informative exhibits to enlighten the public as to the State's resources and the quality and diversity of its produce, and make recommendations as to means of improving production. Departmental publications were on display and available for purchase or free distribution. Officers attending the exhibits explained the material to the enquiring public.

Show judging

Departmental officers were in frequent demand, especially at provincial shows, to act as judges in the section in which they had special expertise and also helped organise show sections. This was regarded as an essential service to the rural community.

Surveying

Arthur Morry, Surveyor, Department of Agriculture and Stock, began a series of articles in the *Queensland Agricultural Journal* dealing with farm constructions. In August 1921, he published specifications for labour and materials required in building a pisé house and farm buildings of all kinds in country districts, and the specifications for laying a concrete floor for cow bails.

Retirement of the Hon. W. Forgan-Smith

With the defeat of the Gillies Government in early 1929, the Hon. W. Forgan-Smith, the retiring Minister for Agriculture and Stock, invited the whole of the staff of the Department to meet him in his room on the eve of his relinquishing office for the purpose of bidding them farewell.

Mr. Forgan Smith said that he was very pleased to see so many of his former staff present. He wanted to take that opportunity of thanking them for the very faithful and loyal service they had given him as their Minister. He was about to take his departure from the Department, and he wanted to assure them that he would continue to take a very keen interest in their welfare and their activities in the service of the agricultural industry. He considered that the Department of Agriculture and Stock was the most important in the State, and it was very pleasing indeed to observe that on his recent election tour that there was everywhere appreciation and praise of the Department and its officers. There was a very healthy feeling between the Department and the men on the land, and that co-operation was something that he had always endeavoured to foster. In the development of Queensland agriculture the officers of the Department would continue to play an increasingly important part. The resources and personnel of the Department had been built up with those of every other State. Continuing, he added—

"Your sphere of utility to the State is one that is worth while. The provision of a nation's food supply and the elements that go to provide for a people's needs all depend on their agricultural resources and what use is made of them. During my period of office, extending a little over four years, much beneficial legislation has been enacted and certain sound developments have taken place. That, of course, has resulted in certain organisations being built up, which I think will be a permanent feature of the life of the State.

"I just wish to express my very hearty appreciation of the very loyal and efficient service that has at all times been given me as the Ministerial head of the Department, and I feel that loyalty and service will be extended to my successor and to whichever Government is in power. I will continue to take a very keen interest in the work you are doing, and, finally, I would advise the Department in its administration never to allow any other organisation to usurp the functions and activities that could only properly be exercised by the Department." (Applause.)

The Under Secretary, Mr. E. Graham, on behalf of his fellow officers of the Department, thanked Mr. Forgan Smith for asking them to meet him on the eve of his severance with the Department. They appreciated very sincerely the laudable references their former Minister had made to the officers of the Department. They knew that he had set efficiency as his standard, and the splendid example shown by himself as Minister and the keen interest he had taken in the work of his officers he (Mr. Graham) felt sure had had a very striking influence on their work. The fine example of efficiency and co-operation he had set had been reflected throughout the Department. Mr. Forgan Smith's association with them as Ministerial head had extended well over four years; that was a fairly long term for a Minister to remain in one Department, and though it might not be a record as far as time was concerned, he thought that it embraced a record of service to the agricultural industry that would be very difficult to equal. (Applause.)

As a mark of their esteem of Mr. Forgan Smith's sterling qualities, his fellow-officers had requested him to accept a small gift. That gift was also some little tangible evidence of their appreciation of him as a citizen who had taken a prominent place in the affairs of the nation, and also as a man. It was desired also that Mr. Smith should have some little reminder of his association with the Department and its officers. (Applause.)

Mr. Graham then presented to Mr. Forgan Smith a solid silver cigar box, suitably engraved, and a silver cigar cutter and holder.

Mr. Smith feelingly responded. He was leaving the Department, he said, with the heartiest good feeling towards every officer, and his interest in their work would increase rather than lessen with the passing of the years.
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Mr. Smith then thanked each officer individually for services rendered to the Department while he was in control. (*QAJ*, June 1929, p. 396)

DEPRESSION, RECOVERY, WAR: 1929-1945

The New Moore Government, 1929-1932

In October 1925 William McCormack succeeded William Neal Gillies as Premier and leader of the Labor Party. "He made the fatal mistake of clashing with the unions. During an industrial dispute at South Johnstone sugar mill in September 1927 the mill's sugar was declared 'black' and railwaymen refused to handle it. The Government sacked them. All railwaymen went on strike, and the State's railway system came to a standstill. The Government stood firm and the strikers went back to work, muttering angrily about their betrayal by a Labor Government. Next election the inevitable happened and Labor was swept out by a landslide as great as that which had given them office in 1915." (Holthouse, 1978).

With the fall of the McCormack Government, the Hon. William Forgan-Smith, the then Minister for Agriculture and Stock, lost his portfolio.

The new Country-National Government led by Arthur Edward Moore took office on 21 May 1929. Their term of office almost coincided with the peak of a worldwide depression whic brought financial ruin, starvation and hardship on a scale unknown in peacetime. Though the Moore Government could not be blamed for the depression's impact on Queensland, the unemployment, relief work gangs, soup kitchen queues, battling and general misery became indelibly associated, in the eyes of the electors, with the Government then in power. (Holthouse, 1978).

Harry Frederick Walker, Minister for Agriculture and Stock

The Hon. Harry F. Walker, Minister for Agriculture and Stock in the new Queensland Government, was born at Gympie on 15th April, 1873. All his early life was lived on the goldfield that has contributed so much to Queensland's progress. He was educated at the One Mile and Monkland State Schools and afterwards at a private Grammar School.

As a young man mining naturally attracted him, and for twelve years he was engaged actively in that industry, both on top and underground. Mr. Walker saw the transition of his native district from one of the most profitable gold-producing provinces to one of the richest and most progressive dairying regions in Australia. In 1910 he acquired a considerable area of land near Gympie and entered into diversified farming in which he has been very successful, particularly in dairying which is his main interest.

Mr. Walker was first elected to Parliament as the representative of Wide Bay in 1907, and has held a seat in the Legislative Assembly ever since. On the redistribution and renaming of electorates some years ago he contested Cooroora, a district on the near North Coast, and had no difficulty in securing the representation of that important rural constituency. His valuable services, Parliamentary and otherwise, to the agricultural and stock raising industries have been recognised by his return without opposition at several successive elections.

Twenty-three years ago, in association with a few other progressive dairy farmers, Mr. Walker assisted very materially in the organisation and establishment of the Wide Bay Co-operative Dairy Company, of which he has been Chairman of Directors for a number of years, besides being a director ever since its inception. This company controls two large modern butter manufacturing plants at Gympie and Cooroy. Its Gympie factory is one of the largest and most complete in the Commonwealth, and in the quality of its output has achieved an enviable reputation on home and overseas markets.

The co-operative movement in Queensland has had in Mr. Walker an ardent, long-sighted and very practical advocate. His interest in dairying particularly led him in 1924 to investigate personally manufacturing methods and marketing systems in Great Britain. This investigation was extended to the Continent and its results have already proved of benefit to the industry in this State, especially on its selling side. While abroad Mr. Walker was also a close observer of agricultural conditions in Europe. He made a special on-the-spot study of Danish dairying organisation and marketing methods, and on his return home contributed a valuable series of Press articles, in which comparisons were often in favour of Queensland, and which added very considerably to our knowledge of present-day dairying practice.

In his day he was a noted athlete and horseman. A supporter of the volunteer movement he joined the Queensland Mounted Infantry which was later to win renown on South African battlefields, and was among the picked body of men chosen to represent Queensland at Queen Victoria's Diamond Jubilee Celebrations in England in 1897. With other Gympie young men who have since loomed large in our public, commercial, and industrial life, including Major General Senator Sir William Glasgow, the Federal Minister for Defence, Mr. Walker joined the first Queensland contingent accepted for service in the last Boer war. He was with his regiment in every engagement, including Sanna's Post where he won distinction, until he was invalided home.

In his youth the new Minister excelled as an exponent of military sports and figured with success in international tournaments in England at which Queensland Mounted Infantrymen competed, as well as in the Light Horse tournaments at Lytton in the old volunteer days.

Mr. Walker's home is at Tewantin, on the near North Coast, and in the centre of our beautiful lake country. In hours of limited leisure he finds recreation in shooting and fishing in a countryside abounding in native game. (*QAJ*, June 1929, p. 394)

In the *Queensland Producer* of 2 April 1930 a tribute was paid to Walker's work as Minister:

We feel bound to say, ... that since Mr. Walker became Minister for Agriculture he has certainly made good. He has gone out of his way to get down to bedrock as to what the producers' problems really are. He has made himself most approachable and has been prepared to listen to suggestions and also to statements by producers' representatives of their difficulties, and he has done so with the utmost patience and consideration. Mr. Walker has been working very long hours and has certainly devoted himself to the cause of the farmers of Queensland.

He has also taken a very big view of the possibilities of the development of Queensland agriculture, and his Wheat Agreement Scheme, designed to bring about increased production of wheat, was a masterpiece, and brought about harmony between the Wheat Board and the millers where formerly there was discontent and continual strife. His attitude in establishing the Banana Industry Protection Board was a big move. His broadminded action in collaborating with the Hon. F. M. Forde in a big forward step to develop the cotton industry is typical of the way in which Mr. Walker sheds the political aspects for wider national point of view." (*QAJ*, Vol. 33, May 1930, p. 346)

Walker died on 23 October 1950.

The Salaries Act of 1930

One of the best remembered pieces of legislation of the Moore government, especially by the public servants (and therefore by Departmental staff), was The Salaries Act of 1930. This was introduced because of the economic condition of the State at the time and the Departmental staff was caught up in the legislation. The Hon. H. F. Walker did not initiate it.

The Salaries Act of 1930 (21 Georgii V. 9, *Qd Govt Gaz.*, No. 128) was assented to on 26 September 1930. Section 3 of the Act reads:

Notwithstanding the provisions of any Act to the contrary every officer employed in the service of the Government of Queensland, instead of being paid the salary which, except for this Act, he would have been entitled to receive, shall, without further or other authority than this Act, be paid such salary less a reduction calculated as follows:

Present Annual Salary	Reduction Per Cent	Minimum Final Salary
more than £1,500	15%	not less than £1,300
£1,100 - £1,500	14%	not less than £965
£800 - £1,100	13%	not less than £710
£600 - £800	12%	not less than £540
£400 - £600	11%	not less than £365
less than £400	10%	

- applicable from 15th September 1930.

This Act does not apply to His Excellency the Governor, the Private Secretary to the Governor or any other person determined in that behalf by the Governor-in-Council. Seniority and Superannuation payments will not be affected.

The Bureau of Economics and Statistics Act of 1930

An Act of some importance to the Agricultural Industry was The Bureau of Economics and Statistics Act of 1930, establishing a Bureau of Economics and Statistics within the Labour and Industry Department, and assented to on 23 October 1930, with James Bristock Brigden, M.A., as Director for seven years from 1 August 1930 and Eric James Coulter as Acting Secretary from 25 August 1930. The powers and functions of the Bureau were to acquire and disseminate knowledge concerning the economic conditions of Queensland, including the income, production and industrial efficiency of the community, to collect statistical and other information relating thereto, and in particular report on:

(a) the organisation, capitalisation and labour conditions of particular industries;

- (b) the trade of Queensland, both overseas and interstate;
- (c) stock of commodities, both primary and manufactured;
- (d) monetary conditions and both wholesale and retail prices;
- (e) employment and unemployment generally and, in particular, industries and localities; and

(f) the relations between employers and employees.

The Statistical Returns Act of 1896 was repealed and a new section inserted providing for the collection and publishing of information relating to:

- (a) population: vital statistics,
- (b) immigration and emigration,
- (c) social statistics,
- (d) factories and manufacturing industries,
- (e) wages,
- (f) employment and non-employment,
- (g) imports and exports,
- (h) shipping,
- (i) railways and tramways and transport generally,
- (j) banking, insurance and finance,
- (k) land tenure and occupancy,
- (l) agricultural, pastoral and kindred industries,
- (m) mining and mining industries (including quarries),
- (n) retail and distributive industries,
- (o) forestry,
- (p) fisheries,
- (q) local government,
- (r) water conservation and supply,
- (s) any other prescribed matters.

Legislative Acts introduced by Walker

- 1. The Agricultural Bank Act Amendment Act of 1929 (20 Georgii V. No. 3, *Qd Govt Gaz.*, No. 81) was assented to on 4 October 1929-collectively The Agricultural Bank Acts, 1923 to 1929. This Act exempted the Bank from any claims by local authorities for arrears of rates or other dues upon the security of a mortgage to the bank or to the Secretary for Public Lands when taking possession of such lands. On the sale of repossessed land any money surplus to the bank's repayment could be paid to persons or local authorities as the Bank saw fit. The provisions also applied to the Corporation under The State Advances Act of 1916.
- 2. The Diseases in Plants Act of 1929 (20 Georgii V. No. 11, *Qd Govt Gaz.*, No. 133) was assented to on 27 November 1929. The Diseases in Plants Acts, 1916 to 1924 were repealed. This Act updated the previous Acts. It gave the Governor-in-Council power to prohibit the introduction of plants and the removal of plants, declare fruit districts, diseases and pests, appoint inspectors, register orchards and nurseries, and defined the powers of inspectors-to enforce eradication of disease by owners, report abandoned orchards, and advise on quarantine areas, upon which the Minister could take action. Penalties and compensation could be decided. Regulations under the Act were formed to generally protect the fruit and vegetable industries in relation to diseases and pests.
- 3. **The Banana Industry Protection Act of 1929** (20 Georgii V. No. 12, *Qd Govt Gaz.*, No. 134) was assented to on 27 November 1929. It was to be read where necessary with The Diseases in Plants Act of 1929. This Act provided for the annual registration of banana orchards. The Government could establish the Banana Industry Protection Board of four members, consisting of two representatives of the Government, nominated by the Minister, and two growers' representatives; one of the Government

members was to be Chairman, also appointed by the Government. The duties of the Board would be:

- (a) to assist the Minister in an advisory capacity in regard to problems appertaining to the culture of bananas, including such matters as were embraced pursuant to The Primary Produce Experiment Stations Act of 1927;
- (b) to advise the Minister concerning banana cultivation, bunchy top, leaf spot and other diseases or pests;
- (c) to disseminate information dealing with the culture of bananas;
- (d) to furnish reports to the Minister on such matters as might be requested by the Minister;
- (e) to perform and undertake such powers, duties and responsibilities as might be imposed by Order-in-Council under this Act or as might be delegated by the Minister to such Board.

The Governor-in-Council could proclaim banana districts, a Chief Inspector under the Act, and also agents to supervise districts. A Banana Industry Fund was established by assessment on growers to cover expenses of the Board and also fund research on pests and diseases. Penalties could be imposed for offences under the Act.

- 4. The Soil Survey Act of 1929 (20 Georgii V. No. 29, *Qd Govt Gaz.*, No. 165) was assented to on 23 December 1929. This Act provided for powers of entry to properties by officers undertaking a soil survey of the State. It provided for reasonable notice to be given to the owner or occupier of the land regarding entry to the land and exercise of their power under the Act.
- 5. The Abattoirs Agreement Ratification and Meat Industry Act of 1930 (21 Georgii V. No. 13, *Qd Govt Gaz.*, No. 143, 22 October 1930) was assented to on 14 October 1930. This Act approved, ratified and confirmed an agreement made between the Hon. A. E. Moore, Premier of Queensland, on behalf of the Government and Swift Australian Meat Company Limited to purchase its abattoirs, and to provide for the Constitution of a Meat Industry Board's having for its object the maintenance and control of the abattoirs, and further powers and authorities regarding the Meat Industry. It applied to the Metropolitan Abattoir Area which conformed with the boundaries of the City of Brisbane as set forth in The City of Brisbane Act of 1924.

A Queensland Meat Industry Board was established consisting of three members:

- (a) the General Manager of the public abattoir, who would also be Chairman,
- (b) a producers' representative, and
- (c) a consumers' representative.

The establishment of the abattoirs required inspection of cattle arriving at the abattoirs for disease and provided for condemnation of animals and for inspection of meat on the carcasses of all slaughtered animals with powers of condemnation by government inspectors. 6. The Primary Producers' Organisation and Marketing, Fruit Marketing Organisation, Wheat Pool and Diseases in Plants Acts Amendment Act of 1930 (21 Georgii V. No. 22, *Qd Govt Gaz.*, No. 184, 24 November 1930) was assented to on 13 November 1920. This Act authorised minor amendments to the above Acts. Under the Primary Producers' Act, plywood and veneer were declared commodities, and a Board could make a particular levy for funds.

Under the Fruit Marketing Act, amendments provided for the specification of the class of fruit involved, the acquisition of special classes of fruit by the Committee and the keeping of accounts. Under the Wheat Pool Act, the Board was to be allowed to raise a mortgage against its assets. Under the Diseases in Plants Act, a nursery was newly defined as - "any place where plants or fruit trees are grown for sale or are offered or exposed or kept for sale". The amendment also provided for grades for plants and nursery stock (fruit trees intended for planting) in respect to age, size, vigour, stocks, development and variety.

- 7. The Home Hill State Farm, Helidon State Quarries and South Brisbane State Workshops Sale Act of 1930 (21 Georgii V. No. 23, *Qd Govt Gaz.*, No. 185, 24 November 1930) was assented to on 13 November 1930. This Act, in relation to the Department of Agriculture and Stock, provided for the sale of the Home Hill State Farm.
- 8. **The Tully Sugar Works Act of 1930** (21 Georgii V. No. 24, *Qd Govt Gaz.*, No. 186, 24 November 1930) was assented to on 13 November 1930. It provided for the transfer of the management and control of the Tully Sugar Works from the Corporation of the Treasurer to a Co-operative Association.
- 9. The Diseases in Stock Act Amendment Act of 1930 (21 Georgii V. No. 35, *Qd Govt Gaz.*, No. 233, 22 December 1930) was assented to on 18 December 1930. This Act provided for several amendments to definitions, gave power to the Government to make a grant in aid of the Stock Diseases Fund out of Consolidated Revenue, provided for new stock assessments and made full provisions for the mustering and disposal of brumbies from specific properties. A month's notice of intention to muster was required in an advertisement through a stock inspector or police, horses could be claimed on the establishment of ownership and payment of a fee, and the remainder destroyed or sold under the supervision of the inspector or police. It also dealt with failure to close gates on a road or stock route.
- 10. The Native Plants Protection Act of 1930 (21 Georgii V. No. 41, Qd Govt Gaz., No. 8, 5 January 1930) was assented to on 24 December 1930. This Act provided for the protection of any native plant specified by Order-in-Council in any declared district for a limited or unlimited time. Penalties were provided for unlawful picking and honorary rangers were appointed. The Minister for Agriculture and Stock administered the Act.
- 11. The Grazing Districts Improvement Act of 1930 (21 Georgii V. No. 44, *Qd Govt Gaz.*, No. 11, 5 January 1931) was assented to on 24 December 1930. The Dingo and Marsupial Destruction Act of 1918 and The Dingo and Marsupial Destruction Act Amendment Act of 1923 were repealed and Section Four of The Marsupial Proof Fencing Act Amendment Act of 1913 was repealed. Some Rabbit Boards and Dingo Districts were abolished and the Minister for Lands administered the new Act.

- 12. The Regulation of Sugarcane Prices Act Amendment Act of 1931 (22 Georgii V. No. 5, *Qd Govt Gaz.*, No. 83, 2 September 1931) was assented to on 31 August 1931. It provided that a certificate under the hand of the Secretary of the Central Board as to the area and boundaries of assigned land should be binding on all courts, Boards or persons.
- 13. The Apiaries Act of 1931 (22 Georgii V. No. 15, *Qd Govt Gaz.*, No. 144,19 October 1931) was assented to on 15 October 1931. The Act provided for the declaration of districts under the Act by the Governor-in-Council, who would appoint inspectors to police the Act. No person could keep bees within a two-mile radius of the Brisbane Post Office without the approval of the Minister and his approval was also necessary elsewhere in the prescribed form. No bees in an apiary or premises occupied by them must be kept in a frame hive, except in the case of native bees. All beekeepers were to be registered with the Department of Agriculture and Stock at a prescribed fee of 2s 6d per annum for 1 to 15 hives, to 10s for hives in excess of 60. Diseases were to be reported by beekeepers to the Minister, and diseased bees, combs, hives, beeswax, honey or appliances were not to be moved without treatment to cure or eradicate the disease.

The Act restricted the introduction of bees or appliances unless accompanied by a certificate from an approved officer of the Department of Agriculture in its State of origin declaring the same came from a district in which foul brood (Bacillus larvae, *B. pluton* or *B. alvei*) or Isle of Wight Disease (acarine disease) did not exist. Areas could be quarantined by the Minister. All containers of honey produced in Queensland were to be marked as described. Penalties for breaches of the Act were prescribed.

- 14. The Margarine Acts Amendment Act of 1931 (22 Georgii V. No. 16, *Qd Govt Gaz.*, No. 145, 19 October 1931) was assented to on 15 October 1931 and was to become incorporated in The Margarine Acts, 1910 to 1931. This Act made minor changes to the definition of margarine, allowed a manufacturer to use skim milk which contained less than 0.05 per cent of butterfat as an emulsifying agent in the process of manufacture, and omitted sesame oil in favour of vegetable oils or vegetable fats.
- 15. The Agricultural Bank Acts Amendment Act of 1931 (22 Georgii V. No. 22, *Qd Govt Gaz.*, No. 178, 28 November 1931) was assented to on 21 November 1931, to become incorporated in The Agricultural Bank Acts, 1923 to 1931. It made provision for the purchase of sheep and beef cattle, for new definitions of a dairy farmer and a sheep farmer, and for the payment of local authority rates.
- 16. The Diseases in Stock and Brands Act Amendment Act of 1931 (22 Georgii V. No. 34, Qd. Govt. Gaz., No. 210, 22 December 1931) was assented to on 16 December 1931, to be incorporated in The Diseases in Stock Acts, 1915 to 1931 and The Brands Acts, 1915 to 1931. It provided for new assessments on owners of stock for the purpose of the administration of the Acts.

Staff Changes under Walker

Owing to the severe economic conditions few new appointments were made during the 1929-32 period, although several promotions were made to meet special circumstances. The Banana Industry Protection Act of 1929 demanded more surveillance in the industry

and W. J. Ross, Senior Instructor in Fruit Culture, became Chief Inspector under the Act and sixteen agents were appointed on 31 July 1930, together with a Secretary to the Board. In consequence H. Joe Freeman was made Senior Instructor in Fruit Culture and Harry Barnes, H. St. J. Pratt, S. E. Stephens, R. L. Prest and E. F. Duffy were appointed Instructors on 1 July 1929.

The Cotton Section was strengthened by six Senior Assistant Graders on 1 July 1929: A. C. P. Nurcombe, E. Widdup, D. F. Kay, F. J. Manuell, J. Byron and W. J. White. W. A. R. Cowdry and K. V. Henderson were appointed Field Assistants.

Queensland suffered a loss from the Entomology group when J. L. Froggatt, who had contributed much to the sugar industry and in other ways, resigned on 14 August 1929 to become Entomologist in the Territory of New Guinea. Following his departure J. H. Smith was promoted to Entomologist and W. Alan T. Summerville to Assistant Entomologist on 16 October 1929. Robert Veitch was appointed Chief Entomologist on 23 January 1930. With the prickly pear almost conquered, Frederick Hugh Roberts was recruited from the Prickly Pear Station at Gogango to become Entomologist, concentrating on internal parasites and other stock diseases. William Alexander McDougall was promoted to Assistant Entomologist, Bureau of Sugar Experiment Stations, on 1 January 1932.

H. W. Kerr was made Acting Director of the Bureau of Sugar Experiment Stations on 23 December 1931 and Edmond Rowlands Behne, later to become Director of the Bureau, started as Acting Assistant Technologist on 25 February 1932.

After a meritorious career with the Department, beginning as foundation Farm Foreman at the Queensland Agricultural College, Gatton, on 1 July 1897, then becoming in succession Manager of Westbrook State Farm (1898-1900) and Hermitage State Farm (1901-15), Inspector of Agriculture (1905-15) and Director of Agriculture (1915-31) at the age of forty three years, Harold Cecil Quodling was named Manager of the Agricultural Bank on 28 August 1931. He had been appointed to the Faculty of Science at the University of Queensland in 1917 to represent the Department in discussions which led ultimately to the founding of the Faculty of Agriculture in 1927.

Following his appointment, G. B. Brooks became Director of Agriculture and Charles Shearer Clydesdale became Senior Instructor in Agriculture on 1 October 1931.

A. E. J. C. K. Graham, Under-Secretary and Director of Marketing, succeeded L. E. Macgregor as a Member of the Committee of Direction of Fruit Marketing on 17 April 1930, although Macgregor's appointment was to continue until 6 December 1931.

Lewis F. Mandelson was appointed Assistant Pathologist on 1 January 1930 to undertake investigations into diseases in tobacco. On the animal side, John Lewis Hodge was appointed Instructor in Sheep and Wool on 30 May 1929, and Albert Fredrick Sigurd Ohman was appointed a Veterinary Officer on probation on 28 January 1932. William John Sanderson, starting as Assistant Photographer, was promoted to Photographer at Head Office on 25 February 1932.

Retirement of Mr Henry Tryon

Henry Tryon the foundation Entomologist and Vegetable Pathologist, retired in 1925 but continued in the Department working on special pathological investigations until 1929. He died on 15 November, 1943.

Retirement of J. C. Brünnich

The retirement this month of Mr. J. C. Brunnich from the office of Agricultural Chemist in the Department of Agriculture and Stock, under the age limit regulations, will mean the severance from official life of one of the most capable men in the service of the State.

His pending retirement on 11th September 1931 has already been marked by many fine and fitting tributes to his worth and work in the metropolitan and country press.

Some features of the Walker Ministry

In addition to the legislative and administrative changes there were other notable features of the Walker administration.

Visit of parliamentarians and school children

So that the Legislature might see the work being done by the Department at head office, the Hon. Harry F. Walker invited members to an informal tour of the Department's facilities - the Central Meat Inspection Depot supervising pork and veal carcass examinations for farmers and butchers from Monday to Saturday each week; the Chemical, Pure Seeds, Entomological, Plant Pathological and Cotton Laboratories; the Seeds Store; and the Wool Store, where farmers' wool from small flocks was classed, bulked according to grade and sold on behalf of farmers. Samples of Queensland-grown light, medium and dark tobacco leaf from Harveys Range and Home Hill were inspected in the Minister's office. Eighteen parliamentary members, the Minister, the Under-Secretary (A. E. Graham), Assistant Under-Secretary (R. Wilson), R. P. Short and J. F. F. Reid, Editor of the Queensland Agricultural Journal, were in attendance. The Minister said questions were often asked as to what the Department was doing and the extent of its scientific service to agriculture was very little known generally so such visits would help to widen public interest. He paid a tribute to the staff, saying that he was proud to be associated with the highly qualified men who were performing such valuable services for the primary industries. The members were very impressed and expressed their thanks to the Minister. (QAJ, Vol. 35, January 1931, pp. 52-54)

Following this visit, several parties of schoolchildren numbering 150 from the Kelvin Grove electorate were shown through the Department on 9 April 1931 at the instance of their local member, Richard Hill, M.L.A. Lunch was provided by the Department. The Minister offered prizes to two pupils from each of the three schools for the best essays about the visit and Richard Hill offered a medal to the writer of the best essay. (*QAJ*, Vol. 35, May 1931, pp. 303-309)

The Native Plants Protection Bill

The Minister, in introducing this Bill, said it was a small Bill and one which might be regarded as having very little commercial value, but it was necessary, for it was their (the Government's) bounden duty to preserve the beautiful flora in Queensland.

Although at the present time we may not value these plants, in the future they will be of immense value. I went for a walk the other week, and saw carload after carload of ferns and orchids coming from Mount Tamborine. One may see carloads of native flora coming in every Sunday and I do not think this is a fair thing. We have some wonderful orchids in Queensland and they can be found from Southern Queensland right up to North Queensland. On Mount Tamborine, on the Blackall Range and in the scrubs of the Mary Valley and on the Atherton Tableland we have a very large variety of beautiful ferns and other flora which will be appreciated more as years go on. (*QAJ*, Vol. 35, February 1931, p. 122)

This anticipated the environmental movement of the 1980s.

Creation of the Pasture Improvement Committee

In 1931 Walker created the Pasture Improvement Committee. Its members were Messrs A. E. Graham (Under-Secretary and Director of Marketing) as Chairman, H. T. Anderson representing the Council of Agriculture, F. F. Coleman representing the Department of Agriculture, W. T. Harris representing the Australian Dairy Council, and Bruce Shearer representing A.C.F. and Shirley's Limited and Nitrogen Limited. It arranged to continue the Departmental experiments at Sherwood and Maleny and conduct further trials at Nerang, Beaudesert, on the Caboolture-Kilcoy line near Eumundi and at Green's Creek near Gympie and at Murgon. (*QAJ*, Vol. 35, June 1931, p. 377)

First Queensland University graduates in Agricultural Science

The first five graduates in Agricultural Science from the Queensland University completed their courses in December 1929-D. O. Atherton, L. L. S. Barr, W. W. Bryan, C. S. Christian and W. Cottrell-Dormer. Cottrell-Dormer had served with the Bureau of Sugar Experiment Stations prior to enrolling at the University and on graduation was appointed Assistant Plant Pathologist with the Bureau. David O. Atherton entered the Department as Assistant to the Entomologist and L. L. S. Barr as an Agent under the Banana Industry Protection Act. C. S. Christian won a C. S. I. R. Travelling Scholarship and studied overseas in Minnesota and Europe, and W. W. Bryan was appointed Lecturer in Plant Breeding, Experiments and Economic Botany at the Queensland Agricultural High School and College. Thus the hopes of the Department when it actively sponsored the formation of the Faculty of Agriculture and expressed its intention to employ a number of graduates each year were initially realised. Many more graduates were to be absorbed in succeeding years.

Defeat of the Country Party Government

The Country Party government was roundly defeated in the 1932 election and the Labor Party regained the Government benches under the leadership of the former Minister for Agriculture and Stock, the Hon. William Forgan-Smith. He chose Frank William Bulcock to be his Minister for Agriculture and Stock, a portfolio Bulcock was to hold for ten and a half years.

Frank William Bulcock, Minister for Agriculture and Stock 1932-1942

The Hon. Frank W. Bulcock, Minister for Agriculture and Stock in the new Queensland Government, has had a lifelong association with rural industry and its problems. He was born at Mount Arapilis, Victoria, where his parents farmed successfully an irrigation area. His early education was obtained at the Newtown Superior Public School, Sydney. Completing his primary tuition, he entered the Sydney Technical College as a student, where he took the agricultural course and graduated with first class honours. Veterinary science next claimed his attention, and afterwards he succeeded in winning an agricultural bursary, of which only nine were then available annually in New South Wales. He selected the Wagga Agricultural College and Experimental Farm for further training in agriculture and animal husbandry, and there won added distinction as a student, achieving in his term the position of dux of the College and taking honours in bacteriology, plant diseases, dairy practice, and sheep and wool. In the semi-final examinations he obtained the remarkable average of 91 per cent in agricultural science, and later secured an excellent pass in veterinary science. On leaving Wagga he devoted his attention to plant breeding with a special bias towards wheat, working on different farms in the Riverina with the object of gaining further field experience. Plant breeding has continued an absorbing interest with Mr. Bulcock, notwithstanding the demands of a strenuous parliamentary career.

Coming to Queensland he quickly found an outlet for his energies in the pastoral industry. Like many other young Australians who have made their mark in public life, he was impatient with the social inequalities of the day. Joining the Australian Workers' Union, perhaps the greatest of our industrial organisations, he soon became prominent in its councils, and, winning the confidence of its members, was elected to an important official position. The Union movement, wisely governed, provides an excellent training in the qualities needed in public life, and to Mr. Bulcock the years spent in active association with the A.W.U.-an organisation of competent direction, high standing, essentially all Australian in its outlook, and unweighted with narrow provincial or sectional prejudice-were invaluable. He was thus brought into direct and vigorous contact with men and affairs, and that experience has helped him immensely in his career as a representative of the people. (*QAJ*, Vol. 38, August 1932, p. 116)

This led to Bulcock's election on 20 December 1919 as Labor member for Barcoo, the seat he held till 15 December 1942. He became the first Minister for Agriculture and Stock in the Forgan-Smith Ministry of 1932 and was the last surviving member of that Ministry when he died in 1973 at the age of 78 years. He held the Agriculture and Stock portfolio until his resignation on 15 December 1942 to become Wartime Director-General of Agriculture for the Federal Government at the request of the then Prime Minister, John Curtin. He was the prime mover for the establishment of a Chair in Veterinary Science at the University of Queensland, and he made a valuable legislative contribution to the development of Queensland's primary industries. He represented Australia overseas on many occasions at international food and agricultural conferences. He was seconded to Washington and London, and for a time led the Australian delegation to the United Nations Food and Agriculture Organisation. (*Qd Parl. Debates*, Vol. 261, 1972-73, p. 2642) He established the Federal Department of Agricultural Production. From 1952 to 1959 he was a Counsellor to the High Commission in London and in 1945 he was made a Life Member of the Royal Agricultural Society of England. (Waterson, 1972).

Legislative Acts introduced during Bulcock's administration

- 1. The Abattoirs Further Agreement Ratification and Meat Industry Act of 1932 (23 Georgii V. No. 4, *Qd Govt Gaz.*, No. 74, 3 October 1932) was assented to on 22 September 1932. This Act approved, ratified and confirmed the agreement between Swift Australian Company Ltd and the Queensland Meat Industry Board. It gave power to the Company, the Board, and the Chief Secretary, the Hon. A. E. Moore to carry into execution the said agreement.
- 2. The Queensland Meat Inspection Agreement Act of 1930 (23 Georgii V. No. 5, *Qd Govt Gaz.*, No. 80, 3 October 1932) was assented to on 22 September 1932. The Agreement made on 6 April 1932 between the Commonwealth of Australia and the State of Queensland came into operation under this Act on 25 November 1932 for three years and thereafter was subject to six months' notice in writing. It was agreed that: the Commonwealth would appoint to the permanent service of the Commonwealth such officers of the State presently engaged in inspecting meat as would be agreed upon by the Commonwealth Public Service Board and the Public Service Commissioner of Queensland with all of its privileges and on the termination of the agreement they would be reappointed to the State Service;

the Commonwealth officers would inspect on behalf of the State all meat slaughtered at the Abattoir of the Queensland Meat Industry Board other than meat to be exported beyond the Commonwealth, the State to reimburse the Commonwealth the salaries and allowances of five Meat Inspectors Grade I, the cost of replacements during leave of absence and annual charges of superannuation. Additional officers were to be appointed if needed;

the Commonwealth was required to supply the State with details concerning the meat inspection.

- 3. The Abattoirs Agreement Ratification and Meat Industry Act Amendment Act of 1932 (23 Georgii V. No. 12, *Qd Govt Gaz.*, No. 105, 24 October 1932) was assented to on 18 October 1932. This Act arranged for matters of compensation for discontinuance of slaughtering works already established. It also prohibited animals to be slaughtered for boiling-down works from entering the Metropolitan Abattoir area, and prohibited storage of meat brought into the area.
- 4. **The Brands Act Amendment Act of 1932** (23 Georgii V. No. 14, *Qd Govt Gaz.*, No. 128, 25 November 1932) was assented to on 11 November 1932 and incorporated in "The Brands Acts, 1915 to 1932. This Act made alterations to definitions, provided conditions for additional earmarks for stud cattle and age brands and prevented similar brands from being used in a district.
- 5. The Stallions Registration Act Amendment Act of 1932 (23 Georgii V. No. 18, *Qd Govt Gaz.*, No. 149, 20 December 1932) was assented to on 8 December 1932 to be incorporated into The Stallions Registration Acts, 1923 to 1932. This Act reduced the size of the Stallion Boards to two experienced breeders instead of three, plus a qualified veterinary surgeon as Chairman, approved by the Minister. Imported stallions already carrying a certificate of soundness would be accepted as sound and registered. Condemned stallions would not be sold to any other person unless unsexed, and a

condemned stallion had to be unsexed within three months of his rejection. Stallions with a life certificate of registration had to be branded with a prescribed fire brand.

- 6. The Farm Produce Agents Acts Amendment Act of 1932 (23 Georgii V. No. 21, *Qd Govt Gaz.*, No. 152, 20 December 1933) was assented to on 8 December 1932, to be incorporated in The Farm Produce Agents Acts, 1917 to 1932. It provided for any person desiring to obtain a farm produce agent's licence to lodge an application accompanied by the prescribed fidelity bond in the prescribed amount from the State Insurance Commissioner or other prescribed security. Licences lasted one year. It also provided that at the time of purchase of the produce from the producer or before its delivery the price to be paid had to be definitely fixed and agreed upon by the vendor. It also provided for a system of fees.
- 7. The Dairy Produce Act Amendment Act of 1932 (23 Georgii V. No. 22, *Qd Govt Gaz.*, No. 153, 20 December 1932) was assented to on 8 December 1932, to be incorporated in The Dairy Produce Acts, 1920 to 1932. It provided for financial statements to be supplied to the Minister by factories, and inspection of books by inspectors at any time. Factories were prohibited from defraying any part of the cost of transport of dairy produce to the factory. Annual returns were to be supplied to the Minister.
- 8. The Primary Producers' Organisation and Marketing Acts Amendment Act of 1932 (23 Georgii V. No. 31, *Qd Govt Gaz.*, No. 6, 12 January 1933) was assented to on 6 January 1933, to be incorporated in The Primary Producers' Organisation and Marketing Acts, 1926 to 1932. It changed the membership of the Council of Agriculture to (a) the Director of Marketing, (b) members elected by the Boards (the Committee of Direction and the State Wheat Boards to be deemed to be Boards), and (c) one representative for each of the nine District Councils. The Board was empowered to deduct not more than two per cent of the aggregate net realisations for a commodity to be placed to the credit of a Working Account Reserve Fund to be drawn upon in the conduct of the Board's business. The number of members of the Council was not fixed but could be declared by the Governor-in-Council by Order-in-Council from time to time.
- The Dairy Cattle Improvement Act of 1932 (23 Georgii V. No. 32, *Qd Govt Gaz.*, No. 8, 12 January 1933) was assented to on 6 January 1933. The Act was to be in force in such districts as declared by Order-in-Council under The Dairy Produce Acts, 1920 to 1932. It provided for:
 - i. licensing of every bull over the age of twelve months,
 - ii. application to the Under-Secretary for licences,
 - iii. the licence to expire on 31 December and to be renewed by 31 January,
 - iv. an annual licence fee for a bull of five shillings,
 - v. a transfer of the licence with any change of ownership,
 - vi. a penalty not exceeding twenty pounds for unlicensed bulls of the necessary age,
 - vii. no licence for a bull used solely for breeding beef cattle.

The Dairy Produce Board was required to notify the Minister of a precept stating the amount the Board would pay to the Dairy Cattle Improvement Fund made up of fees for licences, penalties and precepts.

Inspectors were to be appointed and had right of entry and inspection of bulls on a property, castration or destruction of unlicensed or diseased bulls, etc.

The Minister also had the power to:

- (a) after the expiration of two years from the commencement of this Act, refuse a licence for any bull which was not well grown according to age or season, sound of constitution, and manifestly showing dairy characteristics;
- (b) after the expiration of six years from the commencement of this Act, refuse a licence for any bull which is not approved.

The Dairy Cattle Improvement Fund was to be under the control of the Minister and the regulations made thereunder would be administered and applied by him to improving the standard of dairy cattle, in the direction of:

- (a) recording production,
- (b) extending the use of approved sires, and
- (c) controlling the health of dairy stock.
- 10. The Liens on Crops of Sugarcane Act Amendment Act of 1933 (24 Georgii V. No. 4, *Qd Govt Gaz.*, No. 94, 18 October 1933) was assented to on 11 October 1933, to be incorporated in The Liens on Crops of Sugarcane Acts, 1931 to 1933. It provided for the Cane Pest Board, which supplied and supervised necessary fumigant for crops, to have the first charge against the ensuing crop.
- 11. The Pig Industry Act of 1933 (24 Georgii V. No. 6, *Qd Govt Gaz.*, No. 96, 18 October 1933) was assented to on 11 October 1933. The Act was to come into force in any district declared by Order-in-Council under The Dairy Produce Acts, 1920 to 1932. Inspectors could be appointed under the Act and would also be inspectors under The Dairy Produce Acts, Diseases in Stock Acts and Slaughtering Acts. Inspectors had powers of entry to any premises or places where pigs were kept or depastured and any factory to inspect cleanliness, pigs, water, and food; they could order the premises to be cleansed, with any diseased pigs to be removed and isolated, destroyed and buried, and pure water and wholesome food provided as considered necessary. All meat, offal or blood had to be cooked before feeding. Pigs sold to any factory were required to be marked for identification. Records were to be kept by auctioneers. The manager of every factory had to have all carcasses graded by a qualified grader who would stamp the carcasses accordingly. Suitable penalties were to be provided.

Piggeries were to be registered and the owners issued with certificates.

12. The Dairy Products Stabilisation Act of 1933 (24 Georgii V. No. 14, *Qd Govt Gaz.*, No. 135, 30 November 1933) was assented to on 23 November 1933. For the purposes of this Act a Queensland Dairy Products Stabilisation Board was constituted initially by members of the Butter and Cheese Boards in office for a term of three years. The Governor-in-Council would appoint a member to be Chairman, and the Board would appoint the Vice-Chairman and its officers. The Board could levy contributions on manufacturers to defray its costs. The Board could promulgate quotas on manufactures for intrastate trade or commerce within the State. The Board could enter into interstate contracts. The Board would register or deregister manufacturers of dairy produce, and agents or dealers.

- 13. The Regulation of Sugar cane Prices Acts Amendment Act of 1933 (24 Georgii V. No. 27, *Qd Govt Gaz.*, No. 176, 21 December 1933) was assented to on 14 December 1933. This Act made provision for membership of Central Boards, the question of assignment when cane-land was sold and also the power of the Board to determine if the price and/or terms and/or conditions of the sale or lease were unfair or unreasonable. It also compelled the Central Board to publish a list of approved varieties as issued by the Director of the Bureau of Sugar Experiment Stations each year.
- 14. The Tobacco Industry Protection Act of 1933 (24 Georgii.V. No. 30, Qd Govt Gaz., No. 2, 2 January 1934) was assented to on 18 December 1933. Inspectors could be appointed and districts declared under the Act. All growers had to be registered and all sellers of tobacco seed licensed with the Department. The Minister could refuse to register a tobacco-grower desiring to sell seed. "Pure Seeds Districts" could be constituted in which seed, seedlings and crops would be carefully supervised by inspectors. Diseases, fungi and insects could be declared pests and dealt with as prescribed and quarantine areas declared. Introduced tobacco plants, tobacco leaf or tobacco seed could be inspected and periods for seed sowing or planting seedlings monitored or prohibited. Introduced seed or seedlings had to carry disease-free certificates and transfers had to be approved. Every grower had to inform the Under-Secretary in writing within one week of the appearance of disease. The Minister could order destruction of seed or plants. Inspectors had power to enter and inspect farms, barns, sheds, etc. in carrying out the provisions of the Act. Suitable penalties for infringements would be prescribed. Regulations would prescribe the varieties of tobacco which could be grown in any Pure Seeds District.
- 15. **The Veterinary Medicines Act of 1933** (24 Georgii V. No. 33, *Qd Govt Gaz.*, No. 5, 2 January 1934) was assented to on 18 December 1933. The Act provided for the appointment of the Veterinary Medicines Board consisting of:
 - (a) Stock,
 - (b) the Chief Inspector of Stock for the time being of the Department of Agriculture and Stock,
 - (c) a bacteriologist appointed on the nomination of the Minister, and
 - (d) a veterinary surgeon appointed on the nomination of the Minister.

Veterinary medicines were to be registered only after they had been approved by the Board as efficient and carrying a statutory declaration and printed label. Persons selling veterinary medicines had to be licensed and licences to be renewed annually on payment of the prescribed fee. Every dealer had to notify the Under-Secretary of his name and place of business, the distinctive name of every veterinary medicine he proposed to sell during the current year, the name and address of the manufacturers and the places where the products could be purchased. Products had to be accurately labelled with details of the name of the product, a printed statement giving quantity or proportion of any alkaloids, glucosides or poisonous derivatives thereof, all directions for use and the name and address of the wholesale dealer. The Under-Secretary could require an analysis to be made. The Governorin-Council could appoint inspectors and analysts as necessary to carry out the Act. Costs would be paid for analyses. Penalties were provided for breaches of the Act. Suitable regulations would be framed and published.

- 16. The Diseases in Plants Acts Amendment Act of 1934 (24 Georgii V. No. 3, *Qd Govt Gaz.*, No. 97, 18 October 1934) was assented to on 11 October 1934. This Act provided a new definition of "occupier" for the purposes of this Act.
- 17. The Sugar Experiment Stations Acts Amendment Act of 1934 (25 Georgii V. No. 4, *Qd Govt Gaz.*, No. 98) was assented to on 11 October 1934 to be incorporated in The Sugar Experiment Stations Acts, 1900 to 1934. Under this Act the Sugar Experiment Stations Advisory Board was established, with six members:
 - (a) two representatives of the Government-the Minister for Agriculture and the Director of Sugar Experiment Stations-who would act without remuneration;
 - (b) two representatives of sugar growers-one representative of growers north of Mackay and one for Mackay and south;
 - (c) two mill representatives-one nominated by the Australian Sugar Producers' Association and one by the Queensland Society of Sugarcane Technologists.

The last four members would be entitled to remuneration.

The Minister for Agriculture and Stock would be Chairman.

The duties and responsibilities of the Advisory Board would be:

- (a) to advise the Minister upon the needs of the sugar industry in all matters appertaining to the investigation of the problems of the production and manufacture of cane sugar and other products of sugar-cane, and to disseminate information so obtained;
- (b) to assist the Minister in an advisory capacity in regard to the efficient conduct of the work of Sugar Experiment Stations;
- (c) other duties imposed by Orders-in-Council,
- (d) to consult with the Minister as to the rate of assessment that would be annually levied.
- The Primary Producers' Co-operative Associations Acts Amendment Act of 1934 (25 Georgii V. No. 5, *Qd Govt Gaz.*, No. 99, 18 October 1934) was assented to on 11 October 1934. This Act substituted the word "corporation" for "company" under Section 22 and made minor amendments.
- 19. The Dairy Produce Acts and Other Acts Amendment Act of 1934 (25 Georgii V. No. 11, *Qd Govt Gaz.*, No. 114, 31 October 1934) was assented to on 25 October 1934. This Act placed restrictions on building premises for pasteurisation of cream, manufacture of butter or cheese except with the consent of the Governor-in-Council; and restrictions on agencies except with the permission of the company. A small portion of the Act dealt with the payment of an annual fee for a licence for a bull under The Dairy Cattle Improvement Act of 1932.

- 20. The Fruit Marketing Organisation Acts Amendment Act of 1934 (25 Georgii V. No. 23, *Qd Govt Gaz.*, No. 165, 11 December 1934) was assented to on 29 November 1934. This Act made provision for the extension of The Fruit Marketing Organisation Acts, 1923 to 1930, if growers demanded it, for a further five years.
- 21. The Stallions Registration Acts Amendment Act of 1934 (25 Georgii V. No. 24, *Qd Govt Gaz.*, No. 166, 11 December 1934) was assented to on 29 November 1934, to be incorporated in The Stallions Registration Acts, 1923 to 1934. Under this Act a new definition of stallion was adopted, viz. "Any entire male horse of the age of three years or over such age" and amendments made re registration. Penalties were imposed on any owner using stallions rejected as unsound by the Stallion Board or Appeal Board except for mares of his own property.
- 22. The Sugar Experiment Stations Acts Amendment Act of 1934 (No. 2) (25 Georgii V. No. 26, *Qd Govt Gaz.*, No. 168, 11 December 1934) was assented to on 29 November 1934. This Act provided for the Minister to make a further assessment, if so recommended by the Commissioner for Public Health, for the eradication of rats from the cane fields. This special assessment was not to exceed 3d per ton of cane delivered to the mill within an approved area.
- 23. **The Rural Assistance Board and Agricultural Bank Acts Amendment Act of 1934** (25 Georgii V. No. 30, *Qd Govt Gaz.*, No. 172, 12 December 1934) was assented to on 6 December 1934. Under this Act there was constituted the Rural Assistance Board of four members (being officers of the Public Service), two of whom were officers of the Bank, one an officer of the Department of Agriculture and Stock, and one of the Department of the Auditor-General.
 - 1. Its duties were to act as an advisory board, advising the Bank in respect of applications for advances made under (a) The Agricultural Bank Acts, 1923 to 1934 and (b) The Discharged Soldiers Settlement Acts, 1917 to 1932.
 - 2. The Board would also be an advisory board advising the Minister for Labour and Industry in respect of loans which might be made pursuant to The Income (Unemployment Relief) Tax Acts, 1930 to 1932.

Amendments were made to the Agricultural Bank Acts empowering the Bank to make advances to Commodity Boards, and to graziers for the purchase of beef cattle for breeding and fattening and for the purchase of grass and fodder crop seed. This grazier's advance was not to exceed five hundred pounds.

- 24. **The Regulation of Sugar cane Prices Acts Amendment Act of 1935** (26 Georgii V. No. 16, *Qd Govt Gaz.*, No. 120, 13 November 1935) was assented to on 7 November 1935, to be incorporated in The Regulation of Sugarcane Prices Acts, 1915 to 1935. This Act reduced the acreage of cane to be grown to entitle the grower to a vote from ten acres to a minimum of five acres.
- 25. The Diseases in Plants Act and Fruit and Vegetables Act Amendment Act of 1935 (26 Georgii V. No. 17, *Qd Govt Gaz.*, No. 121, 13 November 1936) was assented to on

7 November 1935, to be incorporated in The Diseases in Plants Acts, 1929 to 1935. This Act defined "abandoned or neglected orchard or nursery" and "quarantine area". It provided for a brand in the shape of a broad arrow on all plants and equipment seized under the Act, and gave Inspectors power to enforce quarantine and stipulate the place, time and manner for destruction of diseased or fallen fruit.

- 26. The Stock Foods Acts Amendment Act of 1935 (26 Georgii V. No. 18, *Qd Govt Gaz.*, No. 122, 13 November 1935) was assented to on 7 November 1935, to be incorporated in The Stock Foods Acts, 1919 to 1935. It provided for sellers of stock food to provide a signed invoice to the buyer indicating his name and address, the name of the stock food, the net weight of each stock food included on the invoice and a warranty in the prescribed words. It also provided for the labelling of packages of hay and chaff with the grower's name and address (stencilled on the package), or affixing of the grower's brand. It gave inspectors power to enter, inspect, examine, remove samples for analysis, seize and mark such seizure. An analyst's certificate was required to be sent to the person from whom the stock food was obtained.
- 27. The Fertilisers Act of 1935 (20 Georgii V. No. 19, *Qd Govt Gaz.*, No. 129, 20 November 1935) was assented to on 14 November 1935. The Fertilisers Act of 1914 and The Fertilisers Act Amendment Act of 1916 were repealed. This Act updated previous Acts following the advancement of knowledge and the expansion of the fertiliser spectrum. Dealers were to be licensed, give full details of name and address, location, fertilisers to be handled, specimen of invoice and labels setting out full details of composition and brands for registration of fertilisers. Inspectors operating under the Act could inspect, sample and have analyses done. Penalties were provided for breaches of the Act, the moneys thereby collected being paid into the Consolidated Revenue Fund. Regulations would be made to carry out the purposes of the Act.
- 28. **The Wheat and Wheat Products Act of 1935** (26 Georgii V. No. 34, *Qd Govt Gaz.*, No. 152, 9 December 1935) was assented to on 5 December 1935. This Act constituted a Queensland Wheat Stabilisation Board composed in the first instance of the existing members of the State Wheat Board, and its officers attended to the administration. This Board would be a body corporate with perpetual succession and an official seal and could collect funds for its administration.

The Board in consultation with the Minister could determine quotas on growers regarding the sale of their wheat for human consumption in the course of both intrastate trade and commerce within the State of Queensland. Receivers of wheat other than the State Wheat Board had to be licensed and furnish full particulars to the Board and a receipt to the grower. The Board would then issue to the wheat grower a home consumption warrant for the percentage of wheat represented by the quota in force at the time. Wheat processors were required to inform the Board of the home consumption warrants involved. Monthly returns were required by the Board of wheat used by the processor. The Board could enter into contracts. All books could be inspected.

29. The Dairy Produce Acts Amendment Act of 1935 (26 Georgii V. No. 26, *Qd Govt Gaz.*, No. 154, 9 December 1935) was assented to on 5 December 1935, to be incorporated in The Dairy Produce Acts, 1920 to 1935. This Act provided for the

inclusion of processed cheese, required swine to be confined and kept more than one hundred and fifty feet away from any dairy produce premises, the payment for cream and milk to be based on butterfat content, and the amount of butter or cheese obtained to be estimated in a prescribed manner. It prevented dairy farmers from diverting supply from a butter to a cheese factory and vice versa, unless twenty-eight days' notice was given. Factory owners were required to furnish monthly statements to the Minister regarding their manufactures. The Minister could notify cream routes to factories and factories could license carriers to convey such cream subject to Ministerial consent. The Minister could appoint a Committee to oversee the transport routes and the system generally. The Act provided for compulsory grading of cream received at a factory into choice, first and second grade. If below second grade it could be accepted, but had to be graded as "pastry". The Act provided regulations for storage of dairy produce and materials related to its manufacture. Monthly statements of new or retiring suppliers of dairy produce were required of factory owners by the Minister, as were particulars of grades and amounts of produce handled and manufactured. All key operators in factories were required to be qualified.

- 30. The Primary Producers' Organisation and Marketing Acts Amendment Act of 1935 (26 Georgii V. No. 35, *Qd Govt Gaz.*, No. 174, 18 December 1935) was assented to on 12 December 1935, to be incorporated in The Primary Producers' Organisation and Marketing Acts, 1926 to 1935. This Act provided for pigs to be declared a commodity under the Act, gave Boards powers to extend districts, where the Minister was agreeable, and provided for prior payment of a grower's harvesting costs to the contractor by the Board out of the grower's due payments before they were received by him. The Act also empowered the Board to include the raising of funds for legal expenses along with insurance funds against fire, pests, hail and flood. The Queensland Cane Growers' Council was declared to be a body corporate.
- 31. The Dairy Products Stabilisation Act of 1933 Continuation Act of 1936 (1 Edward VIII. No. 10, *Qd Govt Gaz.*, No. 98, 29 October 1936) was assented to on 23 October 1936. This Act provided for the continuation of the Act without limit of time.
- 32. The Diseases in Stock Acts, 1915 to 1935 (1 Edward VIII. No. 12, *Qd Govt Gaz.*, No. 118, 16 November 1936) was assented to on 12 November 1936, to be incorporated in The Diseases in Stock Acts, 1915 to 1936. The Act dealt with permits to travel stock. A permit would only be issued by an Inspector if he was satisfied that the application to travel was made by the bona fide owner or his authorised deputy, with the bona fide destination established. Alterations to the permit could only be made by an Inspector.
- 33. **The Regulation of Sugar cane Prices Acts Amendment Act of 1936** (1 Edward VIII. No. 13, *Qd Govt Gaz.*, No. 119, 16 November 1936) was assented to on the 12 November 1936, to be incorporated in The Regulation of Sugarcane Prices Acts, 1915 to 1936. This Act provided for a Judge of the Supreme Court to be Chairman of the Board and eliminated reference to "both Houses" of Parliament and "District Courts".
- 34. **The Veterinary Surgeons Act of 1936** (1 Edward VIII. No. 17, *Qd Govt Gaz.*, No. 142, 3 December 1936) was assented to on 26 November 1936. This Act constituted the Veterinary Surgeons Board of Queensland, of five members including the Dean of the Faculty of Veterinary Science, University of Queensland, who became a member ex

officio and permanent President. All the members of the first Board were to be Government-appointed. Subsequent Boards were to consist of two members nominated by the Minister as Government representatives and two by registered veterinary surgeons. Triennial elections were provided for. The Board was to be a body corporate. The Governor-in-Council would appoint a Registrar, paid from a fund established by the Board from fees and penalties and, if necessary, supplemented by the Government. Any surplus would be devoted to the advancement of veterinary science. The Registrar would furnish to the Minister a current list of registered members as at 31 December each year, which would be published by the Minister as "The Roll of Veterinary Surgeons of Queensland" for the year in the Government Gazette. Each registered member would pay a prescribed yearly fee. Membership was open to holders of a degree or diploma in veterinary surgery or a member of a recognised college of veterinary surgeons who had undertaken a training course and passed its examination or had been practising veterinary surgery for a period of at least five years. All applications from existing operators had to be made within six months of the passing of the Act. Certificates of Registration would be issued by the Board.

Names could be removed from the register by the Board under certain circumstances.

Many Gatton College diplomates registered as veterinary surgeons under the Act, and the Minister himself registered on the strength of his training at the Wagga Agricultural College. When the first graduates from the newly founded Faculty of Veterinary Science at the University of Queensland became available early in 1941, veterinary supervision of the State's livestock was considerably strengthened.

35. **The Plague Grasshoppers Extermination Act of 1937** (1 Georgii VI. No. 7, *Qd Govt Gaz.*, No. 73, 20 September 1937) was assented to on 17 September 1937. The Governor-in-Council could proclaim districts under the Act. Initially it applied to the Pastoral Districts of Moreton and the Darling Downs. A Plague Grasshopper Destruction Committee would be formed in each declared district by local authorities. Each committee would be a body corporate. The Committee was to take all proper steps within its district for the extermination of plague grasshoppers. The Department of Agriculture and Stock could co-operate with any Committee in the administration of the Act. Owners of land infested with larval stages were required to take steps to exterminate them with a bait made up of

¹/₂lb arsenic pentoxide 2¹/₂ gallons of water 4 lb molasses 24 lb bran

spread over a thirty-foot-wide band surrounding each infestation. Any member of the Committee could so order the destruction. An owner had to notify the Committee in writing within twenty-four hours of his sighting of the colony. Suitable penalties were provided.

36. The Diseases in Plants Acts and Another Act Amendment Act of 1937 (1 Georgii VI. No. 16, *Qd Govt Gaz.*, No. 143, 23 November 1937) was assented to on 18 November 1937. It amended The Diseases in Plants Acts, 1929 to 1935 in regard to penalties and identification of lands, and also The Banana Industry Protection Act of 1929 in like manner.

- 37. **The Brands Act Amendment Act of 1937** (1 Georgii VI. No. 17, *Qd Govt Gaz.*, No. 144, 23 November 1937) was assented to on 18 November 1937. This Act altered the size of the prescribed branding irons used for horses, cattle and camels to not less than one and one-quarter inches in length or more than two and one-half inches in length. It also eliminated the word "swine" from the regulations and declared horses or cattle bearing altered or illegible brands to be unbranded.
- 38. The Diseases in Poultry Act Amendment Act of 1937 (1 Georgii VI. No. 21, Qd Govt Gaz., No. 150, 24 November 1937) was assented to on 19 November 1937. This Act was framed mainly to cover the day-old-chick industry. Hatcheries were to be disease-free. The vendor had to specify the sex of the chicks. All chick sexers had to be licensed. The Act also redefined the word disease to include Favus (Zophophyton gallinae), fowl cholera, fowl typhoid, fowl pox, fowl pest (all varieties), gapes (infestation of poultry with Syngamus trachealis), infectious bronchitis (Laryngo tracheitis), mites (all kinds), neurolymphomatosis, poultry lice (all kinds), poultry tick (Argus persicus), pullorum disease (bacillary white diarrhoea), poultry scabies (Sarcoptes laevis), stickfast flea (Echidusphaga gallinacea), tuberculosis, tumours, vent gleet, and any other disease affecting poultry which the Governor-in-Council by Order-in-Council declared to be a disease under and for the purposes of this Act.

The Act also prohibited the sale of diseased birds or the carcass of a diseased bird.

39. **The Fauna Protection Act of 1937** (1 Georgii VI. No. 22, *Qd Govt Gaz.*, No. 151, 24 November 1937) was assented to on 19 November 1937. This Act repealed The Animals and Birds Acts, 1921 to 1924. The Act gave the Governor-in-Council power to declare the fauna involved, declare districts where it would be in force, declare opossum districts, fix a closed season for part of or the whole State, declare sanctuaries, prohibit sale of fauna, limit the taking or killing of fauna, place any sanctuary under the control of a local authority and declare an open season within which it would be lawful to take or kill fauna in accordance with the regulations.

It could appoint officers for the purpose of the Act to protect sanctuaries and control baiting. Native bears were to be fully protected. Fauna dealers and skin dealers were to be licensed and their premises registered. Swivel guns were prohibited. The taking of eggs during the closed season was prohibited. Native bears and opossums could only be kept in a registered zoo. All fauna and all skins or plumage, except exempt, taken or killed lawfully under this Act were the property of the Crown. Royalties were to be paid on fauna taken. The Minister could permit certain gardens, museums etc. to keep fauna, permit collection for scientific purposes or permit a person to retain in a state of domestication or captivity such fauna as were specified. The Act prohibited the use of cyanide or bird lime for taking fauna. Aborigines killing fauna for their own food were exempted. Exportation and importation of fauna had to be by permit. Penalties were provided and regulations framed and made public.

40. **The Seeds Act of 1937** (1 Georgii VI. No. 23, *Qd Govt Gaz.*, No. 152, 24 November 1937) was assented to on 19 November 1937. This Act repealed The Pure Seeds Act of 1913 and The Pure Seeds Act Amendment Act of 1914. This Act updated the previous Acts. All seeds for planting had to comply with the standards for analytical purity,

germination, impurities, pure germinating seed, weight and purity of variety or strain. All seed packages were to be correctly and adequately labelled according to the regulations. Officers and inspectors were to be appointed to carry out the provisions of the Act with powers to enter, inspect, sample for analyses, seize, weigh etc. packages of seed. Buyers could submit samples of seed for Government analysis.

- 41. **The Drought Relief to Dairy Farmers Validation Act of 1937** (1 Georgii VI. No. 25, *Qd Govt Gaz.*, No. 159, 30 November 1937) was assented to on 25 November 1937. This Act was an Act "to approve, adopt, authorise, ratify, confirm and validate certain indentures made between the Secretary for Agriculture and Stock on behalf of the Government and bodies corporate (mostly factories) to provide drought relief to dairy farmers". Factories could supply fodder and/or water to farmers who would undertake to repay the factory with interest for the time being charged by the Treasury. Repayment could be taken from the proceeds of cream and or pigs sold to the factory. Loans to factories would come from appropriation from Consolidated Revenue.
- 42. The Sugar Experiment Stations Act and Other Acts Amendment Act of 1938 (2 Georgii VI. No. 12, Qd Govt Gaz., No. 101, 2 November 1938) was assented to on 27 October 1938, to be incorporated in The Sugar Experiment Stations Acts, 1900 to 1938. This Act allowed any fodder cane not used for the manufacture of sugar to be grown in any mill area under prescribed conditions. It also declared that The Diseases in Plants Acts, 1929 to 1937 should no longer apply to sugarcane. The Act provided for the appointment of inspectors, and the audit of the books of Cane Pest Boards. An important Section of the Act provided for the Director of the Bureau of Sugar Experiment Stations to approve and have published a list of approved varieties of sugarcane for planting in each mill area, the mills to be notified of the list. Canegrowers could not deliver, nor the mill accept, varieties not approved. Any cane grown from a variety not approved would be deemed and dealt with as diseased. Cane grown on unassigned land was also deemed diseased. Growers had to inform mill owners of the varieties they had planted, and a copy of such return had to be supplied by the mill owner to the Director. The Director could grow any variety of experimental cane for testing and all varieties grown on the Sugar Experiment Stations could be treated by the mill as experimental cane. Introduction or removal of sugarcane into or out of any plantation would only be permitted as prescribed. Any cane likely to introduce any insect, fungus or disease was prohibited or permitted as prescribed.

Insects, fungi, packages etc. could be seized by order of the Minister or an Inspector and marked with a broad arrow as prescribed. Owners could be ordered to eradicate any diseased cane. The Minister could also order destruction of any affected cane which in the opinion of the Director posed a threat in relation to the spread of disease. Quarantine areas could be declared. The Minister could also declare an area a canedisease-infested area and constitute a Cane Disease Control Board of five members, three of whom would be canegrowers, to suppress and prevent cane diseases within the disease-infested area. A levy of three pence per ton would be imposed to cover the expenses. A State of Emergency could be declared for a specified and proclaimed period. An occupier of land on which any disease appeared had to notify the Director within twenty-four hours. Regulations would be framed. 43. The Dairy Produce Acts Amendment Act of 1938 (2 Georgii VI. No. 13, *Qd Govt Gaz.*, No. 107, 10 November 1938) was assented to on 3 November 1938, to be incorporated in The Dairy Produce Acts, 1920 to 1928. This Act provided that every owner of dairy produce premises should register and at all times keep registered under this Act in his own name his dairy produce premises. It provided for the entry of a veterinary officer to a dairy for the purpose of inspection and testing of any stock to ascertain if they were diseased and to declare a quarantine area and make necessary orders to the owner regarding diseased stock. An appeal against any order could be made in writing to the Under-Secretary within seven days. The diseases acted upon were those which had been proclaimed in the *Government Gazette*.

Factories would be inspected also. Cream routes would be notified by the Minister on the recommendation of factory owners and carriers would be licensed to service these routes. The Minister could appoint a Committee of Investigation to supervise cream routes.

Milk from a cow taken during the period of fifteen days next preceding or the period of ten days next succeeding parturition was not acceptable to trade as milk.

All dairy produce traded had to be of recognised standard. All factory grading or testing had to be true and made by certified officers. All regulations had to be published in the Gazette. Matters concerning dairy buildings and the erection of milking machines, the checking of scales at dairy produce premises and methods of analyses of dairy produce were included.

- 44. **The Veterinary Medicines Act Amendment Act of 1938** (2 Georgii VI. No. 19, *Qd Govt Gaz.*, No. 126, 29 November 1938) was assented to on 24 November 1938, to be incorporated in The Veterinary Medicines Acts, 1933 to 1938. This Act provided for the Minister to appoint a Registrar of Veterinary Medicines and a Deputy Registrar of Veterinary Medicines from his staff to handle the registration of these medicines. The primary dealer (manufacturer, importer or wholesale seller) was required to register the medicine and pay the annual fee prescribed. Applications for the registration of veterinary medicines had to be referred to the Board. Officers or inspectors could enter, inspect, sample, weigh etc. any veterinary medicine on sale and seize it if necessary under the Act and have it analysed.
- 45. **The Salaries Act of 1930 Repeal Act of 1938** (2 Georgii VI. No. 23, *Qd Govt Gaz.*, No. 130, 29 November 1938) was assented to on 24 November 1938. This Act repealed The Salaries Act of 1930 and portion of The Financial Emergency Act of 1931 and salaries, classifications and increments returned to those payable before passing of the 1930 Act.
- 46. **The Dairy Produce Acts Amendment Act of 1938** (No. 2) (2 Georgii VI. No. 24, *Qd Govt Gaz.*, No. 131, 29 November 1938) was assented to on 24 November 1938, to be incorporated in The Dairy Produce Acts, 1920 to 1938. This Act banned the use of preserving agents, colourisation agents or disinfectants which had been condemned. It provided for owners of dairy herds to apply to the Under-Secretary, Department of Agriculture and Stock, for a certificate stating that the herd was free from tuberculosis.

Factory owners were required to publish a statement concerning rates of payment, quantity manufactured and total quantity of butter paid for during a prescribed period. Suppliers were to give factories twenty-eight days' notice of intention to divert supplies to another factory. The Minister could notify the designation of roads as milk routes to factories in the *Gazette*. Carriers were to be licensed to pick up milk on specified routes. Canvassing of milk and cream supplies was prohibited. Persons misrepresenting the grade or type of milk or cream sold were subject to penalties.

47. The Milk Supply Act of 1938 (2 Georgii VI. No. 27, *Qd Govt Gaz.*, No. 141, 6 December 1938) was assented to on 1 December 1938. This Act applied to all milk and cream for consumption or use within a district comprising the area of the City of Brisbane as set forth in the Schedule and in any other district constituted by the Governor-in-Council from time to time except for milk or cream sold directly by the producer to a consumer or wholesaler and delivered directly to the retail vendor; or milk or cream used for the manufacture of butter, cheese, condensed milk, dried milk or ice cream. The Board known as the Milk Board was abolished. The Area of the City of Brisbane was to be known as the "Brisbane Milk District" and a Brisbane Milk Board was constituted to be appointed by the Governor-in-Council by Order-in-Council published in the *Gazette*. The initial Board consisted of the Chairman, the three persons nominated by the producers and the three members of the old Milk Board nominated by the vendors, holding office for one year.

Subsequent Boards would consist of a Chairman appointed by the Government and equal nominees of the producers and vendors and would hold office for three years. The Board would be a body corporate. The Board was charged with the regulation and control of the collection, treatment, supply, sale and distribution of milk and cream for consumption or use within the appointed district. The Board would devise satisfactory methods of collection, eliminate unhygienic practices, promote consumption, provide a laboratory for chemical, bacteriological and pathological analyses, make provision for inspection of dairy herds, premises etc., fix grades and types of milk or cream, license vendors and appoint officers (including veterinary surgeons) for the discharge of its business. It would license carriers, control the sale of milk runs, amd prevent diversion of supply between vendors except by fourteen days' notice. The Chairman of the Board was to determine the price to be charged by and paid to producers from time to time for milk and cream supplied. These prices were to be published in the *Gazette*.

Every wholesale vendor was required to furnish to the Board a fidelity bond in the prescribed form from the State Insurance Commissioner or other insurer. The Board could require books of producers, wholesale vendors and licensed carriers, to be audited. It could require registration of producers and wholesale vendors.

An important function of the Board was its power to determine quotas relating to the maximum quantity of milk or cream which each producer could supply, and a different maximum quantity could be determined with respect to different producers. The actual quantity of milk supplied by a producer during the months of June, July and August was taken into account when allocating quotas.

The Board could also levy assessments of not more than one-quarter of a penny per gallon on every gallon of milk supplied by a producer to be paid monthly by the

wholesale vendor to the Board. All expenses would be paid out of the funds of the Board, in relation to the administration of this Act.

The Board was to present an annual report to the Minister within thirty days after the first day of August, and the Auditor-General would check the accounts.

Provision could be made to supply pasteurised milk and cream within the district.

48. The Primary Producers' Organisation and Marketing Acts Amendment Act of 1938 (2 Georgii VI. No. 28, *Qd Govt Gaz.*, No. 142, 6 December 1938) was assented to on 1 December 1938, to be incorporated in The Primary Producers' Organisation and Marketing Acts, 1926 to 1938. This Act reorganised the Council of Agriculture, now constituted to consist of the Minister, the Director of Marketing (without any further remuneration), and one representative of each of the Committee of Direction of Fruit Marketing, State Wheat Board, Cheese Board, Egg Board, Northern Pig Board, Canary Seed Board, Barley Board, Arrowroot Board, Peanut Board, the group comprising the Plywood and Veneer Board and the Northern Plywood and Veneer Board, the Queensland Canegrowers' Council, Atherton Tableland Maize Board, Cotton Board, Broom Millet Board, Honey Board and the Brisbane Milk Board with two representatives of the Butter Board. Each member would hold office for no longer than three years but could be re-elected.

The Council at its first meeting would elect one of its members to be President and another Deputy President. The Council would be a body corporate. An Executive Committee of six members-the President and five other members-would handle the administration. The whole Council would meet only once a year.

A Council of Agriculture Fund would be established to cover expenses, subject to audit by the Auditor-General. The amount of all precepts would be paid into the Fund. Local Producers' Associations were eliminated from the Act.

In addition to its usual duties, a Commodity Board would concern itself with the preservation, expansion and economic wellbeing of the industry which it represented and be the medium of communication with the Government or the Council of Agriculture. It would examine agricultural and marketing problems and refer them to the Council of Agriculture.

Provision was made for co-operation with the Department of Agriculture and Stock in studying markets, accumulating data regarding marketing processes and costs, disseminating correct market information and eliminating waste and unnecessary marketing expenses.

Every marketing board was to keep itself insured at all times with the Insurance Commissioner.

49. The Wheat Stabilisation Act of 1938 (2 Georgii VI. No. 33, *Qd Govt Gaz.*, No. 147, 6 December 1938) was assented to on 1 December 1938. Under this Act a committee

called the Flour Price Committee was constituted, consisting of three members appointed by the Governor-in-Council, viz.:

- i. the Director of the Bureau of Industry, who would be Chairman,
- ii. either the Commissioner of Prices or the Deputy Commissioner,
- iii. an officer of the Department of Agriculture and Stock.

The Committee could exercise all or any of the powers of the Commissioner of Prices under The Profiteering Prevention Act of 1920. The Committee was empowered to fix the minimum price of flour to be sold at the place of manufacture by the manufacturer provided that in no case would the price be less than £11 per ton, and no price fixed would apply to flour exported. The fixed price could vary according to locality, quantity, package cost, quality or variety. Adequate returns were to be kept. The Governor-in-Council could arrange for distribution to growers and money granted to the State by the Commonwealth by way of financial assistance. All publications, orders, proclamations would be published in the *Gazette*.

50. The Rural Development Transfer and Co-ordination of Powers Act of 1938 (2 Georgii VI. No. 4, *Qd Govt Gaz.*, No. 171, 24 December 1938) provided that the Minister and his successors in office representing the Crown would be the Corporation of the Bureau of Rural Development. The Act would be administered by the Corporation and, subject to the Minister, by the Rural Development Board, the Secretary thereof, inspectors, valuers and other appointed officers.

The Rural Development Board was to consist of three members, one of whom would be a representative of the Department of Agriculture and Stock, one a representative of the Treasury and one of the Land Administration Board. One would be appointed Chairman and one Deputy Chairman. The Board would:

- (a) advise the Minister or the Corporation on matters connected with the Act generally,
- (b) make any inquiry or investigation required by this Act, or any inquiry or investigation which the Minister or the Board might think necessary or expedient.

For this purpose the Board would have the powers of a Commission. The Board would also advise the Corporation with respect to applications for advances made under:

- (a) The Rural Development Co-ordination of Advances Act of 1938,
- (b) The Discharged Soldiers' Settlement Acts, 1917 to 1938,
- (c) The Farmers' Assistance (Debt Adjustments) Acts, 1935 to 1938,
- (d) The Wire and Wire-Netting Advances Act of 1927,
- (e) The Wire and Wire-Netting Advances Act of 1933,
- (f) The Marsupial Proof Fencing Acts, 1898 to 1913;
- (g) any other Act concerning advances for rural development,
- (h) The Income (Unemployment Relief) Tax Acts, 1930 to 1935.

The Corporation of the Bureau of Rural Development Fund was created, funded by appropriations from Parliament and repayments to the Fund. Money could be borrowed and the Treasurer could issue debentures. Loans could be made to the Corporation by the Treasury. The Corporation could invest in lands. All moneys held in the Agricultural Bank Fund at the Treasury were to be transferred to the Corporation.

Advances could be made to Co-operative Companies for works and special purposes, to Commodity Boards, to farmers and others. Advances to any one person were limited to 1,000. Advances could be made to dairy farmers, farmers and sheep farmers to a maximum prescribed for stock, equipment, fodder and seed, and to graziers for the purchase of beef cattle. Other provisions regarding mortgages, property etc. were made.

- 51. The Pest Destroyers Act of 1939 (3 Georgii VI. No. 8, *Qd Govt Gaz.*, No. 91, 18 October 1939) was assented to on 12 October 1939. The Pest Destroyers Act of 1923 was repealed. This Act declared that any substance which was defined or declared under this Act to be an insecticide, weed destroyer, lure, or steriliser or cleaner would for the purposes of this Act be considered each and all of them. No pest destroyer was to be manufactured, mixed or prepared for sale other than by or under the supervision of a person possessing one of the following qualifications:
 - (a) a Certificate of fellowship or associateship of the Australian Chemical Institute;
 - (b) a master's or bachelor's degree in science with chemistry as a major subject, obtained at a recognised university,
 - (c) a diploma in industrial chemistry or chemistry obtained at a recognised university or technical college,
 - (d) a permit in writing as prescribed,
 - (e) such other qualification as may be approved by the Board.

Persons already manufacturing could continue provided that they furnished necessary information to the Board and were issued with a permit by the Board.

The Pest Destroyers' Board was constituted to consist of:

- (a) the Agricultural Chemist for the time being of the Department of Agriculture and Stock
- (b) an entomologist (plants)
- (c) an entomologist (veterinary) nominated by the Minister
- (d) a pathologist (plants)
- (e) a pathologist (veterinary)
- (f) the Registrar.

The Minister would appoint a Chairman.

The Officer-in-Charge of the Seeds, Fertilisers, Veterinary Medicines, Pest Destroyers and Stock Foods Investigation Branch of the Department of Agriculture and Stock would be also the Registrar of Pest Destroyers, and the Inspector of this branch would be the Deputy Registrar. Before any pest destroyer could be registered it had to be reported on by the Board respecting its efficiency. The Registrar would keep a record of the minutes of all meetings of the Board and a register containing the brand, name, number and date of registration of and name and address of the primary dealer in every pest destroyer registered under the Act. Samples, labels, advertising leaflets or brochures, and a registration fee were required on applications for registration. An annual registration fee was fixed at five shillings per pest destroyer but with a maximum of twenty shillings in registration fees by one primary dealer. Regulations and penalties were provided in relation to the Act.

- 52. The Regulation of Sugarcane Prices Acts Amendment Act of 1939 (3 Georgii VI. No. 11, *Qd Govt Gaz.*, No. 113, 14 November 1939) was assented to on 9 November 1939. This Act provided for the Chairman of the Central Sugarcane Prices Board, if not a Supreme Court Judge, to hold office for fifteen years or until he reached the age of seventy years. The Act also made amendments regarding cane deliveries. The Local Sugarcane Prices Board for a mill area in each year including 1940 could determine the maximum quantity of sugarcane to be grown on assigned lands for each cane grower. Growers could appeal to the Central Board within twenty-one days against the determination by the Local Board. Owners of mills or any fifty or more growers could apply to the Central Board regarding mill quotas for the next succeeding year. The Central Board would move a recommendation in line with the terms of reference of the Royal Commission dated 15 December 1938, namely:
 - i. the total tonnage to be allotted should provide for Australian consumption and the filling of the export quota under the International Agreement or other agreement;
 - ii. the tonnage should be allotted in such a way as to provide for the distribution of settlement along the coastal areas suitable for cane growing;
 - iii. the allocation should recognise to a reasonable extent increased efficiency and new circumstances such as the introduction of irrigation and improved cane varieties and should also take into consideration the financial returns per acre and per farmer in the different districts;
 - iv. utmost employment of labour economically possible under fair and reasonable conditions as to wages etc. should be provided for.

Where the word "Judge" occurred a clause was added "or a person well versed in matters relating to the Sugar Industry".

53. The Agricultural Requirements Control and Conservation Act of 1939 (3 Georgii VI. No. 12, *Qd Govt Gaz.*, No. 114, 15 November 1939) was assented to on 13 November 1939. The Act was aimed at conserving, controlling and adjusting supplies of fertilisers and other agricultural requirements during any emergency arising out of the current war. The Minister would administer the Act but the Governor-in-Council could appoint public servants to be principal officer or officer in any district, subject to the Minister. The principal officer could take charge of the whole of Queensland. Inspectors and other officers could be appointed. Costs would be paid out of Consolidated Revenue. The Governor-in-Council could, by Order-in-Council, declare any fertiliser, any seeds, any chemical, any substance and/or any other thing to

be an essential requirement of agriculture. The Governor-in-Council by Order-in-Council could regulate and control any ingredients.

Hoarding was prohibited and an Order-in-Council could fix the maximum amount of any agricultural requirement a person could accumulate. Declaration of stocks was required and future requirements would be made to the officer in charge of a district. The Commissioner of Prices would determine prices under The Profiteering Prevention Acts, 1920 to 1938.

- 54. The Dairy Produce Acts Amendment Act of 1939 (3 Georgii VI. No. 18, *Qd Govt Gaz.*, No. 129, 27 November 1939) was assented to on 21 November 1939. The Act required every dairy farmer using milking machines to install a steam steriliser for cleaning the milking machine and other equipment. The Act provided for the butterfat testing of stud dairy cows and the branding or marking of cows which qualified, and also their progeny, by an inspector. No cow could be withdrawn from the test without the permission of the Director of Dairying. The Act also made amendments regarding payment for commercial butter, diversion of supplies from factories and grading of butter and cream. It also prohibited any factory from using a separator or handling separated milk.
- 55. The Primary Producers' Organisation and Marketing Acts Amendment Act of 1939 (3 Georgii VI. No. 21, *Qd Govt Gaz.*, No. 140, 7 December 1939) was assented to on 1 December 1939. This Act made minor amendments to pigs as a commodity; the Agricultural Council would elect one member to be President and another Deputy President; no commodity could be represented by more than one member upon the Executive and any Board could apply for exemption in relation to its obligation to insure and keep itself insured.
- 56. The Margarine Acts Amendment Act of 1939 (3 Georgii VI. No. 22, *Qd Govt Gaz.*, No. 141, 7 December 1939) was assented to on 1 December 1939, to be incorporated in The Margarine Acts, 1910 to 1939. This Act required the registration of factories manufacturing margarine and the licensing of manufacturers. The Minister was empowered to determine quotas-the maximum quantity of table margarine which each person licensed under the Act could market, taking into account the amount manufactured in the financial year ending 30 June 1939. Returns were required. Licences to sell margarine were required of wholesalers and retailers. All retailers were required to sell margarine only in pats of cube form containing not more than one pound avoirdupois net weight of margarine, and branded "MARGARINE".
- 57. The Peanut Industry Protection and Preservation Act of 1939 (3 Georgii VI. No. 23, *Qd Govt Gaz.*, No. 142, 7 December 1939) was assented to on 1 December 1939. The Peanut Board was given power to appoint, with the approval of the Minister, inspectors and other officers under the Act. The Governor-in-Council could declare the introduction into Queensland of any insect, fungus or disease to be absolutely prohibited or permitted only as prescribed, prohibit removal of peanuts from place to place, declare any disease affecting peanuts to be a disease, or any fungus to be a fungus, or any insect to be an insect within the meaning of the Act.

An Inspector could seize and destroy insects, fungi, packages etc. contravening the Act, and mark with a broad arrow any condemned packages. He could order growers to

destroy diseased material and clean up abandoned peanut land. He could quarantine areas if necessary.

The Governor-in-Council could declare disease-infested areas. The Board would be charged with suppressing and preventing disease within any such area. Owners were required to notify the presence of disease in writing to an Inspector or the Under-Secretary.

The Board was required to estimate the annual consumption of peanuts for edible purposes within Australia plus requirements for planting purposes and determine maximum quotas for growers to deliver to the Board. Only peanuts graded by the Board could be sold. No grower could plant peanuts unless such had been treated by the Board and certified free from disease. No person could introduce seed from another State or country unless the seed was accompanied by a certificate of freedom from disease.

- 58. **The Fruit and Vegetables Act Amendment Act of 1939** (3 Georgii VI. No. 25, *Qd Govt Gaz.*, No. 144, 7 December 1939) was assented to on 1 December 1939, to be incorporated in The Fruit and Vegetables Acts, 1927 to 1939. This Act made amendments to certain definitions of dried fruit, fruit, grade, place, and provided for the keeping of records of dried fruits and the inspection of dried fruit.
- 59. **The Burdekin River Trust Act of 1940** (4 Georgii VI. No. 5, *Qd Govt Gaz.*, No. 100, 22 October 1940) was assented to on 16 October 1940. This Act was framed to provide for the control of erosion in relation to part of the Burdekin River, to make financial provision to repair the damage occasioned by cyclone and flood to the banks of that river, to constitute a Trust charged with guarding against the future occurrence of any such damage, to provide for the Constitution of a Trust under this Act in relation to any other river, and for other purposes.

The Act gave the Governor-in-Council power to constitute a benefited area to be called The Burdekin River Benefited Area. Any other two local Authorities could apply to the Minister for the constitution of a benefited area or the Co-ordinator-General could recommend such to the Minister. Every trust would consist of a representative of the Government who would be appointed by the Governor-in-Council and be Chairman, and the chairman of each local authority involved. An additional member could be appointed by the local authority if the benefited area embraced the whole of that authority. Personal interest in the undertaking disqualified a member from voting under section fourteen of The Local Government Act of 1936. The clerk of the local authority concerned would be Secretary to the Trust. The Trust would be a body corporate. The Trust would be a 'local body' under The Local Bodies' Loans Guarantee Acts, 1923 to 1936, and could borrow money through the issue of debentures. Compensation limited to the actual damage could be claimed against the Trust, or where land involved assigned land the Central Sugarcane Prices Board would determine compensation or grant an alternate assignment of land. The Trust would undertake works by direction of the Co-ordinator-General and each year submit a programme of works to the Coordinator-General for ultimate approval by the Minister. The Trust could enter into contracts.

The Burdekin River Trust would establish a general fund in a bank at Ayr and a loan fund in respect of each loan borrowed. The Co-ordinator-General was given power to undertake or maintain works for repairing damage by cyclone or flood or for preventing damage as far as possible. He could delegate authority to construct works to any Crown corporation.

An annual report was required of the Trust by the Minister. All Orders-in-Council and regulations were to be laid before the Legislative Assembly within fourteen days of publication.

- 60. The Diseases in Poultry Acts Amendment Act of 1940 (4 Georgii VI. No. 8, *Qd Govt Gaz.*, No. 103, 22 October 1940) was assented to on 16 October 1940, to be incorporated in The Diseases in Poultry Acts, 1923 to 1940. It provided that a vendor purchasing poultry etc. for resale for human consumption must obtain a delivery note in writing, signed by the seller giving the seller's name and address, the number and species of poultry or carcasses involved and the purchase price. Such delivery note must be available to any inspector. Minor amendments were made to the regulations regarding the classes and standards of eggs, the sale of eggs, the processing and treatment of eggs and the marking of eggs. Inspectors could inspect eggs for sale. Regulations for cleaning and packing eggs under hygienic conditions, manufacture of egg pulp and slaughtering poultry for human consumption were involved.
- 61. **The Drought Relief of Primary Producers Act of 1940** (4 Georgii VI. No. 9, *Qd Govt Gaz.*, No. 106, 28 October 1940) was assented to on 25 October 1940. The Act established and kept in the Treasury a fund to be called the Drought Relief Fund which could make advances by way of a loan for the purposes of drought relief. The Corporation of the Bureau of Rural Development constituted under The Rural Development Co-ordination of Advances Act of 1938 was to handle loans.

No dairy farmer or other primary producer could apply for an advance by way of a loan unless he had no fodder and/or water or was unable to pay cash or borrow money or obtain credit through normal channels. Repayment to the Corporation could be by assignment of sums obtained from milk, cream, pigs or other primary produce. Interest was payable at an amount fixed by the Corporation after 1 November 1941. An advance could be made in an emergency.

The Auditor-General could examine the books of any person, body corporate or marketing board.

62. The Brands Acts Amendment Act of 1940 (4 Georgii VI. No. 10, *Qd Govt Gaz.*, No. 112, 5 November 1940) was assented to on 31 October 1940 to be incorporated in The Brands Acts, 1915 to 1940. This Act made minor changes to regulations concerning paint brands, distance between letters, numerals etc., seizure of stock and sale thereof, publication of particulars of stock seized, their location and the time of the projected sale, and provided that proceeds of the sale should be paid to the Under Secretary, Department of Agriculture and Stock, who would deduct expenses incurred and return the balance to the owner.

- 63. The Diseases in Stock Acts and Other Acts Amendment Act of 1940 (4 Georgii VI, No. 11, *Qd Govt Gaz.*, No. 113, 5 November 1940) was assented to on 31 October 1940. This Act made minor amendments to The Diseases in Stock Acts, 1915 to 1936, The Dairy Produce Acts 1920 to 1939 and The Stallions Registration Acts, 1923 to 1934. With the advent of airlifts of livestock air travel was included and definitions of dip, drive, legibly branded etc. were updated. Additional diseases were added under "disease", viz. "sheep ked or tick (*Melophagus ovinus*), sheep louse (*Bovicola ovis, Linognathus pedalis*, or any other sheep louse), necrotic enteritis, swine paratyphoid, swine erysipelas, blackleg". The Act also required a drover to give fourteen days' notice to an inspector of his intention to move stock over a crossing-place or port, and the paint branding of travelling sheep. Under the Dairy Produce Acts and the Stallions Registration Board the new designation of the previous Chief Inspector of Stock viz. "Director of Veterinary Services" was substituted.
- 64. **The Fruit Marketing Organisation Acts Amendment Act of 1940** (4 Georgii VI, No. 12, *Qd Govt Gaz.*, No. 114, 5 November 1940) was assented to on 31 October 1940 to be incorporated in The Fruit Marketing Organisation Acts, 1923 to 1940. This Act allowed the Committee of Direction of Fruit Marketing to lend moneys to the Commonwealth of Australia by way of an interest-free loan for the duration of the war and six months thereafter. It included moneys made available to the Committee by a sectional group committee. The Act covered any other body or associations who would lend moneys to the Commonwealth. The Act also gave the Minister power to arbitrate in the fixing of district boundaries under the Act.
- 65. The Second-hand Fruit Cases Act of 1940 (4 Georgii VI, No. 29, *Qd Govt Gaz.*, No. 147, 3 December 1940) was assented to on 28 November 1940. This Act was to continue in force for the duration of the war and such period thereafter as determined by Parliament. The Act was to be in force within the boundaries "commencing on the sea coast at the mouth of the Pine River, and bounded thence on the north by a line west to the meridian of 151 degrees 30 minutes east longitude, on the west by that meridian south to the boundary of the State, and thence by the boundaries thereof north-easterly and northerly to the point of commencement".

A Second-hand Fruit Cases Committee was constituted of five members - the Director of Marketing ex officio, two members nominated by the C.O.D. and two members nominated by the Queensland Chamber of Fruit and Vegetable Industries-and was to hold office for three years. The Committee could appoint a secretary and necessary inspectors, and every inspector under The Diseases in Plants Acts, 1929 to 1937 would be an inspector ex officio.

Dealers would be licensed and allotted a district wherein they could sell or supply second-hand fruit cases. Licences would be effective for a year. Growers submitted their orders for second-hand fruit cases to the Committee. Maximum prices for second-hand fruit cases could be fixed by the Committee. The costs of administration of the Committee would be met by the cost of licences and penalties and if necessary a levy on second-hand fruit cases sold.

66. The Primary Producers' Organisation and Marketing Acts and Other Acts Amendment Act of 1941 (5 Georgii VI, No. 14, *Qd Govt Gaz.*, No. 127, 22 November 1941) was assented to on 20 November 1941. This Act made minor amendments to the powers of Marketing Boards and included the State Wheat Board. It allowed the Peanut Board to borrow upon the security of peanuts delivered, gave the Committee of Direction of Fruit Marketing additional powers as the holder of shares in Queensland Canneries Proprietary Limited, and listed qualifications of voters at elections under certain Acts.

67. The Seeds Act Amendment Act of 1941 (5 Georgii VI, No. 15, *Qd Govt Gaz.*, No. 128, 22 November 1941) was assented to on 20 November 1941, to be incorporated in The Seeds Act, 1937 to 1941. This Act constituted the Seed Certification Committee to consist of not more than seven officers of the Department of Agriculture and Stock, one of whom would be the Chairman appointed by the Minister. Subcommittees consisting of four members could be appointed to deal with special seeds. The Seeds Specialist and at least one other member of the Certified Seed Committee were to be appointed to each subcommittee. The Act defined certified seeds as "Seeds and other parts of plants used for propagation purposes authorised under this Act to be sealed and labelled as certified seed". With the approval of the Minister for Public Instruction any officer of that Department could serve on subcommittees.

The Seed Specialist was to be Registrar and Executive Officer of the Committee. The powers of the Committee were to properly certify seeds for planting or sowing with respect to:

- i. hybrid,
- ii. kind, variety or strain, and
- iii. freedom from disease of the relative crop plants.

The Committee could approve or disapprove of seed production of any crop, regulate or control planting for the production of certified seed, carry out seed trials by seed certification officers, or by public notice call for applications from persons to grow certified seed named in the notice. Areas used for the production of certified seed were to be registered with the Registrar. Any such area would be subject to inspection and a report to the Committee as to its suitability. All harvests for certified seed were to be supervised by an inspector or seed certification officer, upon notice of intention so to do.

Packages of certified seed were to be labelled as prescribed and the label fixed on the package by an inspector or seed certification officer and signed by him. Packages of certified seed were not to be opened or exposed for sale. Inspectors or seed certification officers would inspect the growing crop, remove samples for analysis, rogue out any atypical plants and destroy them.

Growers were to notify the Registrar of every sale of certified seed. A list of growers of certified seed could be published by the Committee from time to time.

68. **The Sugar Experiment Stations Acts and Other Acts Amendment Act of 1941** (5 Georgii VI, No. 16, *Qd Govt Gaz.*, No. 129, 22 November 1941) was assented to on 20 November 1941. This Act added the words "or alternate host plants" after "sugar-cane" in respect to pests and diseases. It gave the Assistant Director of Sugar Experiment Stations the powers of the Director in the latter's absence. The Minister was given power to declare cane pest and disease-infested areas and constitute a Cane Pest and Disease Control Board of five members for such a cane pest and disease area, three of whom would be canegrowers. Mill owners would elect the other two members and the Board would hold office for three years. A levy of not more than sixpence per ton could be imposed to cover the costs of administration.

- 69. The Brands Acts and Diseases in Stock Acts Amendment Act of 1941 (5 Georgii VI, No. 18, *Qd Govt Gaz.*, No. 131, 22 November 1941) was assented to on 20 November 1941. This Act provided for the use of a spay mark a circular mark not exceeding one inch and one-half in diameter made wholly within the off or near ear of female cattle. The Act repealed the Brands Act Fund under the provisions of The Brands Acts, 1915 to 1940 and formed a Stock Diseases Fund under The Diseases in Stock Acts, 1915 to 1941, established under this Act.
- 70. **The Dairy Produce Acts Amendment Act of 1941** (5 Georgii VI, No. 19, *Qd Govt Gaz.*, No. 132, 22 November 1941) was assented to on 20 November 1941, to be incorporated in The Dairy Produce Acts, 1920 to 1941. This Act gave power to the Minister to notify any area as a milk area either generally or with respect to a cheese factory. He could cancel or modify a milk area. No dairyman registered in a milk area could supply cream produced on such dairy to any factory, and no factory owner could accept such cream. Dairymen within a milk area could only supply milk to a specified factory. The Minister could grant exemptions but notification of such was required in the *Gazette*.
- 71. **The Buffalo Fly Control Act of 1941** (5 Georgii VI, No. 20, *Qd Govt Gaz.*, No. 133, 22 November 1941) was assented to on 20 November 1941. This Act was for the purposes of the control and eradication of the buffalo fly and other diseases of cattle. It established in the Treasury a Buffalo Fly Control Fund into which would be paid all money obtained by the Crown as Stamp Duty on receipts under the Act, and all penalties recovered under the Act. The fund was to be used to cover the cost of administering the Act. A cattle sales stamp duty was to be imposed at the rate of one penny for every five pounds and fraction of five pounds on the sale of a single animal in excess of two pounds or on the total sale price of cattle sold in one lot to the value of two pounds and upwards. Every inspector under The Stamp Acts, 1894 to 1940, The Diseases in Stock Acts, 1915 to 1940 and The Slaughtering Act of 1898 and every member of the Police Force was deemed an inspector under the Act and could demand to inspect receipts.
- 72. The Stock Returns Acts Amendment Act of 1942 (6 Georgii VI, No. 29, *Qd Govt Gaz.*, No. 170, 9 December 1942) was assented to on 4 December 1942 to be incorporated in The Stock Returns Acts, 1893 to 1942. The words The Pastoral Leases Act of 1869 and The Crown Lands Act of 1884 were repealed and The Lands Acts 1910 to 1941 substituted. This Act also provided that every owner of stock had to send his returns of stock to the clerk of petty sessions in the Local Authority Area within one month of 1 January each year and the Clerk of Petty Sessions was required to send the returns to the Government Statistician monthly, who would keep a book for the purpose of recording the names of owners in alphabetical order, their property descriptions and numbers of stock. Publication of these returns was to be discontinued during the war. The returns were to be used for the purposes of The Diseases in Stock Acts, 1915 to 1941, The Brands Acts, 1915 to 1941, The Grazing Districts

Improvement Acts, 1930 to 1934, The Stock Routes Improvement and Animal and Vegetable Pests Destruction Acts, 1936 to 1938, and The Rabbit Act, of 1913.

Some features of the Bulcock Ministry

Bulcock involved himself deeply in the day-to-day running of his portfolio, often taking personal action apart from his staff. He was genuinely concerned with the underdog and the depression urged him into action. He was also careful with expenditure: his Ministerial expense account was usually much lower than those of his colleagues.

Licensing of dairy bulls

This was brought about under The Dairy Cattle Improvement Act of 1932 and attempted to make the use of approved sires more general in the dairying programme.

St Lucia Farm Training School

In late 1932 Bulcock desired to initiate a scheme which would help train unemployed youth, especially city boys. His philosophy was embraced in the following statement:

A contemplation of present conditions reveals that we are face to face with at least one condition that is inimical to the best interests of the State. This condition is described as unemployment, and parents are naturally anxious to find some suitable employment for their sons. With a lessened industrial demand and the capacity for greater and greater production, it is entirely unlikely that the industries of our State will be able to absorb that growing army of maturing boys. The stimulation of agricultural development must, however, reflect itself in a greater industrial demand, and under these circumstances we naturally turn to the land to provide ways and means to brighten the lot of our citizens. A reconstruction of thought is necessary to enable us to more clearly visualise the possibilities of land settlement. It is true that fortunes beyond the dreams of avarice do not lie within the soil, waiting to be charmed forth by the magic touch of a deft hand, but at least life on the land provides health, robustness, and a more fortunate vision than many city dwellers enjoy. Many representative bodies throughout the State recognise that we must turn to the land for the solution of our "Unemployed Youth" problem, and so have initiated movements having in view the employment of boys in rural pursuits. The churches are also co-operating in a State-wide scheme for the placing of youths on farms. (Bulcock, F.W., QAJ, Vol. 39 January 1933, p. 1)

Bulcock called together representatives of government departments and interested citizens' organisations such as Rotary, Legacy and the New Settlers' League to discuss his plan for basic practical training on the future site of the University of Queensland at St Lucia and on land at Moggill bequeathed to the University by Dr O'Neill Mayne and his sister Miss Mayne, both generously made available by the Senate of the University. Bulcock's scheme was unanimously agreed upon.

J. D. Story, Public Service Commissioner, suggested that groups of fifty selected boys should undergo training for six months. Expensive buildings and equipment would be taboo and marketable produce would be the aim. He suggested a general committee out of which should be appointed a Recruiting Committee, a Farm Programme Committee and an Employment Committee. The Recruiting Committee suggested the trainees should be aged between fifteen and twenty years, of fifth grade primary educational standard and in good physical health, and should be interviewed personally. The school opened on 31 January 1933. The trainees would be instructed in mixed farming, dairying, poultry and pig raising
at St Lucia and in general timber work. No fees would be charged and tram and ferry fares would be provided for day students. Housing accommodation was provided for twenty-five trainees and each trainee would take his turn as a resident student. Students would be taught to cook, milk, do milk and cream testing, grow crops and conserve fodder, handle horses, and raise poultry and pigs.

F. O. Bosworth, English Master at the Queensland Agricultural High School and College, was seconded for duty as Principal for the first term and J. A. Kerr, Q.D.A., a Stock Inspector, was placed in charge of the school on behalf of the Department of Agriculture and Stock. The Department also provided visiting officers for lectures and demonstrations. The Chief Dairy Expert, the Director of Agriculture, the officer in charge of the Animal Health Station at Yeerongpilly and the Chief Poultry Expert arranged the courses of lectures. Groups of boys were also to be sent to the Beerburrum Tobacco Group Settlement for instruction in tobacco growing, curing and grading, and to the Roma Street Markets, the Kingston Butter Factory and a local piggery.

Summing up, the Minister said: "St. Lucia is neither an Institution within the accepted sense of the term, nor yet an Agricultural College. It is to impart instruction in the A.B.C. of agriculture. After six months' instruction, it may be reasonably assumed that our students will have learned to be useful boys on farms."

Two boys from each group of fifty would be granted scholarships by examination to enter the Queensland Agricultural High School and College. As J. F. F. Reid, Editor of the *Journal*, stated: "The chance of a lifetime is only during the lifetime of the chance."

Potential employers were asked to contact the Central Committee or the Employment Committee. State officers throughout the State were asked to seek employment for trainees under practical progressive farmers who would supervise their development.

It was anticipated that not all the selected trainees would adapt to farm life.

During 1933-34, ninety-four boys were placed on farms, four were awarded scholarships to Gatton College, fourteen found employment other than farming and sixteen found to be unsuitable left before completing their six months' training.

By 1934, thirty-two acres had been cultivated including twelve acres of maize, and five acres of improved pastures under control of the Pasture Improvement Committee; root and fodder crops were grown and fodder was conserved. Queensland nut trees were planted. The farm was self-supporting for food. (*QAJ*, Vol. 42, August 1934, pp. 253-274)

The Interviewing Officer, J. Kilmartin, Department of Agriculture and Stock, made arrangements for entry of trainees, and farmers desiring to employ trainees were handled by the Lads Employment Bureau, Box 1448T, G.P.O., Brisbane.

By June 1936 the land under cultivation had been extended to thirty-three acres. No difficulty had been experienced in placing boys on selected farms. They were happy in their new environments and the employees pleased with their motivation and performance.

Great credit was due to the dedication, practical and theoretical knowledge and administrative competence of the Officer-in-Charge, J. Arthur Kerr, Q.D.A.

In his annual report to 30 June 1938, Kerr stated:

Several factors have rendered the continuation of the Training Farm under the present scheme and on its present location difficult. The introduction of the subsidy scheme for Juvenile farm labour in June 1937 presented a superficially more attractive scheme to untrained youth, and has resulted in a reduction in the number offering for training at the farm. Further, the ground works, excavations and the construction of buildings for the new University have seriously curtailed the areas available for cultivation and pasture. It is evident that the continuation of the training farm on the present site for more than a few months may become impracticable." (*Rep. Dep. Agric. Stk*, 1937-8, p. 69)

By June 1936 a total of 244 trainees had been successfully placed on farms, and during 1936-37 fifty-eight more were added.

On 13 October 1938, Kerr was transferred to Kingaroy as Instructor in Agriculture and the Training Farm at St Lucia was closed down. Kerr's experience with this scheme made him invaluable in arranging labour and other services to the peanut farmers at Kingaroy during World War II (1939-45) and at the end of hostilities he was rewarded with a handsome honorarium from the Kingaroy primary producers.

Group settlement in tobacco at Beerburrum

Old pineapple lands were thrown open for tobacco growing by unemployed breadwinners and their families at Beerburrum. Local timber was used to construct housing, tobaccocuring barns and bulk sheds; and seeds, fertilisers and advice were provided by the paternalistic efforts of Dick Tarrant of the Agriculture Branch, with other visiting help.

Piggery hygiene

Too often the piggeries associated with dairy farms lacked the hygiene necessary for the production of human food and also were the source of flies and other hazards to the dairy buildings. The Pig Industry Act of 1933 made regulations to upgrade husbandry.

Protection of the tobacco industry

The Tobacco Industry Protection Act of 1933 regulated the supply of good-quality seed for planting and the control of diseases and pests in an industry that grew in leaps and bounds in the 1930s.

Control of veterinary medicines

The registration of veterinary medicines was made mandatory under The Veterinary Medicines Act of 1933, which constituted a Board to examine, test and control the distribution of veterinary medicines.

Sugar Experiment Stations Advisory Board

The Sugar Experiment Stations Acts Amendment Act of 1934 provided for a Sugar Experiment Stations Advisory Board, the members of which, elected on 7 March 1935, were the Minister, the Hon. F. W. Bulcock (Chairman), Dr H. W. Kerr (Director, Bureau of Sugar Experiment Stations), W. D. Davies and B. Courtice (growers' representatives), and J. Smith and W. F. Seymour-Howe (millowners' representatives) to advise the Minister upon the needs of the industry and with regard to the efficient conduct of the Sugar Experiment Stations.

Advances to commodity boards and primary producers

The Rural Assistance Board and Agricultural Bank Acts Amendment Act of 1934 providing for a Rural Assistance Board considerably helped advances for primary production, including purchase of improved stock. It replaced the Better Boar Subsidy Scheme of August 1933 to June 1934. It took over the Beerburrum Group Settlement in tobacco, financing the remaining settlers.

Date Experiment Station, Barcaldine

Dates were introduced into Queensland by the Queensland Acclimatisation Society as early as 1866 and limited distribution was made. In 1895 Captain Withers of the P & O Steamship Company obtained six date palms in Bombay and donated them to the Society. In 1896 Barcaldine was one of twenty-three towns to receive date suckers. In the *Queensland Agricultural Journal* for 1901 it was suggested that the area west of Hughenden, Longreach and Charleville and from latitude 23° to the southern border of the State should be suitable for date culture. (*QAJ*, Vol. 8, p. 197). In 1904 Sir William McGregor introduced some date palms which were planted at Roma. The Roma State Farm planted dates of Algerian origin in the early 1930s and four of the seedlings of the Deglet Noir variety bore fruit. (*Rep. Dep. Agric. Stk*, 1932-33, p. 37)

Bulcock, the Member for the Barcoo electorate and Minister for Agriculture and Stock, attempted to establish a date-growing industry on a commercial scale throughout central and north-west Queensland and especially at Barcaldine. He directed the new Director of Fruit Culture, Harry Barnes, to obtain seeds and to ascertain the distribution of date palms throughout the State. Barnes obtained seeds of eight varieties from C. G. Savage, Director of Horticulture in N.S.W., seeds of eleven varieties from A. McTaggart, the Plant Introduction Officer of the CSIR, who had obtained them from the Indio Research Station in California, and seed from Dr Swingle of the United States Department of Agriculture. These seeds were propagated by Barnes and at the direction of the Minister young palms were forwarded to Head Teachers of the State Schools at Blackall and Tambo; the Shire Clerk, McKinlay Shire Council, Julia Creek; the Shire Clerk, Barkley Shire Council, Camooweal; and the Chairman, Barcaldine Shire Council, Barcaldine.

The Barcaldine palms were distributed in the hospital grounds, the Chairman's house plot, at the Shire Hall and at the residence of H. Kerwin.

Barnes collected palm suckers from sites where he was informed they were growing and had them planted at the Botanical Gardens at Rockhampton and at the Callide Research Station at Biloela.

In January 1935, H. Joe Freeman of the Horticulture Branch was sent to Barcaldine to select a site for the establishment of a date experimental plot. He chose a 500 acre site at the "Four Mile" on the Alice River about four miles south of Barcaldine on portion 107, Parish of Barcaldine. J. Olive, a local man, was offered a special lease of about ten acres of land by the Land Administration Board to supervise the date plantation. The plantation was fenced and a windmill, pump and tank were erected to irrigate the palms. G. Shave replaced J. Olive before the palms were planted and he planted sixty-eight offshoots on 10 September 1935. Further palms were collected locally, another eight from Dr J. Ryan's farm at Dayboro, and W. A. T. Summerville collected seed of improved varieties on his world study tour in 1935.

There were periodic shortages of water and a small weir across the Alice River was built in 1939 at a cost of $\pounds 86$ 11s 4d, shared equally by the Department and the Barcaldine Shire Council. By 1940 there were one hundred and eighty-four palms representing nineteen varieties.

In March 1943 Shave sent Barnes a small case of dates representing several varieties with varying flavours. He also advised that birds ate most of the dates from the plot. In the same year, when he was over eighty years of age, Shave resigned as caretaker of the experimental plot. His successor was not satisfied with the payment he was receiving for his part-time employment and labour was difficult to obtain during the war. By this time the driving force behind the Barcaldine experiment, Bulcock, was no longer either member for Barcoo, Minister for Agriculture and Stock or even in Queensland, having gone to be Wartime Director-General of Agriculture for the Federal Government. The Department decided to abandon the experimental plot on 19 October 1943. (Skerman, P. J., "Cultivation in Western Queensland", *North Australia Research Bulletin*, No. 2, 1978, pp. 93-96)

Determination of cream cartage routes

The Dairy Produce Acts Amendment Act of 1935 ended competition between factories for supplies by defining cream routes and licensing carriers.

Bureau of Tropical Agriculture

With the closure of the South Johnstone Sugar Experiment Station and the transfer of E. J. R. Barke from South Johnstone to Meringa, Bulcock set about establishing the Bureau of Tropical Agriculture at the site. The primary object of the Bureau was to explore the possibilities of crops other than sugarcane which, by either natural fitness or adaptation, could find an economic future in north Queensland and contribute to its further settlement and development. (*Aust. Sugar* J., 10 October 1936, p. 411) It also would establish some political presence in north Queensland.

On 1 July 1935, Charles John McKeon, Q.D.A., who had for many years conducted a successful programme of maize improvement, was appointed the foundation Director of Tropical Agriculture, taking up residence in September 1935. Repair work and renovation

were necessary to prepare the station for the desired experimental and research work. The staff appointed to the Bureau in addition to McKeon consisted of Lawrence Gordon Miles, Ph.D., B.Agr.Sc., as Plant Breeder; W. J. Cartmill, B.Sc., as Analyst; G. W. J. Agnew, Q.D.A., Q.D.H., as Pomologist; and Colin Whitehead as Senior Cadet. As Director of Tropical Agriculture, McKeon was to exercise supervision over general experimental work throughout the northern areas.

Appointment of a Science Co-ordinating Officer - Professor E.J. Goddard

On 31st January 1924, the Hon. W. N. Gillies, then Minister for Agriculture and Stock, enlisted the aid of the Commonwealth and New South Wales in investigating the bunchy top disease of bananas along with Queensland scientists. Professor A. E. V. Richardson (Commonwealth Institute of Science and Industry), Professor R. D. Watt (Sydney University) and Professor E. J. Goddard (Queensland University) were elected to a Committee for the purpose, with Goddard as supervisor of investigations. On the successful diagnosis of the cause of bunchy top and its transmission subsequent legislation was enacted to deal with the problem. Goddard was then asked to investigate "squirter" disease of bananas.

The Hon. F. W. Bulcock called on Professor Goddard again as a consultant in the reorganisation of the Department of Agriculture and Stock from 1 January 1936.

The Minister for Agriculture and Stock (Mr. Frank W. Bulcock) in announcing the appointment of Professor Goddard stated that although the initial term was twelve months, extensions might be made from time to time. Two years ago a conference of Ministers of Agriculture had agreed that research should be undertaken into the nature of the problems confronting each State, instead of each State continuing to work on various important and unimportant problems. The idea was that there should be co-ordination between the agricultural research services of Australia. One of Professor Goddard's primary duties would be to investigate the incidence of researches and try to eliminate overlapping. Few eminent technicians were available in agriculture and, therefore, their services must be used to the best advantage. The need for co-ordination is realised when attention is drawn to the various factors that may operate in an agricultural problem. We must utilise in that connection all the available man power represented in the Department and other institutions such as the University. The position is made more evident still when we view the possibilities of co-operation with the activities of the Commonwealth Council of Scientific and Industrial Research and the other Australian States.

Agricultural research was so far advanced today that definite planning was necessary. Professor Goddard, with the heads of the scientific branches and the Minister himself, would try to map out a comprehensive programme extending over a number of years. The agricultural possibilities of North Queensland would call for special consideration. The Bureau of Tropical Agriculture was being established at South Johnstone, and it would be possible to lay down a considered programme so that new avenues of agriculture might be economically exploited.

Experimental work was of major importance, and by the co-ordination of the department's activities, sustained research would be possible. Professor Goddard's advent to the department would afford much closer union between the educational and official sides. He hoped the professor would find time to interest himself in the careers of the younger men. Not the least important of his duties would be to determine the amount of training the department might be prepared to make available for various junior officers.

As part of the scheme a new research branch has been created in the Department of Agriculture. The Minister, in announcing this fact recently, said the branch must become one of the most important under his control. Three outstanding officers had been appointed, and additional appointments would be made from time to time. Mr. R. E. Soutter, wheat breeder,

had become agricultural research officer in wheat and maize; Mr. L. F. Mandelson, who had recently been studying abroad, had been appointed research pathologist; and Mr. Atherton, entomologist stationed at Atherton, had also been seconded for special work. The branch would deal with the practical application of research work, and every facility would be provided for it. (*QAJ*, January 1936, p. 83)

Goddard's reports can be found in the annual reports of the Department of Agriculture and Stock for 1935-36, 1936-37 and 1937-38.

Division of Plant Industry (Research) created

A Division of Plant Industry (Research) was created by Bulcock on the recommendation of the Public Service Commissioner on 20 August 1937 and certain officers were appointed to re-designated positions as from 1st July 1937. Robert Veitch, Chief Entomologist and Director of Research, was made Director of Plant Industry (Research).

Faculty of Veterinary Science, University of Queensland

The Department of Agriculture and Stock in the early 1930s was experiencing difficulty in obtaining veterinary graduates from the south and the State had several veterinary problems of importance to the animal industries needing attention. Consequently the Government, in which Bulcock was a leading figure, made possible the inauguration of the Faculty of Veterinary Science within the University of Queensland. A very close liaison was established between this Faculty and the Department and during 1936 two cadets from the Department were enrolled as foundation students. Professor H. R. Seddon, the foundation Dean of the Faculty of Veterinary Science, was then involved in the organisation of a Division of Animal Industry within the Department. (*Rep. Dep. Agric. Stk*, 1936-37, p. 17) The Townsville (Oonoonba) Stock Experiment Station was being returned to the Department in September 1936 and liaison between this station, the Animal Health Station at Yeerongpilly, the C.S.I.R., the Queensland Meat Industry Board and the Bureau of Tropical Agriculture was being organised.

The Veterinary Surgeons' Board. Major A. H. Cory and Government Veterinary Surgeon Tucker had earlier recommended that people operating as veterinary surgeons should be adequately qualified and licensed to practise as such. With the founding of the Faculty of Veterinary Science at the University, Bulcock introduced The Veterinary Surgeons Act of 1936 to provide for the registration of veterinary surgeons and the annual listing of the names of the registered surgeons in the *Government Gazette*.

Extermination of plague grasshoppers

The Plague Grasshopper Extermination Act of 1937 was the first legislation making it mandatory for landholders, through local committees, to take steps for the control of plagues.

Drought relief

Because of the prevailing depression and the incidence of drought, The Drought Relief to Dairy Farmers Validation Act of 1937 made it possible for factories to immediately supply fodder and water for drought relief and obtain subsequent payment.

Approved sugarcane varieties, Cane Disease Control Boards and Quarantine areas

The Sugar Experiment Stations Act and Other Acts Amendment Act of 1938 gave power to the Director of the Sugar Bureau to declare and publish a list of the only approved cane varieties for each mill area. It also constituted the Cane Disease Control Boards to prevent cane disease spreading from infested areas and empowered the Minister to declare quarantine areas for disease control.

The Brisbane Milk Board

This Board was constituted under The Milk Supply Act of 1938 to control the collection, treatment, supply, sale and distribution of milk within the Brisbane Milk District and determine supply quotas from each dairyman.

Control of pest destroyers

A Pest Destroyers Board was constituted in 1939 to control the manufacture and provide for the testing and registration of pest destroyers.

Overseas trip by Bulcock

In early 1939 Bulcock made an overseas trip to USA, Argentina and South Africa to look at the cattle and other industries. In his absence the Hon. D.A. Gledson was Acting Minister for Agriculture and Stock.

Wartime control of agricultural requirements

An Act of Parliament provided for the conservation, control and adjustment of supplies of fertilisers and other agricultural requirements for the duration of World War II.

Protection of the peanut industry against crop disease, grading of peanuts and issue of supply quotas

The Peanut Industry Protection and Preservation Act of 1939 provided for the appointment by the Peanut Board of inspectors to control the spread of disease and declare diseaseinfested areas. Only peanuts graded by the Board could be sold and growers could be issued with quotas for the supply of peanuts to the Board.

The Burdekin River Trust

In October 1940 an Act of Parliament was gazetted to constitute a Trust to control erosion of the Burdekin River banks and the repair of same and the constitution of a Trust in relation to any other river in the State.

Dairy Research Laboratory

A Dairy Research Laboratory was established in Brisbane in 1935. It introduced a scheme to assist factories to control the moisture and salt contents of butter in 1937-called the Butter Stabilisation Scheme-and in 1939 included bacteriological tests, whereupon its name was changed to the Butter Improvement Service.

Coastal beef fattening scheme

Bulcock collaborated wholeheartedly with Bruce Henry of Tully in the latter's innovative scheme to fatten younger cattle on pastures of para grass in the wet tropics.

Overseas trips for staff

Bulcock encouraged overseas trips for special staff to investigate the latest developments in their special fields.

New wing erected

A new wing was erected adjoining the main building to accommodate increasing investigational work and the staff associated with it.

Importation of jack donkeys

It was decided to introduce jack donkeys to cross with local brood mares to produce mules for the sugarcane field work and Bulcock asked Joe Freeman to select these in the USA and accompany them back to Australia. (See later note in this Chapter.)

Publication of the Queensland Agricultural and Pastoral Handbooks and temporary cessation of publication of the Queensland Agricultural Journal

These excellent publications brought to the public up-to-date information on crops, horticulture, pastures, and pests and diseases. A *Weekly News Bulletin* was commenced in June 1936. Owing to the emergencies of war, publication of the *Queensland Agricultural Journal* was suspended after 1 December 1941. It did not reappear till July 1943.

Transfer of control of the Agricultural Bank

Under The Rural Development Co-ordination of Advances Act of 1938 the Bank came under the administration of the Corporation of the Bureau of Rural Development within the Treasury. The Rural Development Board was constituted of three members, one of whom was a representative of the Department of Agriculture and Stock, one of the Treasury and one of the Land Administration Board.

Staff and Organisation, 1932-1942

Staff and salaries, 1932-1942

The Hon. Frank W. Bulcock was Minister for Agriculture and Stock for ten and a half years at a time when the early Departmental staff were reaching their age limit under the Public Service Acts and were being replaced by younger men; when university graduates in both Agricultural Science and Veterinary Science were becoming more available, and when the legislative Acts introduced by him demanded more staff for their administration. Furthermore, the Department had encouraged any non-graduate staff to undertake part-time tertiary study by allowing them to attend the necessary university subjects towards a degree during some Departmental time plus evening attendance at the University, spreading the attendance over several more years than the normal three to four years to enable them to fulfil the degree requirements. Dr H. W. Kerr, A. F. Bell, W. A. T. Summerville, to name a few of the later senior scientific administrative officers, completed degree courses in such circumstances.

Salaries being offered were still governed by the 10% to 15% reduction imposed under The Salaries Act of 1930. The original salaries were not restored until the passage of The Salaries Act of 1930 Repeal Act of 1938, assented to on 24 November 1938. In the early 1930s many qualified people were unable to obtain jobs. The author (P. J. Skerman), after being dux of Gatton College in 1928 and having graduated with honours in Agricultural Science in 1931, was unable to obtain a job and spent six months dairying and felling brigalow scrub with an axe on his father's farm until advised to go to Fairymead Sugar Co., Bundaberg. Here he was in veterinary charge of 400 horses, did a soil pH survey of 3000 acres for a liming programme, did the sugar analyses for determination of harvesting priorities and managed a plantation for a month-all for £3 per week, less £1 5s 0d for board and lodging! Frustrated, he sat for the Department of Agriculture and Stock examination for Dairy, Stock and Meat Inspectors, gaining first place in Queensland. On 14 August 1933 he received the following letter

Sir,

I desire to inform you that the Commonwealth Public Service Board of Commissioners is prepared to recognise you as qualified for appointment as a Commonwealth Meat Inspector provided that your appointment, if made, shall be dependent upon your serving a reasonable period of probation - without pay - under the direction of a Commonwealth Veterinary Officer in order to familiarise yourself with the practical side of meat inspection, and at the conclusion of that period being certified as satisfactory after such test may be considered necessary by the Commonwealth Authorities.

Yours faithfully

Under Secretary

In the meantime he had been offered and accepted the position of Agriculturist at the Queensland Agricultural College at a salary of $\pounds 400 - \pounds 525$ per year!

Jasper E. Ladewig, who was dux of the Gatton College Agriculture Diploma Year in 1929, and also subsequently graduated with his Bachelor of Agricultural Science degree, approached the Acting Under-Secretary, R. "Digger" Wilson, for a job and was told that

there were no vacancies for graduates but that there were five vacancies for Dairy, Stock and Slaughtering (Meat) Inspectors. He sat for the same examination and took one of the Stock Inspector's positions at a salary of £260 per year. When he approached "Digger" Wilson to ask him to put him on a graduate salary (most inspectors were only diploma holders) Wilson, said "Do you really want to go on a graduate salary - because it is £250 a year and you will lose £10 a year!" Jasper Ladewig, after a varied career in stock and dairy inspection, pig nutrition in Queensland and later soil conservation in New South Wales and Queensland, rose to be Director of the Division of Land Utilisation in the Department of Agriculture and Stock until his retirement.

Staff changes during Bulcock's administration

Death of A. E. Graham, Under-Secretary

The following article appeared in the *Queensland Agricultural Journal*, in May 1938 (pp. 510-512) upon the death of A. E. Graham on 1 May 1938.

Mr. A. Ernest J. C. K. Graham, Under Secretary of Agriculture and Stock, and Director of Marketing, passed away in St. Martin's Hospital, Brisbane, on Sunday, 1st May. He was in his office as recently as the previous Tuesday when he was obliged to give up the heroic struggle which he had waged for two years against failing health.

Mr. Graham's name will go down in the annals of this State as one of the framers of much of its present-day marketing schemes and the development of agriculture generally. He was closely associated with the framing of The Dairy Produce Act of 1920, which has been used as a basis for similar legislation overseas, and for many years had had charge of the administration of other important measures bearing on dairying.

The late Mr. Graham was born at Wagga, New South Wales, and would have been sixty-two years old next month. He was educated at the Bega public school and Grammar School, on leaving which he entered the service of the New South Wales Creamery Butter Company. He also studied agricultural chemistry. Before coming to Queensland in 1906 he had held important managerial positions in the dairy industry of New South Wales, where he was the first to introduce the practice of grading cream and to apply the principle of payment according to quality. He was for some time instructor in dairying at Gatton College. Then he took over the managership of the Queensland Farmers' Co-operative Dairying Company at Booval. He, however, soon afterwards was appointed a dairying expert in the Department of Agriculture, and rising step by step, became on 1st January, 1925, the occupant of the principal permanent position in the department, following Mr. E. G. Scriven. Meanwhile, he had filled the offices of Chief Dairy Expert and Director of Dairying and Cold Storage.

When the Council of Agriculture (the executive of the Queensland Producers' Association) was formed, Mr. Graham was appointed Government representative on that body. He was a member of the standing committee of agriculture of the Commonwealth Council for Scientific and Industrial Research, and one of the Queensland representatives on that council. He also was member of the standing committee of agriculture of the Australian Agricultural Council, of the State Nutrition Council, and of the Faculty of Agriculture within the University of Queensland, besides being chairman of several important committees associated with departmental services and administration.

In addition to other offices, Mr. Graham was a member of the Australian Dairy Council and chairman of the State Dairy Board.

His knowledge of the primary industries was as varied as it was sound, for he was an accepted authority on the growth of fodder crops, animal husbandry, and modern dairy factory practice. For many years he lectured on these subjects, in which he combined academic knowledge with a sound practical training; his administrative powers were quite as outstanding. Both as author and collaborator he was responsible for the publication of numerous bulletins and pamphlets on various aspects of agriculture and animal husbandry, of which among the more notable were "The History of Dairying in Queensland", "Dairying in Queensland" (an economic survey), and several on the economics of cotton-growing, sugar production, and poultry and pig raising. Besides being associated with the initial organisation of farmers under the Primary Producers' Organisation and Marketing Acts, he remained in close touch with the legislative machinery which the several commodity pool boards constituted under the Acts have, from time to time, found necessary in connection with their marketing operations. His annual reports on the operations of these pools were remarkable for their lucidity and able presentation of the facts of the contemporary agricultural situation, particularly in relation to the special and extremely intricate economic problems with which agriculture is confronted the world over.

The late Mr. Graham was a keen student, an omnivorous reader, and something of an authority on English and classical literature, and was gifted with unusual powers of observation and a remarkably retentive memory. He was a prodigious worker, a great home lover, with an extraordinary capacity for friendship. He won his way to success through sheer merit and fine character - a success that left him quite unspoilt. He remained the same unassuming, courteous gentleman to the end.

Death of Robert Wilson, Assistant (1925) and Acting Under-Secretary (1938-39)

It is a sad fact that the achievements of an individual are rarely put together until his "In Memoriam" is published after his death! Robert "Digger" Wilson was deputy to the Under-Secretary, A. E. Graham, and shouldered a great deal of the executive load more or less behind the scenes, particularly during the illness of his superior.

Wilson was born on 1 May 1873 in the Logan River district where his father was engaged in cotton and sugarcane growing and sugar manufacture.

Mr. Robert Wilson, Acting Under Secretary and Director of Marketing of the Department of Agriculture and Stock, died on Wednesday, 19th April [1939] at his home, Kirkland Avenue, Coorparoo. He was actually the executive head of the Department, but as he had almost attained the retiring age when his predecessor, Mr Ernest Graham died, the permanent appointment was not made.

Mr Robert Wilson was an old Brisbane Grammar School boy. Upon leaving that school and passing the Public Service examination, he was appointed to a junior position in the then infant Department of Agriculture and Stock. By sheer ability he rose step by step in that department, in practically every branch of which he served until he became its principal executive officer. In addition, he held at various times the secretaryships of important conferences, such as those dealing with rust in wheat, and of the Board of Advice under the Diseases in Plants Act, the Meat and Dairy Board, and the Royal Commission on Central Sugar-mills, also of the various annual agricultural conferences held in different parts of the State from 1897 to 1903.

When the State Hansard staff was short-handed, Mr Wilson, who was an expert shorthand writer, capably filled the vacancy until a permanent appointment could be made.

In January, 1935, Mr. Wilson was appointed Assistant Under Secretary, assuming the administrative responsibility under ministerial direction and by delegation from the Under Secretary of a great department with activities and influence covering rural industry throughout Queensland. He was a member of the Agricultural Bank Board, Deputy Chairman of the Rural Assistance (Farmers' Rehabilitation Scheme) Board, and a member of the Dairy Products Stabilisation Board. He also was Government representative on the Butter and Cheese Boards, and other commodity boards operating under the Primary Producers' Organisation and Marketing Acts, and related legislation. He frequently accompanied Ministers for Agriculture to the meetings of the Australian Agricultural Council in the South. For many years he was a member of the Royal National Agricultural and Industrial Association.

The late Mr. Wilson, who was a brother of a brilliant cavalry leader, Brigadier-General L. C. Wilson, served in the Great War with the 47th Battery, 12th Australian Field Artillery Brigade, on the Somme during the 1916-17 winter, through the autumn operations in the Ypres area in 1917, and the subsequent winter campaign, also during the memorable events on the Somme and the Lys in the last year of the war. He was a vice-president of the State Service Branch of the Returned Sailors and Soliders' Imperial League of Australia.

Mr. Wilson was a prominent amateur cyclist and rower, and also an administrator of those sports. He was at various times treasurer of the Queensland Cyclists' Union; captain, secretary, and treasurer of the Brisbane Safety Bicycle Club; secretary, captain, and treasurer of the Commercial Rowing Club; a member of the Rowing Council; and selector of the Queensland Rowing Association.

In 1903 and 1904 he was champion of the Brisbane Safety Bicycle Club. He won several Brisbane Grammar School old boys' cycle races, and in 1900 was second in the Australian five miles championship.

He also was a member of the champion eight crew of the Commercial Rowing Club of 1909. He was a ground member of the Queensland Cricket Association, and a supporter of Rugby football.

Wherever he was - in the Department, in the A.I.F., in sports (in which for some years he figured so prominently), and amongst his friends - the late Mr. Wilson was noted for his straight-forwardness and his unvarying courtesy.

In official life he lived up to the highest ideals of public service. He was a friend of the junior officers, in whom he took an especial interest, guiding and influencing them in their choice of career in branches of the Department for which they had a natural aptitude. His was an attractive personality, to which occasional flashes of whimsical humour were an additional charm. Those who had the privilege of close association with him, officially and otherwise, revered him for the strength and simplicity of his character, his unfailing fairness, and other qualities of mind and heart which inspired both respect and affection for him. (*QAJ*, May 1939, pp. 523-524)

Appointment of Richard P. M. Short as Under-Secretary

Richard Patrick Montfort Short who had been Acting Under-Secretary was offically confirmed as Under-Secretary on 26 October, 1939.

Retirement of Sydney Smith Hooper, Accountant

The following article appeared in the *Queensland Agricultural Journal* of January 1936 (pp. 86-87) on Hooper's retirement.

In the course of the discussion on the Departmental Estimates in the State Parliament, members on both sides of the Chamber referred to the impending retirement of Mr. S. S. Hooper, Accountant of the Department of Agriculture and Stock, and paid high tributes to his zeal and capacity as a senior officer of the public service. Notable among the speakers was Mr. W. J. Copley, M.L.A., formerly an officer of Mr. Hooper's branch, and following is the "Hansard" report of his remarks:

"I take this opportunity to pay a tribute to a man who this year will retire under the public service regulations. He will be a great loss to the public service. I refer to the accountant of the department, Mr. Hooper. Mr. Hooper, who was transferred from the Commonwealth service, was first appointed to the department forty-three or forty-four years ago. For more than forty years he has each year attended the sittings of Parliament and assisted the Minister to pilot his Estimates through Committee. This is a record that is not surpassed by any other accountant in the State, and is one that will bear comparison with a similar officer in any other State. Both the present Minister and an ex-Minister, the honourable member for Cooroora, told me they regarded Mr. Hooper - the Premier and the Public Service Commissioner also support their opinions - as a most valuable officer. I desire to pay a tribute to him for his services to the State. The account section

began with Mr. Hooper himself, but the staff has increased to twelve to fifteen officers under Mr. Hooper's control. He has trained some very valuable officers for the public service, and some of his former subordinates now occupy important positions in our civic life. The Minister informs me - and I believe this is also a record - that for about ten years - with one exception - it has never been necessary for the department to incur unforeseen expenditure. That is a compliment to the officer who framed the Estimates of the department. I also understand from the Minister that Mr. Hooper has never failed him in his public duties...Mr. Hooper will leave the public service this year with the full knowledge that he enjoys the confidence of all those with whom he has come in contact. He enjoys the confidence of the Minister and his fellow-officers. He has a very fine record, and he leaves an excellent organisation for his successor.

Tribute by the Minister

Replying to the general discussion on the work of his department, the Minister, Hon. Frank Bulcock, referred to Mr. Hooper's approaching retirement in the following terms:

"I should not like to resume my seat without paying a personal tribute to the accountant of my department, Mr. Hooper. He has prepared the departmental Estimates for forty-one years, and, unfortunately, these Estimates will be his last. Mr. Hooper commenced work as a clerical assistant in the public service in 1886, and became accountant of the Department of Agriculture in 1894. He has framed Estimates for the last forty-one years, and his method has been used as a pattern by the various other Government departments. He has been more than an officer to the fifteen Ministers under whom he has worked. Mr. Hooper is that rare type of individual, who is not only the Minister's accountant, but also his guide and friend. He has very largely contributed, by his skilful financial administration, to the success of the department. He is respected by everybody with whom he comes in contact, and during the war period he acted as chief clerk in the absence of the present Assistant Under-Secretary (Mr. R. Wilson), who was then chief clerk. Every officer in the department is grieved by the thought that Mr. Hooper is leaving. I am particularly sorry, because there is not a more honest, zealous, or conscientious friend in the department than Mr. Hooper has been to me and my predecessors. I hope that he enjoys a period of good health after he leaves the department, but there are personal circumstances that cause him to desire to be relieved of the work he is doing. I desire to pay a tribute on the floor of this Chamber to an officer who has done yeoman service for his State, and I feel that when he leaves the department will be the poorer for his absence."

On 21 May 1934, Leo Cain was made a member of the State Wheat Board, the Arrowroot, Barley, Broom Millet, Canary Seed, Honey and Peanut Boards during the absence of A. E. Graham, the Under-Secretary, and on 1 December 1935 was made Clerk, Director of Marketing and Senior Clerk on 14 December 1939. John William Munro was appointed Records Clerk. Robert John Pritchard became clerk in the Clerical and General Branch. Ephraim Cecil Roy Sadler and Ernest Francis Keefer were appointed Clerks, Accounts, on 1 December 1935. William Thomas Gettons was appointed Accountant on 1 July 1936 and John Robert Winders became Clerk in the Accounts Branch. He was later to become Chairman of the Sugar Board. On 11 November 1937, Dermot Sydney Beaven Davis was made Receiving Clerk in the Chief Office, and later became Officer-in-Charge of the Standards Branch.

Retirement of James Patrick Orr

James Patrick Orr retired on 30 June 1935.

Under the age limit provisions of the Public Service Act, Mr. James P. Orr, Registrar of Co-operative Associations, has retired from the Department of Agriculture and Stock, in which he served for fifty-two years.

Mr. Orr entered the Queensland Public Service on 1st February, 1883, commencing as a junior clerk in the Office of the Chief Inspector of Stock. Since then he has served with distinction in a number of responsible positions under fourteen Ministers.

As a very young man Mr. Orr's proficiency was recognised by his appointment to the secretaryship of the Stock Board, and in that capacity he later became associated very closely with the general progress of the Stock Branch. When the tick invasion was at its height he was made Secretary of the Board of Stock Commissioners appointed to inquire into methods of checking and mitigating the effects of that menace to the cattle industry, and the alignment of quarantine areas. He was concerned on the administrative side also with other important investigations into animal pest and pathological problems. Among other important posts held by Mr. Orr in the course of his long and honourable official career were those of Chief Clerk in the Stock Branch and Deputy Registrar of Brands, Deputy Chief Inspector of Stock, and Chief Clerk of the Department of Agriculture and Stock. At the time of his retirement Mr. Orr was Registrar of Co-operative Associations, with which he combined the office of Departmental Librarian. To those who served under him he was ever the guide, philosopher, and friend.

In sporting circles it may be said without exaggeration that Mr. Orr's name is a household word. His is a familiar and popular figure on the cricket field to many thousands of enthusiasts. He was one of the original trinity that formed the Queensland Umpires' Association, and as a member of that body umpired many international (including Tests), interstate, intertown, and final premiership matches. He also interested himself keenly in Rugby Union football; he was Vice-President of and delegate for the South Brisbane Electoral Club on the old Rugby Union Committee, on which he sat for about eight years. In his younger days he was very prominent also in musical and dramatic circles.

At a valedictory gathering of his fellow officers presided over by the Minister, Hon. Frank. W. Bulcock, a very fine tribute was paid to Mr. Orr's work and worth during his official career, and cordial appreciation of his high personal qualities, as expressed by the Minister, found unanimous approval. Mr. Orr carries with him into his well-earned retirement from Departmental life the high esteem and warm regard not only of his colleagues, but also of a host of friends outside the Public Service. (*QAJ*, January 1936, p. 96)

On 1 July 1935, Allen John Everist, Private Secretary to the Minister, was appointed Librarian and Registrar of Co-operative Agricultural Associations vice J. P. Orr. On 1st December 1935 Malcolm Lorne Cameron, a Clerk in the Dairying Branch, became Private Secretary to the Minister, but returned as Chief Clerk Dairying Branch on 14 December 1939 when Eric Stephen Keehan, an Inspector under the Diseases in Plants Act, became Private Secretary to the Minister.

Agriculture Branch

George Booth Brooks, who had been appointed Director of Agriculture on 1 October 1931, reached the retiring age of sixty-five years on 5 September 1933 and relinquished the position of Director, but was retained as Senior Instructor in Agriculture in the Central District to carry on special work in connection with tobacco until 30 June 1938.

Brooks was born and reared on a farm in Aberdeen, Scotland, famous for Shorthorn and Aberdeen Angus beef cattle and Clydesdale horses. He undertook a course in agricultural science at Aberdeen University to be followed by special courses in botany, geology, chemistry and animal husbandry. He migrated to Queensland and was appointed on 14 February 1896 to the Mackay State Nursery, where he took immediate charge of the Tryon collection of New Guinea sugarcanes; these had as much impact on the Queensland sugar industry as Farrar's wheats had on the Australian wheat industry. Brooks became overseer of Kamerunga State Nursery on 25 June 1899, working with tea, coffee, cocoa,

rubber, cotton, sugar and tropical fruits. On 1 May 1901 he was appointed Manager of the Biggenden State Farm and in October 1904 became Farm Foreman at the State Agricultural College at Gatton. From here he moved to become Instructor in Agriculture for the Central District on 7 April 1911. When power alcohol was being developed at Sarina, Brooks was commissioned by the Government to visit Java to study cassava production and procure high-yielding lines to develop a Queensland industry. He accompanied the Queensland contingent to the Wembley Exhibition in 1924 and whilst in Britain inspected plant-breeding, seed-testing and animal nutrition stations and livestock studs. (*QAJ*, August 1928, p. 153)

Brooks made a collection of sweet potato varieties, classified them and published a coloured catalogue of varieties in the *Queensland Agricultural Journal* in the August 1923 number.

During the vacancy in the Principalship of Gatton College between John Brown's resignation on 25 May 1915 and the appointment of Cuthbert Potts on 30 July 1915, Brooks was sent to Gatton as Acting Principal.

Brooks was interested in finding underground water with the divining rod and other mechanical devices and he designed and patented an automatic water-finder.

Albert Ernest Gibson succeeded Brooks as Director of Agriculture on 5 October 1933 at the age of sixty years and six months after a long career in land matters. He was born in Victoria and his secondary education was pursued at Dookie Agricultural College where he graduated in February 1890, winning several prizes. After leaving Dookie he was engaged in butter manufacturing under the Victorian Butter Bounty scheme and assisted in making the first 100 tons of butter exported to England under the Scheme. A term of dairy farm management was followed by the management of a Western District sheep property for a period of four years. Later he farmed on his own account in the Maffra district, North Gippsland, where he was engaged in fruit growing, dairying and general farming, and introduced to that district the practice of conserving fodder as stack silage. Seven years later he left for Queensland and joined his brother, a surveyor in the Survey Department, in field work for the purpose of obtaining first-hand information and experience in the soils, grasses and timbers of this State, knowledge which was of great assistance to him in his agricultural work. In July 1911 he was appointed to the Department of Agriculture and Stock as Farm Foreman at the Queensland Agricultural College under John Mahon and continued under H.C. Quodling. He conducted all the experimental work.

In 1915 Gibson was transferred to Head Office as Agricultural Instructor for Southern Queensland; he dealt with a variety of crops and was frequently called upon to advise on land development. He was promoted to Senior Instructor and then Director. As Director he was involved in the continuous development of the cotton industry, the tremendous expansion in tobacco growing, the Beerburrum Group Settlement in tobacco, development of improved pastures and the reorganisation of the Agricultural Branch by widening its activities by the appointment of special research officers to plan and conduct field experiments and other work of importance to the farming community. (Graham, A.E., *Rep. Dep. Agric. Stk*, 1935-36, p. 4) Gibson died on 8th July 1937.

On 2 September 1937, Charles John McKeon, who had been appointed the foundation Director of Tropical Agriculture at the Bureau of Tropical Agriculture, South Johnstone, on 1 July 1935, was withdrawn from the north to become Director of Agriculture and continued in office during the remainder of Bulcock's Queensland ministry and beyond. He was to be invited by Bulcock, by this time Director-General of Agriculture in the Commonwealth Department of Commerce and Agriculture, along with H. A. Mullet, Director of Agriculture, Victoria, and H. A. Grantham, Agronomist, New South Wales Department of Agriculture, to accompany him on a four-month Commonwealth Commission of Investigation of the Soybean Industry in the United States of America from 20 June to 30 October 1946.

On 25 August 1932, R. E. (Dick) Soutter, who had been breeding wheat and other crops at the Roma State Farm under the title Manager and later Manager and Wheat Experimentalist, was finally appointed officially as Wheat Breeder. The Minister, Bulcock, then made arrangements for him to make an extended tour of the chief wheat-growing regions of Australia to confer with other wheat breeders at the principal research stations and experiment farms in the Commonwealth. (*QAJ*, August 1932, p. 195)

Professor E. J. Goddard of the Queensland University had been in consultation with Bulcock and the need for more research in the Department was put forward. The designation "research officer" was introduced to distinguish officers working on research as distinct from those doing administrative and extension work. Dick Soutter, when he was transferred to Brisbane at the age of fifty-seven years, was appointed as Agricultural Research Officer (Wheat and Maize) on 1 December 1935, and Senior Research Officer, Agricultural Section, Division of Plant Industry on 11 November 1931. Charles Herbert Powis Defries was sent to Roma as Instructor in Agriculture to fill the local advisory needs on 1 July 1936.

On 1 February 1933, Walton Garrett Wells, who had been appointed at a special salary outside the Public Service on his arrival from America as Cotton Specialist, was admitted to the Public Service and appointed Director of Cotton Culture. With the closure of the Gindie State Farm, E. R. Ashburn, the Manager, was transferred to Brisbane as Instructor in Agriculture on 25 May 1933.

On 6 June 1934, Lawrence Gordon Miles, B.Agr.Sc., Ph.D., returned from post-graduate study at Cornell University, Ithaca, New York, and was appointed Plant Breeder, the first holder of a Ph.D. to be appointed to the Department. After eighteen months spent assessing the breeding work at the Roma State Farm and the Callide Research Station he was sent by Bulcock to be Plant Breeder at the Bureau of Tropical Agriculture at South Johnstone to join C. J. McKeon (Director), W. J. Cartmill (Analyst), G. J. W. Agnew (Pomologist) and C. E. Whitehead (Senior Cadet).

Charles W. Winders, Assistant in the Botany Section, had been sponsored by the Department through the Agricultural Science degree course; he completed his studies in 1932 and was appointed Assistant Agronomist to undertake pasture investigations. He was promoted to Assistant Agrostologist on 8 December 1936 and Assistant Research Officer, Division of Plant Industry (Research) in the Agriculture Section on 11 November 1937.

Leslie Wood, a field assistant at Toowoomba, was transferred to Brisbane and given charge of silo construction field work on 16 October 1940.

Cotton growing was being promoted vigorously during the pre-war years and with W. G. Wells promoted to Director of Cotton Culture numerous promotions and relocations were made amongst existing staff. A. Nagle (Brisbane), N. Goodchild (Rockhampton) and O. Hassall (Townsville) became Senior Instructors. W. A. R. Cowdry and William Gerald Steele became Assistant Instructors. F. J. Manuell, A. C. P. Nurcombe, W. J. White, E. Widdup, J. Byron and H. J. Winchester became Graders. L. M. Hodge, whose son had recently been killed on active service, was transferred from the position of Manager of the Callide Cotton Research Station at Biloela to become Instructor in Cotton Culture at Dalby and W. A. R. Cowdry took his place. Two new positions were created - that of Cotton Pest Control Officer at Biloela, filled by William George Ferguson on 1 August 1940, and that of Instructor in Cotton Irrigation at Biloela, filled by a graduate in Agricultural Science from the University, Fielding Chippendale, who soon afterwards enlisted for war service. Richard Walsh, Q.D.A., a cadet with the Cotton Section, also joined the armed forces and was killed in action with the RAAF.

With the formation of the Division of Plant Industry (Research), Walton Garrett Wells, Director of Cotton Culture, was named Director of Cotton Culture and Senior Research Officer on 11 November 1937, and R. W. Peters, previously Experimentalist, was named Research Officer, Division of Plant Industry (Research), continuing his cotton selection work. Stanley Marriott, Assistant Plant Breeder at the Queensland Agricultural College, joined the Department as Assistant Research Officer in this new division and was sent to the Callide Cotton Research Station to undertake breeding work with cotton to help overcome the cotton Jassid problem, in which he was successful by breeding varieties with hairy leaves. When mechanical cotton pickers were introduced these hairy varieties impeded harvest. L. G. Miles was appointed Research Officer; W. J. Cartmill was appointed Assistant Research Officer in the Division on 20 August 1937, whilst still located at South Johnstone. On 8 May 1941 Miles was transferred to the Callide Cotton Research Station, Biloela, to work on cotton and more particularly grain sorghums, with which he had outstanding success. His variety "Alpha" attained and maintained the status of the most desired variety for many years.

Tobacco growing was also expanded and intensified during Bulcock's administration, particularly in the Townsville, Dimbulah and Mareeba areas. Royce Clyde Cannon, B.Agr.Sc., A. Hamilton, Thomas Gerald Graham, Q.D.A., Evan William Baird, Q.D.A., and Hugh McNee, Q.D.A., concentrated on advisory work. Lewis Folk Mandelson, B.Agr.Sc., was designated Research Officer in the Division of Plant Industry (Research) and undertook research on diseases of tobacco. N. A. R. Pollock, Senior Instructor in Agriculture, supervised the Inglewood district from his base in Toowoomba. With the departure of L. G. Miles from the Bureau of Tropical Agriculture, T. G. Graham was sent to this centre to carry out work on pastures and also tea production; he did outstanding work in both. On 1 March 1938 Eric Christian Tommerup was appointed Soil Bacteriologist, located at Atherton.

With the departure of C. J. McKeon from the Bureau of Tropical Agriculture to become Director of Agriculture in Brisbane, the position of Director of Tropical Agriculture was advertised on 9 June 1938 at a salary of £550-£700. John Leeming Schofield, B.Sc., who

had considerable tropical experience with crops in South-East Asia was selected and appointed Director on probation on 21 July 1938, the appointment being confirmed on 24 November 1938.

Selwyn L. Everist, Junior Assistant Botanist in 1931, had been stationed at Blackall just prior to World War II to study inland pastures; he was appointed Assistant Research Officer, Division of Plant Industry (Research), in the Agricultural Section on 17 May 1940.

General Agricultural Husbandry fell to the lot of Norman A. R. Pollock, Charles Shearer Clydesdale, Senior Instructor, William Rothwell Straughan, C. H. P. Defries and Alfred Frank Skinner, Q.D.A.; Skinner concentrated on soil conservation aspects.

To cater for the administrative side in the Agriculture (General) Branch, Harold Frank Wylde Ball, Assistant Experimentalist, was appointed Experimentalist and Senior Clerk; Stanley Burchill was transferred from the Chief Office to be Clerk on 11 November 1937.

Horticulture Branch - H. Barnes, Director of Fruit Culture

The Banana Industry Protection Board was still active in the early 1930s. C. Newton Morgan was promoted from Agent to Inspector under the Plant Diseases Act and located at The Summit on 6 October 1932 and at Brisbane on 13 July 1933. Charles Schindler, B.Agr.Sc., and John Reuben Horsley were appointed Agents on 13 July 1933 and Henry Collard was appointed Assistant Instructor in Horticulture and Agent at Cardwell on 3 May 1934.

George Williams, Director of Horticulture, died on 10 March 1933 and was succeeded by Henry Barnes, Instructor in Fruit Culture, who was elevated to the position of Director on 17 March 1934.

Henry Barnes was born at Maryborough on 19 January 1904. After gaining his Junior Certificate from the Christian Brothers High School he joined the Department of Agriculture and Stock on 1 October 1920, serving in clerical positions. He twice accompanied the Sugarcane Prices Board on its annual tours of the canegrowing districts. In 1924 he was transferred to the Fruit Branch under A. H. Benson and became Secretary to the Bunchy Top in Bananas Committee. In 1926 he gained first place in the Fruit Inspector's examination and in 1929 he passed the Fruit Instructor's examination. He was then involved with the citrus budwood scheme, maturity standards in citrus and grapes, citrus fertilisers and citrus stocks. He was Chairman of the Banana Industry Protection Board and had deputised for the Director of Marketing on the C.O.D. He acted as head of the Fruit Branch following George Williams' death.

In Memoriam - George Williams . The *Queensland Agricultural Journal* of April 1933 (p. 176) paid tribute to George Williams.

Widespread regret was felt at the passing of George Williams, Director of Fruit Culture in the Department of Agriculture and Stock, on Friday, 10th March, [1933]. He was sixty-one when the end came after a long illness borne with extraordinary fortitude and a cheerfulness that was an inspiration to those in close association with him. In fact, it may be said that it was his indomitable will that kept him alive during the last year of his life. With remarkable courage he

attended to the work which was his lifetime vocation up to within a few weeks of his death; and so he died, as he desired, practically in harness.

There was no better known or more highly respected man in Queensland horticulture than George Williams. He joined the Department of Agriculture as Inspector of Plants at Rockhampton in 1899, and subsequently served in the Cairns district, where his extensive knowledge of tropical fruit culture, both as an instructor and as an experimentalist, was a factor in the firm establishment of the fruit industry in the far North. While in North Queensland he also had much to do with the establishment of the citrus-growing industry at Charters Towers and other places. He was appointed Assistant Instructor in Fruit Culture in 1913, Instructor in Fruit Culture in 1922, and Director in 1928.

To his official life the late George Williams brought the fidelity, integrity, breadth of outlook, and thoroughness that characterised his private life. To him, "the reward of a thing well done is to have done it". His interest in progressive horticulture was deep and genuine, and his generosity in passing on to others the information drawn from a wealth of experience and keen observation in the nursery and orchard was proverbial.

Fruitgrowers throughout the State have, from time to time, paid tribute to the valued services of George Williams during his long association with the Department. Endowed with an attractive and genial personality and innate courtesy, he enjoyed a wide popularity, not only among those interested in the fruit-growing industry, but also among all classes of the community, and especially his fellow officers.

Banana-growers, particularly, will miss the benefit of his character, ability, and sound judgment as Chairman of the Queensland Banana Industry Protection Board; while for the fruit industry generally he performed notable service as Government representative on the Committee of Direction of Fruit Marketing.

In his younger days, he took a very keen interest in the Volunteer movement, firstly as a member of the Port Curtis Infantry, and afterwards as Officer Commanding the Machine Gun Section in the 15th Australian Light Horse. He was also an expert rifle shot. (*QAJ*, April 1933, p. 176)

On 3 May 1934, Harold Joe Close Freeman was made Senior Instructor in Fruit Culture and Chief Inspector; William James Ross was appointed Senior Instructor at Rockhampton and Stephen Ernest Stephens was appointed Instructor in Cairns and Inspector of Apiaries. Henry St. John Pratt was promoted to Senior Instructor and William Leslie was appointed Assistant Instructor at Bowen.

With the creation of the Division of Plant Industry (Research) on 1 July 1937 William Alan Thompson Summerville, Entomologist in the Science Branch, was made Senior Research Officer in the Horticultural Section. Keighley Mansfield Ward was made Assistant Horticultural Research Officer on 17 September 1936 and Research Officer on 9 June 1938. On 5 February 1941, Hubert Martin Groszmann, recently graduated from the University in Agricultural Science, was appointed Assistant Research Officer, Division of Plant Industry (Research), and immediately set to work on pineapple improvement.

On 7 May 1942, Alan Alexander Ross was appointed Assistant Research Officer, Horticulture Section, Division of Plant Industry (Research), but moved off to Munitions Research during the War. He later returned to the Department in the Horticulture Section and then became Director of Marketing and later Director-General of the Department.

Bureau of Sugar Experiment Stations

In Memoriam - H. T. Easterby. Harry Tinniswood Easterby, Director of the Bureau of Sugar Experiment Stations, suffered a heart attack while on an official visit to Cairns and died on 28th September 1932. His "In Memoriam" read:

By the death of Mr. Harry T. Easterby, Director of the Bureau of Sugar Experiment Stations, the sugar industry has lost one of its most notable personalities and Queensland a fine citizen. Making a tour of the cane-growing districts, he was in the office of the Cairns Canegrowers' Association when he suffered a sudden seizure which terminated fatally on Wednesday, 28th September, so he practically died in harness.

An excellent administrator and a master of method, Mr. Easterby characteristically left everything in perfect order. Form some time past he had been engaged in writing a history of the sugar industry, a work comprehensive in its scope, which on its publication in both form will be accepted as an authoritative survey and as a valuable record of the establishment and development of one of Australia's greatest agricultural enterprises. To him it was a labour of love and the last chapter was ready for the printer just before he left Brisbane on what was to be his final visit to the North.

Mr. Easterby's death is a distinct loss to the State which he loved and served so well; and also to the industry in which was bound up his life's work, and which he helped on its technical, scientific, and administrative sides to develop to the stage it has reached today. In fact, for many years he ploughed a lonely furrow, and on his shoulders rested the entire investigational work of the Bureau until in time it became possible to appoint an adequate staff. It is believed that the heavy work entailed in the organisation of the services of the Bureau, entailing as it often did actual hardships in the years when transport and other facilities were anything but modern, undermined a powerful physique to an extent that was largely the cause of his ultimate breakdown.

Great in heart and ability, big in achievement, firm and courageous in his convictions and rigid in honesty of purpose, he was regarded as a man among men. His thoughtful consideration of others, geniality of manner in all personal contacts, his capacity for inspiring the affection of his associates made of him an exemplar of what is best in humanity.

Harry T. Easterby was born at Echuca, Victoria, in 1867. He studied at the Horsham (Victoria) Public School, and applied himself to chemistry and microscopical science, including sugar chemistry, and subsequently entered the sugary factor of Maffra in 1897, where he studied the technology of sugar under Dr. Riesen. He was afterwards appointed to the position of chemist with Messrs. Gibson and Howes, owners of the Bingera Sugar Plantation at Bundaberg. Mr. Easterby was engaged later by the Victorian Government to make investigations into the beet sugar industry in 1900 and part of 1901, after which he was appointed Assistant Director of Sugar Experiment Stations in Queensland to Dr. Walter Maxwell. He subsequently became Director, which positions he held up to the day of his death.

The Sugar Experiment Stations during Mr. Easterby's long term of office developed remarkably. At the time he joined the service there was only one station in Queensland. Now there are three; also three entomological laboratories, a sugar-cane pathological laboratory, a sugar soils laboratory, and a sugar mill technologists' laboratory; while the staff has increased from six to twenty-two, including chemists, pathologists, entomologists, and agriculturists; while the yield of sugar has increased from 120,858 tons in 1901 to 581,276 tons in 1931, and the tons of cane required to make 1 ton of 94 net titre sugar have been reduced from nearly 10 in 1901 to well under 7 during the past two seasons. (*QAJ*, November 1932, p. 414)

Dr H. W. Kerr, Director, Bureau of Sugar Experiment Stations. Easterby was succeeded by Dr Henry William Kerr. He was Acting Director of the Bureau of Sugar Experiment Stations until 20 April 1933, when he was appointed Director.

The new Director was born at Randwick, Sydney, on 18th May, 1901. He received his early education at the Central State School at Charters Towers, from which in 1914 he gained a scholarship entrance to the Ipswich Grammar School. In 1917, after obtaining an excellent pass in the Junior University examination, he entered the public service as a cadet in the laboratory

of the Agricultural Chemist under Mr. J. C. Brunnich. Attending the University of Queensland as an evening student, he graduated in Science with first-class honours in Chemistry. With two other brilliant young students, Messrs. Arthur Bell and Norman Bennett, he was awarded a travelling scholarship, enabling him to spend four years abroad studying agriculture and soil science and visiting the sugar-producing countries of the world as an observer of modern agricultural practice relating to every phase of cane cultivation. All three young men have since given, and are continuing to give, notable service to the Queensland sugar industry.

In the course of his period of study abroad Dr. Kerr spent two years at the University of Wisconsin in soil research work, and graduated with the degree of Doctor of Philosophy. He was Queensland delegate at the 1927 Conference of the International Society of Soil Scientists and at the Imperial Agricultural Conference in the same year. After a further course of research work at the Rothamsted Experiment Station (England), Wisconsin University (U.S.A.), Hawaiian Islands, and Java, he returned to Queensland in 1928, and was appointed Soils Chemist to the Bureau. On the reorganisation of the Bureau he assumed control of the Division of Soils and Agriculture, and has since directed all the agricultural investigation work of the Bureau, including farm experimental plots and the planning of the work of the three experimental stations - South Johnstone, Mackay, and Bundaberg. (*QAJ*, July 1933)

The Reorganisation of the Bureau of Sugar Experiment Stations. In 1929 the Bureau was reorganised and four Divisions were instituted:

Division of Soils and Agriculture - Dr H. W. Kerr, Soils Chemist-in-Charge;

Division of Pathology - A. F. Bell, Sugar Pathologist in Charge;

Division of Entomology - E. Jarvis, Entomologist in Charge;

Division of Mill Technology - N. Bennett, Sugar Technologist-in-Charge.

The Division of Soils and Agriculture under Dr H. W. Kerr. Kerr instituted farm fertility trials - first of a qualitative and later of a quantitative type in all cane-growing districts and those were made complementary to a programme of soil survey and soil analysis. The Experiment Stations, chemists, plant breeders and field staff were under his personal jurisdiction.

The Division had as its duties the full field experimental investigations of fertiliser requirements of the various soil types, the yielding capacity of new cane varieties, and the value of specific cultural treatments in increasing yields. The breeding of new varieties was an important phase of the work. Hand in hand with the field work were the laboratory analyses of the soil types under examination in order to determine the relationship between the field results and soil composition. (Easterby, H.T., 1933, p. 212-213)

To accomplish these duties the Division of Soils and Agriculture needed chemists, soil survey officers, plant breeders and field officers.

Before 1911 the Bundaberg Experiment Station was the headquarters of the Director and handled most of the soil analyses. From 1911 to 1930 the Agricultural Chemist Branch at the headquarters of the Department carried out this work till new laboratories were built for the Bureau within the Agriculture and Stock Complex. C. R. von Steiglitz was then made Analyst-in-Charge for the Bureau, with Neville George Cassidy appointed Research Assistant on 1 January 1932.

Bulcock was seeking a site for the investigation of tropical crops and pastures and at the same time Dr H. W. Kerr was seeking to centralise the northern sugar research programmes. Consequently, the South Johnstone Sugar Experiment Station was handed over to the Agriculture Branch and additional buildings were provided at Meringa near Gordonvale to accommodate and equip extra Bureau staff. Up-to-date laboratories were equipped for the performance of all analytical work, a large glasshouse for seedling production was erected, and land was cleared for the field experimental studies.

With the transfer of the South Johnstone Sugar Experiment Station to the Agriculture Branch, Edwin James Reuben Barke, the Chemist-in-Charge, was transferred to Meringa on 18 January 1934. P. McWalters had succeeded in raising cane seedlings from local fuzz (seeds) and several new canes were released from South Johnstone as "S.J." canes before its closure. Barke carried on selections at Meringa where he was made Manager on 1 December 1935 but the South Johnstone site was not very suitable for cane breeding work because of the extremely wet climatic conditions.

Meanwhile on 1 July 1935, Frances Keogh, Chemist-in-Charge at the Mackay Sugar Experiment Station, was transferred to the Agricultural Chemist Branch at the Department's head office.

Norman Joseph King, Assistant to the Analysts in Brisbane, was on 1 December 1935 appointed Soil Survey Officer in the Bureau. After completing the soil survey of the canegrowing areas to assist in allocating fertiliser trials he was appointed Chemist-in-Charge at the Bundaberg Experiment Station on 29 April 1937 to replace James Pringle, who was transferred to the Agricultural Chemist Branch in Brisbane on 28 October 1937.

The first field instructors were appointed in 1912: H. T. Harvey in north Queensland and H. G. Burn in the south. In 1915 they were replaced by A. P. Gibson and J. C. Murray and in 1921 E. H. Osborn joined the field staff.

In 1929 when the reorganisation of the Bureau took place, G. Bates, H.D.A., was transferred from the Entomological Division to the Agricultural Division and assumed responsibility for carrying out all field trials in the far north. Between 1933 and 1936, G.A. Christie, C. G. Story and S.O. Skinner (all holding the Diploma in Agriculture from the Queensland Agricultural College) and H. G. Knust joined the field staff, and from 1939 to 1941 five more Gatton Diplomates in Agriculture - N. McD. Smith, J. T. Elliott, E. V. Humphrey, R. A. Abbott and E. A. Pembroke - were so engaged. The field staff carried out the field experimental programme of work (as distinct from Sugar Experiment Station work) and handled the extension and advisory work of the Bureau. (King, N. J., 1950)

Division of Pathology under A. F. Bell. Although the Division of Pathology under A. F. Bell was not established until 1929, W. Cottrell-Dormer, the first cadet pathologist (and entomologist), carried out a disease survey in sugarcane in the various districts of Queensland from 1921 to 1925. Then he undertook the newly established degree course in Agricultural Science at the University of Queensland as a foundation student in 1926 (science) and 1927 (Agricultural Science), graduating at the end of 1929 and rejoining the Bureau in 1930 in the Pathology Division.

In 1926 N. L. Kelly investigated Fiji disease and in 1927 E. J. Ferguson-Wood proposed quarantine districts for the cane-growing areas and supervision of planting material. On 17 November 1934 Cecil Graham Hughes, an Agricultural graduate from Sydney University, was appointed Assistant Pathologist vice W. Cottrell-Dormer who resigned on 28 June 1934 to join the Fairymead Sugar Company. On 30 October 1937 David Louis Steindl and Charles William Leece were appointed Assistants to the Pathologist.

Edmund Jarvis, Entomologist, took over from the foundation entomologist, A. A. Girault, in 1914 after working in Brisbane with Tryon. He was to be relieved by Dr J. F. Illingworth in 1917 but in 1921 again took over the Entomology Section at Meringa, which had become the entomological centre for the Bureau. On 21 December 1933 he was transferred to Brisbane and Reginald William Mungomery assumed control at Meringa. Edmund Jarvis died on 18 December 1935 and a tribute to his work was published in the *Queensland Agricultural Journal*. Mungomery had previously been stationed at the Bundaberg Sugar Experiment Station dealing mainly with White Grub damage to cane. In 1935 Mungomery visited Hawaii to study the habits and economic importance of the giant American toad (*Bufo marinus*) prior to introducing it to Queensland to control the cane beetles. However, it did not perform as well here as overseas and itself became a pest with householders and beekeepers. (See under Sugar Industry later in this chapter.)

Meanwhile, W. A. McDougall had taken over duties at the Mackay Sugar Experiment Station in 1931 working on wire worm problems; in 1936 he began his research on the rat problem, which was to gain him international recognition. At Meringa J. H. Buzacott was working on rind hardness as a prevention of borer damage at this time.

In 1934 the Divisions of Entomology and Pathology were combined under the control of A. F. Bell, and on 1 December 1935 Bell was appointed Assistant Director of the Bureau. He was responsible for calling the first conference on Cane Pest Boards in 1935, the forerunner of the Annual Conferences of Cane Pest and Disease Control Boards that did much to update and economise cane pest and disease control. (King, N. J., 1950)

Division of Mill Technology. In 1929 the Division of Mill Technology was established at Mackay under Norman Bennett as Sugar Technologist. On Bennett's resignation in 1932 it was found desirable to transfer the Division from the Mackay Sugar Experiment Station to Brisbane where suitable headquarters existed. Between then and 1935 sugar technology work was carried on by Edmund Rowlands Behne, appointed Assistant Mill Technologist on 1 September 1932, and David Lindsay McBryde, appointed Assistant Mill Technologist on 2 August 1934. On 7 March 1935, Jacob Eigenhuis was appointed for three years as Consulting Mill Technologist; Norman Smith was appointed on the same date, but resigned in 1937. George Horner Jenkins was appointed on 17 June 1937; Arthur Harold Praeger (20 August 1937) and John Lindsay Clayton (1 March 1938) followed. Eigenhuis resigned in 1938 and on 22 February E. R. Behne was appointed Chief Mill Technologist. (King, N. J., 1950)

Under The Regulation of Sugarcane Prices Acts, 1915 to 1931 the Minister for Agriculture and Stock appointed Government Assistant Cane Testers and Cane Testers for each sugar mill plus some Inspecting Cane Testers. These were listed in the *Queensland Government* *Gazette* yearly for that sugar season. Thus for the 1933 season eighteen assistant cane testers, seventeen cane testers and three inspecting cane testers (located at Bundaberg, Cairns and Mackay) were appointed to the various mills.

Chief Inspector of Stock, New veterinary surgeons, Death of A. H. Cory

During the decade, in which Bulcock was Minister and Lieutenant-Colonel A. H. Cory was Chief Inspector of Stock until his death, no fewer than thirteen new Government Veterinary Surgeons were appointed, mainly graduates from Sydney University. When the first Queensland graduates became available at the end of 1941 they were appointed as Assistant Veterinary Surgeons. The appointees as Government Veterinary Surgeons included John Colin James Maunder (1 June 1933); Kenneth S. McIntosh (14 August 1934); Ross Nott (22 November 1934); Colin Rodrick Mulhearn (12 December 1934); Ronald Erskine Churchward (7 November 1935); Paul Francis Affleck Hardman and Marshall Roland Irving (6 February 1936); R. W. Greville (4 February 1937); Keith Macdonald Grant, Ian Lind Johnstone and Robert Davis Chester (16 December 1937); John Shilkin (22 February 1939); and Alexander Kennedy Sutherland (13 November 1941). The three Queensland Assistant Veterinary Surgeons appointed were Owen Henry Brooks, George Russell Moule and Leslie Gilbert Newton (2 January 1942).

Following the passage of The Veterinary Medicines Act of 1933, Elliott Henry Gurney (Agricultural Chemist), Arthur Henry Cory (Chief Inspector of Stock), St George Thorn (Bacteriologist) and John Arthur Rudd (Government Veterinary Surgeon) were appointed to The Veterinary Medicines Board on 8 February 1934.

With the passage of The Veterinary Surgeons Act of 1936 Professor H. R. Seddon (Dean of the Faculty of Veterinary Science, University of Queensland), A. H. Cory (Chief Inspector of Stock), James Washington Irving (Veterinary Surgeon), John Legg (Senior Veterinary Surgeon), and E. F. Sunners (Manager of the Brisbane Abattoir) were appointed to the Veterinary Surgeons' Board from 28 February 1938.

Lieutenant-Colonel Arthur Henry Cory, Chief Inspector of Stock, died on 18 December 1939. Professor H. R. Seddon was appointed to the new position of Director of Veterinary Services for three years from 1 June 1940 and Lawrence Daniel Carey became Chief Inspector of Stock and of Slaughterhouses.

Since the passage of the Stock Diseases and Slaughtering Acts, stock and slaughtering inspectors too numerous to mention had been appointed to the various districts. Theirs was to be a most important link between Head Office, the farmers and graziers and meatworks. The feedback to Head Office regarding the sudden arrival of new diseases, the spread of existing diseases and the reaction to disease control measures were vital in providing legislation and material for identification and research. The inspectors are the unsung heroes of the animal industries.

A list of existing stock and slaughtering inspectors was provided in the 1924 Public Service List.

On 1 June 1940, Herbert Scott Iliff was made Registrar of Brands, Senior Clerk in the Stock Branch and Registrar to the Veterinary Surgeons Board.

Pig Section

On 17 November 1934, E. J. Shelton, Senior Instructor in Pig Raising, was made also Supervisor of Grading under The Pig Industry Act of 1933. The only new appointment in the Pig Section in the years 1932-42 was that of Brian Reid Martin, B.Sc., as Inspector in Pig Raising, made on 12 August 1940. On 15 November 1934, twenty-four State and sixteen Commonwealth officers were appointed Check Graders under The Pig Industry Act of 1933.

Sheep and wool

James Carew was Senior Instructor in Sheep and Wool and in July 1935 was involved in tests with the residual amounts of arsenic in wool as a result of dipping. On 31 December 1942 he retired. He had had a remarkably diverse career, being the original gardener at Gatton College in 1897, then Horticulturist, then Horticulturist and Instructor in Woolclassing. He then entered the Sheep and Wool Branch of the Department, then the Cotton Branch and finally retired in the Sheep and Wool Branch. On 23 December 1936 Charles John Forrest Swinburne was appointed Instructor in Sheep and Wool, and on 24 October 1940 Clarence John Payne was given the task of Senior Grader in the Wool Room in the Department.

Retirement of Charles Joseph Pound, F.R.M.S.

Soon after Bulcock's assumption of the Agriculture and Stock portfolio on 17 June 1932 the Yeerongpilly Stock Experiment Station was to lose, by retirement, its most colourful identity.

The Queensland Graziers and Stock Breeders Association successfully petitioned the Government to establish a Stock Institute "having for its object the discovery by means of experimental research of the nature and origin of diseases in stock and the means of their prevention". A Stock Institute was founded on 29 November 1893. Charles Joseph Pound, F.R.M.S., one of the most expert microscopists from England, who at the time was employed by the New South Wales Central Board of Health investigating diseases of stock at the Sydney abattoir and Homebush Saleyards, was appointed Director on 2 December 1893 at a salary of £400 a year. The Institute was under the Colonial Secretary's administration, the incumbent at the time being the Hon. Horace Tozer. Premises were rented in Turbot Street in a two-story house and the Institute remained there till February 1900. It was transferred to the Department of Agriculture's jurisdiction on 1 January 1897, along with the Department of Stock; in late February 1900 it was moved into new buildings in College Road.

In 1894, Pound visited the Gulf country to enquire into the nature and cause of tick fever. He described organisms seen in smears stained with methylene blue and declared that "the investigation shows very conclusively that the micro-organism is the actual cause of the disease and that it is transmitted by ticks", though he did no experiments to prove it. Dr Sydney Hunt was to prove this when as Government Pathologist he carried out the necessary experiments. Pound carried out experiments which showed that tick fever could

be controlled by inoculating animals with blood from immune animals ("bleeders"), and he and Hunt travelled southern Queensland advising and demonstrating this method.

Pound was an enthusiastic preacher of the new method and prepared lantern photographic transparencies illustrating the complete history of the cattle tick, the micro-organisms of tick fever in various stages of development, maps of infested areas and black and white photographs to supplement them; he delivered fifty lectures in provincial towns in southern Queensland and at the request of the Minister lectured on tick fever to dairy conference delegates at Hawkesbury College and to stock owners at the Chamber of Commerce in Sydney. In August 1898 he attended the Intercolonial Tick Conference in Sydney along with the Hon. H. Tozer and P. R. Gordon (Chief Inspector of Stock) as the Queensland Delegation.

On 1 July 1899 Pound was appointed Government Bacteriologist at the Stock Institute at Normanby at a salary of £500 per year. In February 1901 the Stock Institute was transferred from the Department of Agriculture to the Home Secretary's Department and research on tick fever temporarily stopped. Pound was appointed Bacteriological Expert for The Health Act of 1900, within the latter Department.

On 21 September 1907, Dr S. Dodd was appointed Principal Veterinary Surgeon and Bacteriologist at the Bacteriological Institute and had the Stock Experiment Station at Yeerongpilly erected. He resigned on 30 April 1910 and Pound was restored as Bacteriologist. He took up residence at Yeerongpilly Stock Experiment Station and confined his work to animals. The Stock Institute at Normanby was transferred to the Health Department for bacteriological and other work. During 1912-13 some 33 083 head of cattle were inoculated against tick fever, 30 "bleeders" were sold and 72 stud animals were held and inoculated. Pound was appointed to join a Royal Commission of New South Wales that visited the United States of America for seven months to enquire into the procedure adopted for fighting the tick fever.

In 1912-13 he advocated a scheme for complete eradication of tick fever beginning with the Government Lands at St Helena, the Queensland Agricultural College, the State Farms, Goodna Hospital and Dunwich, by dipping each animal every fourteen days.

Pound also prepared tuberculin and encouraged the use of the tuberculin test as an aid in diagnosing the disease in cattle. The Stock Experiment Station was the only laboratory in the southern hemisphere preparing it. He also prepared virus for pleuropneumonia inoculation, blackleg vaccines, and autogenous vaccines for contagious mammitis; he recognised the first appearance of the warble fly and eradicated it; he prepared pure lactic starters for cheese factories, examined multitudes of organs for disease and generally policed the infectious diseases of animals throughout the State over his thirty-nine years' service. Pound shared his knowledge generously throughout the State, and Queensland's livestock industries owe him much.

Animal Health Stations. On Pound's retirement the Stock Experiment Stations at Yeerongpilly and at Oonoonba, Townsville, were renamed Animal Health Stations. J. A. Rudd, L.V.Sc. (Melb.), was appointed Acting Director at Yeerongpilly on 1 August 1932, the appointment being confirmed on 22 June 1933. As from 1 August 1932, St

George Thorn became Bacteriologist and Douglas Forsyth Stewart became Government Veterinary Surgeon on probation. Frederick Hugh Sherston Roberts, D.Sc., who had been appointed to the first veterinary position in Entomology in Australia on 23 January 1930 (Veitch, R., 1962), was appointed Entomologist and Parasitologist at Yeerongpilly on 20 February 1936, and Parasitologist on 1 August 1940. Dr John Legg, made Senior Veterinary Surgeon on 31 October 1935, became Director of the Animal Health Station vice J. A. Rudd on 24 October 1941. He had made a study tour of South Africa to investigate protozoal diseases and returned in mid-1932.

With the return of the Townsville (Oonoonba) Stock Experiment Station from the Council for Scientific and Industrial Research, Clarence Rodrick Mulhearn, appointed Government Veterinary Surgeon on 12 December 1934, was made Acting Director on 1 October 1936, and Director at Oonoonba on 21 December 1939. He was to do some important work on the fattening of beef cattle in north Queensland on the new tropical pasture species.

Dairying

Charles McGrath, Supervisor of Dairying, retired on 30 June 1935 after thirty-nine years' service with the Department. He joined the Department on 1 December 1896 and was made Assistant Dairy Instructor on 1 July 1897 at a salary of £157 per year. He assisted John Mahon on the travelling dairies and became Dairy Instructor at the Queensland Agricultural College on 1 July 1898, dropping his salary by £1 a year but no doubt making up by cheaper living! He was Instructor in Dairying at Toowoomba in 1924 and on 1 April 1926, was designated Supervisor of Dairying to follow A. E. Graham. He was very interested in the production side of dairying, selections of cattle and herd testing. He did not marry and accumulated considerable properties on the land during his lifetime.

George Henry Ewald Heers, the Senior Grading Inspector, succeeded McGrath on 1 July 1935. Heers started his service in the Department as a dairy inspector in 1907. He was appointed in 1935 as Director of Dairying. He helped to draft The Dairy Produce Act of 1920. Among the offices held by Heers in the course of his official career were those of Chairman of the Dairy Cattle Improvement Board and Chairman of the Dairy Factories Investigation Committee; he was a member of the Milk Tribunal, the Cheese Advisory Board, and the Rail and Road Transport Committee.

A keen horticulturist, Heers was regarded as one of the highest authorities on rose growing in Queensland and had land interests in the Pacific Nurseries at Manly. As a young man he was a noted all-round athlete, excelling in field sports, particularly cricket and football, and at one time enjoyed the distinction of being among the foremost of distance runners of his day. He also excelled in aquatic sports and was one of the founders of the Manly Yacht Club. (*QAJ*, January 1941, p. 62)

On 11 October 1940 Ernest Brooke Rice, Dairy Technologist, was appointed Director of Dairying, after having acted in that capacity since 16 November 1939. Brooke Rice obtained his Diploma in Industrial Chemistry at the Brisbane Technical College and in 1922 entered the Department as a cadet. He specialised in dairy technology and gained Milk and Cream Testing, Buttermaking and Cheesemaking Certificates. In 1934-35, under an exchange scheme, he was attached to the Dairy Branch of the Department of Agriculture in New South Wales and did a course in dairy bacteriology at Sydney

University. In 1936 he undertook a course of advanced study at the National Institute of Research in Dairying at Reading, England; while abroad, he studied dairying methods in Great Britain, Eire, Germany, Denmark and Holland. As a member of the Cheese Investigation Committee he helped reorganise the technical side of the cheese industry with a travelling dairy laboratory operating under his charge on the Darling Downs in 1938. (*QAJ*, January 1941, p. 61)

On 17 January 1935, John Dorwood Wears Ogilvie was made a Dairy Instructor. Ludvig Frederick Andersen, the first Herd Tester, was also appointed Instructor on 27 November 1935. Both had had a considerable period in the field and were close to retirement.

The nucleus of a scientific staff to specialise in dairy industry problems was provided with the appointment in 1930 of Oliver St John Kent, B.Sc., to carry out chemical and bacteriological examinations. A Dairy Research Laboratory was established in 1935 and St John Kent was made Senior Dairy Technologist on 11 November 1937 as part of the research drive. On 1 September 1936 Leslie Edwin Nichols, Assistant to the Dairy Bacteriologist in Brisbane, was transferred to Toowoomba but returned to Brisbane on 25 November 1937 when Leonard Alfred Burgess, Analyst, was made Dairy Technologist. E. B. Rice then went to Toowoomba as Dairy Technologist.

With the passage of The Milk Supply Act of 1938, Dr Oskar Kudelka was appointed Bacteriologist (Milk Investigations) on 1 April 1939. On 25 March 1942 Victor Bruce Darlington Skerman, who had recently graduated in Agricultural Science with emphasis on bacteriology, was appointed Temporary Assistant to the Dairy Technologist (Milk Investigations), pending his taking up a postgraduate scholarship at Melbourne University. He was to become the first Professor of Microbiology at the University of Queensland.

On 29 January 1942 Vincent Russell Smythe, B.Agr.Sc. (Qld.), was appointed Assistant to the Dairy Technologist. Robert Matthew Knight Snell, who had been an early Instructor in Cheesemaking in the Department in 1917, was recalled as Acting Instructor in Cheesemaking on 25 May 1942 to cope with wartime demands for cheese.

Agricultural Chemist-E. H. Gurney

Johannes Christian Brünnich, the foundation Agricultural Chemist in the Department, retired on 11 September 1931 and died on 3 July 1933. Elliott Henry Gurney was placed in charge of the Agricultural Chemical Laboratory, and held this position until he was appointed Agricultural Chemist on 19 July 1933.

Gurney's first important appointment was as Chief Assistant Chemist to F. B. Guthrie, Agricultural Chemist, Department of Agriculture, New South Wales. During this period he made investigations on hybrid wheats for William Farrar, the famous wheat breeder. He joined the Queensland Public Service on 1 February 1901 as Natural Science Master at the Queensland Agricultural College. He was transferred to the Chemical Laboratory at Head Office, Brisbane, on 1 July 1908 as First Assistant Chemist to J. C. Brünnich, visiting the College as a part-time lecturer during 1909. In addition to his laboratory work, he delivered many lectures to farmers' and fruit growers' associations on soils and fertilisers. In company with H. J. G. Hines of the University of Queensland and P. J. Skerman, Agriculturist at the Queensland Agricultural College, he conducted a silo survey of south-eastern Queensland soon after his appointment as Agricultural Chemist. He was President

of the Royal Society of Queensland in 1917 and of the Australian Chemical Institute in 1933-34. He was the author of a Departmental publication on stock foods.

Gurney had on his staff John Luigi Fidelis Foran, transferred from the Bureau of Sugar Experiment Stations on 1 March 1932; together they analysed numerous soils for tobacco growing. (In 1935 Foran was given the job of Analyst under the Pest Destroyers Act.) William James Cartmill was appointed Analyst on 1 April 1933 and seconded to the Agriculture Branch to conduct tobacco fertiliser experiments at Dimbulah and Mareeba over a full range of tobacco soils in those districts. He was appointed a Research Officer in September 1935 and joined the staff of the Bureau of Tropical Agriculture at South Johnstone, where he carried out detailed analyses of the new tropical pastures.

Frederick George Few and William George McKechnie, Analysts, were given the responsibility for analyses required by the new Veterinary Medicines Act of 1933 on 8 February 1934. George Robert Patten, from the Sugar Bureau, became Senior Analyst on 22 February 1934. Lewis George Vallance was appointed Analyst on 25 December 1934 and concentrated on a survey of the pineapple soils of south-eastern Queensland before joining the Sugar Bureau staff where he eventually became Assistant Director. On 28 October 1937, James Pringle, Chemist-in-Charge of the Bureau at Bundaberg, transferred to the Agricultural Chemistry laboratory as Analyst. James Meiklejohn Harvey, later to become Director-General of the Department, was promoted to become Analyst on 1st July 1939.

With the creation of the Division of Plant Industry (Research), William George McKechnie was named Assistant Senior Analyst in the Agricultural Chemistry Laboratory on 11 November 1937. His was a research appointment.

E. H. Gurney retired as Agricultural Chemist and was succeeded on 9 April 1941 by Dr Montgomery White, M.Sc. (Qld.), D.Med.Sc.Biochem. (London). White had had a brilliant academic career in Queensland and won a coveted 1851 Exhibition to further his studies overseas.

Seeds, Fertilisers, Stock Foods and Pest Destroyers and Veterinary Medicines Branch; Death of F. F. Coleman

On 24 April 1935, Frederick Freutel Coleman, the first Officer-in-Charge of the Seeds Branch when it was formed on 1 January 1923, died. His 'In Memoriam' reads:

We regret to record the passing at the age of sixty-six years of Mr F. F. Coleman, Officer in Charge of the Pure Seeds, Stock Foods, Fertilizers, Pest Destroyers, and Veterinary Medicines Branch of the Department of Agriculture and Stock, which occurred on 24 April.

The late Mr Coleman was born in Sandwich, England, and received his early education in England and France. Later, he specialised in the study of seeds and plant life and took out an extension course under the auspices of the Cambridge University. In 1903 he obtained an award of merit from the Royal Horticultural Society, London. He was afterwards engaged in the supervision of extensive variety trials, and the inspection and selection of crops for seed purposes in both England and France. Interested in military matters, he joined the British Volunteer Garrison Artillery. After coming to Australia he entered the Queensland Department of Agriculture and Stock in December, 1914, in the capacity of seed expert, and organised the Queensland seed testing station. To the work of the station, other activities were added from time to time. He made grasses his hobby, and pasture improvement was added to the more

important activities of his branch. He planned a comprehensive series of experiments, which he developed indefatigably. He was the first secretary of the Pasture Improvement Committee, through which experiments on a larger scale were possible. He was a capable administrator, maintaining a high standard of efficiency in his branch. In legislation governing pure seeds, fertilisers, stock foods, and pest destroyers, Queensland is regarded as a pioneer, and in his administration of the several Acts of Parliament respecting those agricultural essentials, and veterinary medicines also, Mr Coleman did good work for the man on the land whose interests within the scope of the activities of his branch he was assiduous in protecting. In some of those measures he had a shaping hand, assisting in the drafting of them with an eye to their effective application when passed into law. Method, thoroughness, and dependability characterised all his work, never losing sight of the practical end in view.

He was a frequent contributor to the "Queensland Agricultural Journal" on technical subjects, and among his recent contributions were "Pasture Improvement," "Intensive Pasture Improvement," "Sub-division, Renovation, and Top Dressing to Produce Better Grass," "The Cultivation of Grasses," "Some Factors that Determine the Keeping Qualities of Stored Maize," and "Wild White Clover," "Comparative Analyses of Grasses, Clovers, and Other Fodder Crops."

The late Mr Coleman's first wife died in 1932. Later he married Miss L. Brundritt, who survives him; also two sons, Messrs Bert and Leslie Coleman. His second son, Lieutenant E. L. Coleman, was killed in action in France while serving with the Australian Field Artillery (A.I.F.). (*QAJ*, May 1935, p. 522)

On 11 July 1935 his son Fritz Burfield Coleman, Inspector-Examiner in the Branch, was promoted to the position of Officer-in-Charge. He also became Expert under the Act on 25 July 1935. He was appointed Registrar under the Veterinary Medicines Act on 19 January 1939, with Royston Alfred Taylor appointed as his deputy on 11 January 1940. These two were given similar positions also under the Pest Destroyers Act, and on 11 July 1940, when the demands of war required control of supplies, particularly of fertilisers, F. B. Coleman was made also Principal Officer-in-Charge, Officer-in-Charge and Inspector under the Provisions of The Agricultural Requirements Control and Conservation Act of 1939 with R. A. Taylor as his Deputy. Frederick Percival Charles Bell, Robert Joseph Holdsworth and Arthur Christopher Peel were appointed Inspectors.

A Science Branch, Chief Office, enrolled its first officers on 19 December 1935. J. H. Simmonds, R. B. Morwood, J. A. Weddell and W. A. T. Summerville were named officers as from 1 December 1935. (*Qd Govt Gaz.*, No. 183, 21 December 1935)

Entomology

On 1 July 1936 Robert Veitch, Chief Entomologist, was made Chief Entomologist and Director of Research. On 1 July 1937, with the creation of the Division of Plant Industry (Research), he was made Director of Plant Industry (Research), supervising research in the Agricultural, Horticultural, Botanical, Plant Pathological, Entomologistal and Plant Physiology Sections. Hubert Jarvis and John Arthur Weddell (Entomologists) were promoted to Research Officers, and Henry Hacker (Museum Entomologist) and David O. Atherton, Norman Ernest Handley Caldwell, William James Stuart Sloan, Alfred Roy Brimblecombe and David Joseph Lee (Assistant Entomologists) were made Assistant Research Officers, Division of Plant Industry (Research), on 1 July 1937. On 11 November 1937 Jacob Harold Smith was appointed Senior Research Officer and W. A. T. Summerville moved from the Entomological Section to become Senior Research Officer in the Horticultural Section. On 7 May 1942 Alan Walter Sydney May was appointed Assistant Research Officer.

Henry Hacker was appointed the first full-time Entomologist on the Museum staff in 1926, and transferred to the Department of Agriculture and Stock staff while still full-time Museum Entomologist. This arrangement held until he retired in 1943. He was to spend two days a week at the Museum. In the Department he handled the insect collections and, being well versed in beekeeping, he was appointed also an Inspector under the Apiaries Act in 1931. He wrote "An Introduction to Beekeeping", a 45-page Departmental Bulletin published in 1935. (Veitch, R., "The History of Entomology". *J. Entomological Soc. of Qld*, Vol. 1, 1962, pp. 5-15)

In 1934 A. R. Brimblecombe was made full-time Forest Entomologist in the Department and continued till 1940, and again from 1944 to 1949. During the Second World War D. O. Atherton, J. H. Simmonds, F. H. S. Roberts, J. E. C. Aberdeen, L. F. Mandelson, W. A. Smith, P. J. O'Sullivan and H. A. Malcolm served with distinction in malaria-control units. (Veitch, 1962)

The title of Illustrator, Division of Plant Industry (Research), Entomological Section, was bestowed on Iwan Wassil Helmsing on 1 July 1937 after he had served for several years as illustrator in the Science Branch. He died on 23 March 1940, leaving behind some beautiful line drawings and colour plates recorded in the *Queensland Agricultural Journal*.

In Memoriam - Iwan Wassil Helmsing

The death on 23rd March of Mr. I. W. Helmsing, Illustrator, Division of Plant Industry (Research), Department of Agriculture and Stock, is recorded with deep regret. Born in England fifty-five years ago, he had a most varied and interesting life. Throughout his whole career, however, he maintained a definite interest and ability in art work and microscopy, and these interests culminated in the excellent output of scientific illustration work in the Department during the past fifteen years.

As an adventurous young man he forsook clerical work, first in England and later in Germany, to explore possibilities in Patagonia, South America. After some years in the pastoral industry there, he went to New Zealand, where for a time he engaged in fruit-growing. His biological interests later gained for him an appointment in New Zealand as an instructor in fruit culture. The desire for personal independence led him to Australia and for a period he was a successful banana-grower in the Tweed River district of New South Wales - a venture that was terminated by a disastrous outbreak of bunchy top disease of bananas.

During all those years he had carried with him a microscope which he possessed as a youth, and had also developed a remarkable talent for water colour work, mainly of botanical and plant pathological studies.

By his work in the Department he soon won recognition as a scientific illustrator of high standing. His work ranged through many classes of subject-matter - such as entomological, plant pathological, botanical, and veterinary specimens - and his output had for years added to the value and attractiveness of Departmental publications by making structures and forms intelligible to readers, which verbal descriptions would never adequately convey. Published illustrations included pen and ink, wash and colour, the pen and ink drawings being of a particularly fine, painstaking, and characteristic technique that is outstanding. Much of his work, in the form of insect life history studies in water colour, line the walls of the Departmental museum and remain as a fitting and lasting monument to his memory.

In addition, Mr. Helmsing studied taxidermy while in the Department with a view to adding to the collection of preserved insectivorous birds in the museum. In recent years he took up photography as a hobby and made official use of this interest along the lines of photomicrography, producing some excellent photomicrographic illustrations where the strict authenticity of a photograph of minute structures was desirable. This photographic interest was linked with a love for the open air, his holidays being spent wandering amidst mountain scenery, mainly of the National Parks, recording striking views and studying native plant and bird life.

The death of the late Mr. Helmsing has left a distinct gap in the organisation of the Department of Agriculture and Stock, regrettable not only officially but also to his friends and colleagues, who recognised and admired his many sterling qualities. Sincere sympathy is felt for those whom he has left bereaved. (*QAJ*, April 1940, pp. 413-414)

Plant pathology

On 19 December 1935, John Howard Simmonds was promoted to Senior Pathologist and Roy B. Morwood to Pathologist in the Science Branch. With the creation of the Division of Plant Industry (Research) they were made Senior Research Officer and Research Officer respectively in the Pathology Section. Harold Edwin Young, Assistant Pathologist, became an Assistant Research Officer. Harold Young was working on fused needle disease in pine trees, a thesis on which gave him the first Doctorate of Agricultural Science from the Queensland University.

On 1 April 1939 Frederick William Blackford and John Errol Chandos Aberdeen were appointed Assistant Research Officers. Edwin Warner Brandon Da Costa followed on 5 February 1941.

Plant Physiology Section

With the formation of the Division of Plant Industry (Research) in 1937 a Plant Physiology Section was set up, with Harry Kingsley Lewcock, previously Pathologist, becoming Senior Research Officer, Plant Physiology. On 14 March 1942 he was joined by Henry Lambert Wood, B.Sc., as Assistant Research Officer.

Botany Section

With the creation of the Division of Plant Industry on 1 July 1937 Cyril Tenison White retained the title of Government Botanist in the new situation. On 11 November 1937 William Douglas Francis, Assistant Botanist, became Botanist in the Botany Section, and on 4 September 1942 Stanley Thatcher Blake, Walter and Eliza Hall Fellow in Economic Botany at the University of Queensland, joined the Botany Section as Assistant Research Officer.

Biometrics

Dr H. W. Kerr, later Director of the Bureau of Sugar Experiment Stations, during his sugar industry scholarship awarded in 1921 worked at the Rothamsted Experiment Station in England for three months studying soils and also field experimental techniques under R. A. Fisher. On his return to Queensland in 1927 he instituted the first field experimental techniques in Australia on a sugarcane field of Gaban Bros. at "Tantitha", Bundaberg. In 1930 W. W. Bryan, Lecturer in Plant Breeding at the Queensland Agricultural High School and College, Gatton, commenced lectures to students in experimental techniques. The first published use of the statistical method of analysis of field experimental results showing the

probable error, standard deviation, coefficient of variability and significant differences appeared in the *Queensland Agricultural Journal* for August 1930, when W. G. Wells, the Cotton Specialist, published results of some cotton experiments. (Wells, W. G., *QAJ*, Vol. 34, 1930, p. 173)

The planning and analyses of the experiments were in the charge of Miss Elaine Smith.

Dr Gordon Miles, whilst on his overseas scholarship from 1931 to 1934, sat in on lectures by R. A. Fisher in Iowa and Minnesota and later at Rothamsted, England, and with Wishart at Cambridge. On Miles's return to Queensland on 6 June 1934, Bulcock called him into his office, told him he was appointing a "Biomathematician", and asked him to define his functions. Miles suggested he tour the Departmental field stations to ascertain the nature of the experiments and the collection of data and then go to Canberra to consult Miss Betty Allen who was handling the biometrics for CSIR.

Patrick Blake McGovern was selected and appointed Assistant (Biometry) on 1 February 1933. He undertook these tours and returned to Queensland to spend some time in Records before being appointed Assistant Biometrician on 1 July 1941.

Miss Barbara Shield was appointed Assistant Research Officer during 1937-38 she specialised in biometrics, designing experiments employing a range of treatments in the one investigation.

Henry Finucan, Queensland Rhodes Scholar in 1938, proceeded to Oxford and studied biometrics and agricultural experimentation at Cambridge before returning to Australia. He was appointed Biometrician in the Department of Agriculture and Stock and conducted part-time lectures in the University of Queensland's Department of Agriculture. He resigned from the Department on 21 March 1946 to join the permanent staff of the University Mathematics Department.

Publicity Branch

On 11 November 1937, Albert Armitage Salmon, Clerk, Chief Office, was appointed Assistant Photographer in the Publicity Branch. He was to help William John Sanderson, who had been appointed Photographer on 25 February 1932. On 4 December 1940 William Whiting Manley was appointed Illustration Assistant.

Research strengthened in the Department

Introducing the year 1936, the Editor of the *Queensland Agricultural Journal*, J. F. F. Reid, said it should be an extraordinarily interesting year in Queensland agriculture.

Apart from normal cropping programmes...there would be new developments in agricultural research. Research was the Department's biggest job and the Department had strengthened its scientific staffs and extended its scientific services. A new Research Bureau would commence to function early in the new year; the Bureau of Tropical Agriculture would commence its planned field programme; the Dairy Research Laboratory, then fully staffed and equipped, would commence its investigations; and the Marketing Branch would intensify its activities

towards the attainment of a balanced rural industry in Queensland. The most important and most difficult problem in marketing was in bringing about changes in current methods, practices and facilities in order to promote efficiency and lower selling costs. Improved marketing and better education could also go a long way towards increasing the consumption of certain foods. Increased interest would be taken in our indigenous and native grasses. (He said grass was the best and cheapest stockfood.) Another of the research jobs would be in soil erosion control, in regard to which they had not yet realised fully the high cost of doing nothing. (*QAJ*, Vol. 45, January 1936, pp. 1-3)

The Goddard reports

In his June 1936 report as Science Co-ordinating Officer, Professor E. J. Goddard, Professor of Biology at Queensland University, drew attention to the importance of science in its relation to agricultural and pastoral problems. He noted that the Commonwealth had created the Commonwealth Council for Scientific and Industrial Research to deal with problems involving several States but it would be limited in the amount of research it could do. The States must individually participate in research activities and accept full responsibility for all experimental, extension and advisory work within their domains.

To do this involved the organisation of the scientific and technical staff of the State Department of Agriculture and Stock, co-ordination of activities directly or indirectly relating to primary production discharged by the various Departments of the State and institutions such as the State Agricultural College and the University of Queensland, and co-operation with the activities of the Council for Scientific and Industrial Research and other States of the Commonwealth.

Professor Goddard was appointed on 1 January 1936 by the Minister, in a temporary capacity to reorganise the scientific and technical activities within the Department of Agriculture and Stock as he was familiar with the scientific research being pursued in the State. Professor H. R. Seddon, Dean of the newly established Faculty of Veterinary Science at the University, was also invited to advise on a Division of Animal Industry. Because of a shortage of men capable of carrying out research on animal problems, two cadets from the Department were enrolled in the Faculty of Veterinary Science in 1936; on graduation they would be available for pig and poultry investigations.

The Animal Health Station at Oonoonba, Townsville, would revert to the Department from CSIR in September 1936 and would inter alia undertake research in fattening cattle on improved tropical pastures on the coastal country. The Animal Health Station at Yeerongpilly would function as a centre for research and routine work and operate in close co-operation with the Townsville unit. Co-operation would be established with the CSIR, the Queensland Meat Industry Board and the University of Queensland.

Pastures constituted Queensland's most important crop and fell into three main divisions inland pastures being investigated by Departmental officers and a full-time Walter and Eliza Hall Research Fellow, S. T. Blake, from whom a pasture map would emanate; the pastures in the southern coastal areas being investigated under the direction of a Pasture Improvement Committee; and the tropical pasture research at the Bureau of Tropical Agriculture, South Johnstone. Soil erosion had become a problem of national importance and the Minister, Bulcock, obtained the services of a CSIR officer to survey the problem in south-west Queensland, and also appointed a Committee to investigate the problems of water erosion generally. (Goddard, E. J., *Rep. Dep. Agric. Stk*, 1935-36, pp. 16-19)

The third and final Goddard report on 30 June 1938 reviewed the progress of reorganisation to date, especially in connection with the aims and success of fattening cattle on improved tropical coastal pastures for the chilled beef trade. Goddard also dwelt on the need for research in connection with the nutritional value of foodstuffs utilised in animal rations. An Animal Nutrition Officer, Dr Montgomery White, had been appointed and he had commenced digestibility studies of a number of concentrates and roughages, commencing with Rhodes grass, lucerne, coconut meal and cottonseed meal. The possibility of spraying standing Rhodes grass with a 5-10 per cent solution of molasses to induce greater consumption was investigated. (Goddard, E. J., *Rep. Dep. Agric. Stk*, 1937-38, pp. 17-19)

With the outbreak of World War II further reorganisation was postponed until 1944-45, when the Public Service Commissioner appointed John Irwin, Deputy Public Service Commissioner, and Arthur Bell, Director of the Bureau of Sugar Experiment Stations, to inspect the Department and draw up a final reorganisation scheme. This was completed and approved in December 1944 and staff adjustments followed.

General agriculture, 1929-39

State Farms

Home Hill

Trials with the Hawaiian system of irrigation down the cane row compared with irrigating by furrows carrying water between the rows showed that the latter was more economic. Trials with lucerne, pineapples, bananas, sweet potatoes and yams were laid out but as the farm was to be sold in March 1930 all development work ceased.

Roma

Wheat-breeding work continued but during 1934-35 it was decided to suspend breeding at the farm and commence breeding plots on the Darling Downs, where varieties suited to the main wheat-growing districts were needed. (Graham, A. E., *Rep. Dep. Agric. Stk* 1934-35, p. 3) Eleven varieties of wheat were received from the International Institute of Agriculture, Rome, for the purpose of making geographical wheat trials and to compare with local varieties. Sudan grass selections were promising and pumpkin-breeding work advanced. Other crops handled were grapes, citrus, dates, olives, Algaroba beans, cotton, water melons, sweet potatoes, asparagus, soybeans and tree lucerne.

Kairi

School of Instruction for boys was held at the Kairi State Farm during 1931, fifty-five boys attending under the leadership of J. A. L. Sides. He wrote: "We ask you to accept our sincerest thanks for the courteous and generous manner in which your Department supported this, our first camp. We also wish to thank, through you, the officers of your Department whose services you made available to us, for the able and courteous manner in which they carried out their duties." (*QAJ*, Vol. 36, October 1931, p. 427)

Gindie

Emphasis at this farm centred on the breeding of stud Beef Shorthorns and Suffolk Punch and Clydesdale horses. The farm took both male and female Beef Shorthorn Championships at the Royal National Exhibition in 1929. At the Rockhampton show the Gindie farm won the class for champion bullock, champion fat cow and pen of three fat cows; the five were sold for a net total of £38 7s 6d, "a sum that will more than cover the cost of exhibiting the stud stock there"! Some 100 tons of silage were made in 1929-30 and 50 tons of wheaten hay in 1930-31. After three years of inadequate rainfall the Gindie Farm was closed in late 1932 and E. Roy Ashburn, the Manager, was transferred to take up general Instructor in Agriculture duties elsewhere on 25 May 1933.

Grain crops

Wheat development - R. E. Soutter

The 1929 wheat crop was a record for Queensland - four and a half million bushels of high quality grain. H. C. Quodling and C. S. Clydesdale selected commercially pure grain for seed purposes on behalf of the Wheat Board for which a premium of 2d per bushel was paid to growers. A. E. Gibson, Instructor in Agriculture for the Southern Division, acted as arbiter in the classification of wheat between growers and the Board or the millers and the Board.

Roma crossbred wheats were to the fore. One, "Duke of York", gained first and second places in the field wheat competitions. The Roma crossbred wheats were tested under field conditions by Clydesdale at Inglewood, Southbrook and Jandowae.

Wheat growing was extending into the Callide and Dawson Valleys and G. B. Brooks, Instructor in Agriculture for the Central Districts, tried out 53 varieties in this area during 1928-29. "Retro" station in the Capella district also grew wheat for hay.

A comprehensive review of the wheat industry in Queensland was published by the Minister, the Hon. H. F. Walker, in the *Journal* for November 1929, pp. 493-498. He showed that Queensland's requirement for bread was five million bushels of wheat, but over the previous eleven years barely half of this requirement had been met by growers in this State. During September 1929 he called a conference of the Wheat Board as representing the growers and the millers. He felt that the wheat industry was suffering from lack of harmony between the Wheat Board and the millers, resulting in:

1. the Wheat Board having to retain considerable stocks of wheat of one season well into the next year;
- 2. first payments by the Wheat Board to the growers being less than they might otherwise have been and final payments being considerably delayed pending realisation;
- 3. costs being sustained by growers through accumulating charges by double handling of wheat at country stations;
- 4. sustaining by the growers of additional interest and storage charges;
- 5. low attention to the deterioration of the quality of the wheat;
- 6. on occasion wheat being exported by the Wheat Board while southern States' wheat has been brought in by the millers;
- 7. the market formerly enjoyed by the Queensland millers for Queensland flour being invaded by southern millers.

The Minister hoped to double the Queensland wheat harvest and, if possible, to reach the five-million-bushel State requirement. As a result of the conference it was agreed that the millers would endeavour to increase the consumption within the State of flour made from Queensland wheat up to four million bushels within the three-year agreement decided upon.

In the first year the millers agreed to purchase 3 500 000 bushels for gristing plus additional for poultry feed, seed etc., which should fulfil the aim of 4 000 000 bushels and to pay growers 8d per bushel above New South Wales country prices at Queensland country stations or 1d per bushel above Wallangarra ex Sydney. The Wheat Board was to act as acquiring and storage agents for millers at country stations or mills and bear the loss in weight or deterioration valued at 11/8d per bushel in storage; the Board was to bear costs of administration; millers were to store to their capacity of 1,500,000 bushels; the Government was to finance the mouse-proofing of the Wheat Board's storages. The millers agreed to take prompt delivery of wheat from farmers. The millers were to pay the Board weekly, accounts were to be subject to audit by the Auditor-General. Monthly conferences were to be held between the Wheat Board and millers during the wheat-receiving months of November to February.

These arrangements, it was hoped, would greatly increase wheat growing and the Minister arranged for more experiments and field days at Roma State Farm.

The result was rather spectacular, with a thirty per cent increase in the wheat area for 1930-31 with crop estimates indicating a small surplus of grain above State needs. However, rust and frost took their toll and rust resistance in the new Roma crossbreds was carefully recorded. In the Central Division rust was not so evident as in the same varieties on the Darling Downs. Departmental experiment plots were laid down in the Dawson Valley and on "Retro" Station, Capella.

C. S. Clydesdale tested Roma crossbred wheats at Kincora (Pittsworth) and Nobby, and G. B. Brooks tested at Dululu and Biloela for grain and at Emerald and "Retro" for hay. Observations were made on rust resistance, quality of grain, strength of straw and apparent yields. (*Rep. Dep. Agric. Stk*, 1930-31, pp. 20-23)

Owing to drought and then heavy hailstorms late in the season, the 1932-33 wheat crop was down 40 per cent. In one district hail was responsible for the loss of 29 155 acres and 229 800 bushels of grain.

To extend the Roma State Farm wheat-breeding work, some 2000 varieties were used in experiments on the Darling Downs, where rust was more likely to occur. Trials were also instituted in Central Queensland. Queensland-bred wheats were giving Queensland the highest average yields of the Australian States.

During 1933-34, R. E. Soutter submitted some of his crossbred wheats to the Agricultural Chemist for the Pelshenke test for loaf quality, but he added: "It does not indicate whether it will be pleasing in appearance or otherwise. This can only be ascertained by actual baking tests." He was also ready to try the vernalisation of wheat grain, a Russian technique for hastening the germination of grain which he felt would help the plant breeder when dealing with long-season wheats.

Samples of 152 wheats grown in Queensland were obtained from the 1934-35 harvest by E. H. Gurney, Agricultural Chemist, and tested for bushel weight, weight of 1000 grains and protein on a ten per cent moisture basis. Notes of soils (sandy, light black, heavy black) were recorded. At that time the dominant Queensland-grown wheats in descending order were Florence (16.27%), C.C.C. (15.67%) and Flora (11.84%), with other varieties occupying from 8.51 down to 0.36%. Protein percentages ranged from 16.6% for C.C.C. from light black soil at Pittsworth, three samples of more than 15% from heavy black soil at Bongeen of the Florence variety, to 10% for Cedric variety grown on heavy black soil at Oakey. Grain protein percentages were beginning to be recognised in wheat production. (QAJ, Vol. 44, August 1935, pp. 250-252)

Soutter transferred to Brisbane as Senior Research Officer and continued his wheatbreeding work. Flora, a variety he bred, won the Commonwealth Champion prize in the medium-strong wheat class at the 1938 Sydney Royal Agricultural Show. It is one of the parents of Puora wheat of Soutter breeding, which won the same class at Sydney in 1937. Soutter also continued his attempt to breed rust-resistant barleys, superior strains of Virginia bunch peanuts, soybeans and cowpeas. (*Rep. Dep. Agric. Stk*, 1937-38, p. 24)

During 1938-39, of the 30 recorded varieties of wheat sown, no fewer than 15 had been bred at Roma, representing 60% of the aggregate sown. (*Rep. Dep. Agric. Stk*, 1938-39, p. 11)

During 1938-39, mottling or yellow berry appeared in wheat and gave concern to millers as it is unsatisfactory for breadmaking. It is now believed to be caused by a shortage of nitrates in the soil.

Barley

A Barley Pool Board was constituted during 1929-30 and several new crossbred barleys produced at the Roma State Farm were under test. Seed of a Californian brewing type was imported from England for trial and propagation. The Queensland Brewing Company secured the use of "The Maltings" at Black Gully, Toowoomba, to convert their grain into malt. Over 100 000 bushels of malting barley were grown on the Darling Downs during the year. (Quodling, H.C., *Rep. Dep. Agric. Stk*, 1929-30, pp. 4-5)

During 1930-31, C. S. Clydesdale tested six barley varieties on seven farms at Cambooya, Mount Kent and Nobby. The imported Vaughan variety, a six-row barley, yielded up to 54.5 bushels per acre. (*Rep. Dep. Agric. Stk*, 1930-31, pp. 20-21)

Barley harvested in the 1930 season was difficult to sell as the breweries had ample stock from the 1929 season and the Board made arrangements with Denhams Ltd to act as its agents. This firm gristed a good deal and sold it as barley meal and ultimately the Queensland Brewery Company took 20 000 bushels of malting barley. Returns to growers were at the rate of 1s 9d per bushel. (Graham, A. E., *Rep. Dep. Agric. Stk*, 1930-31, pp. 98-99)

40 000 bushels each Castlemaine Perkins Limited and Queensland Brewery Limited were supplied with at 3s 6d per bushel for No. 1 Malting Grade from the 1932-33 harvest by the Barley Board. The master Mr Elliott, who undertook malting on behalf of Denhams Limited, suggested to the Board that the class of barley being used had lost its identity and suggested that new seed be obtained. Archer's Plumage variety was secured from Tasmania by the Board and Archer's Spratt from New Zealand by a Toowoomba seed merchant, Con Bowdler. (*Rep. Dep. Agric. Stk*, 1932-33, p.127) The Department introduced the varieties Spratt's Archer, Plumage Archer and Selected Winter Archer from Messrs Gartons Limited, England during 1933-34. The breeding of barleys for rust resistance was undertaken at the Roma State Farm.

Maize

Seed maize improvement work continued in southern and north Queensland under the supervision of C. J. McKeon, with variety trials on several private farms, and on the Departmental plot at Burnside, Tolga. Some *Diplodia* resistance was evident. Kairi State Farm was selected to concentrate on improving Durum maize.

Maize grain deliveries to the Atherton Tableland Maize Board for the 1930-31 season reached 18 006 tons, giving growers a price of £6 0s 3d per ton. Prices were declining in competition with other cereals for feed purposes and the displacement of the horse by the tractor led A. E. Graham to suggest that the Board investigate the use of maize in feedstuffs for lower animals (pigs and poultry). Overseas demand was also low. (Graham, A. E., *Rep. Dep. Agric. Stk*, 1930-31, p. 98)

By 1933 the variety Funk's 90-Day, introduced from America several years earlier and selected by McKeon for yield and husk covering, had proved the best variety for the Darling Downs and gave excellent yields elsewhere. Star Learning and Reid's Yellow Dent were excellent for low rainfall areas. Improved Yellow Dent was the most popular and heaviest yielder for south-east Queensland. (McKeon, C. J., *Rep. Dep. Agric. Stk*, 1932-33, pp.19-20) In the maize improvement work, yields from trial plots often yielded over 100 bushels per acre and reached 117 bushels per acre. (*Rep. Dep. Agric. Stk*, 1932-33, p. 4)

A heavy demand for maize for drought-feeding sheep in western districts was a feature of the 1934-35 maize season, with Departmental wool staff active in advising feeding matters. With his transfer to the Bureau of Tropical Agriculture at South Johnstone on 1 July 1935, McKeon supervised maize breeding and selection work on the Atherton Tableland. As World War II threatened to dislocate experimental work in north Queensland seed of selected maize varieties for the Tableland was moved south to Biloela Research Station for storage.

Sorghum

N. A. R. Pollock encouraged trials of sweet sorghums on the north-western Downs sheep country and laid out trials on properties in the Stamford, Richmond and McKinlay districts on Mitchell grass Downs soils, and at "Colane" and "Wantalanya" on "desert" soils near Winton in 1929. On Stanley Downs, 3 acres of Sudan grass yielded 3 tons of hay per acre and Honey Sorghum watered by overflow from a tank gave an estimated yield of 20 tons of greenstuff per acre from a small area. (Pollock, N. A. R., *Rep. Dep. Agric. Stk*, 1929-30, p. 37)

McKeon planted grain sorghum varieties introduced from the United States, Egypt and South Africa on M. Reeve's farm at Imbil during 1933-34. Among these were Hegari, Brown Yolo, Day Milo, Kalo and Wheatland Milo which were to become forerunners of Queensland's grain sorghum industry. (McKeon, C. J., *Rep. Dep. Agric. Stk*, 1933-34, pp. 23-24) The 1934-35 season trials at Swan Creek near Warwick were damaged by the depredations of flocks of parrots, indicating that only large-scale plants would be able to compete with these attacks. (*Rep. Dep. Agric. Stk*, 1934-35, p. 2)

During 1936-37 weather conditions were unfavourable to maize and the Department sponsored dwarf grain sorghum growing with the limited amount of seed it had on hand from seed saved from imported varieties from USA.

The crop expanded rapidly when it was realised that these dwarf grain sorghums could be planted and harvested with the normal wheat-handling machinery and that grain sorghums could outyield maize in areas receiving less than 30 inches of rain per annum. The standing stubble remaining after harvest was a valuable cattle fodder during the winter. The Department's field Instructors in Agriculture - N. A. R. Pollock (Toowoomba), C. H. P. Defries (Roma), O. L. Hassell (Central Queensland) and C. S. Clydesdale - were very active during the late 1930s in extending the crop.

Dr Gordon Miles was transferred from the Bureau of Tropical Agriculture at South Johnstone to the Cotton Research Station at Biloela on 8 May 1941 to concentrate on grain sorghum breeding. In 1939-40 a comprehensive series of trials with the new grain sorghums had been conducted at Biloela and the varieties Kalo, Wheatland Milo and Hegari had outyielded Learning maize. Twenty-four sweet sorghum varieties were also tried, the best being Jones for a short-season crop and White African, Sugardrip and Atlas for a longer season. (*Rep. Dep. Agric. Stk*, 1939-40, p. 8)

Miles set about producing new varieties, notable of which was Alpha, which was the leading Queensland variety for many years. (Miles, L. G., *QAJ*, Vol. 57, November 1943, pp. 261-265)

Meanwhile, Dr Montgomery White, Agricultural Chemist, had shown the important place grain sorghum could take in the nutrition of stock.

Canary seed

The 1930-31 crop yielded 1022 tons 3 cwt 11lb from 3334 acres. The Canary Seed Board handled the crop and in view of complaints about prices from the 1929-30 crop, the Board circularised growers before the 1930-31 harvest telling them to exercise more care in harvesting. In addition, the Board, as it received the 1930-31 harvest, collected two samples from each delivery, made its own comments, and retained the duplicate sample. This scheme had the desired effect on subsequent quality of seed delivered to the Board. (Graham, A.E., *Rep. Dep. Agric. Stk*, 1930-31, p. 100)

The embargo against the importation of canary seed was removed on 26 February 1932, but on representations by the Canary Seed Board to the Tariff Board canary seed was granted an increased tariff of 12s per cental foreign. This was adequate to protect the Queensland growers who were urged to produce 1500 tons annually to meet Australian requirements. However the 1932-33 crop was light and seed had to be imported from South Australia and overseas.

Rice

G. B. Brooks planted two upland varieties on the farm of Lloyd Jones, Rosedale during the 1929-30 summer. The yields of grain were 46 bushels per acre from the variety Kirishima and 38 bushels from Owari. (Brooks, G. B., *Rep. Dep. Agric. Stk*, 1929-30, p. 33)

Root crops

English potatoes

English potatoes were grown in suitable districts as required during the 1930s. Seed potatoes were imported from the southern States. Potatoes for north Queensland were being produced at Bowen, at Giru and in the lower Burdekin in 1932-33 and these growers provided some expertise for the expanding north Queensland crops during World War II.

Sweet potatoes

Sweet potatoes for human consumption and for pig feed continued to be grown and named varieties were available as a result of Brooks's earlier selection and classification work in central Queensland.

Arrowroot

The limited production of arrowroot for flour was handled by the Arrowroot Board established in 1922 and continued without opposition, although a proclamation had to be issued on 6 April 1932 declaring arrowroot and arrowroot flour to be vested in the Board to prevent millers disposing of the commodity illegally.

Cassava

The interest in cassava waned as molasses continued to be used for the production of power alcohol. In order to keep the eighteen varieties introduced from Java true to type,

arrangements were made by G. B. Brooks, District Instructor in Agriculture, with J. Edminston of "Pink Lily", Rockhampton for the use of an acre of land in which to preserve them. The National Power Alcohol Company, Sarina, arranged with local farmers to plant several acres of cassava so that a supply of propagating material would be available when the distillery required a starch-producing crop to supplement the local supply of molasses. (Brooks, G. B., *Rep. Dep. Agric. Stk*, 1929-30, p. 33)

Ginger

Early in 1930 rhizomes of ginger imported from China were sown on S. A. Burnett's farm at Buderim Mountain but the growth was poor. (Clydesdale, C. S., *Rep. Dep. Agric. Stk*, 1930-31, p. 21)

When World War II broke out supplies of ginger from China were cut off and Buderim growers grasped the opportunity to re-establish the industry both on the farms and in their cooperative factory.

Fibre Crops

Cotton

The 1929-30 season gave variable cotton yields but increased acreages had been planted in response to the State Government's guarantee of 5d per lb of seed cotton and the Federal Government's bounty. Attacks by the corn ear worm were severe.

Cotton breeding and selection of pure seed. At the Callide Cotton Research Station pure seed production of several varieties - Durango, Acala, Lightning Express and Coker - amounted to 100 000 lb for the 1930-31 crop and the field officers were engaged in determining suitable varieties for the various soils in the cotton-growing areas. Distribution of seed for planting was carried out by the Cotton Board under instruction from the Department. The 1931-32 crop was so poor that 4000 tons of cotton seed were purchased from East Africa to meet the Australian demand for oil. In June 1931 a deputation from members of the Queensland Cotton Board approached the Minister seeking permission to import several tons of suitable varieties of seed from the United States of America as the local Durango variety did not suit all areas. But the Minister, the Cotton Specialist (W. G. Wells) and the US scientists recommended against it because of the risk of introducing disease. Instead the Department imported small quantities of some new varieties under strict quarantine. (*QAJ*, Vol. 35, June 1931, pp. 410-411)

The Durango, Acala and Lone Star varieties were supplemented by the importation by Wells of 600 lb of Indio and 3000 lb of Mebane seed from California, both big boll, high lint percentage types producing the medium staple required by Australian spinners. Anticipating the probable demand of medium staple cottons, the Department during 1933-34 produced sufficient seed to plant 40 000 acres in the wake of an improved tariff schedule. Sufficient seed of Durango and Lone Star varieties was now available. In addition, during 1933-34 four long tons of Cliett Superior, two of Lone Star, 800 lb of Ferguson 406 and 180 lb of Improved New Boykin seed were imported from Texas. The changeover to the big boll

medium staple high lint per cent varieties increased the advisory work of the field staff most appreciably.

Breeding work to produce a jassid-resistant cotton variety was carried out by Stanley Marriott in the Callide Valley, crossing the jassid-resistant US variety with Miller, a popular variety being grown in the State. Resistance was being provided by hairiness of the cotton leaf.

Soil moisture and nitrate nitrogen. W. G. Wells continually stressed the need for adequate soil moisture for the cotton crop, aiming at 18 to 24 inches depth of moist soil at planting. Most of the cotton being grown in the 1930s was rain-grown. Wells kept accurate records of rainfall and stored soil moisture and showed that early ploughing in late March to May helped retain some summer moisture to be supplemented by June rains. He showed that continuous cultivation to cotton was making weeds such as giant pigweed (Trianthema portulacastrum) difficult to control and that chemical and physical changes were taking place in the soil. Nitrate nitrogen was being built up in the soil, with consequent rank growths of the cotton accompanied by continuous shedding of the squares. Also, a decrease of organic matter led to loss of soil structure, clod formation on ploughing and lack of penetration of storm rains. Wells suggested a crop rotation should be developed for cotton and after several ideas he recommended a rotation of three years Rhodes grass to precede the cotton crop to reduce the soil nitrate level, improve soil structure and provide hay. It also helped control soil erosion. (Wells, W. G., QAJ, Vol. 44, August 1935, pp. 182-190) He showed that cotton for three years after ploughing out Rhodes grass gave up to 100% increase in cotton yields. (QAJ, Vol. 52, August 1939, p. 213) This soil moisture-nitrate nitrogen and organic matter investigation meant that during 1933-34 some 600 soil samples were analysed by the Agricultural Chemist for nitrates and carbon; and many more were handled at Biloela for soil moisture.

Cotton grading. Departmental graders graded the seed cotton as it arrived at the ginneries and the resultant bales of lint prior to delivery to the spinners. Sets of lint standards based on the world's universal standards for American Upland cotton were prepared for the buyers as well as for use in grading the crop. (Wells, W. G., *Rep. Dep. Agric. Stk*, 1931-32, pp. 37-38) It was decided to pay a bounty on lint instead of seed cotton in 1934-35 and the grading system had to be altered. The one pound of lint cotton became the unit for fixing the bounty according to grade.

Cotton growing. As a result of several years' experience at the Callide Cotton Research Station at Biloela, R. W. Peters advised farmers to plough the land before the winter, plant delinted seed at an ample rate as soon as the soil temperature was high enough after the third week in September at a depth of $1\frac{1}{2}$ -2 inches in rows $4\frac{1}{2}$ feet apart, harrow after the planting rains to check weed growth and later thin the crop.

Field officers were stationed in each of the largest cotton-growing districts to conduct varietal trials, allot pure seed, increase plots to selected growers, carry out cultural and fertiliser investigations, and advise growers on general cotton matters. The field staff were also engaged in testing the findings of the research station and in developing modifications of them to suit the range of conditions in the various districts.

Because of the failure of the 1930-31 cotton crop and the steep drop in the world's cotton prices and the failure of the succeeding 1931-32 crop, the Cornronwealth and State Governments and the Agricultural Bank gave financial assistance to growers of some £48 500 to prepare some 40 000 acres of land for the next crop and to develop their holdings. The poor 1931-32 season, however, proved the remarkable drought resistance of the cotton plant itself and many crops provided useful grazing. The Cotton Branch field staff were engaged part-time in crop inspections connected with loans under the Relief Loan Fund issued by the State Department of Labour and Industry. (Wells, W.G., *Rep. Dep. Agric. Stk*, 1933-44, pp. 45-47)

Cotton pests. A new insectory was provided at the Biloela Research Station in 1939. W. J. Stuart Sloan, Assistant Entomologist (later to become Director-General), was engaged in the investigations of damage and control measures for cutworms, false wireworms, aphids, thrips, jassids, grasshoppers, flea beetles, boll worm and the com earworm.

Cotton irrigation. Where irrigation water was available, as in the Theodore Irrigation Area, cotton crops were generally successful, showing the need for irrigation to ensure a crop of cotton, providing pests and diseases are controlled. During the late 1930s experiments were conducted with supplementary irrigation in the Gayndah area and in the Callide Valley. Results showed that the practice was highly rewarding.

Cotton ginneries. The Australian Cotton Co-operative Association leased the ginning plants at Whinstanes and elsewhere that it had purchased from the British Australian Cotton Association Limited (BACAL) to the Cotton Board during 1929. The Board thus handled the marketing of the growers' cotton and also the ginning and marketing of lint and the treatment of seed and by-products. This channelled all profits into the growers' accounts and for the year ending 31 November 1930 a profit was made of £36 726. The encouragement and protection accorded manufacturers to utilise the whole of the Queensland crop by the Federal Government by bounties on yarns tariff and exchange rates stimulated the operation of the spinning mills. On 31 July 1931 the bountry was reduced 2 per cent.

In 1932, just when the cotton was ready to harvest the Commonwealth Government abolished the flat rate of duty on yarns due to a severe drop in world cotton prices and spinners cancelled their contracts. Negotiations led to the Commonwealth Government terminating the bounty system on yarns from 30 June 1932 and placing a graduated tariff on all imported yarns according to the "counts" of the yarn. Thus the whole of the Queensland crop was absorbed by the spinners who still had to import cotton to fill their requirements. Most of the 1932-33 crop was disposed of within the Commonwealth but 100 bales of "good middling" grade of staple length of 11/8 inches were sold in Japan. This was well received and led to enquiries for further supplies.

In 1940 the Commonwealth Government renewed the bounty on raw cotton for five years for American Middling Cotton, from 4.75d per lb for the 1940-41 season, progressively reducing to 3.50d per lb for 1944-45.

Broom millet

This was grown by some 230 growers in 1930 resulting in a production of 340 tons, nearly double the Queensland requirements. The surplus was sold to Western Australia and New Zealand. (Graham, A. E., *Rep. Dep. Agric. Stk*, 1930-31, p. 99)

Sugar industry

Harry T. Easterby submitted evidence before the Commonwealth Committee of Enquiry into the Sugar Industry in late 1930. Some of his submission included:

The sugar industry employs over 20,000 men in the fields, mills and refineries. Directly and indirectly it gives employment to 100,000 persons. Trains and steamers are employed in carrying thousands of tons of raw sugar to the southern refineries and bringing back freight such as farm implements, mill supplies, jam, clothing, boots, etc. to supply the numerous sugar producers and wage-earners, as well as the population of the coastal towns in Queensland dependent on the industry...The wages paid for labour in the Queensland sugar industry amount to £6,000,000-the sugar producer is not allowed to buy his labour in the cheapest market. The Commonwealth Government ordered as a matter of national policy that only white labour should be employed and then for many years commanded the rate of wages to be paid. Later this was handed over to the State Arbitration Court by the Commonwealth when it abolished the excise on sugar.

Australian consumers and manufacturers profited at the expense of the industry for many years in obtaining cheap sugar...The sugar grower never asked for world parity during the war-he should be allowed fair treatment from the Commonwealth when the price of sugar is being considered...

The efficiency of the industry is shown in the tons of cane required to make one ton ot sugar of 94 net titre-10.09 tons in 1900, 8.73 tons in 1910, 8.00 tons in 1920 and 6.91 tons in 1929! ...

The sale of sugar from Australia overseas is at the present time of immense value to this country in increasing the Australian revenue paid by a creditor nation and by compensating for adverse trade balances...

National security must be considered...The people engaged in the sugar industry are a most effective garrison for the North. (Easterby, H.T., *QAJ*, Vol. 35, January 1931, pp. 11-17)

Mill peaks

The 1933 sugarcane crop of 637 944 tons of 94 net titre sugar easily exceeded the previous record of 581 276 tons and resulted in a great tonnage of excess sugar to be sold overseas. The Australian home consumption price was £23 18s 6d per ton and the export surplus £8 0s 6d per ton. Small growers grew more cane to make a living, resulting in excess production and lower average prices.

In 1929 each sugar mill was allocated a peak production calculated on its maximum production of sugar up to that year. All sugar within the peak was then acquired and sold on an equal footing. From this No. 1 pool, Australia's requirements were to be taken and paid for at export price. (*QAJ*, March 1938)

A Royal Commission was appointed in December 1938 to deal with mill peaks which then provided for a total No. 1 pool production of 613 928 tons of 94 net titre sugar but which did not directly limit the manufacture of excess sugar. The Government agreed to accept the Commission's recommendations to increase the mill peaks aggregate to 737 000 tons

and virtually limit the total production in any one year to this amount. (*Rep. Dep. Agric. Stk*, 1938-39, p. 10) The report appeared in the *Queensland Parliamentary Papers* 1939, Vol. 2, pp.1031-1090.

Sugar Experiment Stations transfers

The South Johnstone Sugar Experiment Station was closed and transferred to Meringa where the building programme was completed during 1935 with laboratories for the chemist and entomologist, a glasshouse for seedling canes and experiments in irrigation. Electrification of the Station was achieved through the Cairns Hydroelectric Supply. The Station was officially opened by the Hon. F.W. Bulcock, Minister for Agriculture and Stock, on Friday 13 September 1935 in the presence of the Sugar Industry Advisory Board and delegates to the International Society of Sugar Cane Technologists Fifth Congress. This was the first World Conference of any kind and was held in Brisbane on 27 August 1935. The Queensland Government supplied a special train to convey delegates throughout the sugar areas of Queensland. (*QAJ*, August 1935, pp. 139-40)

In welcoming the guests, Dr H. W. Kerr expressed pleasure in having all the sugar experimental work in north Queensland at one station. Bulcock stated that under the Financial Readjustment Plan which had been effected when the Sugar Experiment Stations Act was recently amended, the Government contributed £7000 annually towards the cost of maintaining the Experiment Stations. The balance of the money was found by the industry. The Advisory Board was responsible for this and had discharged its function admirably. The sugar industry on the experimental side was one which he thought was more efficient than any other agricultural industry in Australia. The price of the preservation of the industry was the maintenance of the very highest standards of efficiency and if they did not practice that efficiency in and out of season, the price of sugar would be much greater than it was at the present time.

The Mackay Sugar Experiment Station, the original starting point for the Sugar Bureau work in north Queensland, was disposed of as a special lease during 1935 to an area of land, part of the Palm's Estate, comprising seventy acres of typical average lands of the Pioneer Valley. The old site was a difficult site for field experiments due to irregularities of soil and restriction in acreage. The buildings were transferred to the new site, a glasshouse and other buildings added, an irrigation plant installed, the land suitably subdivided and graded for field experiments. The site is at Te Kowai. (King, N. J., *50 Years of Scientific Progress*, Govt. Printer, Brisbane, 1950, p. 10)

Sugarcane production.

As Director of the Bureau and personally handling the soils and agriculture section, Dr Kerr concentrated on the actual growth of the cane plant. He first arranged for Norman King to undertake a soil survey of the cane areas to catalogue the various groups being used for cane growing.

i. Sugarcane soils. In October 1929, Bureau officers presented a report on Queensland cane soils, planting and tillage for the Committee of the International Society of Sugar Cane Technologists. (*QAJ*, Vol. 32, October 1929, pp. 390-392) In 1930, Norman King conducted a soil survey of the north Queensland mill areas and produced a map of

the various soil groups together with their descriptions (*Cane Growers Quarterly Bulletin*, July 1933), commented on by Gilbert Bates. In April 1935, as Resident Soil Chemist at the Bundaberg Sugar Experiment Station, he published his survey of the soils of the Woongarra scrub lands and gave further details of the Queensland sugar soils later. (*QAJ*, March 1937)

ii. Fertilisers for sugar soils. In March 1931, Dr Kerr published the results of the first series of farm fertility trials carried out on the various soils using the new experimental plot design of latin squares (five blocks with five treatments, each randomly selected to eliminate soil variations within soil types). The standard treatments were:

control-no fertiliser; N-nitrogen alone (as 240 lb/acre of sulphate of ammonia); NP-nitrogen + phosphorus-as above plus 30() lb/acre of superphosphate; NK-nitrogen as above + 180 lb/acre of muriate of potash; and NPK-containing all three fertilisers at the above rates.

The results were published, giving details of yield in tons per acre, the value of the crop, harvesting costs, net return, increased return due to fertiliser, cost of fertiliser and application, and profit/loss from fertiliser use. A lime versus no-lime trial was conducted on one block combined with the fertiliser treatment.

This gave the farmers their first insight, in easily understandable terms, into the value of fertilisers and lime in farm practice. The trials were carried out on private farms representing various soils from Nambour in the south to Mossman in the north using good local cane varieties for the tests. (Kerr, H. W., *QAJ*, Vol. 35, March 1931, pp. 145-162) Kerr summarised the broad fertiliser needs of the various soil groups mapped by King as follows:

granitic alluvials-require phosphorus and nitrogen;

granitic residuals-similar responses but need more nitrogen;

schist alluvials-require mainly nitrogen;

red schist residuals-deficient in humus and hence nitrogen, variable in phosphorus and potash;

red volcanic loam-responds well to potash.

Early application of sulphate of ammonia proved rewarding. Subsoiling of the red volcanic loam at Bundaberg proved uneconomic and trash conservation using the variety Q813 gave no beneficial result.

With the low price of sugar on the home market at £23 per ton and the net price in London in 1933 of about £17 per ton, growers had to seek more urgently the reduction in production costs. These fertiliser trials conducted by the Bureau helped considerably in this regard.

A new concept in sugarcane growing that Dr Kerr stressed was that intensive culture reduced costs. Intensive production involved:

- 1. a continuous supply of soil moisture in a well-drained soil;
- 2. an adequate supply of available plant food;

- 3. high temperatures combined with a humid atmosphere;
- 4. absence of harmful substances in the soil, such as intensive acidity; and
- 5. freedom from diseases and pests.

(Kerr, H. W. and Barke, E. J. R., *QAJ*, Vol. 39, January 1933, pp. 14-20)

iii. Sugarcane irrigation. The Bundaberg Sugar Experiment Station was equipped to undertake some irrigation studies and Dr Kerr wrote fully in *The Canegrowers Quarterly Bulletin* on spray irrigation equipment and techniques. In March 1937, Norman King published the results of his survey of the irrigation waters of the Woongarra scrub lands and their quality.

In 1933, Dr Kerr and his staff commenced a small-scale irrigation trial at Bundaberg to demonstrate what yield of sugarcane could be obtained on the red volcanic soils when soil fertility and soil moisture ceased to be limiting factors. The variety used was POJ2878 and the crop was liberally fertilised and watered. The yields from the crop (3 harvests-plant crop, 1st ratoon and 2nd ratoon) were:

Total cane yield per acre, 3 crops-233 tons Total sugar yield per acre, 3 crops-28 tons (*QAJ*, Vol. 48, November 1937, p. 626)

Sugar yield improvement

A graph showing the yields for sugarcane for the thirty-five years from the establishment of the Bureau of Sugar Experiment Stations in 1900 to 1934 can be found in the *QAJ*, Vol. 45, page 193 (February 1936). It shows the remarkable improvement in mill and farm efficiency which had been effected with the assistance of the Bureau research and extension.

While cane yields fluctuated somewhat, they show a distinct upward trend. The improvement in sugar yields is most striking. From an average of 1.5 tons per acre for the period 1900-04, the figure increased consistently to a yield of 2.80 tons per acre for the years 1933 and 1934.

Sugarcane diseases

A list of farms in the Bundaberg district found free from "gumming" disease after inspection was listed in the July 1929 *Queensland Agricultural Journal* so that farmers would know where they could purchase disease-free plants for the spring planting.

Bulletin No. 2, "A Key to the Field Identification of Sugar-Cane Diseases" by Arthur F. Bell, Pathologist to the Bureau of Sugar Experiment Stations, published in 1929, was acclaimed throughout the sugar world. Amongst letters received by the Bureau several may be quoted.

Dr Lyon, Consulting Pathologist, Experiment Station, Hawaii, said: "I wish to thank you most sincerely for copy of Bulletin. It is well arranged, very concise and accurate, and certainly constitutes the best manual of the diseases of sugarcane now in existence."

Dr H. V. Koningsberger, Director, Department of Agriculture, Sugar Experiment Station, Java, said: "I have been very much impressed by reading the recent Bulletin by Mr. Bell and I want to congratulate you on the important papers published by the Bureau. Mr. Bell especially deserves the gratitude of all canegrowing countries for this valuable 'key '."

Dr E. W. Brandes, Principal Pathologist-in-Charge, Sugar Cane Plants, United States Department of Agriculture, said: "Without any question this is the most up-to-date and valuable summary of cane diseases that has yet appeared, and will be of service to the sugar industry everywhere." (*QAJ*, Vol. 32, October 1929, p. 386)

During a disease survey of North Queensland cane farms in 1929, a disease similar to leafscald but yet distinct was suspected. In 1932 during the International Conference of Sugarcane Technologists, pathologists from several countries considered the disease common in all countries, the Hawaiians naming it chlorotic streak disease. Warm water treatment of cane cuttings before planting at 52°C for twenty minutes was found effective in destroying the disease in Hawaii and this success was confirmed in Queensland. (Bell, A. F., *Cane Growers' Quarterly Bulletin*, Vol. 1, July 1933, pp. 42-43)

At the Queensland Society of Sugar Cane Technologists' Conference at Ayr in March 1933, Arthur F. Bell presented a paper entitled "The Control of Sugar Cane Diseases". He mentioned three ways of attack-prevention, reduction and resistant varieties. (*QAJ*, Vol. 39, May 1933, pp. 202-207) In March 1937, George Christie published an article "Fiji Disease in Southern Queensland" and A. F. Bell published an article "Pineapple Disease". (*QAJ*, March 1937)

The Bureau continued to list approved varieties of sugarcane for the various mill areas based on yield and other factors especially disease resistance. As varieties of the sugarcane genus *Saccharum* are used as fodder canes for horses and cattle and not for sugar manufacture, varieties of fodder canes approved for growing in certain mill areas were also listed. The varieties Uba, C0290, "Improved fodder cane", "90 Stalk" and C.S.1 (also known as EG) were allowed to be grown in mill areas listed in the *Queensland Agricultural Journal* for August 1939. N. A. R. Pollock had found that the variety "90 Stalk" gave heavy yields on the Atherton Tableland. (*Rep. Dep. Agric. Stk*, 1929-30, p. 37)

Sugarcane entomology

i. *The Giant American-Toad* (Bufo marinus). Arthur F. Bell of the Bureau of Sugar Experiment Stations visited Puerto Rico as the official Queensland Government representative at the Fourth Conference of the International Society of Sugar Cane Technologists held in San Juan in 1932. He was impressed with the way the toad was reducing the cane beetle population. Analyses of its stomach contents showed that it consumed approximately 51 per cent harmful insects, 42 per cent neutral and 7 per cent beneficial ones. The toad is a native of tropical America from Mexico to Argentina. It was introduced to Hawaii and after its success there, Reg Mungomery, Entomologist to the Bureau, visited Hawaii and in June 1935 introduced a colony of 100 toads to Queensland. These were raised in a pond specially constructed for breeding in quarantine. They had not previously been bred in captivity. By 17 November 1935,

thirty-five female toads had laid 1 560 000 eggs. (QAJ, Vol. 44, August 1935, pp. 242-248)

Some were liberated in far north Queensland and were thriving well. The Commonwealth Health Department then prohibited their further distribution and in February 1936 the Bureau staff officer said: "It is hoped, however, that further investigation will convince the Health authorities of the desirability of more extensive release of these animals. (*QAJ*, Vol. 45, February 1936, p. 201) The ban was lifted in September 1936 after Bureau officers had supplied detailed information on the excreta from the toads to the Health Department.

Liberations were made at Mossman, Babinda, Ingham, Bamberoo, Giru, Ayr, Mackay, Bundaberg and in the Isis district. (*QAJ*, Vol. 48, August 1937, p. 209)

Meanwhile trapping trials against the greyback cane beetle were continued.

ii. *Rats.* In 1935, A. F. Bell chaired a meeting of North Queensland Pest Control Boards to coordinate future effort and W. A. McDougall was delegated to undertake an intensive study of the life history and habits of the rats infesting canefields with the aim of devising effective methods of control. McDougall proceeded to Sydney and Canberra for further biological studies before undertaking this new assignment. In 1937 he was able to identify the field rat (*Rattus culmorum*) and the Khaki rat (*Rattus littoralis*) as the main offenders (*QAJ*, Vol. 48, August 1937, p. 201) and developed a bait of thallium-sulphate-treated wheat grain at a 1:300 ratio as a rat poison. (*QAJ*, Vol. 53, May 1940, pp. 465-468)

Sugarcane breeding

In 1929 some 10 000 seedling canes were planted out at South Johnstone. Fertilised tassels were also transferred to the Mackay and Bundaberg Experiment Stations to begin a plan to raise seedlings suitable for local conditions. (*Rep. Dep. Agric. Stk*, 1928-29,p.6)

By June 1934, Bureau officers had produced several varieties resistant to "gumming" and this disease was on the way to being eradicated.

In 1932-33, some twenty thousand new seedling canes were planted out. (*Rep. Dep. Agric. Stk*, 1932-33, p. 7) In 1935, a new insect-proof quarantine house was constructed in Brisbane to receive new sugarcane varieties from overseas. All varieties from abroad were fumigated on arrival and then grown in the quarantine house under strict supervision for a year. In 1936, Fiji disease was restricted from spreading to central and northern Queensland because of this facility. Figures for imported canes for 1928-38 and 1919-20 were:

Country of origin	Varieties imported	Varieties imported
	1918-19	1934-38
Hawaii	6	68
Java	8	13
Mauritius	13	0
India	6	12
United States	0	9
West Indies	3	12
New Guinea	1	1
Philippines	4	0
Totals	41	105

During 1928-30 some dozens of seedlings raised by the Colonial Sugar Refining Company in New South Wales and Fiji and varieties imported from abroad into New South Wales by the Company were introduced to Queensland. In addition, in 1938 an American Sugarcane Expedition visited New Guinea and collected over one hundred varieties which it placed at the disposal of the Bureau. Many of these were abandoned after subjection to disease resistance tests. (Bell A.F., *QAJ*, Vol. 50, November 1938, p. 621-624).

A reed of the *Saccharum* genus was introduced to help with the breeding for disease resistance program. Resistance to "gumming", Fiji disease and chlorotic streak disease was sought.

The Cane Growers Quarterly Bulletin

The first copy of this new journal was issued on 1 July 1933. In his foreword to this new venture, Dr H. W. Kerr, Director of the Bureau of Sugar Experiment Stations, wrote:

Every year the Bureau of Sugar Experiment Stations expends several thousand pounds in research and investigational work on behalf of the cane growers of the State. The scientific facts gathered in this way are of the greatest importance to the Industry, but our money and efforts are entirely wasted if we have no means of translating these facts into popular language and transmitting our statements to the growers for whom they are intended.

It has been our conviction that the methods hitherto employed in disseminating information leave much to be desired, and we are happy to announce that, in the future, a Cane Growers Quarterly Bulletin will be issued, and transmitted directly to each individual grower.

In presenting this first number, we trust that farmers will appreciate our effort to provide them with the information they are seeking and we take the liberty of suggesting that these serial publications be carefully preserved, for ready reference purposes as occasion demands. (*Cane Growers Quarterly Bulletin*, Vol. 1, July 1933)

The Cane Growers Quarterly Bulletin thenceforth dealt with sugar matters, and articles which had wider application were reproduced in the Queensland Agricultural Journal.

Tobacco

Trials at Townsville and Mareeba by N. A. R. Pollock during 1929-30 proved that Queensland could produce a considerable proportion of the tobacco leaf required for Australian consumption. In co-operation with C. M. Slagg, Director of the Australian Tobacco Investigations, and under the three-year agreement between the British Australian Tobacco Company and the Commonwealth, field tests were conducted at Mareeba, Chillagoe, Almaden, Pentland and Charters Towers in the north by Pollock, and in the central districts from

Bundaberg to Mackay by Brooks. Two regulation-sized flue-curing kilns and a bulk shed were erected at Mareeba and a small curing kiln at Rockhampton. (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1929-30, pp. 11-12) Three growers in the Bowen district and one at Townsville harvested White Burley tobacco for air-curing under Pollock's supervision.

Pollock stated that "at present prospective tobacco growers, unless by purchase, can only secure land for their purpose as miners' homestead leases or by special lease from the Crown. Viewing the strong indications that tobacco production will become a staple industry in north Queensland, it is suggested that consideration to the survey and opening of Crown lands to selection for that purpose should not be further delayed". (Pollock, N. A. R., *Rep. Dep. Agric. Stk*, 1929-30,p.36)

In September 1930 at Mareeba, 25 farms were thrown open for selection by the Lands Department at 2s 6d per acre, as agricultural homesteads for growing tobacco. Relief labour was engaged to do the clearing and the ploughing was done by contract at £12 per acre to the selector. Five acres were cleared on each farm. Departmental officers R. A. Tarrant and later O. Hassall prepared and planted a fairly large seedbed area in the heart of this settlement and distributed seedlings to growers. All leaf was flue-cured and its average price was approximately 3s 8d per lb, yielding £110 per acre. More land was designed for additional farms. The choice of soil for growing tobacco was paramount. (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1930-31, p. 17) Crops were also grown at Hervey's Range, Bowen and Ingham.

Brooks established an impressive array of trial plots during 1930-31 in twelve areas, from Mackay to Bundaberg, with curing barns erected at Miriam Vale, Rockhampton and Sarina to treat the leaf. He proved that "there are considerable areas of country of suitable soil and climate for the growing of a mild, aromatic, bright tobacco adaptable for cigarette manufacture and blending with imported leaf". (Brooks, G. B., *Rep. Dep Agric. Stk*, 1930-31, p. 22) A bulletin "Bright Tobacco in North Queensland" was compiled by Pollock and published.

The enormous development that took place in the tobacco industry was responsible for the rearrangement of the instructional staff of the Department during 1931-32. Practically every instructor associated with the various industries had to assist in tobacco work. Hassall was transferred from Atherton to Mareeba, A. Hamilton from Townsville to Dimbulah, Dick Tarrant from Mareeba to Brisbane, Norman Goodchild from the Cotton Branch as Assistant to Mr Howell at the Tobacco Experiment Station, Mareeba. Pollock, Senior Instructor in Agriculture, Townsville, was solely engaged in tobacco activities from 1929 onwards. (Brooks, G. B., *Rep. Dep. Agric. Stk*, 1931-32, p. 15)

The results accruing from the research work undertaken during the previous three years, the satisfactory returns from leaf sold in comparison with the low prices obtained for other agricultural products, together with the large number of unemployed, all led to an increasing interest in tobacco growing.

The desire to grow tobacco was not confined to one particular area but affected every agricultural district of the State. The complying with the hundreds of requests that were received by the Department for inspections to be made of land as to its suitability for tobacco, and the equally numerous applications for advice in laying down seedbeds, cultural methods, curing and grading was the source of much activity in the Department. Much credit is due to

the Instructional Staff for the manner in which they coped with the situation, which occasioned long hours and working seven days in the week for many months. These efforts have been fully appreciated by growers. (Brooks, G. B., *Rep. Dep. Agric. Stk*, 1931-32, p.15)

The greatest expansion took place where the initial experiments were carried out, at Mareeba. In 1932 there were 420 growers in the district with 1890 acres under tobacco with an estimated return of 945 000 lb of cured leaf valued at £100 000. The expenditure incurred in this area included:

Clearing 3780 acres of land at £6 per acre	\$22 680
Erection of curing bams	£66 000
Erection of bulking down sheds	$\pounds 27\ 000$
Cheap housing accommodation	£5 000
Total	£120 680

Other districts involved included Hervey's Range, Bowen, Sarina, southwards to Brisbane with the Texas district growing being undertaken by companies-often under sharefarming-in Texas, Inglewood and Yelarbon. Irrigation from the Sevem (Dumaresq) River and Macintyre Brook was used.

Pollock, Senior Instructor in Agriculture, published a detailed review of the history and culture of bright tobacco in a 143-page article in the August 1931 *Agricultural Journal*, followed by a 17-page illustrated article on tobacco pests by J. Harold Smith, and a 20-page article by L. F. Mandelson dealing with tobacco diseases. This gave a handy pamphlet for the increasing number of growers and students.

In 1932 some 5680 acres of tobacco were harvested in Queensland from Inglewood and Texas (1300 acres), Stanthorpe and Killarney (400 acres), Brisbane (250 acres), Maryborough, Bundaberg, Gladstone and Rockhampton (200 acres), Mackay and Sarina (230 acres), Townsville (700 acres), Bowen (200 acres) and Cairns Hinterland (2400 acres) (*QAJ*, Vol. 37, April 1932, p. 199)

The Commonwealth Tobacco Investigation Group organised fertiliser trials throughout the Central Division during 1932-33 and C. S. Clydesdale, the Departmental Senior Instructor in Agriculture, confined his experiments to rates of application of fertilisers together with pathological and physiological effects of lime, potash and magnesia. A tobacco seed plot of Hickory Pryor variety was grown under irrigation at the Callide Cotton Research Station and yielded 80 lb of well-filled clean seed. In conjunction with Plant Pathologist Mandelson, Clydesdale showed that "barn spot" could be eliminated by increasing humidity to 100 per cent during curing. (Clydesdale, C. S., *Rep. Dep. Agric. Stk*, 1932-33, pp. 22-23)

The Beerburrum Group Settlement, which was designed to establish unemployed people on the land as tobacco growers during 1931-32 on old pineapple plantations, had initial success. Some settlers were found temperamentally unfit for farming work and were asked to leave in 1933. The remaining thirty-seven settlers at this time were given the opportunity to become self-supporting and the settlement was handed over to the care of the Rural Assistance Board. The settlers were given a special lease of their blocks and additional areas were allocated where necessary. Prior to being passed over to the Rural Assistance Board, each settler was supplied with a cow, a horse and the necessary implements for his farming operations, with tobacco seed and seed of fodder and side crops. Periodical visits were made by Departmental instructional staff after the change took place. (Gibson, A. E., *Rep. Dep. Agric. Stk*, 1933-34, p. 21)

The Commonwealth Government granted funds during 1933-34 to augment the instructional staff in tobacco.

During 1933-34 copper emulsion and colloidal copper sprays to control blue mould in the seedbeds gave much promise. (*Rep. Dep. Agric. Stk*, 1933-34, p. 12)

A curing kiln was erected by the Department at the head office in William Street, where testing of leaf grown on experimental plots in the surrounding districts took place.

During 1932-33, Tarrant was transferred from Head Office as Tobacco Instructor to the Beerburrum Group Settlement. He was a father figure and organised housing made from local timber with walls of whitewashed com sacks, and curing barns and stringing and bulking sheds of local ti-tree logs pugged with local clay. The roofs of the buildings were of galvanised iron.

Ploughing and general land preparation, seedbeds, seeds and fertilisers were supplied by the Department. Boys from the St Lucia Training Farm for unemployed youths and students from the Queensland Agricultural High School and College visited the area for instruction. N. E. Goodchild assisted with the tobacco work for a time and W. J. Cartmill assisted with tobacco instruction in south-east Queensland. Some ninety unemployed families were placed on abandoned pineapple farms at Beerburrum.

Extensive fertiliser trials were laid out by Pollock at Dimbulah, Mareeba, Hervey's Range. and Bowen on varying soils during 1932-33. The season was poor for tobacco growing because of saturated soil at Hervey's Range. and Dimbulah, nematode attacks at Mareeba and drought at Bowen. From observation only, a fertiliser mixture of 4-12-6 (nitrogen-phosphorus-potash) applied at the rate of 320 lb per acre appeared the best of the treatments.

An interstate conference of scientific and technical officers specialising in tobacco problems was held in Brisbane during the last week of July 1936, presided over by Dr T. B. Dickson, Chief of the Division of Plant Industry, of the Council for Scientific and Industrial Research. The work of officers of the Queensland Department of Agriculture and Stock in soil survey and fertility studies in the tobacco growing areas was a major contribution.

During 1933-34, tobacco variety trials were laid down at Beerburrum, Miriam Vale, Byfield, Koumala, Sarina, Dunevold, Bowen, Inkerman, Hervey's Range and Woodstock. Fertiliser trials were planted at Inglewood, Texas, Byfield, Miriam Vale, Koumala, Sarina, Dunevold, Mount Aberdeen, Inkerman, Hervey's Range, Woodstock, Koah-Chewko, Mareeba and Dimbulah; green manuring trials were done at Miriam Vale, Sarina, Mount Aberdeen, Home Hill, Charters Towers, Woodstock, Hervey's Range and Dimbulah. Crop rotation trials took place at Dimbulah, and seed propagation plots were established at Alpha, Gracemere and Pentland.

During the 1933-34 season, Cartmill established tobacco fertiliser trials on each of the major soil types of the tobacco areas of the Cairns Hinterland, but blue mould disease and heavy rain reduced the final results to four satisfactory trials. Responses differed with soil type but generally there was a good response to phosphorus and nitrogen in respect to yield and to potash in regard to quality. Total fertiliser used was 890 lb per acre. (*QAJ*, Vol. 43, February 1935,pp.207-215)

Very good crops were obtained in Dimbulah from 1000 acres-an average of 7 acres per grower-in 1934-35 and in Mareeba, with good prices. The Tobacco Industry Protection Act of 1933 was proclaimed in July 1934 and the growers co-operated well with the Department in carrying out its provisions.

A Tobacco Pure Seed district embracing Marmor, Bajool and Archer was declared by Order- in-Council on 20 September 1934.

In the June and July 1935 issues of the *Journal*, Pollock, Senior Instructor in Agriculture, dealt in detail with quality in bright tobacco leaf and the home grading of tobacco. (*QAJ*, Vol. 43, June 1935, pp. 551-568)

During 1934-35, Cartmill extended tobacco fertiliser trials beyond the Cairns Hinterland to Woodstock, Charters Towers, Bowen, Mackay and Miriam Vale on infertile lands mainly of granite origin. Concentrating on phosphorus, Cartmill found the sandy soils gave increases in yield of tobacco with up to 50 lb and in some cases 75 lb of phosphoric acid (250-375 lb of superphosphate) per acre, while the red and brown soils showed increases in yield with up to 375 lb of superphosphate per acre. He assessed that a 4-12-6 mixture (NPK) at 700 to 750 lb per acre would be likely to give a good result overall.

D. O. Atherton, Entomologist, conducted detailed research on the tobacco leaf miner and stem borer in north Queensland at Mareeba, the whole cost of the experimental seedbed work being borne by the Commonwealth Tobacco Grant.

L. F. Mandelson, Plant Pathologist, spent the period from 9 January to 15 November 1935 on a tour of the tobacco industry of the United States, the cost being met by Queensland's share of the Federal Tobacco Vote.

R. A. Tarrant toured South Africa in 1935-36 to study tobacco culture. His report "Tobacco Culture in Southern Rhodesia" appeared in the *Queensland Agricultural Journal* for November 1936,pp.651-668.

The treatment of tobacco seedbed covers to prolong their life and effectiveness occupied the attention of J. H. Simmonds and T. McKnight during 1937-38 and the alum-lead acetate treatment was shown to be more effective than using Shirlan AG. (*QAJ*, Vol. 50, July 1938, pp. 4-7) During this period, Royce C. Cannon was advising on seedling production, bulking of tobacco leaf and pest and disease control in the northern areas.

Peanuts

Peanuts were planted fairly extensively in the Rossmoyer Caves area and Keppel Sands in the Central District during 1929-30 and on the Atherton Tableland. Some of the latter crops yielded a ton to the acre. Small areas were harvested around Cooktown, which area was outside the jurisdiction of the Peanut Pool, and the crop was marketed in Sydney. (Pollock, N. A. R., *Rep. Dep. Agric. Stk*, 1929-30, p. 35)

By 1932 grading depots had been established at Kingaroy, Rockhampton and Atherton.

During 1932-33, Rockhampton growers started to sell peanuts outside the Jurisdiction of the Board and the Board appealed to the Supreme Court in Brisbane and lost the case under Section 92 of the Commonwealth Constitution. This led to the loss of some growers. As the local crop was insufficient, peanuts had to be imported. However, in the 1933 season most growers marketed through the Board. In September 1932, W. Muir was replaced as Manager of the Board by R. C. Rowlinson.

Departmental trials with peanuts during 1939-40 included plant selection amongst Virginia Bunch and Red Spanish varieties, a Virginia Bunch spacing trial, and a graded seed trial. (*Rep. Dep. Agric. Stk*, 1939-40, p. 18)

Soybeans

During 1933-34, variety trials were conducted using the varieties Biloxi, Columbia, Easy Cook, Hartimony, Japan, Old Dominion, Otootan and AK2 with only fair success. In August 1934, C. J. McKeon said the Department had been conducting trials with soybean varieties over several years but it was difficult to find varieties which gave consistently good results. Later the Department was to learn that Equatorial varieties would perform better but suitable varieties would have to be bred locally. There was also a need for an effective bacterial seed inoculum.

Cowpeas

Cowpea breeding of cowpeas was undertaken at the Roma State Farm by R. E. Soutter while he was manager there. He continued this on his transfer to Head Office as Senior Research Officer. Crossbreeding for nematode resistance with the native *Vigna lanceolata* was a major objective. Field officers of the Agriculture Branch and Sugar Bureau tested the crossbreds and other leguminous green manure crops in the various districts of the State.

Fruit and vegetables

In his 1928-29 annual report the Under-Secretary, A. E. Graham, stated in relation to the activities of the officers of the fruit branch:

Plots have been established in different districts for experimental and demonstration purposes. The activities on these plots include divers forms of pathological, entomological and chemical study, and field practice. At the back of it all is the aim to serve the industry efficiently in all its branches, and

there is evidence of the growers' appreciation of the efforts of the Department and the services placed at their disposal. (*Rep Dep. Agric. Stk*, 1928-29, p. 9)

Bananas

The Advisory Board under the Banana Industry Protection Act considered a policy to prevent the spread of Bunchy Top disease northwards. In November 1929 the Minister, the Hon. Harry F. Walker, suggested the Board look at creating a buffer area not more than ten miles wide with eradication of all bananas within the area and compensating growers, which would cost £25,000 to £50,000. However, the Board decided to intensify inspection and rigid adherence to regulations regarding cleaning up diseased plantations. They arranged to reduce the time between an inspector's order to clean up and its completion from 90 days to 28 days. By 31 November 1931 some 2220 acres had been eradicated.

The banana industry expanded significantly during 1930-31, with permits to plant issued to 2246 applicants for 11 000 acres from Baileys Creek north of Cairns to the southem border of Queensland.

The serious marking of fruit by the banana thrips led the Committee of Direction of Fruit Marketing to offer a reward of £1,000 for an economic remedy or preventive. This problem was allocated to Harold Smith, Entomologist at Cairns, and later to Norman E. H. Caldwell, Assistant Entomologist from June 1933. An embargo on transferring banana planting material from infested plantations proved an important check on the transfer of the insect from north to south Queensland. (*QAJ*, Vol. 48, October 1937, p. 392-399)

Up to 1932 some 12 000 acres of diseased plantations had been eradicated and were unlikely to be planted again and limited new areas were available. At this time steep hillsides provided over ninety per cent of the land under the crop and better husbandry was needed to preserve the soil.

The dry weather experienced during the growth of the 1931-32 crop led to late maturing of the fruit. The C.O.D. had opened modern ripening rooms and artificial ripening with ethylene gas produced coloured but immature fruit with high acid content. Agreement was reached with New South Wales regarding maturity standards for the fruit. (Williams, G., *Rep. Dep. Agric. Stk*, 1931-32, pp. 39-41)

Fertiliser, green manuring and spacing trials with bananas were carried out at the Kin Kin Banana Experiment Station. Green manuring and application of nitrogen appeared to be beneficial but site and soil type variations rather nullified experimental results. (*QAJ*, Vol. 34, July 1930, p. 39)

A proclamation in 1930 created a Metropolitan Fruit District under the Diseases in Plants Acts and a second proclamation cited all plants of the genus *Musa* (bananas, plantain, Manila hemp) to be pests under the Act, and as such they had to be taken out and destroyed to prevent the spread of Bunchy Top. Bananas growing in suburban gardens were a menace to the industry. (*QAJ*, Vol. 34, July 1930, p. 103)

During 1932-33, applications to the Banana Industry Protection Board were made by 2000 growers for 3 081 000 suckers, of which half a million were for planting between Nerang and the New South Wales border. Strict watch was kept by Departmental personnel for any Bunchy Top disease.

The reduction in the tariff on bananas imported into Australia following the Ottawa Agreement to permit the introduction of 40 000 centals of this fruit from Fiji shocked local growers but they were able to compete successfully with this imported fruit.

In 1935, H. Barnes and J. H. Mitchell promoted the one bunch-one sucker system of culture as the best for Cavendish, Gros Michel and Mons Marie varieties. The system was devised by J. H. Mitchell Senior when he was Manager of the Bribie Island State Nursery. In 1936 the endless-wire system was introduced to banana plantations.

Bagging of banana bunches had over a five-year period proved to produce fruit even in length and circumference, uniform in development, flavour, and colour; had protected the fruit during handling; had reduced losses from sunscorching, insects and spotting; and had given better overall control of the crop. (*QAJ*, Vol. 46, August 1936, pp. 264-265)

H. Joe Freeman in 1938 wrote a detailed account of banana growing in Queensland, which was published serially in the monthly issues of the *Queensland Agricultural Journal* from January to July 1938.

J. H. Gregory, the Instructor in Fruit Packing, in articles published and illustrated in the *Journal* and by local demonstrations, outlined the best methods for packing bananas. Packing experiments showed that bananas packed as "singles" were better than those packed as bunches or hands. (*QAJ*, October-November 1935)

Pineapples

Pineapple yields in the early 1930s were deteriorating, owing, it was thought, to fungal infection and nematodes, and long-term experiments were commenced on an experimental plot at Elimbah. Fertiliser trials gave a positive response to potassium sulphate but not to phosphorus. Calcium cyanide was ineffective against nematodes. Improved drainage improved crop yields. (*QAJ*, Vol. 34, August 1930, p.189) Instructor S. E. Stephens envisaged heavy production in north Queensland. A collection of varieties was planted at the Northem Experiment Station where conditions for propagation by seed were satisfactory.

Excessive production of pineapples led to concem and W. Ranger, Manager of the COD, went on a business mission to Canada and England and successfully disposed of 150 000 cases of canned pineapples to Canada. However, the Ottawa Conference removed the Australian preference on the Canadian market over lower-priced Singapore fruit and the previous Australian portion of 20% of the Canadian market lapsed. During 1932-33, a grant of £20 000 was obtained from the Fruit Industry Sugar Commission to assist in the export of canned pineapples now directed at the London market. This was insufficient and the growers levied themselves to assure a fixed price for factory pineapples. To help dispose of surplus pineapples to New Zealand, its Government permitted the entry of fresh fruit from Queensland.

H. K. Lewcock launched an extensive pineapple improvement programme during 1936-37, with Hubert Groszmann continuing his plant breeding and selection work with the Smooth Cayenne, the most important commercial variety, determining the cause and inheritance of abnormalities in the fruit and selecting superior strains. J. H. Gregory pointed out the desirable shape of fruit for canning. E. W. B. Da Costa was appointed in April 1937 to deal with physiological problems in production and canning of pineapples.

L. G. Vallance concentrated on survey and analyses of pineapple soils and spent three months studying soils in the laboratory of the Waite Research Institute at Adelaide. Lewcock himself dealt in depth with the soil requirements of the pineapple, particularly the buffer capacity and iron and sulphur requirements of manganiferous soils, the big fertiliser response to potash and preference for inorganic fertilisers over organic materials. Lewcock also introduced the practice of spraying fruit with acetylene to induce flowering and early ripening of the winter crop to provide fresh fruit at a time when it was needed most. The treatment also reduced the serious "black heart" disease.

Lewcock put all this knowledge together in articles in issues of the *Queensland Agricultural Journal* for December 1939, January, March and July 1940, and April 1941.

Citrus

During the 1930s coastal citrus orchards were deteriorating and Instructor Prest envisaged a general movement inland to drier districts with the crop grown under irrigation. The Department conducted fertiliser and green manuring experiments on the Blackall Range. and at Gayndah and Elimbah and the yield of developed trees was increased by three cases per tree for an expenditure of only 3s. During 1933, citrus fertiliser experiments were conducted on Tamborine Mountain by H. Barnes and C. N. Morgan. Responses were obtained from complete fertiliser mixtures and with the addition of bonedust a 200% increase was recorded. (*QAJ*, Vol. 43, April 1935, p. 368)

In August 1939, James H. Mitchell published a comprehensive article dealing with budding and grafting, following Prest's advice on pruning citrus in earlier *Journals*. The Department established a citrus budwood plot at Gayndah to eventually supply budwood from selected trees which had been approved from local orchards and nurserymen's stock. A summary of the budwood selection work was published by Barnes. (*QAJ*, Vol. 49, February 1938, pp. 126-130)

J. H. Gregory and R. Prest conducted experiments in colouring of citrus fruits using ethylene gas, acetylene gas and a kerosene lamp. Ethylene gas gave the best results. (*QAJ*, Vol. 49, March 1938, pp. 276-279)

The Australian Citrus Advisory Council was formed in April 1936 to organise production and marketing of citrus fruit. (*Rep. Dep. Agric. Stk*, 1936-37, p. 60) On the occasion of a glut in orange production the Government guaranteed to exporters of oranges to countries other than New Zealand a reimbursement of their out-of-pocket expenses to the extent of 13s per half-bushel case.

Apples

The Granite Belt crop of temperate fruit was excellent in the summer of 1929-30 and Departmental officers were active in collecting and distributing scions of approved varieties from specially selected trees. Apples were sent to Singapore during January-February 1930 and opened up well. They were also successfully marketed in Colombo. In the following year 5000 cases were exported to England, New Guinea, Canada, Indonesia and Singapore. (Williams, G., *Rep. Dep. Agric. Stk*, 1930-31, pp. 33-35)

To meet the surplus production of apples on the Granite Belt during 1932-33 growers levied themselves 3d per case on all apples marketed for the purpose of constituting a stabilisation scheme. Two additional packing houses were established-one at Passmore and the other at Thulimbah-making four in all.

A Hail Relief Scheme was established during 1932-33 with a levy of 10d per ton on all fruit and vegetables railed from the Stanthorpe district. Assistance from the fund was generally made in kind, e.g. fertilisers or other requisites. The COD formed a trading department during 1932-33 for fertilisers and other requisites on behalf of the growers. It established depots at Brisbane, Bowen, Cleveland and Wallangarra. (*Rep. Dep. Agric. Stk*, 1932-33, pp. 134-135) J. H. Gregory the Fruit Packing Instructor, was actively engaged in advising on packing house designs and the packing of apples for export and the home market.

Officers were also busy with recommendations for control of the fruit fly with sprays of white oil and blackleaf 40 every ten days on commercial orchards, control of weeds and the destruction of non-commercial orchards and backyard fruit trees. A collection of apple rootstocks was introduced from the East Malling Research Station in England for testing in the Granite Belt.

Grapes

F. L. Jardine of the Horticulture Branch looked after the interests of grape growers at Stanthorpe, advising on the general culture of the vine, pruning and grafting. J. H. Gregory conducted experiments in cold storage of grapes at Stanthorpe using nine varieties. One three bushel case of each was packed in sulphite paper or woodwool and one in granulated cork. There was some initial problem with sawdust taint in grapes packed in woodwool but this was overcome. The experiment proved that Queensland grapes could be successfully exported to most parts of the world and successful shipments had arrived in Canada, New Zealand and the East. The varieties Purple Cornichon, Flame Tokay, Red Malaga and Cervant could carry safely for 7-8 weeks, Black Muscats and Waltham Cross for 5-6 weeks, and Gordo Blanco and Gros Colman for 3-4 weeks. Harder varieties carried better in wodwool, softer ones in granulated cork. (*QAJ*, Vol. 36, July 1931, pp. 82-84)

Strawberries

The COD acquired the strawberry crop in 1930 but in 1931 growers handled their own crops. With the increasing interest in strawberry culture an experimental plot was established by the Department at Palmwoods where R. L. Prest, Instructor in Fruit Culture, established variety trials using Aurie, Phenomenal, Aird's Early, Creswell, King Edward, Wilba, Sperckman's Seedling and a cross between Marguerite and Phenomenal. Tests with Q5 and ACF4 fertilisers

supplied by ACF and Shirleys Fertilisers Ltd were included. H. Barnes, Director of Fruit Culture, contributed a detailed article on strawberry growing (*QAJ*, Vol. 51, March 1939, pp. 291-295) and J. H. Gregory advised on packing for market.

Avocados

Some interest in avocado growing was being aroused and H. Barnes publicised the crop in 1936 (*QAJ*, November 1936) and Prest took over supervision of the crop. Investigation of the blossoming habits was completed and an illustrated cultural pamphlet for the fruit was compiled. Seedling stocks of Guatemalan varieties were planted.

Passionfruit

Interest in passionfruit culture was being shown in 1931 and H. Barnes and J. M. Wills promoted the crop in southem coastal districts in 1937. Crossbreeding of the common passion fruit (*Passiflora edulis*) with *P. incarnata*, a hard-shelled variety possessed of some disease resistance, was carried out at Bowen. There was to be a big demand for this crop for fruit salad during World War II.

Queensland nut

George Williams, Director of Horticulture, in 1930 drew attention to the need to develop the Queensland macadamia nut industry from thin-shelled nuts selected by Messrs J. W. Waldron of Eungella and S. M. Greer of Upper Dungay. Market prospects were good. (*QAJ*, Vol. 34, July 1930, p. 36) By 1933 the cultivation of the crop began to attract attention.

Williams died on 10 March 1933. His successor as Director of Horticulture, Harry Barnes, had attended a conference of macadamia nut growers at Murwillumbah during 1932 where a Nut Growers' Association had been formed. The Hon. F. W. Bulcock had them growing on his farm at Cleveland. (*QAJ*, Vol. 38, July 1932, p. 78) J. M. Wills wrote a comprehensive article, "The Queensland Nut", in the August 1939 *Queensland Agricultural Journal* and Stephens promoted it in north Queensland.

Papaws

A new hybrid variety of papaw was selected in 1932-33 and named the Yarwun variety after the district in which it was developed. Barnes promoted the crop in 1937 (*QAJ*, October 1937, pp. 480-487) and J. W. G. Agnew, appointed Pomologist at the Bureau of Tropical Agriculture at South Johnstone, began breeding and selection work with the assistance of Dr Gordon Miles. This material was transferred to an experimental area at Kamerunga during World War II.

Mangoes

Some varietal selection work was commenced at South Johnstone just prior to the war and during 1939-40 a rootstock and scion field experimental plot was established with mangoes at the Animal Health Station at Oonoonba. Grafted mango trees were imported from Java and planted in this plot. Rootstock and scions were also planted in a five acre plot resumed from the old Kamerunga State Nursery. By 1940-41 all the South Johnstone

mango material, comprising 4 grafted trees of 50 selected mango varieties, was transferred to Kamerunga.

Miscellaneous tropical fruit

A wide variety of miscellaneous tropical fruit was under observation at Kamerunga and in a tropical fruit plot in the Cairns Botanic Gardens, mainly by S. E. Stephens. They included granadillas, litchi, mangosteen, cashew nut, vi apple, sugar apple, wampee, five corner, sour sop, cochin-goraka, cucumber tree, star apple, sapodilla and woolmi.

The walnut was studied at Warwick by C. Schindler.

Vegetable production

The cultivation of the tomato received constant attention from Departmental officers prior to World War II. In September 1930 officers of the Fruit Branch published an article dealing with tomato culture, liberally illustrated with packing directions to suit the market. Tomato colouring experiments were conducted at Redland Bay to encourage earlier fruit. Local growers had been fertilising heavily with phosphorus and potash and experiments were undertaken to ascertain if production costs could be reduced. Departmental officers also produced pure seed from plots at Moggill. Other common vegetable crops received attention from Departmental officers but the real pressure came with the outbreak of war. When Japan joined the conflict demand for vegetables by US and Australian troops increased tremendously.

Fruit for western and northern areas

Early in 1935 the Director of Marketing, Harry S. Hunter, discussed with the COD and the Commissioner for Railways how fresh fruit and vegetables could be provided for distant families. As a result a scheme was approved by State Cabinet whereby fresh fruit and vegetables would be delivered to distant parts of the State by the COD at a quoted price, and the freight would be only one shilling per half bushel case with a reduction for larger quantities, no matter how far the fruit and vegetables had to be carried. (*QAJ*, Vol. 43, February 1935, p. 137-138)

Winter forage crops and silage

Queensland's low rainfall during the winter months has always resulted in lowered livestock production and especially so in relation to dairy produce. Hence higher prices for market milk have been available during the winter months as feeding costs from supplementary feeding or the irrigation of crops are higher.

On the Atherton Tableland, N. A. R. Pollock, the Northem Instructor in Agriculture, showed the value of wheat, oats and barley grown in association with field peas, and dwarf Essex rape as a pure crop for grazing by dairy cattle during the winter months. This system was almost universally adopted. Summer crops such as pearl millet, white panicum, teosinte, Honey sorghum, cowpeas and velvet beans were also grown by some farmers as supplementary grazing. When the White Grub damage was so severe on the Atherton

Tableland, Leslie Wood was appointed Silo Construction Officer stationed at Atherton to encourage farmers to store crops of summer-grown maize and sorghum as silage for winter feeding. The Bureau of Rural Development assisted farmers to construct concrete collar type pit silos, forty-four of which were completed during 1938-39. (*Rep. Dep. Agric. Stk*, 1938-39, p. 12) A Fodder Conservation Committee was formed in November 1940 to examine proposals for a State Fodder Conservation Drive. (*QAJ*, Vol. 54, December 1940, p 427)

Drought insurance scheme

In 1935 Bulcock outlined a drought insurance scheme to sheep graziers at a Blackall conference. It provided for the purchase of fodder and storage on normal markets at normal prices. During the 1927 drought, the cost of feeding sheep averaged one shilling per head per month on the basis of £6 per ton for luceme hay and 6s a bushel for maize. The return from sheep in normal times was 10s per head. Minor droughts occurred every five years and major ones every ten years.

Queensland's annual sheep flock averaged 20 000 000 over a ten-year period and if assessed at 3d per head would return a capital annually of £250 000 or £1 000 000 over four years, which would be held in trust. The money would buy feed in normal times, handled by a board of graziers, with advisers from the Treasury and the Department of Agriculture and Stock. A grazier's assessment would cease until climatic conditions in his district enabled him to again contribute. (*QAJ*, Vol. 44, July 1935, p. 3)

Pastures

During the late 1920s and the 1930s an interest in improvement of native pastures and the introduction and establishment of new species to replace the native species was being fostered.

Native pastures. Professor J. K. Murray and W. W. Bryan had undertaken a fertiliser topdressing trial on the native *Heteropogon-Dichanthium - Bothriochloa* pastures on the Queensland Agricultural College sandy ridge country and W. D. Francis, Assistant Botanist of the Department, was called in to record the species composition of the plots before and after treatment during 1929-30. No economic response was obtained.

Fencing, top dressing, harrowing and regular mowing of the native species on the Roma State Farm appeared to improve production but no quantitative records were kept.

In 1930 G. B. Brooks reported that the native legume *Mimosa pudica*, the sensitive plant which appeared in the Mackay State Nursery about the year 1900, was gradually making its way southwards down the coast. He said, "There is no question as to its value as a soil improver. Its importance as a pasture plant is that stock graze it lightly during the summer and practically down to the crown during the winter." Townsville stylo was also proving useful and spreading rapidly, and *Vigna oligosperma* (now probably *V. parkeri*), a legume introduced from Java, was giving promise. (Brooks, G. B., *Rep. Dep. Agric. Stk*, 1930-31, p. 22)

In March 1934, Francis, Assistant Government Botanist, made a detailed study of the Western Mitchell grass pastures after bounteous rains that followed the serious drought of 1933. Questionnaires were sent to District Stock Inspectors and Land Commissioners. On well managed properties Mitchell and Flinders grasses were as good as ever but on properties which had been continuously overstocked Mitchell grass had dwindled. Horses, because of their close grazing, eating of seedheads and pawing up of tussocks, had been destructive.

The Walter and Eliza Hall Fellowship in Economic Botany was awarded to Stanley Thatcher Blake at the University in 1934 to investigate pastures of Western Queensland. He collaborated closely with Departmental officers.

Francis, accompanied by E. J. Tannock, the local District Inspector of Stock, described the four main Mitchell grasses (*Astrebla* spp.) found in Western Queensland in the Charleville district, viz. curly Mitchell grass (*A. lappacea*), barley Mitchell (*A. pectinata*), bull Mitchell (*A. squarrosa*) and hoop or weeping Mitchell (*A. elymoides*), and also Flinders grass (*Iseilema membranacea*) and associated grasses and herbage of the Ward River plain. Associated grasses were Queensland blue grass (*Dichsnthium senceum*), brown-top grass (*Eulalia fulva*), rats tail grass (*Thellungia advena*) and shot grass (*Paspalidium globoideum*).

Suggestions were made that experiments be carried out to assess the effect of removal of stock on regeneration and the germination requirements of Mitchell grass seed. (*QAJ*, Vol. 43, March 1935, pp. 268-282)

Reports requested from Departmental stock inspectors on the state of their district pastures were collated by Selwyn Everist, Assistant Botanist, and published in the April 1935 issue of the *Journal*. Mitchell grasses had responded well to the drought where rainfall had been adequate but more slowly in overstocked areas. Herbage was plentiful in the Boulia, Longreach and Jundah districts, consisting of pigweed (*Portulaca oleracea*), wild spinach (*Tetragonia expansa*), tar vine (*Boerhaavia diffusa*), wild cucumber (*Cucumis* sp.), potato vine (*Ipomaea* sp.), daisy burr or bindy-eye (*Calotis hispidula*), the seeds of which were licked up by sheep during the winter and provided good feed. In the southern areas around Charleville winter herbage of crowsfoot (*Erodium cygnorum*), small burr (*Medicago minima*), lamb's tongue (*Plantago varia*) and "clover" were plentiful. Nut grass (*Cyperus rotundus*), although a pest of cultivation in Queensland, was a very important plant for sheep around St George and Dirranbandi on low-lying heavy blacksoil flats, as was red burr (*Bassia echinopsila*).

In the Bumett and Port Curtis areas Queensland blue grass (*Dichanthium sericeum*), Forest blue (*Bothriochloa bladhii*), Scented top (*Capillipedium porviflorum*) Kangaroo grass (*Themeda australis*) and Bunch spear grass (*Heteropogon contortus*) were dominant. Everist then dealt in more detail with the feeding value of the dominant species. (Everist, S. L., *QAJ*, Vol. 43, April 1935, pp. 374-388) Everist continued his description of Queensland grasses in the May 1935 *Journal* with the *Chloris* grasses, continuing into June and July.

Everist was to continue his studies of native pastures and in July 1938 he made an ecological study of the flora of the Springsure and Clermont districts following a major expansion of the White spear grass (*Aristida leptopoda*) within the native pastures of the

open black soils downs country of the Central Highlands. He reported it to be a major menace to sheep raising, causing graziers to switch to cattle. Its spread was attributed to overstocking with sheep, burning, drought, soil erosion and wind dispersal of the inflorescence. (Everist, S. L., *QAJ*, Vol. 51, January 1939, pp. 30-42)

C. T. White, the Government Botanist, wrote a comprehensive article on clovers and trefoils in Queensland in 1936, and O.L. Hassall in 1945 listed the native pasture legumes of the Central Coast. He described species of *Alysicarpus* (3), *Cassia* (3), *Crotalaria* (1), *Desmodium* (1), *Glycine* (4), *Indigofera* (7), *Lotus* (1), *Rhynchosia* (1) and *Sesbania* (1). (*QAJ*, Vol. 60, May 1945, p. 13)

Departmental officers introduced Mitchell and Flinders grasses to the Goondiwindi district during 1932-33 to provide hay. (*Rep. Dep. Agric. Stk*, 1933-34, p. 22)

Introduction and testing of new species. Rootlets of Spartina townsendii were introduced to vegetate the marine flats and were first planted along the shores of Redland Bay on 27 August 1930. Continual covering with sand led to their being moved further away from the beach on to heavier soil. Underground spread was good on the new site but top growth was poor. A second consignment of rootlets from New Zealand in 1931 was planted along the river bank of the Brisbane River near the old wharves at the back of the State Stores building in William Street. Good growth resulted, with stools reaching over three feet in diameter and carrying a dense leafy growth ten to twelve inches in height. (McKeon, C. J., Rep. Dep. Agric. Stk, 1932-33, p. 20) G. B. Brooks in 1928-29 had obtained Spartina townsendii seed from the Royal Botanical Gardens at Kew in England and sowed it on marine flats, along with roots of water meadow grass (Glyceria maxima) in Central Queensland. New seed was obtained and Spartina townsendii was established at Gladstone, Raglan and Casuarina Island during 1932-33. It made slow but definite growth, more particularly at Gladstone. Brooks said: "This grass, reported to provide good grazing and to be drought resistant, could be an important grass to Queensland." (Brooks, G. B., Rep. Dep. Agric. Stk, 1931-32, p. 17)

Queensland Pasture Improvement Committe. This was set up in April 1931 to extend into 1934, to carry out topdressing and rotational grazing trials with pastures. Over fifty per cent of the funds were contributed by A.C.F. and Shirley's Fertilisers Ltd of Brisbane in conjunction with Nitrogen Ltd of Melbourne, Bruce Shearer being the fertiliser companies' representative on the Committee and Chairman. The Australian Dairy Council contributed £500 and was represented by W. T. Harris of Toowoomba. The Council of Agriculture contributed £200 and was represented by H. T. Anderson of Biddeston. The Department of Agriculture and Stock was represented by A. E. Graham, Under-Secretary, and F. F. Coleman, Officer-in-Charge of the Seeds and Fertiliser Branch, who acted as Secretary. (Coleman, F. F., *Rep. Dep. Agric. Stk*, 1932-33, pp. 88-95)

Visit of William Davies of the University of Wales, Aberystwyth. William Davies, lecturer in agrostology toured Queensland during 1931-32 and remarked: "The two major problems in Queensland, as I see them today, are the introduction of improved winter grasses and the introduction of clovers that are suitable to the State...What has been achieved through the introduction of clover into the southem States of Australia can be achieved in Queensland if a suitable clover can be found."

He said: "The modem lines of grass research dealt with: (1) the introduction of new species; (2) the finding of the best varieties or strains within those species; (3) the effect of manures, phosphates, nitrogen, lime and potash on the grass; and (4) the best methods for getting the most out of these grasses after they have been made to grow and for managing them. Modern grass philosophy can be summed up in four words-species, strain, fertility and management." William Davies' brother, Dr Jack G. Davies, was to come to Queensland as head of the Division of Tropical Pastures of the CSIRO and put this philosophy into practice.

Pasture plots established by the Pasture Improvement Committee. In April 1931, in conjunction with the Queensland Acclimatisation Society, the Committee had sown two hundred plots on the Society's land on well-prepared land topdressed with a mixture of ³/₄ cwt of sulphate of ammonia, 2 cwt of superphosphate and 42 lb of muriate of potash per acre. In addition to the perennials, rye grass, Toowoomba canary grass (*Phalaris tuoerosa*) and cocksfoot, the short-term Italian rye grass was sown as winter-growing species alongside the summer perennials paspalum and kikuyu. (Coleman, F. F., *Rep. Dep. Agric. Stk*, 1931-32, pp. 80-93) Of these, New Zealand perennial rye grass, Akaroa cocksfoot, Toowoomba canary grass, paspalum, Rhodes grass, N.Z. Certified white clover, Kentish wild white clover, luceme and Sheeps Bumet gave satisfactory growth. Where rainfall was good (e.g. Maleny), N.Z. Broadleaved red clover and N.Z. Certified white clover grew well with paspalum. Other species sown performed only fairly or unsatisfactorily. Coleman invited dairymen to make an effort to inspect the plots. (*QAJ*, Vol. 37, June 1932, pp. 314-317)

Trials were also carried out by the Committee on "Brooklands", W. Stuart Conochie's farm at Sherwood, on the Oxley Creek alluvials using the local paspalum as a base. Significant increases were obtained with nitrogen, phosphorus and potash. An application of 1 cwt of sulphate of ammonia, 2 cwt of superphosphate and ³/₄ cwt of muriate of potash increased grazing days from 106 on unfertilised plots to 210 on the fully fertilised plots. Despite this improvement there was a feed gap in the winter and the Committee aimed to introduce winter-growing grasses and clovers. (*QAJ*, Vol. 35, June 1931, pp. 381-382)

Until 1931 pasture improvement studies were made mostly on old paspalum pastures at Gympie, Eumundi, North Arm, Maleny, Caboolture and Nerang by the Committee. There were no efficient renovators but in 1931 a new Sunpalm Renovator was available and at Maleny red and white clover were established in paspalum with added fertiliser. On the low acid soils at Nerang up to two tons of lime were required in addition to fertiliser.

The Committee found that grasses which were allowed to seed before grazing and refused by cattle were very poor nutritionally compared with less mature leafy growth. Full analyses of the nutritive value of grasses at various stages of growth were published in the annual report of the Department for 1930-31. In May 1933 the Royal National Association invited the Committee to sow plots in the Exhibition grounds and these provided much to interest the thousands of Show visitors.

The Central and Northern District Agricultural Instructors were also very active in pasture work. Pastures were laid out by C. S. Clydesdale in a demonstration area at Yalboroo between Mackay and Proserpine in co-operation with the Manager of the Agricultural Bank (H. C. Quodling) and the Lands Department for the guidance of new settlers on the Eungella lands. Five acres of former jungle land and five acres of former forest lands were sown to the legume *Stylosanthes procumbens* (probably *S. hamata*) and paspalum, molasses grass (*Melinis minutiflora*), giant blue (*Dichanthium aristatum*), giant couch, woolly finger grass (*Digitaria eriantha*), kikuyu and Rhodes grasses.

N. A. R. Pollock, the Northern Instructor in Agriculture, also in 1932-33 had trials with woolly finger grass, *Urochloa trichopus, U. pullulars, Panicum coloratum, P. antidotale* and *Cynodon plectostachyum.* (Pollock, N. A. R., *Rep. Dep. Agric. Stk*, 1932-33, p. 30)

In the same period rootlets of four further strains of *Digitaria* were obtained from South Africa, *Digitaria pentzii*, two strains of *D. polevansii* (Inkruip and Kuruman) and *D. valida*. These were increased in 1933, ready for further trials. Townsville stylo seed was also increased with the same object in mind. (McKeon, C. J., *Rep. Dep. Agric. Stk*, 1932-33, pp. 20-21)

At Roma State Farm, R. E. Soutter and C. H. P. Defries had found *Panicum antidotale* (blue panic), *Cynodon plectostachyum, Cenchrus ciliaris* (Buffel) and *Digitaria eriantha* promising, along with the now ubiquitous Rhodes grass.

During 1933-34, a more determined effort at pasture improvement was made, particularly in central and northern Queensland. G. B. Brooks, Senior Instructor in Agriculture for the Central Division, had trial plots at Scrubby Creek and on the property of A. R. McLeod at Yalboroo, between Mackay and Proserpine. Grasses under list were *D. pentzii, D. valida, D. polevansii* (Kuruman and Inkruip strains), Para grass (*Brachiaria mutica*), Molasses grass (*Melinis minutiflora*), Blue panic (*Panicum antidotale*), Kikuyu (*Pennisetum clandestinum*) and Paspalum (*Paspalum dilatatum*). Legumes being tested included Stylo (*Stylosanthes guianensis*), Townsville stylo (*S. humilis*), *Phaseolus trilobus, Lespedeza sericea*, Korean clover (*L. stipulacia*), *Alysicarpus rugosus, Vigna oligosperma* (*V. parkeri*), *Indigofera endecaphylla* and the native sensitive plant (*Mimosa pudica*).

Many of these remain important tropical species at the present time. Seed was supplied through the Departmental Pasture Improvement Committee. C. S. Clydesdale, the Northem Senior Instructor, also tested several of these and in addition the grasses *Setaria aurea*, Fine stemmed guinea (*P. maximum* var. *trichoglume*), *Panicum coloratum, Cynodon plectostachyum* and *Hyparrhenia rufa*.

Clydesdale's comments are interesting: "Grasses giving excellent results under tropical conditions are molasses (*Melinis minutiflora*), para (*Brachiaria mutica*) and Paspalum (*Paspalum dilatatum*)."

In addition to the grass improvement trials already established, further test plots were inaugurated at Silkwood, Clump Point, Euramo via Tully, and Kennedy. "The distribution of grass seed, cuttings and rootlets of the varieties available has been made to various farmers." (Clydesdale, C. S., *Rep. Dep. Agric. Stk*, 1933-34, pp. 34-38) Obviously Clydesdale was the source of the planting material from which Brice Henry, the founder of the Tully Cattle Fattening Scheme, obtained his para grass.

In August 1935 attention was drawn to the spread of mat grass (*Axonopus affinis*) in deteriorating paspalum pastures on the north coast. Renovation and fertilisation would be necessary to restore them.

In June 1935 the three-year term of the Pasture Improvement Committee came to an end, and a new Committee and program were set in train, starting with winter species and fertiliser trials in 1935, with some summer species and lucerne planted in the summer. Two- to five-acre experimental plots were laid out on farms in the chief dairying and sheep districts. The mixtures of grass and legume are listed below.

On the coast: *Phalaris tuberosa* and lucerne *Bromus marginatus* and lucerne Italian rye grass and red clover

On the Downs: the best mixture was Wimmera rye grass and lucerne.

Fertilisers used were: 1 ton lime + 2 cwt Superphosphate/acre 1 ton lime + Shirley's No. 9-3 cwt/acre Superphosphate alone 2 cwt/acre Shirley's No. 9 - 3 cwt/acre

Renovation, liming and top-dressing of paspalum and oversowing of winter legumes were tried at St Lucia, using potash as well as lime and superphosphate. W. G. Wells, Senior Research Officer and Cotton Specialist, reporting on the St Lucia plots stated "an African grass, *Brachiaria decumbens*, has done particularly well at St. Lucia on an infertile sandy clay soil and warrants extensive careful testing under coastal conditions." (Wells, W. G., *Rep. Dep. Agric. Stk*, 1937-38, pp. 25-26)

At Eungella, of the pasture species sown Nebo, Calen and Rise and Shine, *Panicum coloratum, P. maximum, Brachiaria mutica* and *Dichanthium nodosum* did well; the winter clovers, rye grasses and cocksfoot were good on the higher areas. (Clydesdale, C. S., *Rep. Dep. Agric. Stk*, 1935-36, pp. 31-32) N. E. Goodchild had pasture plots at Gracemere and Pink Lily near Rockhampton sown to *Digitaria* and *Panicum* species.

Lucerne manurial trials were laid down at Yangan, Harristown, Wellcamp, Goodyer, Brooklands, Lanefield and Toogoolawah using superphosphate and bonedust.

Charles Winders, B.Sc.Agr., Assistant (Agronomy) in the Agriculture Branch, began a very active publishing program in 1935. He prepared a bulletin entitled "Sown Pastures for Queensland" from articles appearing serially in the *Queensland Agricultural Journal* from November 1935 to 1939, summarising existing information and suggesting some projects for future research, e.g. grazing methods and reseeding with Mitchell grasses in the West.

On his transfer to Toowoomba, Pollock, Senior Instructor in Agriculture, assessed the adaptability of a large suite of both tropical and temperate species of grasses. These

included most of the species already mentioned but some newer ones included Tussock love grass (*Eragrostis curvula*), *Eragrostis superba*, ditch millet (*Paspalum scrobiculatum*), *Paspalum plicatulum*, fine-stemmed guinea (*Panicum maximum* var.) *Panicum makarikariensis*, *P. isachne*, *Ischaemum sulcatum*, buffel grass (*Cenchrus ciliaris*), birdwood grass (*Cenchrus setiger*) feathertop (*Pennisetum masaicum*), perennial flinders (*Iseilema laxum*), *Chloris pycnothrix*, *C. conterei*, frost-resistant Rhodes grass (*C. distichophylla*), Marcella grass (*Urochloa tricophus*), *U. pullulans*, *U. panicoides* and *U. bulbodes*. Frost-resistant grasses *Agropyrum intermedium*, *A. cristatum*, *A. caninum*, *A. sibirioum*, *A. desertorum*, *A. elongstum*, *A. orientale* and *A. villosum*, *Erharta erecta*, *Festuca mairei* and *Brachypodium phoenicoides* were also tried. (Pollock, N. A. R., *Rep. Dep. Agric*. *Stk*, 1937-38, pp. 51-53)

Meanwhile, the paspalum pastures on the Atherton Tableland were declining in productivity. Pastures previously carrying one beast to the acre in the early years of settlement were carrying only one beast to every 3-4 acres in 1939. It was estimated that 10 000 acres were affected in 1930, but by the winter of 1935 the area had increased to 25 000 acres, centred on Peeramon. Declining fertility through loss of organic matter was a contributory factor but the main problem was the depredation wrought by the larvae of the beetle *Lepidiota caudata*, and to a lesser extent, of *L. albohirtum* near Tolga and of *L. laevis* near Atherton. Cultivating the land and sowing fodder crops for conversion into silage and using fertilisers on the crops were suggested to reduce losses of productivity and a silo construction officer was located at Atherton. (Atherton, D. O., *QAJ*, Vol. 52, November 1939, pp. 484-522)

Norman E. Goodchild was Officer-in-Charge of the Bureau of Tropical Agriculture at South Johnstone in the interim between the departure of C. J. McKeon to become Director of Agriculture in Brisbane and the arrival of J. Leeming Schofield, the new Director of Tropical Agriculture. A. Frank Skinner, Field Assistant, had supervision of the tropical pasture plots. Goodchild reported that *Panicum coloratum, Cynodon plectostachyum, Digitaria milanjiana, Urochloa bulbodes* and *Brachiaria decumbens* were outstanding among the grasses, and *Dolichos hosei, Stylosanthes guianensis, Desmodium triflorum* and *D. scorpiurus* among the legumes. Frank Skinner published articles dealing with the establishment and management of tropical pastures (*QAJ*, Vol. 50, August 1938, pp. 164-177) dealing especially with para and molasses grasses.

Urochloa panicoides (Liverseed grass) spread widely on the Darling Downs during 1939-40 and was hailed as successful competitor with the weed Pittsworth mint (*Salvia reflexa*), which had taken over bare areas, especially overgrazed corners of the paddocks. However, it was so vigorous a coloniser that farmers were regarding the grass as a weed, requiring an extra cultivation of fallow land. (Smith, L. S., *QAJ*, Vol. 53, June 1940, pp. 526-529)

During 1939-40 an area of land at Moggill was made available for plant introduction purposes and planted to twenty strains of luceme, thirty clovers and medics, thirty grasses, seven lespedezas and six vetches. Some of this seed was supplied by the CSIR (Wells, W. G., *Rep. Dep. Agric. Stk*, 1938-39, pp. 21-27) Trials with winter-growing legumes were also established at Dayboro during 1939-40. Pasture strips of several grasses were established at Graceville in the same year and opened to grazing as a "cafeteria" for cattle to determine palatability. Molasses, para and elephant grasses were very acceptable.

Further afield pasture furrowing proved successful at Biloela and on the hard chocolate soils of westem Queensland for trapping extra moisture for pastures, but not on the Darling Downs. (Wells, W. G., *Rep. Dep. Agric. Stk*, 1939-40, p. 9)

J. L. Schofield settled into his position as Director of Tropical Agriculture at South Johnstone and assessed the possibilities of the new tropical grasses and legumes. To the latter he gave common names for easy communication with the primary producers and others, viz. centro (*Centrosema pubescens*), stylo (*Stylosanthes guianensis*), puero (*Pueraria phaseoloides*), calopo (*Calopogonium mucunoides*), and croto (*Crotalaria* sp.), accepting the existing common name of pigeon pea (*Cajanus cajan*). (*QAJ*, Vol. 56, November 1941, pp. 378-388)

Schofield then initiated replicated pasture experiments to determine the effect of grazing and phosphate application on the legumes calopo, centro, puero, stylo and strains of pigeon pea alone and in combination with grasses. These were to continue later under Thomas G. Graham. A five-acre plot of stylo grown on the red acid soil at Innisfail grew splendidly and gave promise for a seed crop.

Stylo proved to be the best legume in grazing trials for twelve months in association with guinea, purple top guinea, molasses grass, paspalum, kikuyu, para and *Brachiaria brizantha* and *B. decumbens*. (Schofield, J. L., *Rep. Dep. Agric. Stk*, 1940-41, p. 13) To widen the information regarding these legumes, trials were established on Cashmere Station, Mt Garnet, north Queensland and at Moggill in south Queensland with small plots of calopo, centro, puero, pigeon pea and stylo. Single plant studies were begun here in 1944 where centro had proved very successful. Considerable variations in plant types occurred and Dr L. G. Miles selected strains for further testing in south-east Queensland. Similar legume plots were established for observation at the Animal Health Station Yeerongpilly, Kingaroy, Toowoomba and Greenmount, at four locations in the Brisbane Valley, and at Quilpie. Through the courtesy of the Forestry Sub-Department a small number of strains of pigeon pea were established on "wallum" country at Beerwah. (Schofield, J. L., *QAJ*, Vol. 61, September 1945, pp.133-144)

Weed control. Control of inkweed (*Phytolacca octandra*) in pastures at Millaa Millaa had been effected by Pollock, using a five per cent solution of arsenic pentoxide sprayed with an atomiser and 800 acres had been treated. Heavier spraying using a pump spray had produced toxicity amongst dairy cattle. (Pollock, N. A. R., *Rep. Dep. Agric. Stk*, 1929-30, p. 38)

Early in the war years a Committee known as the Queensland State Weeds Co-ordination Committee was established as an advisory body whose function was to review the status of weed problems in Queensland and to suggest allocation of investigational work between Federal and State authorities interested in such problems. CSIR, the Department of Public Lands and the Department of Agriculture and Stock were represented, with Robert Veitch, Director of the Division of Plant Industry (Research), as Chairman. The entry of Japan into the war in 1941 curtailed its programme. (*Rep. Dep. Agric. Stk*, 1945-46, p. 6)

Entomology

Several staff changes occurred during 1928-29. G. A. Currie, Assistant Entomologist dealing with cotton pests, resigned in March to join the Council for Scientific and Industrial Research to supervise weed research. He was later to become Vice-Chancellor of the University of New Zealand. He completed and published a detailed work on the brown cutworm (*Euxoa radians*, now *Agrotis munda*), which led Veitch to comment, "This piece of work constitutes a distinctly valuable contribution to economic entomology."

Margaret E. Temperley and S. M. Watson, Assistants to Entomologists, resigned but M. Gwen Evans joined the Public Service after years assisting the Commonwealth Entomologist, Mr Ballard, and completed her study of the cotton stainer (*Dysdercus* (*sidae*) *cingulatus*), emphasising the importance of biological control by native parasites.

Early in 1930 extensions to the building were completed and the Division had an extensive set of offices and laboratories well equipped for the handling of its work. The Division (of Entomology and Plant Pathology) now consisted of the Chief Entomologist (Veitch), seven officers engaged on entomological investigations, three on plant pathology, one illustrator and one clerk. On 1 January a new field station was started at Nambour to work on citrus and pineapple entomology, making three field stations. One at Cairns handled banana and tomato pests and one at Stanthorpe concentrated largely on deciduous fruit pests.

J. A. Weddell commenced field trials for the control of the banana weevil borer at the recently established Banana Experiment Station at Kin Kin and J. Harold Smith worked on the control of the banana rust thrips at Cairns. Hubert Jarvis continued work on the fruit fly and codling moth at the Stanthorpe field station and W. Alan T. Surnrnerville, in charge of the Nambour station, on the spiny orange bug (*Biprorulus bibax*) at Gayndah and Rockhampton, the bronze orange bug on the Blackall Range and the citrus root bark channeller (*Pseudomydas citriperda*) at the Mapleton Farm College. D. O. Atherton was stationed at Cairns to work on the control of the caudata white grub (*Lepidiota caudata*) and the cane grub (*Lepidiota albohirtum*) and the flat-headed pasture webworrn (*Oncopera mitocera*) in pastures on the Atherton Tableland.

A. A. Girault continued his taxonomic work on the Hymenoptera (wasps etc.) and Thysanoptera (thrips), while I. W. Helmsing continued his illustration work and collection of insectivorous birds. (Veitch, R., *Rep. Dep. Agric. Stk*, 1930-31, pp. 43-46) F. H. S. Roberts concentrated on veterinary entomology.

In early 1930 Robert Veitch, Chief Entomologist, left by HMS *Maloja* for England on a holiday visit. However, the Minister, the Hon. H. Walker, commissioned him to visit the chief entomological and vegetable pathological institutions, and also to endeavour to find a suitable pathologist to work on pineapple diseases and an entomologist to work on entomological problems such as the corn earworm in the cotton industry. (*QAJ*, Vol. 34, July 1930, p. 101) However, two Australians were later appointed: H. K. Lewcock, to work on pineapples, from 1 December 1935, and Thomas H. Strong, interrupting his university studies, to work on the com earworm, from 1 September 1932. Norman Ernest Handley Caldwell commenced duty as Assistant to the Entomologist to work on banana thrips. In February 1933 J. Harold Smith and D. O. Atherton were transferred to Atherton, the new headquarters for the North Queensland Entomological Field Station, where a new entomological station was built. F. H. S. ("Ossie")

Roberts was transferred to new laboratories at the Yeerongpilly Animal Health Station to work on veterinary entomology.

William J. Stuart Sloan joined the Department as an entomologist on 5 April 1934 to work at Nambour with Summerville, and in December 1935 Alfred Roy Brimblecombe was allocated to work on forest entomology, with his salary and expenses paid by the Forestry Sub-Department. Sloan later moved to Rockhampton to work on cotton pests.

Stone fruit and pome fruit

Hubert Jarvis liberated further colonies of the codling moth egg parasite (*Trichogramma minutum*) at Stanthorpe and this parasite had become widespread. The woolly aphis parasite (*Aphelinus mali*) was also doing good work on the control of woolly aphis. Jarvis also experimented with non-arsenical sprays and bandages to control the codling moth. Nicotine sulphate and white oil emulsion spray proved effective. This finding was important as growers were not permitted to export apples which carried too high a percentage of arsenate of lead. Potash soft soap sprays also compared well with the arsenate of lead treatment. Jarvis found that the fruit were penetrated by the larvae of the codling moth from the side and not from the calyx end.

In October 1936 Keighley M. Ward was appointed Assistant Research Officer (Horticulture) at Stanthorpe, financed from funds from the Commonwealth Apple and Pear Grant. He continued studies on codling moth control, with Alan A. Ross as assistant. The Department had initiated a scheme whereby University students studying entomology in the Agricultural Science Course could interrupt their studies for one year and do field work and then return to the University. Alan W. S. May served thus in 1936, Alan A. Ross in 1937, and J. L. Groom in 1938. With Ward they were able to show that using arsenate of lead as a calyx spray followed by a white oil and nicotine sulphate cover spray was effective.

An outstanding feature of the entomological work during 1930-31 was the success of Hubert Jarvis's fruit fly lure, attracting both males and females of the Queensland fruit fly, the Solanum fruit fly, the Jarvis fruit fly, the small black fruit fly, the Mediterranean fruit fly and the Boatman fruit fly. The formula for the lure was 1/8 oz imitation vanilla essence, 2 oz household ammonia and 26 oz water. J. A. Weddell found that exposure to eight hours of actual temperatures between 110° and 115°F at a relative humidity of 100 per cent killed the larvae of the fruit fly and codling moth but affected the fruit and was too costly for commercial practice. Fruit fly repellants-tar oil, paradichlorobenzene-carbon bisulphide, and paradichlorobenzene-kerosene mixtures were tried at Stanthorpe but the absence of flies necessitated further tests.

Grapes

In November 1932 the Grape Phylloxera (*Daktulosphaira vitisolii*), recorded for the first time in 1910 and eliminated, occurred again in a vineyard at Pinkenba. The City of Brisbane was declared a quarantine area. The use of resistant stocks was recommended to eliminate the trouble. (*QAJ*, Vol. 39, February 1933, pp. 79-83) Harold Smith summarised the current information in connection with pests of the grape vine in December 1938. (*QAJ*, Vol. 50, December 1938, pp. 700-707)
Citrus

W. A. T. Summerville, investigating the spiny orange bug at Gayndah, studied its life history in detail and sought control measures. He found that a mixture of 10 lb resin, 3 lb caustic soda and 11 lb fish oil in 40 gallons of water sprayed at the end of March to the beginning of April effectively controlled the bug. At Nambour he concentrated on the control of citrus scale insects. Fumigation with hydrocyanic acid gas, as adopted by Benson many years earlier, was still effective and the application of oil sprays during March and early April controlled the red scale. (*QAJ*, Vol. 43, February 1935, pp. 141-144) For control of the bronze orange bug he recommended beating the tree and collecting the fallen insects. During 1935 he dealt with the white louse, and the pink wax and white wax scale insects.

During 1941-42, the COD acquired the Robinson fruit fly lure developed at Gayndah for citrus and approved by the Department, but orris root, one of its constituents, was difficult to obtain during the war. During 1943, N. E. H. Caldwell and A. W. S. May recommended five lures based on ammonium carbonate or aqueous ammonia. The best was made up of shredded orange (2½ in. diameter), concentrated aqueous ammonia (18%) and tank water. (*QAJ*, Vol. 57, September 1943, pp. 166-168) Caldwell outlined measures for the control of maori mite in citrus in December 1940 and the citrus bud mite in April 1945, and in conjunction with F. W. Blackford developed control schedules for citrus pests and diseases in south-east Queensland. (*QAJ*, Vol. 56, August 1941, pp. 117-120) Alf Brimblecombe discussed the citrus branch borer in 1943. (*QAJ*, Vol. 57, July 1943, pp. 37-38) Other citrus pests investigated at Nambour were the citrus nematode and the red-shouldered leaf beetle. (*QAJ*, Vol. 48, December 1937, p. 730)

Bananas

J. A. Weddell and Miss Temperley investigated the damage caused to bananas by the fruit caterpillar (*Tiracola plagiata*) in southem coastal districts. Its alternate hosts were numerous with a special liking for inkweed (*Phytolacca octandra*.) They recommended using a paris green-bran bait and covering choice banana bunches with a stockingette "sausage". (*QAJ*, Vol. 33, March 1930, pp. 196-201, April 1930, pp. 251-261, including two excellent colour plates by Helmsing, the Illustrator). Weddell also studied the life history of the predator of the banana weevil borer (*Plaesius javanus*). (*QAJ*, Vol. 38, July 1982, 1932, p. 24) Caldwell wrote a comprehensive article dealing with the banana rust thrips and its control in August 1938. He recommended covering the bunches with hessian bags and dusting the fruit with nicotine based dusts over a four-season period. (*QAJ*, Vol. 50, August 1938, pp.154-163 and 576) During the war, brown paper bags were used because of the shortage of hessian.

Miscellaneous fruit and vegetables

J. H. Smith described the insect pests of the papaw, (*QAJ*, Vol. 48, November 1937, pp. 553-577) Hubert Jarvis described the pineapple scale, (*QAJ*, Vol. 59, July 1944, pp. 26-29) W. A. T. Summerville wrote on the onion thrips in 1933: three sprayings with Katakilla oil were effective. (*QAJ*, Vol. 39, January 1933, pp. 41-46) Cabbage moth-derris sprays were effective against the diamond-backed moth. In March 1933 Veitch described the

damage caused by nematodes; in April 1935 cabbage pests and their control; in May 1935 the brown vegetable weevil; and in December 1935 the potato tuber moth and its control. During 1942-43 potato storage was a problem and magnesite and derris dusts proved effective against the tuber moth. During 1942-43 the flea beetle destroyed 60% of the Lockyer potato crop. (Brimblecombe, A. R., *QAJ*, Vol. 57, August 1943, pp. 94-95) The bean fly (*Ophiomyia phaseoli*) was a problem in south-east Queensland and Caldwell recommended spraying with nicotine sulphate and white oil. (*QAJ*, Vol. 52, October 1939, pp. 393-396)

Tobacco

J. Harold Smith and D. O. Atherton, Entomologists at Cairns and later at Atherton, monitored tobacco pests at Mareeba. Seed-harvesting ants, which were taking seed from the tobacco seed beds, could be controlled by spreading a thin layer of medium river sand to a depth of approximately one-eighth of an inch over the seed in the bed. In 1932 Smith discussed the control of the tobacco stem borer, and Atherton found that the two copper sprays developed to control blue mould in the seed bed exerted some control over the leaf miner and stem borer. A handbook on tobacco pests and diseases was updated during 1932-33.

Cotton

W. J. S. Sloan, Assistant Entomologist, investigated the cotton web-spinner (*Loxostege officinalis*) first observed in the Callide Valley in 1931. In 1931-32 it moved from weeds to light attacks on cotton but in the 1935-36 season it was a very serious pest. Control measures advised included clean weed-free fields and swabbing affected plants with a mixture of arsenic and molasses in solution. (Sloan, W. J. S., *QAJ*, Vol. 46, December 1936, pp. 718-728) David J. Lee was appointed Entomologist to work especially on cotton pests in September 1937 at Biloela. His salary was paid by the Queensland Cotton Board, which aimed at decentralisation of research. (*Rep. Dep. Agric. Stk*, 1936-37, p. 77)

Sloan worked on control measures for cotton jassids (leaf hoppers) in 1938 and concluded that varieties of cotton resistant to jassid attack would be the answer. Stanley Marriott was located at Biloela and achieved some success with this objective. (Sloan, W. J. S., *QAJ*, Vol. 50, October 1938, pp. 450-455)

G. A. Currie, as mentioned before, had dealt with the brown cutworm during 1928-29 and Miss Evans with the cotton stainer. T. H. Strong worked on control of the com earworm in cotton. Infestations in cotton could be traced largely to local weeds acting as alternate hosts and cleaner cultivation was offered as one of the control measures.

Army worms

In 1932-33 the day-feeding army worm (*Spodoptera exempta*) and the lawn army worm (*S. mauritia*) occurred in plague proportions on the Atherton Tableland, seriously affecting pastures and maize. J. H. Smith wrote an article, "Caterpillar Plagues in Grassland and Cultivation Paddocks", and advocated using a paris green bait to halt the advance of the caterpillars. A similar plague occurred in the middle of March 1936, the day-feeding army worm being spread over an area from Roma to Rathdowney and involving Gympie, the Blackall Range, Samford, Strathpine, Brookfield, Moggill and Ipswich, with the heaviest infestation around Gympie and the Blackall Range.

Plague grasshoppers

J. A. Weddell stated that grasshopper plagues had been spasmodic in Queensland. (*QAJ*, Vol. 47, March 1937, pp. 246-259) Major plagues had occurred in March 1884 in sugarcane in the lower Herbert; in December 1886 around Toowoomba affecting pastures, and again in 1902-03; in 1907-08 around Rockhampton; in 1911-12 in Central Queensland; in 1914-15 in sugarcane at Ayr and around Springsure; in 1915-16 in the Townsville-Herbert area; and in 1916-17 around Toogoolawah.

A major plague involving the Australian plague grasshopper (*Chortoicetes terminifera*) was recorded during 1934-35. This actively involved the Departmental entomologists: J. A. Weddell, N. E. H. Caldwell, W. J. S. Sloan and T. H. Strong in southem Queensland; A. R. Brimblecombe at Wallumbilla; W. J. S. Sloan in the Callide Valley; and J. H. Smith in north western Queensland (Julia Creek to Charters Towers). Other lesser species were encountered, mainly the yellow-winged locust (*Gastrimargus musicus*) around Richmond and Hughenden.

Preliminary experiments showed that a bait consisting of 2 lb arsenic pentoxide, 4 lb molasses and 24 lb bran in 22 gallons of water was most successful. It was distributed over infested country between 10 a.m. and 3 p.m. at the rate of 12 bushels of bran equivalent of dry bran, by drill in an area 10 feet wide ahead of the hoppers. In December-January 1939-40 a baiting campaign on hatching grasshoppers involving shire councils and the CSIR led to the formation of a local information service, with field officers of the Department as couriers.

Pastures

Mention has been made of the army worm infestations. In September 1936 the Minister, the Hon. F. W. Bulcock, set up a White Grub Investigations Committee consisting of C. J. McKeon (Chairman), D.O. Atherton (Entomologist) as Secretary, and local farmers R. T. Crocker, M. Lynch and C. W. Roseblade, to study the effect of fertilisers, renovation, rotational grazing, crop rotations and free range pig raising. (*Rep. Dep. Agric. Stk*, 1935-36, p. 91)

The following month, J. H. Smith outlined in the *Journal* the importance of the grubs. The caudata white grub (*Lepidiota caudata*) attacked paspalum pastures on the Atherton Tableland during late summer, causing severe damage and shortage of grazing for dairy cows in particular. Pastures older than fifteen years were the worst affected. The destructive larval period occupied some eighteen to twenty months. The grub is indigenous to the rain forests of north Queensland and is an occasional pest of sugarcane. Trapping beetles at lights, "hogging-off" pastures with pigs, renovation of pastures to stimulate new growth and adoption of a mixed farming system were suggested as remedies. (*QAJ*, October 1936, pp. 446-468)

Timber pests

J. Harold Smith, while stationed in north Queensland, carried out a good deal of research on the pinhole borers of the walnut bean. They were problem insects in veneers and in the heartwood of logs and the chief species was *Crossotarsus grevilleae*. The Forestry Board sought help from the Departmental entomologists to seek a method of control. (*QAJ*, Vol. 38, September 1932, pp. 229-246)

Robert Veitch in March 1933 listed the common timber pests-the short-hole borer (*Platypus omnivores*), the hoop pine jewel beetle (*Prospheres auranteopictus*), the powder post beetle (*Lyctus brunneus*) and the Queensland pine beetle (*Calymmaderus incisus*). He recommended painting the timber with a mixture of creosote and kerosene to control these insects. (*QAJ*, Vol. 39, March 1933, pp. 122-127)

A. R. Brimblecombe was allocated to forest entomology in December 1935. He stated that the Queensland pine beetle was of major importance to householders in southern Queensland in hoop pine products. Its attacks usually started under the flooring boards of houses and spread from there. (*QAJ*, Vol. 46, November 1936, pp. 582-583) During 1936-37 Brimblecombe conducted research on the pine bark weevil, *Aesiotes notabilis*, a source of considerable worry in young stands of hoop pine. (*Rep. Dep. Agric. Stk*, 1936-37, p. 82)

General information. Robert Veitch published a comprehensive article on insecticides in the *Journal* for June 1938.

Insectivorous birds

Henry Tryon identified fifty-eight species of birds, and during 1919 Hubert Jarvis analysed the stomach contents of birds collected by Thomas Batchelor, the taxidermist, in the Mount Gravatt area. The results published in the *Journal* for July 1929 showed conclusively how beneficial such birds were in controlling the insect population. Consumption of seeds and fruit in the area was minimal.

Veterinary entomology

Fredrick Hugh Sherston Roberts, known to his colleagues as "Ossie", joined the Department on 23 January 1930 after service with the Commonwealth Prickly Pear Board at Gogango. He was the first officer to be appointed to a position in veterinary entomology in Australia. (Veitch, 1961) In February 1933 he was installed in new laboratories at the Animal Health Station, Yeerongpilly, and on 20 February 1936 he was named Entomologist and Parasitologist. In June 1938, Roberts was sent overseas by the Hon. F. W. Bulcock for eight months to study the control of parasitic diseases in stock in the United States, Canada, Great Britain, Holland, France and South Africa.

During World War II he was in a Malaria Unit in New Guinea. He proved to be an outstanding research worker and transferred to the CSIR Veterinary Parasitology Laboratory at Yeerongpilly in 1947 as Officer-in-Charge. Roberts was involved in research on external and internal parasites of domestic animals and spread his interest to a wider field when he discovered a new tapeworm (*Houttvignia* sp.) in the pigeon, and the Trichostongyles, *Trichostongylus retortaeformis*, *T. colubriformis*, and *T. vitrirus* found for the first time in a rabbit, along with a pinworm, *Passalurus ambigius* and a larval lapeworm of *Taenia serialis*. (*QAJ*, Vol. 44, September 1935, pp. 299-300)

External parasites of cattle

i. *Buffalo fly*. (Haematobla irritans exigua.) This had migrated from Indonesia to northern Australia and during 1928-29, J. Harold Smith, Assistant Entomologist at Cairns, and J. E. Clegg, District Inspector of Stock, surveyed the extent of its intrusion into Queensland. Queensland then in 1929 prevented cattle from the infested and suspected area of buffalo fly infestation from moving from the area to help prevent the spread of the fly further. The Commonwealth Government, which at that time was in charge of investigations, would not provide funds to Queensland for a clean muster of the infested area in Queensland and of "Wollogarang" and "Calvert Hills" in northem Australia and the creation of a buffer area thirty miles wide west of "Wollogorang" and so the fly spread further. (Walker, H.F., *QAJ*, Vol. 35, June 1931, pp. 345-347)

F. H. S. Roberts was to keep in touch with the fly's progress and advise the Minister. CSIR officers were investigating parasites of the buffalo fly introduced from Java (Indonesia) from their base at "Bumside", Ingham.

Since 1929 the fly had spread sixty miles eastward into Queensland and had reached the Leichhardt River beyond Burketown by June 1932. By June 1941 the fly had migrated to the Mitchell River on the west coast of Cape York Peninsula and at the end of June it had reached the east coast at Cooktown. No successful methods of control were available. Control of the organised movement of infested stock and the installation of spraying outfits at railheads had been instituted. (*Rep. Dep. Agric. Stk*, 1941-42, p. 1) The fly had reached Clermont in the central district and a few miles south of Bowen on the coast by June 1944 and was still extending.

Trapping and spraying were still being used and CSIR officers were researching the problem.

The American horn fly trap was adopted: the flies were wiped off cattle by curtains as the cattle walked through the trap and the flies were then attracted to lights and destroyed. (*Rep. Dep. Agric. Stk*, 1943-44, p. 19)

Roberts summarised the knowledge of the buffalo fly in a comprehensive article in the *Queensland Agricultural Journal*. (*QAJ*, Vol. 56, July 1941, pp. 34-42)

ii. *Cattle lice*. In November 1935 Roberts discovered a third species of cattle-sucking louse, the tubercle-bearing cattle louse (*Solenopotes capillatus*). It was found to be common in the northern cattle areas of the State and was collected on cattle grazing on "Gregory Downs" by Stock Inspector S. Seamer. He was to write about cattle lice before he left for overseas. (*QAJ*, Vol. 49, February 1938, pp. 115-120)

Surveys in 1937 showed that *Haematopinus eurysternus* was the most common cattle louse in the State and could be controlled by spraying with a mixture containing 5 mL nicotine sulphate (40% nicotine) to a gallon of water, giving two sprayings at intervals of fourteen days.

iii. The New Zealand cattle tick (*Haematophysalis bispinosa*) was found to occur in several north coastal areas. It can cause tick worry but is not a vector of tick fever.

iv. Simulid flies, *Trichuris gobulosa*, *T. ovis* and another *Trichuris* species were found on cattle. *T. ovis* was previously thought to be the only sandfly species infesting cattle.

External parasites of sheep

In February 1933 Roberts wrote about the life history, spread and control of sheep lice, the Sheep "lick", the scrub tick and scab (*QAJ*, Vol. 39, February 1933, pp. 74-91) and in 1941 outlined the distribution of the sheep body louse (*Bovicola ovis*) in Queensland. In 1937 surveys had shown that black sandflies (Simulids) severely affect sheep in westem Queensland after floods. Three species of *Trichuris* were involved.

In October 1931 Roberts described the various sheep blowflies which are troublesome in Queensland. (*QAJ*, Vol. 36, October 1937) He later attended field days held by CSIR in New South Wales dealing with blowfly control, and on his return, in conjunction with Sheep and Wool Officers and selected Veterinary Officers, held field days at Yeerongpilly and subsequently in several woolgrowing centres in western Queensland. Sheep jetting, crutching and the Mules operation figured largely in these meetings and demonstrations.

External parasites of pigs. In October 1937 Roberts wrote on the parasites of the pig, describing pig lice and mites causing sarcoptic and demodictic mange.

External parasites of dogs and cats. These were dealt with in a comprehensive article, comprising seventeen pages, in the *Queensland Agricultural Journal* for August 1935. The common dog fleas were *Ctenocephalides felis* (65%) and *C. canis* (33%), with *Pulex irritans* the most common in seaside dwellings.

Extemal parasites of poultry. In January 1936 Roberts drew attention to the feather mites of poultry. (*QAJ*, Vol. 46, January 1936, pp. 42-43) Later the stickfast flea was found at Boonah and drastic control measures were imposed.

Internal parasites. In 1934, Roberts published a check list of helminth parasites of domestic animals in Queensland, recording many for the first time.

i. Internal parasites of sheep. The new records for sheep included several Trichostongyles (Ostertagia trifercata, Cooperia punctata, C. oncophora, C. pectinata, Nematodirus spathiger, Trichostrongylus vitrinus, T. rugatus, T. falculatus, and Oesophagostomum venulosum) in sheep from the Goondiwindi area. (QAJ, Vol. 44, September 1935, pp. 299-300) In 1936 he reported on the distribution of gastrointestinal parasites of sheep in the State. The main one, the twisted stomach worm, occurred mainly in warm seasons in areas receiving more than twenty-four inches of rain a year. Roberts found that carbon tetrachloride which had been used in recent years as a drench for worms was in some cases toxic and he recommended the use of a bluestone-nicotine sulphate drench against both the stomach worms and the hairworms. In September 1939 he updated the information in a 26-page article, "The Parasitic Worms in Sheep". (QAJ, Vol. 52, September 1939, pp. 254-280)

In 1945 nicotine sulphate supplies were exhausted because of restrictions imposed by the war but phenothiazine had just become available. Roberts recommended using bluestone, bluestone and arsenic, or carbon tetrachloride for *Haemonchus*, bluestone, carbon tetrachloride or phenothiazine for hair worms (Trichostongyles) and phenothiazine for the nodule worm (*Oesophagostomum*). (*QAJ*, Vol. 60, June 1945, pp. 370-371)

- ii. *Internal parasites of the pig.* In October 1937 Roberts wrote on the internal parasites of the pig-liver fluke, tapeworms, round worms, thornheaded worms, whip worm, nodule worms, lung worms and kidney worms. The Pig Branch Officers had handled the farmer contacts at field days, rural school classes and personal visits. Arthur L. Clay, whilst veterinary officer at Atherton, reported that *Hyostrongylas rubidus* was pathogenic to pigs. This was confirmed by Roberts the first report in Queensland as a pathogenic organism.
- iii. Internal parasites of fowls. Among the new records for internal parasites in 1934 was a tapeworm found in fowls and recorded as *Raillientia echinobothrida*. Roberts undertook some painstaking research on the biology and control of the large round worm of fowls, *Ascaridia galli*, and published his findings serially in the *Queensland Agricultural Journal* from July 1936 to January 1937. He found that 42.1% of fowls over three years of age were infested with the worm. He recommended the injection of carbon tetrachloride with a syringe and nicotine sulphate incorporated in the mash at feeding. (*QAJ*, Vol. 46, November 1936, pp. 600-601) A comprehensive article, "The Parasites of Poultry", of twenty-two pages, was published in July 1939. (*QAJ*, Vol. 52, July 1939, pp. 4-26) An intestinal infestation in fowls believed to be *Capillaria collaris* was shown by Roberts to be *C. columbae*.
- iv. Internal parasites of cattle. In 1936 Roberts reported that the lesser stomach worm (Ostertagia sp.) had been found in coastal cattle and hairworms (Trichostongyles) in cattle on the Darling Downs. In February 1940 when dairying was so important for the war effort he summarised up-to-date information on "The Parasitic Worm Diseases of Cattle" (Q,AJ, Vol. 63, February 1940, pp. 136-155) giving symptoms, descriptions of the worms and treatments.
- v. *Parasites of the horse*. These were also covered in a *Journal* article by Roberts in April 1940. (*QAJ*, Vol. 53, April 1940, pp. 350-373)

Sawfly. The ironbark sawfly attracted Roberts' attention and he believed, as had J. C. Brunnich earlier, that toxins produced in the rotting heaps of dead larvae caused death in cattle, the cattle probably eating the mass of dead larvae at the foot of the ironbark tree as an outward indication of lack of phosphorus in the diet. Phosphorus licks were recommended. (*QAJ*, Vol. 37, January 1932, pp. 41-52)

Plant pathology

New laboratories were provided early in 1930, an Assistant Pathologist was appointed and a portion of the University glasshouse was made available for research. Negotiations were under way for an experimental plot on the Domain. In April 1931 J. H. Simmonds, Plant Pathologist, undertook a twelve-month overseas study tour, visiting plant disease stations in America, Europe, North Africa and Asia, and resuming duty on 4 April 1932. H. E. Young joined the

Department on 2 January 1934 and engaged exclusively in pathological problems with the Sub-Department of Forestry and was paid by that Branch. In April 1936 F. W. Blackford and J. E. C. Aberdeen joined the staff as Assistants to Pathologists. Aberdeen's salary was subsidised by tomato growers and the Rural Credits Fund to investigate solely tomato pathological problems. (*Rep. Dep. Agric. Stk*, 1935-36, p. 89)

A Plant Pathological Station was established at Toowoomba in early 1936 and a well equipped laboratory set up. Roy B. Morwood was made Officer-in-Charge and the laboratory concentrated on cereal crops on the Downs and fruit and vegetables on the Granite Belt. Also in early 1936 L. G. Vallance of the Agricultural Chemist's staff was switched to study soil problems associated with pineapples. Then contributions from the Fruit Industry Sugar Commission, the Rural Credits Branch of the Commonwealth Bank and the pineapple canners made it possible to employ E. W. B. Da Costa as plant physiologist and Hubert Groszmann as a plant breeder working on pineapples. There was a subsidy also from the Pineapple Sectional Group Committee. H. K. Lewcock was the supervisor of pineapple research: thus four officers worked full-time on pineapples with long-range finance for five years.

A second plant pathological field station was established early in 1941 at Atherton, specifically to handle maize diseases but handling all plant disease problems. (*Rep. Dep. Agric. Stk*, 1940-41, p. 8)

Pineapples

During 1928-29 a joint investigation by J. H. Simrnonds, Plant Pathologist, in the Department, and Dr T. B. Dickson (CSIR) into the water blister of pineapple caused by *Thielaviopsis paradoxa* was begun. Lewcock found that pineapple wilt was caused mainly by soil fungi and especially *Phytophthora cinnamomii* during wet seasons, and high soil acidity. He recommended drainage, prevention of erosion, adding organic matter such as green manure crops and adjusting the soil reaction to below pH 5.0 by the use of sulphur, to control the disease. (*QAJ*, Vol. 43, January 1935, pp. 9-17) In February 1935 he announced that top rot of pineapples (wet rot or heart rot), also caused by *P. cinnamomii*, could be controlled by ridge planting and immersing suckers or slips in bluestone or lime prior to planting. He also found that the disease yellow spot of pineapples was transmitted by *Thrips tabaci*. (*QAJ*, Vol. 48, December 1937, pp. 671-672)

Bananas

During 1928-29, leaf spot of bananas was studied at the Kin Kin Banana Experiment Station. It was caused by a fungus *Cercospora* sp. and a control programme was developed (*QAJ*, Vol. 52, December 1939, pp. 633-647) of spraying with Bordeaux mixture with Agrol as a spreader. In the March 1935 *Journal* Simmonds discussed the diseases of the banana, including bunchy top, leaf spot and speckle, heart rot, yellow leaf spot, panama disease, dry rot, cigar end, black finger, gumming, black pit, squirter, fruit stalk rot or black end and anthracnose. Norman J. King, Analyst, in 1932 thought the possible cause of squirter in bananas was physiological, owing to cold spells during the maturing period affecting bananas exposed on cleared slopes. In 1937, Simmonds and R. S. Mitchell determined the cause to be a fungus *Nigrospora sphaerica* from banana trash and debris around the packing shed. Cleanliness in the packing shed and periodic spraying with 5%

formalin reduced infection. The condition was a serious transport disease during the winter and early summer. Later it was found that irnmersion of "singles" in a 1% solution of Shirlan AG would control the disease. (*QAJ*, Vol. 47, June 1937, pp. 542-548) Banana heart rot was found to be a virus disease spread by the banana aphis.

Citrus

L. F. Mandelson studied citrus black spot (*Phoma citricarpa*) at Palmwoods and black spot and melanose at Mapleton on the farm of J. Park. Citrus root nematode (*Tylenchus semipenetrans*) was found to be limiting citrus growth at Gayndah on some soils. Mottle leaf of citrus caused by *Tylenchulus semipenetrans*, brown spot of the Emperor mandarin and pink disease of citrus were also met with. In February 1937 Simmonds summarised the position of the above diseases as well as scab, blue mould, brown rot and stem rot, psorosis, exanthema, collar rot, gumming, armillaria root rot, sooty mould and smoky blotch. Brown spot of the Emperor mandarin was found by Mandelson and F. W. Blackford to be controlled by treatment with Bordeaux mixture or colloidal copper and in August 1938 Blackford outlined spraying recommendations for the control of citrus diseases. To lessen costs, Blackford gave details for the manufacture of a homemade cuprous oxide mixture with which to spray citrus and provided notes on the diseases. (*QAJ*, Vol. 56, July 1941, pp. 4-33)

Deciduous fruit

Physiological breakdown following storage of deciduous fruit was examined and green rot of apricots, found to be caused by *Sclerotinia sclerotiorum*, was the first record of this disease in the State. In December 1937, R. B. Morwood discussed the occurrence of "little leaf" in apple trees, and Keighley Ward in May 1939 stated it was due to zinc deficiency and could be controlled by spraying the trees with a mixture of 50 lb zinc sulphate in 100 gallons of water.

Passion vines

Diseases of the passion vine were investigated on the farm of Mr Bishopp of Tarnborine. Brown spot (*Macrosporium* sp.) and scab (*Cladosporium* sp.) were investigated and control measures recommended. J. H. Simmonds stated that woodiness came to Queensland about 1931 and by 1936 was the most important passion vine disease. It was caused by a virus and the best control was to cut off diseased plants to ground level in situ and allow them to die there, use clean pruning knives, and destroy plants of the white passion flower (*Passiflora alba*) nearby as it was an altemate host. (*QAJ*, Vol. 45, April 1936, pp. 322-330)

Grapes

Berry shrivel of the grape had been found to be a drought effect. In 1939 R. B. Morwood published a comprehensive coverage of diseases of the vine. (*QAJ*, Vol. 51, January 1939, pp. 5-16)

Tomatoes

During 1928-29 R. B. Morwood investigated the occurrence of Verticillium wilt of tomatoes and J. H. Simmonds summarised the current information on tomato diseases in the April 1932 *Journal*, and again in January 1936.

Beans

In 1931 Mandelson discovered a new disease of beans called angular leaf spot, caused by *Isariopsis griseola*. Halo blight of beans reached serious proportions in February 1931, owing to seed infection by *Phytomonas medicaginus* var. *phaseolicola*. He recommended use of disease-free seed or seed of a variety resistant to the disease. (*QAJ*, Vol. 37, February 1932, pp. 128-133)

Potatoes

During 1930-31 Irish blight seriously affected potato crops and the virus diseases of leaf roll and mosaic were common. Morwood found that potato crops on the coast were not being sprayed. During 1935 he carried out spraying experiments and showed that three sprayings of a 4-4-40 mixture (4 lb bluestone and 4 lb quick lime in 40 gallons of water) successfully controlled the disease. Sulphur sprays would not. (*QAJ*, Vol. 45, March 1936, pp. 232-236)

Wheat

R. B. Morwood paid close attention to flag smut in wheat on the Darling Downs. During 1930, in collaboration with the Director of Agriculture, H. C. Quodling, R. E. Soutter and others, he tested thirty-one varieties of wheat for resistance to flag smut (*Urocystis tritici*). A high degree of resistance was found in the varieties Nabawa and Florence. It was also demonstrated by Simmonds that bluestone treatment of seed before planting was effective against light infestations of flag smut. (*QAJ*, Vol. 33, June 1930, p. 388)

Maize

Cob rot of maize was shown to be caused by *Diplodia macrocarpa* as well as by *D. zeae* along with *Fusarium* sp. In April 1935 Morwood summarised the results of his 1934 cereal smut experiments. Dusting the seed of maize, peanuts and prairie grass with mercury dusts such as ceresan controlled seed-bome diseases in these crops.

Tobacco

With the expansion of the tobacco industry during 1931-32, L. F. Mandelson devoted his whole time to this crop. Imported seed from America was passed through quarantine and the resulting crops were inspected in the field to check if disease had been imported. Blue mould became the worst disease and control measures were required urgently. During November 1934 and June 1935, CSIR officers developed control of blue mould in tobacco seedbeds by exposure to benzol vapour applied as benzol at the rate of 2 square inches of evaporating surface in trays per two square feet of seedbed. Mandelson confirmed this in 1936.

Cotton

Cotton wilt was found to be caused by *Verticillium* sp. instead of by *Fusarium*, which caused wilt in other crops. It was recorded for the first time in Queensland in a crop at Boonah. (Simmonds, J. H., *Rep. Dep. Agric. Stk*, 1931-32, pp. 56-57)

Timbers

Timber diseases identified for the Forestry Sub-Department by Department of Agriculture and Stock officers included Diplodia disease of *Pinus radiata* caused by *Botryodiplodia pinea*, and bark splitting of *Araucaria cunninghamii* seedlings caused by *Phoma juniperovia* during 1930-31. In 1934 H. E. Young joined the Department to deal with forestry diseases. He commenced work on the fused-needle disease in species of exotic pine trees in forest timbers. This was to provide the material for the thesis which gained him the first Doctorate of Agricultural Science awarded by the University of Queensland. He showed it to be a nutritional disease associated with the lack of soil phosphorus. His first research report was published. (*QAJ*, Vol. 44, September 1935, pp. 286-298) In addition to *Diplodia pinea* identified by R. B. Morwood in 1930 affecting *Pinus radiata*, Harold Young identified *Diplodia natalensis* affecting *Pinus taeda* and *P. caribaea* at Beerwah. (*QAJ*, Vol. 46, September 1936, pp. 310-327)

Miscellaneous diseases

Powdery mildew of papaw on a farm at Camp Mountain was found to be caused by *Sphaerotheca humuli*, and in 1937 J. H. Simmonds published an article dealing with diseases of the papaw. (*QAJ*, Vol. 48, November 1937, pp. 544-552). F. W. Blackford in 1939 described the virus diseases of strawberries (*QAJ*, Vol. 51, January 1939, pp. 173-176) L. F. Mandelson recorded a new disease, lettuce spot, caused by *Septoria lactuca*, in 1930. R. B. Morwood found narcissus bulb rot was caused by a nematode (*Tylenchus dipsaci*), and mosaic in *Lilium longiflorum*. (*Rep. Dep. Agric. Stk*, 1930-31, pp. 47-48) Witches' broom disease of luceme was studied at the Queensland Agricultural College at Gatton during 1938-39 by Morwood and the Departmental entomologists were called in to find an insect vector.

Sugar

Arthur F. Bell investigated a new disease in the variety POJ 2714 at Mackay in 1930 and called it dwarf disease. He suspected it to be of virus origin and suggested the variety be replaced, infested stools destroyed and farm hygiene improved until more was known of the disease. (*QAJ*, Vol. 37, January 1932, pp. 9-17) William Cottrell-Dormer submitted his thesis for his Bachelor of Science in Agriculture with Honours to the University of Queensland under the title "Red Stripe Disease of Sugar cane in Queensland". He showed that both top rot and red stripe diseases were caused by the same bacterium, which he identified as *Phytomonas rubrilineans*. (*QAJ*, Vol. 37, January 1932, pp. 23-40 and February 1932, pp. 98-114)

Plant physiology

Early in 1937 the Department was able to initiate a comprehensive five-year program of research into pineapple problems, largely as a result of financial assistance received from

the growers, canners and other interested bodies. On the reorganisation of research activities within the newly constituted Division of Plant Industry (Research), the officers engaged in pineapple investigational work were, with one exception, included in the Plant Physiology Section, which in 1937-38 was confined to pineapple investigational work.

The main objective of the pineapple investigations was the securing of a reduction in production costs through improvements in cultural practices. Work had been planned to cover:

- 1. cultural studies-the soils work of L. G. Vallance and H. L. Wood in co-operation with field officers;
- 2. plant selection problems by H. M. Groszmann at Nambour from May 1937;
- 3. fruit quality studies by E. W. B. Da Costa.

Thirty-two experimental plots were laid down throughout the pineapple growing districts and trials were to continue over a cycle of three crops. The value of paper mulch soon showed. The effectiveness of acetylene treatment to induce flowering was worked out with the help of Queensland Oxygen Pty Ltd. Selection of slips taken from vigorous stock showed this to be a major improvement. Monthly application of sulphate of iron sprays proved beneficial with soils failing to respond to economic applications of sulphur because of their high buffer capacities. Spraying young plants with a solution of boracic acid greatly reduced the incidence of "crookneck" disease.

The plant selection project sought out a strain or strains of the Smooth Cayenne variety which would yield fruit of better average shape, size and quality, and to select and propagate superior genotypes.

The fruit disease investigations showed that "marbling" was caused by two types of bacteria, and "black heart" was due to low sugar concentration in immature fruit.

Donations of fertilisers for the experiments were made by A.C.F. and Shirley's Fertilisers Ltd, Nitrogen Fertilisers Pty Ltd and the Pacific Potash Company. (Lewcock, H. K., *Rep. Dep. Agric. Stk*, 1937-38, pp. 40-45)

Borax was found to reduce the severity of "hen and chickens" disease in Waltharn Cross grapes. (*Rep. Dep. Agric. Stk*, 1941-42, p. 6)

Botany

The decade 1929-39 was an extremely busy period for the Government Botanists.

Herbarium

The Australian section of the Herbarium was reorganised for reference purposes during 1928-29. The Director of the Royal Botanic Gardens at Kew in England, C. E. Hubbard, was approached and consented to revise the genus *Astrebla* (Mitchell grass.) All the Queensland material was sent on loan to Kew for this purpose. (*Rep. Dep. Agric. Stk*, 1928-29, p.65)

At the same time the Government Botanist, C. J. White, was entrusted with the examination of the L.J. Brass (USA) Collection (from Cape York Peninsula) and a set of all specirnens was incorporated in the Queensland Herbarium. The original set was for the Arnold Arboretum in Boston.

In December 1929, W. D. Francis, Assistant Botanist, went to Kew to undertake a year's work, and in April 1930 Hubbard of Kew came to classify Queensland grasses. His visit was to prove very important to grass taxonomy in this state. (White, C. T., *Rep. Dep. Agric. Stk*, 1929-30, pp. 63-64). C. W. Winders, an assistant in the Botany Section presently undertaking the University course in agricultural science with a view to taking up work in agrostology in the Department, accompanied Hubbard on his collecting trips throughout the State as opportunity offered. Some nine hundred and seven dried specimens were sent to Francis at Kew for identification and labelling. C. T. White gave assistance to Mrs Forgan-Smith in the preparation of a popular publication, "The Eucalypts or Gum Trees of the Brisbane District". During 1939-40 Henry Tryon donated his private herbarium of native plants to the Oueensland Herbarium.

From 7 March to 11 October 1938 C. T. White spent an extended period as liaison officer at the Royal Botanic Gardens at Kew.

Collecting trips throughout Queensland and New South Wales during this decade included visits to Springbrook and Lamington where several new species were obtained; to Beechmont to classify the various types of Queensland nut (*Macadamia ternifolia*) for which C. T. White forecast a bright future commercially; Dorrigo State Forest in New South Wales; Biggenden in the Bumett; the Main and Little Liverpool Ranges; Glasshouse Mountains and Springbrook; Mt Ernest, Torren's Creek; Townsville and Mount Spec, and the Blue Mountains in New South Wales; Glen Lamington; Roma to Injune and the Carnarvon Ranges; Ballandean to Wallangarra and Mt Edwards. Several species new to science were collected. A week was spent at Hayman Island labelling plants for tourist information.

During 1935-36 White published "Contributions to Queensland Flora No. 5", issued as Volume 97, No. 5, *Proceedings of the Royal Society of Queensland*. It included descriptions of thirty-two Queensland plants previously unknown to science.

White continued his informative "Answers to Correspondents" in each monthly *Queensland Agricultural Journal* in reply to readers who forwarded specimens for identification.

Poisonous plants

The Government Botanist and his staff continued to record occurrences of poisoning or suspected poisoning of stock by various plants. Either plants were sent in for identification or a field officer or veterinary surgeon would seek the assistance of botanists in the field at first hand. C. T. White also requested feeding tests at the Yeerongpilly Stock Experiment Station wherever possible.

A Departmental Poison Plants Committee was set up early in 1937, established by a grant from the Australian Wool Board for the purpose of conducting investigations with plants suspected of being poisonous to stock. It consisted of Professor H. R. Seddon, Dean of the

Faculty of Veterinary Science; the Government Botanist, C. T. White; the Agricultural Chemist, E. H. Gurney; the Director, Animal Health Station, Yeerongpilly, Dr John Legg. However, prior to its formation, White and his officers had established a long list of suspected poisonous plants, viz. thirteen during 1930-31, and an additional twenty-six during 1931-32. By 1939, the list had grown to the following:

Family ASCLEPIADACEAE Asclepias curassavica-Red head or milky cottonbrush Cryptostegia grandiflora-Rubber Vine (Barcaldine) Hoya australis-Waxflower (Wondai)

Family BORAGINACEAE *Trichodesma zeglanicum*-Camel bush

Family CHENOPODIACEAE *Threlkeldia proceriflora*-Soda bush

Family COMBRETACEAE Terminalia oblongata-Yellow-wood

Family COMPOSITAE Verbesina encelioides-Crown beard Wedelia asperrima-Yellow daisy (Cloncurry)

Family CONVOLVULACEAE Ipomoea calobra-Weir vine (Surat)

Family CUCURBITACEAE *Cucumis myriocarpus*-Prickly Paddymelon (Cloncurry) *Cucumis trigonus*-Paddymelon (Cloncurry)

Family CYCADACEAE *Cycas media*-Zamia palm

Family DYSPHANIACERE *Dysphania myriocephala*-Red Crumbweed

Family EUPHORBIACEAE Andrachne decaisnei-Andrachne Euphorbia drummondii-Caustic creeper (Longreach)

Family GRAMINEAE Brachyachne convergens-Native Couch Cynodon dactylon-Green Couch Dactyloctenium radulans-Button grass (Cloncurry) Eleusine indica-Crowsfoot grass (Pomona) Panicum maximum var. trichoglume-Green Panic Sorghum verticilliflorum-Wild Sorghum

Family LABIATAE Salvia coccinea-Red Salvia Salvia reflexa-Mintweed Family LEGUMINOSEAE Crotalaria medicaginea-A Rattlepod (Homestead) Swainsona galegifolia-Smooth Darling Pea Swainsona luteola-Dwarf Darling Pea

Family LINACEAE Linum usitatissimum-Linseed (Pittsworth)

Family MALVACEAE Malvastrum spicatum-Malvastrum (Cloncurry)

Family MELIACEAE *Melia azedarach* var. *australasica*-White Cedar

Family MYOPORACEAE Eremophila latrobei-Emu Bush Myoporum acuminatum-Boobialla (Strychnine bush) Myoporum deserti-Ellangowan poison bush (Grey Range)

Family OLACACEAE Ximenia americana-Yellow plum

Family PASSIFLORACEAE Passiflora suberosa-Corky Passion Vine

Family POLYPODIACEAE Blechnum serrulate-Bungwall Fern (Coolangatta)

Family PORTULACACEAE *Portulaca filifolia*-(Hughenden)

Family PRIMULACEAE Anagallis arvensis-Scarlet Pimpernel (Indooroopilly)

Family SAPINDACEAE Atalaya hemiglauca-Whitewood Heterodendron oleifolium-Boonaree or Rosewood

Family SOLANCEAE Cestrum parqui-Green Cestrum (Ipswich, Brisbane, Bundaberg) Duboisia leichhardtii-Corkwood Solanum aviculare-Kangaroo apple (Tara) Solanum nigrum-Blackberry Nightshade (Kilkivan) Solanum seaforthianum-Brazilian Nightshade Family THYMELIACEAE *Pimelea trichostachya*-Flaxweed (Mitchell) *Wickstraemia indica*-Tie bush (Leitch's Crossing)

Family ULMACEAE *Trema aspera*-Peachleaf Poison Bush (Kingaroy) Family VERBENACEAE Lantana camara-Lantana

Family ZYGOPHYLLACEAE *Zygophyllum apiculatum*-Twin leaf or Gall weed (Dalby)

With White's assistance *The Queenslander*, a weekly magazine, published a series of articles on poisonous plants.

Bishop Island

Selwyn Everist, Junior Assistant Botanist, in 1932 was sent to Bishop Island to make a list of plants to be gazetted as protected under The Native Plants Protection Act. (White, C.J., *Rep. Dep. Agric. Stk*, 1931-32, pp. 58-61)

Dr E. Hirschfield's property "Bybera", Inglewood

Dr Hirschfield, a Brisbane medical practitioner, owned a property at Inglewood and took a keen interest in development of the brigalow country. He introduced Mitchell and Flinders grasses under cultication. A questionnaire was forwarded by C. T. White to graziers asking their opinion about these two grasses. The questionnaire was answered splendidly and much information was collated.

"Principles of Botany for Queensland Farmers"

C. T. White began a series of articles in the *Queensland Agricultural Journal* for August 1936 under this title. They concluded with Chapter XV in the February 1937 issue. It was well illustrated and easy to follow.

Everist's western Queensland research

From December 1935 to March 1936, Selwyn Everist visited western Queensland to select sites for pasture experiments. He selected three plots in the Blackall district at "Duneira", "Mineeda" and "Athol", and two at Hughenden-"Corona" and "Cameron Downs"-for stocking experiments. His research showed that enclosure of the Mitchell grass areas for eighteen months gave an increase in herbage usually eaten by sheep in preference to Mitchell grass such as *Salsola kali* (Roly-poly), *Portulacua oleracea* (Pigweed), *Rhynchosia minima* (a legume), *Sida* sp., *Malvastrum spicatum* (Malvastrum) and *Bassia echinopsila* (Red Burr) Flinders grass litter was also cleaned up by sheep before Mitchell grass (*Astrebla lappacea*).

Whilst stationed at Blackall, Everist was also asked to make a study of fodder trees and their value in western Queensland and he subsequently produced an illustrated bulletin dealing with his findings.

Brigalow destruction

In February 1938, C. T. White and R. E. Soutter visited the Tara district to ascertain what measures the graziers were using to contain the brigalow. Shallow frilling followed by burning in three to four years gave best results, and grazing young suckers with under one month's growth with sheep at the rate of one sheep per acre kept suckers in check if there was little grass to attract sheep from the suckers. (*Rep. Dep. Agric. Stk*, 1937-38, p. 27)

Leucaena leucocephala

N. A. R. Pollock, Northern Instructor in Agriculture, sent to the Government Botanist a sample of this plant on 1 September 1936. Analysis of the plant by the Agricultural Chemist on 29 October 1921 showed it contained 25.75 per cent of protein in the leaves and twigs. Stockmen around Bowen told of the loss of hair in the tail and from the mane in horses from eating this plant around Bowen at that time. (White, C. T., *Rep. Dep. Agric. Stk*, 1936-37, pp. 110-114)

Weeds

Government Botanists turned their attention to publicising weeds from 1936. C. T. White described Tridax daisy (*Tridax procumbens*), Groundsel bush (*Baccharis halimifolia*), Hexham scent (*Melilotus indica*), Crofton weed (*Eupatorium adenophorum*), Bindweed (*Convolvulus arvensis*), Castor oil (*Ricinus communis*), Thornapple (*Datura stramonium*) and Hoary Cress (*Lepidium draba*) He also announced that Indian Hemp (*Cannabis sativa*), Opium poppy (*Papaver somniferum*) and Coca leaf (*Erythroxylon coca*) had been declared noxious weeds under the Local Government Act and in the December 1938 issue of the *Journal* illustrated and described these plants. W. D. Francis, Assistant Botanist, described Knobweed as a weed new to tropical Queensland.

Grass identification

S. L. Everist described the various Chloris grasses in Queensland and provided a key to their identification. (*QAJ*, Vol. 49, May 1938, pp. 420-424) while Lindsay S. Smith, transferred from the Chemist Branch, described the various couch grasses.

Food plants

In co-operation with the Queensland Nutrition Council, the Department of Health and Home Affairs and Government Analyst during 1938-39, the Government Botanist prepared publications "Native Plants in Human Diet" and "Food Plants of the Aborigines".

Rainforest trees

W. D. Francis continued his special interest in rainforests and rainforest trees of tropical Queensland. (*QAJ*, Vol. 51, March 1939, pp. 250-279)

Edible trees and shrubs (fodder trees)

The Brown Kurrajong (*Commersonia bartramia*) [August 1943], Broadleaved Sally Wattle [October 1943], Queensland Bottle Tree (*Brachychiton rupestris*) [December 1943] and

the Mulga (*Acacia aneura*) [February 1944], were described in the *Journal* during the war years by W. D. Francis.

Marketing

The first report of the Director of Marketing, L. R. MacGregor, under The Primary Producers' Organisation and Marketing Act of 1926, was published in the annual report of the Department for 1928-29.

In reviewing the experience gained from the organisation of agriculture during the previous decade, MacGregor named three trends of development.

- 1. The lesson of experience, which clearly demonstrated that farmer organisation to be effective must be on a commodity basis.
- 2. The encouragement of the farmer first to make himself conversant with his marketing problems gradually forces the realisation of the fact that although much can be accomplished by organised marketing, nevertheless the solution of many problems lies with the individual farmer.
- 3. The lessons of Queensland's espousal of the intensive system of farmer organisation on a commodity basis have become infectious. The plan has been copied in New South Wales and in the other States, while much interest has been evolved in other lands in the light of the Queensland experience. (MacGregor, L. R., *Rep. Dep. Agric. Stk*, 1928-29, p. 149)

By 30 June 1929, fourteen products had been brought under controlled marketing:

- arrowroot, established in 1922 without any opposition;
- Atherton maize, established in 1923 without any opposition;
- broom millet, established in 1926 without any opposition;
- butter, established in 1925 by a 75 per cent majority, renewed in 1928 without any opposition;
- canary seed, established in 1925 by a 75 per cent majority, renewed in 1928 without any opposition;
- cheese, established in 1922 by a 91 per cent majority, renewed in 1925 and 1927 without any opposition;
- cotton, established in 1926 without any opposition;
- eggs, established in 1923 by an 87 per cent majority, renewed in 1925 by a 73 per cent majority, renewed in 1926 by a 66¼ per cent majority, renewed in 1929 by a 70 per cent majority;
- fruit, with the Committee of Direction of Fruit Marketing established by special legislation in 1923 for a period of three years. The Act provided for a ballot to be taken at the end of the three-year period in the event of 500 growers demanding such ballot. A sufficient number of requests for a ballot to be taken on the question of continuance was not received;
- honey, established in 1929 without any opposition;
- northern pigs, established in 1923 without any opposition and renewed in 1926 without any opposition;
- peanuts, established in 1924 without any opposition, renewed in 1925 without any opposition, renewed in 1926 by a 90 per cent majority;
- strawberries, established in 1929 with an 82 per cent majority;

— wheat (under the Wheat Pool Act), established in 1921 by a 97½ per cent majority, extended in 1924 by an 89 per cent majority, extended in 1928 without any opposition.

Sugar was the subject of a separate arrangement between the State and Commonwealth Governments with the approval of the sugarcane growing and manufacturing interests. (MacGregor, L. R., *Rep. Dep. Agric. Stk*, 1928-29, pp. 149-150)

The facility which has been afforded farm leaders of making themselves conversant with marketing economics, so far as they concern the particular product they are specially interested in, has been helpful in many cases in effecting the stabilising of prices, in encouraging a more gradual emplacement of perishable products on the market, in enabling the giving of advice to producers of perishable products as to the extent to which the market can absorb the product, and generally in many ways assisting the anticipation of and measurably influencing of (if not the control of) marketing conditions.

It is especially noteworthy that in a good number of instances the realisation has been forced upon all concerned that marketing conditions lead back to the farm. Again in other instances farm leaders have been impelled to realise that there are limits beyond which the consumer cannot afford to pay the price and that inflation results in a shrinking of consumption. In other cases they have been brought to see that the Queensland product compared unfavourably with products from elsewhere. Hence attention has been directed to fresh seed supplies, increased production on the farm, improvement in packing, and many other matters associated with farm economics rather than with those things which purely concern the collective marketing of the product.

An atmosphere has been created which lends itself to the launching of a well-directed campaign designed to secure the co-operation of primary producers in Queensland in steps calculated to reduce production costs. During the last seven years, a goodwill has been built up among the farmers in relation to the marketing phase of organisation, and it seems to be incumbent upon us to develop the same goodwill in respect to the tackling of production problems.

The point may be emphasised therefore that organised marketing is not necessarily uneconomic. The bringing of agricultural leaders face to face through practical experience with the essentials of marketing economics is promising to be fruitful of untold good, even in those instances in which temporarily the experience of wisdom has to teach its lessons. (Macgregor, L. R., *Rep. Dep. Agric. Stk*, 1928-29, p. 150)

The Commonwealth Parliament passed the Rural Credits Act constituting a Rural Credits Department of the Commonwealth Bank to provide finance for marketing operations, thus relieving the State Government of guarantees.

In 1930 a Barley Pool was constituted by an 81 per cent majority and the Strawberry Pool which expired by effluxion of time was not reconstituted. A. E. Graham, Under-Secretary for Agriculture and Stock, was also Director of Marketing and submitted a report on the operations of each of the Pools of which he was officially a member in the annual report of the Director of Marketing. Other marketing details are given under the Department and World War II.

Reclamation of prickly pear land

The success of the *Cactoblastis cactorum* caterpillar in reclaiming prickly pear land led the Department to investigate means of bringing the reclaimed land into productive use. A 70 acre block was secured at Palardo in the Maranoa district. In designing the experiments consideration was given:

- (a) to deriving the fullest possible benefit from the large quantity of vegetable matter present;
- (b) to avoiding the immediate use of fire in order to ensure the preservation of the humus and the various forms of insect life which had wrought the destruction of the pear in the first place, so that successive generations of insects might more effectively deal with all the following growth of pear; and incidentally to obviate the inevitable suckering which took place if brigalow was prematurely fired;
- (c) to frilling and poisoning the standing timber with arsenic pentoxide to ensure a more rapid and decisive kill;
- (d) to broadcasting summer-growing and winter-growing grass mixtures and cover crops to permit of stocking the country as quickly as possible, and making it productive in a matter of months rather than years; and in doing so, bringing about an appreciable increase in its carrying capacity;
- (e) to ascertaining the most suitable and effective strength of arsenic pentoxide solution for timber destruction and for killing "suckers";
- (f) to determining the best period of the year to destroy the timber so that any suckering of the brigalow would be obviated.

Broadcasting of Rhodes and paspalum grasses, sudan grass, white panicum, Japanese millet, French millet and giant panicum directly on to the rotting pear mass gave only fair results due to dry weather but subsequent broadcasting of lucerne, bokhara clover, Sheep's burnet, Toowoomba canary grass, wheat, barley, oats, rye, canary seed and rape for winter forage, aided by an excellent winter season produced abundant forage and showed that this system would give an early dividend in these reclaimed lands. (Quodling, H. C., *Rep. Dep. Agric. Stk*, 1929-30, pp. 17-18)

Continuing into the 1930-31 year the projects were successful but good rainfall was required for establishment to enable the moisture to sink below the rotted prickly pear mass.

Seeds, stock foods, fertilisers and pest destroyers

Numerous samples of seeds were tested for merchants and buyers. A major problem with pasture seeds was the immaturity at harvest. After-ripening in storage generally improved the germination percentage and it was suggested to merchants that they should store the seed and sell it when the required germination percentage was attained.

In the Stock Foods Section it was found that imported canary seed was favoured by merchants as canaries prefer to shell their own seed and rejected the broken grain in a lot of Queensland-harvested seed. Poultry men complained of the rise of mouldy grain in mixed rations purchased. Insect problems were also met with and F. F. Coleman, in charge of the branch, offered advice on fumigation of grain with carbon bisulphide, emphasising precautions to be taken in its use.

New regulations regarding stock licks provided that bone meal, bone dust, or bone flour for stock licks and feeding purposes had to be made only from bones obtained from animals slaughtered for human consumption, and would be subjected for at least two hours to a steam heat at a temperature of not less than 250°F and ground to a fineness of at least 95 per cent passing through a one-twenty-fifth of an inch aperture. A list of stock licks and mineral feeds was published in the May 1930 issue of the *Queensland Agricultural Journal*.

Several fertilisers were found not to contain the minimum percentage of ingredients as stated on the label and were subject to penalties imposed on their vendors.

A considerable amount of time was taken up by the inspection and examination of peanut samples of material delivered to the Peanut Board at Kingaroy.

F. F. Coleman, as the Departmental representative on the Pasture Improvement Committee, became heavily involved in fertiliser experiments.

General analyses were carried out during 1932-33. Samples of sorghum seed from the Darling Downs were often contaminated with *Datura* (Thornapple) seeds. Sudan grass and sorghums were tested for HCN content and the Sudan grass had much less HCN than the sorghums. Numerous stock foods, fertilisers and pest destroyers were tested and registered.

Two conferences of Seed Testing Officers were held in Melbourne and Adelaide, where rules for uniform methods of analyses and tentative standards were considered. "Pure Germinating Seed" was substituted for "purity" and "germination" separately. Pure germinating seed is obtained by multiplying the percentage of pure seed by the percentage of germinable seed and dividing by 100. Also under the Act all seeds had to be uniformly labelled, and seeds could be seized if the Act was not complied with within ninety days. (F. F. Coleman, *Rep. Dep. Agric. Stk*, 1937-38, pp. 119-129)

Chemist

During 1929, C. R. von Steiglitz and N. G. Cassidy were transferred to the Bureau of Sugar Experiment Stations. J. C. Brünnich, the first Agricultural Chemist, retired in September 1931. During 1935-36, Henry L. Wood transferred from the photographic group to the Agricultural Chemist. Mr. F. Few was appointed Assistant Analyst and Oliver St.J. Kent was transferred permanently to the Dairy Branch.

The Chemists were increasingly called upon not only for the normal analytical work but also for special assignments. Analyses of pastures for the Pasture Improvement Committee occupied a major proportion of the time, the results being published in detail in the 1930-31 Annual Report. Analyses of paunch contents, commenced in 1930, gave startling and interesting results, e.g. the high phosphoric acid content in the paunch of a steer fed lucerne chaff. Analyses of grasses from a sheep station at Julia Creek for Dr John Legg showed that malnutrition was due to protein and mineral deficiencies in the grasses in the dry conditions. (Brünnich, J.C., *Rep. Dep. Agric. Stk*, 1929-30, pp. 68-87) Analyses were published. The chemist recommended a lick and one grazier wrote, "Since using this lick I have not seen a sign of sickness nor have I drenched for worms. My usual carrying capacity prior to its use was a sheep to two acres or 40,000. I have gradually increased the numbers, until at the commencement of the 1926 drought I had 85,000. 15,000 went away in

September, leaving 70,000 which are still all in good, strong condition, and from which there has not been more than the normal losses." (*QAJ*, Vol. 31, January 1929, p. 11)

Soil samples were done for the expanding tobacco industry, for pineapple nutrition, and for cotton rotation trials. Casein glues were examined for the Forestry Sub-Department in connection with the gluing of plywood and soft soaps were tested for constituents of sprays. Ginger, arrowroot bulbs, tung oil and macadamia nuts were analysed for composition.

Dr M. White, the Animal Nutrition Officer, worked on supplements for Mitchell grass and Rhodes grass, while J. M. Harvey (later to become Director-General) worked on digestibility of foods. Endemic fluorosis in sheep was detected in the late 1930s and Harvey was delegated to investigate this problem which by 1943 was causing serious losses. In collaboration with the Pig Nutrition Committee tests were made with feeding meat meal to pigs.

The Minister, the Hon. F. W. Bulcock, formed a Departmental Experimental Committee of officers to work with Local Producers Associations in different localities in any outstanding experiments desired of a varietal, cultural or fertilising nature. Proposals were received and considered and some were implemented. Fifty were decided on for coastal districts as far north as Mackay including crop varietal trials, fertiliser trials, green manuring, winter grasses and fodders, soil erosion control and drainage. (Graham, A. E., *Rep. Dep. Agric. Stk*, 1934-35, p. 12)

Soils and soil erosion

Increasing interest was being taken in soils and soil fertility in the late 1920s. Dr Kerr had given these subjects highest priority in the planning of the agricultural section of the Bureau of Sugar Experiment Stations.

In September 1929, Professor Prescott of the Waite Research Institute, Adelaide, H. J. G. Hines of the Queensland University, Mr Winks and N. A. R. Pollock of the Department made an inspection tour of the north-west of Queensland. They visited Sellheim, Charters Towers, Pentland, Hughenden, Richmond, Winton and Longreach, investigating soils on desert sandstone, granites, alluvials and the brown and chestnut soils of the rolling Downs.

On 8 October, under the Chairmanship of the Minister for Agriculture and Stock, the Hon. H. F. Walker, Professor Prescott, who was Chief of the Division of Soil Research, addressed a gathering of officers of the Department of Agriculture and Stock, Public Lands and the Provisional Forestry Board in the Land Court Room, Brisbane. He outlined the various world groups of soils, the intention of the Division of Soil Research to build up a soil survey staff to map Australia's soils and generally to lead to a discussion of a soil classification suitable to Queensland based initially on the Russian Glinka's classification. (*QAJ*, Vol. 32, November 1929, pp. 528-532) Prescott spoke warmly of J. C. Brünnich's work in connection with soils of Queensland and hoped that Dr W. W. Bryan and H. J. G. Hines of the University would keep in touch with Departmental officers regarding soil classification.

No doubt this visit initiated soil survey, classification and mapping of Queensland soils within the Australian landscape. Following on this visit Walker, Minister for Agriculture and Stock, invited J. K. Taylor, Commonwealth Soil Survey Officer attached to the CSIR, to visit Queensland to advise the Department on soil surveys of areas likely to be available for further development in Queensland. From 5 May 1930, accompanied by Dr Kerr, Soil Technologist to the Bureau of Sugar Experiment Stations, G. B. Brooks, Senior Instructor in Agriculture, and N. J. King of the Agricultural Chemist Branch, he visited Mackay, spending four days on the Eungella lands and areas within ten miles of Mackay where sugar was growing. Taylor spent a week in the Dawson Valley around Theodore, then attended the Australian Association for Advancement of Science Congress in Brisbane. Following this he investigated possible extension of wheat growing between Roma and Toowoomba and south to the border. (*QAJ*, Vol. 34, July 1930, p. 32) Kerr and Cassidy in 1932 published results of a broad soil and irrigation water survey of the Burdekin Delta.

L. G. Vallance and H. K. Lewcock published the results of a soil survey of the Beerburrum - Glasshouse Mountains - Beerwah area and its suitability for pineapples, and actually named the soil types-a new system for Queensland, e.g. Glasshouse sandy loam, Glasshouse sand, Beerburrum fine sand and Beerwah sand. (*QAJ*, Vol. 49, June 1938, pp. 540-553, 554-579) Vallance and Wood followed with the soil survey of the pineapple soils of the Nambour - Palmwoods districts. (*QAJ*, Vol. 54, August 1940, pp. 102-107, and Vol. 55, February 1941, pp. 92-107)

Soil erosion and soil conservation

A. F. Skinner, a cadet in the Agriculture Branch of the Department, turned from his work on tropical pastures in the north to a study of soil erosion and conservation. He published a comprehensive article in the August 1929 *Queensland Agricultural Journal*, effectively illustrated from photographs and his own artistic pen. He followed this with an article on contour furrowing. (*QAJ*, Vol. 54, August 1939, pp. 102-109) Dr Kerr wrote on soil erosion in relation to the sugar industry in *The Cane Growers' Quarterly Bulletin* in 1941.

A Departmental Soil Erosion Committee was set up during 1936-37. Soil erosion in the peanut areas at Kingaroy was severe and broad-based terraces proved useful in combating the problem. (*Rep. Dep. Agric. Stk*, 1941-42, p. 10)

The Department soil erosion work had to be curtailed during World War II.

The animal industries

A scheme organised by the Commonwealth and State Governments and the Empire Marketing Board to assist importers of cattle, sheep and swine from the United Kingdom to Australia came into operation for two years from 1 October 1929. Costs of transport were to be borne one-third by the purchaser, one-third by the Commonwealth and State Governments and one-third by the Empire Marketing Board. (Cory, A. H., *Rep. Dep. Agric. Stk*, 1930-31, p. 87)

During 1930-31 the number of hides and skins imported and disinfected were:

From	Туре	
Italy	550 ox hides	
France	25 ox hides	
New Zealand	225 ox hides	
New Zealand	5814 sheep skins	
New Zealand	163 rabbit skins	
India	24 000 goat skins	
Port Moresby	118 goat skins	

Animals that passed the quarantine period at Colmslie Quarantine Station were: 8 bulls, 2 cows, 5 dogs, 1 cat, 4 pigs, 651 rabbits.

Imported articles disinfected in accordance with the Quarantine Regulations were 10 riding saddles and animal effects, 2 springbok skins, 158 rabbit skins, 1 spotted-deer skin, 1 snake skin, 1 leopard skin, 1 case of mounted elk horns and 1 parcel of feathers. (Cory, A.H., *Rep. Dep. Agric. Stk*, 1930-31, p. 88)

Beef cattle

Closure of Newmarket Saleyards. During 1931 some 790 129 sheep, 75 503 lambs, 91 661 cattle, 10 302 calves and 29 955 pigs were sold at the Newmarket Saleyards, the last sales to be conducted at these yards before sales were moved to Cannon Hill. Prices were:

Cattle -	average value per cental (100 lb) for bullocks	28s or per head £8.1.0
Sheen -	average value per cental for cows	26s 9d or per head \pounds 5.7.0
Lambs -	average value per lb	4d or per head 9.3d
Pigs -	average value per lb porkers and baconers	$4^{1}/4d$ or per head £1.14.0
	average value for suckers, slips and stores	per head 14.0
Vealers -	average value up to 80 lb	per head 17.6

Opening of the Brisbane Abattoir. The Brisbane Abattoir commenced operations at Cannon Hill on Tuesday 25 November 1931. Its capacity was 1200 cattle, 6000 sheep, 1000 pigs and 600 calves. Inspection was carried out by Commonwealth officers and under the agreement between the State of Queensland and the Commonwealth, four State meat inspectors transferred to the Commonwealth Public Service. With this centralised killing many undesirable private slaughter houses disappeared.

Upgrading of retail butcher shops. The regulations under The Meat Industry Act of 1930 providing for the Abattoir also required all local shops and vehicles to be registered, making it possible for Departmental inspectors to effect a great improvement in the standard of shops and vehicles in the metropolitan area. Improved establishments with the very latest devices for handling meat safely and hygienically were being adopted - displaying attractively arranged joints and cuts etc. on tiled and marble-topped window counters, the installation of refrigerated serving counters, mechanical slicers, power saws, wrapping of meat in greaseproof transparent paper. All establishments were inspected by Departmental inspectors.

(Cory, A. H., *Rep. Dep. Agric. Stk*, 1930-31, pp. 88-89) Several prosecutions were made for illegal slaughter.

Development of a chilled beef trade. C. S. I. R. officers working at the new laboratories of the Queensland Meat Industry Board's Abattoir at Cannon Hill and in consultation with staff of the Low Temperature Research Station at Cambridge, England, developed a technique for chilling carcasses of meat for shipment in a carbon dioxide atmosphere. A trial shipment of 604 quarters of beef was consigned in the ship *Idomeneus* in February 1934 and was placed on the London market forty-four days after slaughter. It opened up in splendid condition and by the end of June four more shipments totalling 289 tons had been made. Regular shipments were made until the outbreak of World War II, when frozen and then canned meat took its place. However, the stage was set for Australian beef to compete with shipments from South America, especially the Argentine. (Alexander, G. and Williams, O.B., *The Pastoral Industries of Australia*, Sydney University Press 1973, p. 64) Better quality stock was still required.

Carcass competitions. These were instituted by the Queensland Meat Industry Board, comprising six carcasses of beef of dressed weight of 580-700 lb, lamb carcasses not exceeding 34 lb and porkers from 60 to 80 lb. Trade displays were also arranged in the Meat Hall at the Royal National Exhibition.

Establishment of Karumba Meatworks. A new meatworks was established at Karumba by private enterprise, with Government help, to treat Gulf cattle.

Importation of Zebu bulls. In his 1932-33 annual report the Chief Inspector of Stock, Major A. H. Cory, wrote: "Some Zebu bulls are being imported from America with a view of experimenting in the breeding of new types of cattle suitable for north Queensland and Gulf conditions. It is understood that the breeding arrangements will be under the direction of the Council for Scientific and Industrial Research. The object of this is to ascertain if this crossbred animal will be practically immune to tick borne diseases, also if it thrives under the northern climatic conditions, and will produce meat suitable for the British market." The local graziers vetoed the idea but eventually four pastoralists and pastoral companies from northern Queensland had formed a syndicate with CSIR to import animals and in 1933 eighteen Zebu cattle and one Santa Gertrudis bull were landed in Sydney from America and sent to nominated properties to cross with local stock. By 1941 the syndicate began selling crossbred bulls. (Alexander and Williams 1973, p. 72) This was the beginning of general adoption of *Bos indicus* blood in the beef cattle herds of central and north Queensland.

Finishing beef cattle on tropical pastures. During 1937-38 Rod Mulhearn carried out nutrition studies with beef cattle on a mixture of introduced tropical grasses comprising mainly para grass (*Melinis minutiflora*) and guinea grass (*Panicum maximum*) at Tully in a 150 inch average annual rainfall zone. Rotational grazing at a stocking rate of a beast to two acres was practised. With good management and quality cattle he found that beasts could be marketed in prime condition throughout the year on these tropical pastures. Cattle grazing on native pastures in the Charters Towers area could only be marketed in late autumn and early winter. (*Rep. Dep. Agric. Stk*, 1937-38, p. 114)

Dairying

Cheese Investigation Committee

Investigations into defects in cheese were set in train by a committee consisting of Professor J. K. Murray, Principal of the Queensland Agricultural High School and College at Gatton, C. J. Pound, Government Bacteriologist, and Charles McGrath, Supervisor of Dairying, during 1929-30. Its terms of reference were:

- 1. to investigate the circumstances connected with the reduction in the percentage of gradings of cheese as "choice" and "first-grade" commencing from the month of October 1928 and continuing to April 1929;
- 2. to match any developments in the 1929-30 summer of similar character;
- 3. to ascertain the causes thereof and to suggest remedies therefor;
- 4. to make any other suggestion which would tend to the improvement of cheese manufacture in Queensland. (*QAJ*, Vol. 32, October 1929, p. 437)

No copy of any report emanating from this Committee has been sighted but it is significant that in his annual report on the College in December 1930 Murray stated: "There is a necessity for a Dairy Research Institute within the State to which various problems may be referred for their solution under manufacturing conditions, but with laboratory facilities. The only factory owned by the Queensland Government is that at this College. Research work can be undertaken here, provided that the factory is suitably improved and possessed of a research staff." (*Gatton College Magazine*, 1930, pp. 13-14)

Dairy research

Oliver St. J. Kent, B.Sc., was appointed Dairy Science Officer in 1931 and in his first annual report on 30 June 1932 after settling in he noted that he had investigated the "rabbito" or surface taint in butter, found acid brines corrosive of pipes, worked with weed taints removed by deodorisation of cream, the keeping quality of butters in storage and the milk quality for cheesemaking using the methylene blue test, the Wisconsin curd test and direct microscopic examination. By visits to factories and farms in co-operation with dairy instructors and inspectors, he was able to identify problem areas. A remarkably high output of "choice" and "first-grade" butter (99%) was achieved by the Atherton Tableland factories.

A Dairy Research Laboratory was established in Brisbane in 1935 and Kent was placed in charge. He was joined by E. B. Rice and later by L. E. Nichols as Assistant Bacteriologist to study cheese problems, and L. A. Burgess, Analyst. A second dairy research laboratory was established in Toowoomba in September 1936, with Nichols in charge. Rice was sent with a travelling laboratory visiting cheese factories on the Darling Downs in 1938 to upgrade their cheese quality. Nichols returned to Brisbane in 1937 and Rice assumed the position of Acting Director of Dairying in 1939.

Dairy Education

Dairy factory employees schools were commenced at the Queensland Agricultural High School and College, Gatton, in 1926 and continued yearly to 1936. The schools were organised with the help of the Queensland Butter and Cheese Factory Managers' Association and the Department of Agriculture and Stock. At the completion of each school the Department held examinations for certificates of competency in milk and cream testing, grading and butter and cheesemaking. Most of the students attending were successful. Thirty-two students attended the Fifth Dairy Science School in 1930. (*Gatton College Magazine*, 1930) Dairy Science Schools for butter factory employees were held at the Brisbane laboratory in 1936 and 1937. Short refresher courses in dairy science were also given to employees at Malanda, Kingaroy and Toowoomba during 1933-34.

A Dairy Committee Scheme was established in 1933 to expand the educational activities of the Department and 105 local committees were formed within Local Producers' Associations. Suitable papers on dairying subjects were prepared by the Dairy Branch and despatched regularly to each association for reading and discussions at its meetings. Courses of instruction in matters of breeding, care and health of dairy stock and farm management generally were arranged by committee leaders. These courses included lectures and demonstrations at the Animal Health Station, Yeerongpilly, and in the laboratories of the Department of Agriculture and Stock in William Street. (Graham, A. E., *Rep. Dep. Agric. Stk*, 1932-33, pp. 9-10) During 1933-4 short courses were given to forty-seven leaders and included visits to the Hamilton Cold Stores, the Brisbane Abattoir, the Whinstanes Cotton Ginnery, stud farms and a butter factory.

The Dairy Cattle Improvement Act of 1932 became law during 1933. The object was to assist dairy farmers to head their herds with bulls from cows with high production records. Veterinary surgeons were attached to the Dairy Branch.

On 16 April 1935 the first field day for dairy farms on the Darling Downs was organised by the Glenorie Local Producers' Association under the Dairy Committee Scheme of the local Dairy Cattle Improvement Act, at the farm of W. F. Kajewski at Glencoe. Fifty Downs farmers attended. Mr. Charles F. McGrath, Supervisor of Dairying, outlined the objects of the Dairy Cattle Improvement Act; Kent dealt with hygiene in relation to milk and cream production with the assistance of a microscope; G. B. Gallway, Inspector of Accounts, spoke on marketing; and C. R. Mulhearn, Veterinary Officer, spoke on mammitis and conducted a post-mortem examination of a cow. Many questions were asked and dealt with by the Departmental officers. (*QAJ*, Vol. 43, May 1935, p. 497)

"Certified" milk

Two qualities of milk were gazetted during 1933-34, "certified milk" and "milk from a certified dairy", the standards differing in the cooling and bottling of certified milk while the latter could be delivered straight from the can. (McGrath, C., *Rep. Dep. Agric. Stk*, 1933-34, pp. 55-56) The first "certified" dairy was opened by the Hon. F. W. Bulcock on C. Gill's farm at Eagle Farm in April 1935, and Dr Clifford Croll, a member of the State Animal Health Board, congratulated him on the inauguration of the scheme.

Herd testing

During 1932-33 the Department arranged for butter and cheese factories to test the milk samples of their suppliers who were undertaking herd testing, while all the recording work was carried out by the Dairy Branch officers. (McGrath, C., *Rep. Dep. Agric. Stk*, 1932-33, p. 56) The Dairy Cattle Improvement Scheme, under which rebates of railway freights were granted to dairy farmers purchasing young bulls whose dams had qualified for entry into the advanced registers for production kept in the respective breed societies' herd books, was of great help to dairymen. (*Rep. Dep. Agric. Stk*, 1937-38, p. 91)

Butter-testing laboratory at Hamilton

A new butter-testing laboratory was opened at Hamilton during 1938-39. This was the Department's third laboratory after Brisbane and Toowoomba. A butter-improvement service replaced the standardisation service of previous years and was extended to every Queensland factory. Moisture and salt contents of butter were monitored as well as water supplies and brines.

Cheese starters and the bacteriophage

The Cheese Improvement Scheme continued in Toowoomba with three technical officers involved during 1939-40. Cheese starters were important and during 1942-43 some factories had trouble with bacteriophage affecting their efficiency. Strict attention to isolation of cultures and asepsis were needed to contain the trouble and where necessary fresh starter cultures were supplied by the Department. Waxing experiments with cheese to allow transport in an unrefrigerated condition were successful. (*Rep. Dep. Agric. Stk*, 1942-43, p. 14)

Dairy Machinery Advisory Service

Departmental officers were called upon from time to time to provide plans for dairy buildings, milking machines and dairy farm management. During 1944-45 a dairy machinery advisory service was inaugurated and concentrated mainly on milking plants and separators, and steam sterilisation.

Pigs

Carcass requirements

In his annual report for 1929-30 E. J. Shelton drew the attention of pig raisers to the changing demand by consumers for pig meats. Hitherto the heaviest and fattest pig was sought after but now lean meat produced by light, early-maturing animals was required and bacon factories had difficulty in disposing of fat carcasses. In 1935 it was announced by Shelton and Downey that present requirements were for a fleshy pig with a light covering of fat which would harden under chilling. For local and export porkers the desirable weight of a dressed porker carcass was 60-80 lb, for Queensland baconers 95-120 lb, and for English Wiltshire Sides 130-160 lb. In August 1937, L. A. Downey introduced Queensland pig raisers through the *Journal* to the system of pork and bacon carcass appraisal devised by Dr John Hammond of Cambridge University and his associates. It was based on

measurement and eye appraisal and was to revolutionise thinking not only in connection with pig carcasses but also those of cattle. A scale of points was drawn up for use in judging. (*QAJ*, Vol. 48, August 1937, pp. 152-158)

A service for valuing and reporting on the carcass quality of particular pigs nominated by producers was inaugurated in 1938. The producer paid a fee of 2s6d and nominated the pig. After slaughter at the processing firm a Government officer would appraise the carcass, forward a report to the Department where it would be analysed, and comments would be forwarded to the supplier. The standard method of carcass appraisal used was that provided by the British authorities, as published in *The Pig Breeders' Annual* for 1936-37 and adopted by the Australian Meat Board. Points were allotted for weight, colour and texture, skin, leg bone, lean meat on the hindquarters and shoulders compared with photographic plates, length of carcass in millimetres, leg length, backfat depth $1-1\frac{1}{2}$ inches from the middle line, eye muscle and streak. (*QAJ*, Vol. 50, August 1938, pp. 196-205)

"Soft bacon" from feeding peanuts

In 1929 C. J. Pound, the Government Bacteriologist, was asked to investigate the occurrence of "soft bacon" in pig carcasses where the adipose (fatty) tissue never became firm, but remained more or less flabby and oily. He found that feeding of the pigs was at fault and the main centre from whence the trouble emanated was the Kingaroy district, where pigs were fed almost solely on reject peanuts. Local studmasters were also forcing pigs with peanuts as they grew quickly, had shiny coats and appealed to judges in the show rings. Departmental advice to pig raisers henceforth was to stop feeding pigs with peanuts after the weaning stage. (Pound, C. J., *Rep. Dep. Agric. Stk*, 1929-30, pp. 136-137)

Queensland Pig industry Council

This body was formed during 1932-33 to continue and enlarge the work formerly carried out by the Queensland Pig Industry Committee, a branch of the Australian Pig Industry Council. Advice was received that British pork buyers preferred white pig carcasss as they were said to dress to better advantage and maintain that "bloom" so much in demand. The Committee under the Council decided unanimously to recommend "that a sum of money be allocated to purchase suitable stud pigs (stud boars in particular) for distribution on a subsidy basis to approved farmers". Also an allocation of £1000 was made to add to State funds to establish a Pig Experiment and Research Station at the Animal Health Station at Yeerongpilly. (Shelton, E. J., *Rep. Dep. Agric. Stk*, 1932-33, p. 41)

The Pig Industry Council activities were initially confined to a series of enquiries into the following:

- (a) grading of pork and bacon carcass and payment for such on a quality basis;
- (b) systems of identification of live pigs and of pork carcass;
- (c) legalisation to eliminate payment for pig carcass or parts thereof condemned on slaughter;
- (d) stabilisation of prices;
- (e) standardisation of breed type;
- (f) Commission of Enquiry into all phases of the industry;
- (g) extension of operations to largely increase export of pork products and increase local consumption;

- (h) improvement of marketing conditions;
- (i) pig industry legislation;
- (j) conservation of fodder for pigs;
- (k) supervision of pig sales;
- (1) research and nutrition work;
- (m) extension of instructional activities inclusive of pig clubs, correspondence courses, schools of instruction, country itineraries. (Shelton, E. J., Rep. Dep. Agric. Stk, 1932-33, p. 42)

Better Boar Subsidy Rebate Scheme

This was operated from August 1933 to 30 June 1934 and resulted in a wide distribution of pedigreed boars of the Large White and Middle White breeds. It was replaced on 30 June 1934 by a scheme fostered by the Rural Assistance Board of the Agricultural Bank operating with the Department of Agriculture and Stock. It offered advances as loans of fifty per cent on the landed costs of boars, four months to two years of age, of the following breeds: Large White, Middle White, Tamworth and Berkshire. Loans were repayable after two years. (Shelton, E. J., Rep. Dep. Agric. Stk, 1933-34, pp. 41-42)

Queensland pig industry figures for 1931

- 222,686 - 3rd amongst the States
- 23.10 - 12th in world, 1st in Australia
- 20,008,227 lb - 3rd in Australia
- Australia - only 7 lb - (Canada 87 lb!)
- 9
- 526
- £177,543
- £97,786
-£123,824
- £1,092,740 - 1st in Australia
- 3,182 (from 546 in 1927)
- 150 to 180 enrolled

Crossbreeding experiments

During 1931-32 crossbreeding experiments were begun by the Pig Industry Committee and the Department of Public Instruction at Gatton College; the Department of Agriculture and Stock contributed a sum of £600 over three years towards the cost of the project.

Pig feeding experiments

Pig feeding trials using barley, maize and wheat as grains in combination with protein-rich supplements were conducted at the Yeerongpilly Stock Experiment Station from March to July 1931. Maize proved marginally better than wheat, which in turn was marginally better than barley. Lucerne chaff could be fed in conjunction with grain and separated milk to young pigs. An average ration of 2.3 lb grain, 0.3 lb lucerne chaff, 5.1 lb of separated milk and 1.7 lb of greenstuff would produce 1 lb liveweight increase per day with pigs of 50-150 lb weight.

From February 1934 to May 1935, J. E. Ladewig conducted pig feeding trials at this centre to ascertain if pigs could be reared economically without the use of milk products. Meat meal from the Brisbane abattoir was the main source of the protein. The rations used consisted of 45% maize meal, 40% pollard, 8% meat meal and 7% lucerne chaff with a mineral supplement containing 75% calphos. The complete mixture contained 18% protein. The trials successfully demonstrated that meat meal in the dry form could be substituted for skim milk in all rations and when skim milk was available it could be used to increase the turnoff of pigs in conJunction with the meal ration for pigs up to 13-15 weeks of age. (Ladewig, J. E., *QAJ*, Vol. 44, September 1935, pp. 307-316)

In August 1941, T. Abell gave instructions on the use of whey in feeding pigs. (*QAJ*, Vol. 56, August 1941, pp. 148-149)

Open-air pig raising

E. J. Shelton spent a good deal of time and effort in persuading pig raisers and particularly school children that an open-air system of pig raising on succulent pastures was more economic and more hygienic than in pens. Suitable movable pig houses were provided under this system. (*QAJ*, Vol. 34, July 1930, p. 89)

Queen State Stud Piggery

A stud piggery under this name was established at the Queensland Agricultural High School and College at Gatton during 1935-36 and stud pigs were widely distributed with price and transport concessions. (*Rep. Dep. Agric. Stk*, 1938-39, p. 5) During 1939-40 the Berkshire and Large Whites were transferred to the College Stud, the Queen State retaining the Middle Whites and Tamworths imported from Great Britain and recently supplemented from Victorian studs. Prior to the establishment of the Queen State Stud and before June 1930 the stud at Kairi State Farm was the only stud remaining under the control of the Department of Agriculture and Stock. Demand for these pigs was keen. (Shelton, E. J., *Rep. Dep. Agric. Stk*, 1929-30, pp. 39-41)

Pig litter recording

Pig raisers began litter recording of pigs with Departmental assistance in 1935, notably by Hibberd Bros. of "Grenier Park", Gold Creek, Indooroopilly, and H. O. Rees of "Cethor" Stud, Maleny. Three of the Hibberd sons completed the Gatton College Diploma courses and joined the Department staff.

Correspondence courses in pig raising

During 1931-32 the staff of the Pig Branch prepared instruction lessons on pig raising and allied subjects for interested young farmers, who, after studying them, submitted answers to questions which were checked and returned. These courses were planned after the manner of commercial subjects conducted by the Department of Public Instruction. This service was also extended to Thornborough College at Charters Towers and Scots College at Warwick. L. A. Downey also gave instruction to youths at the Salvation Army Training School at Riverview.

Accommodation for pigs

In July 1930 L. A. Downey, Instructor in Pig Raising, published a comprehensive article dealing with accommodation and equipment for the pig farm, including detailed sketches and specifications. It was published in the *Queensland Agricultural Journal* and revised in June 1935.

Diseases of the pig

E. J. Shelton prepared a major paper entitled "Diseases of the Pig", no doubt with veterinary help, with numerous illustrations (particularly of internal parasites) for the September 1930 *Journal*; this was reprinted as a *Farmers' Bulletin* for free distribution on application to the Under-Secretary. K. S. McIntosh described the various forms of lameness in pigs in February 1935 and in May 1935 he discussed ulcerative spirochaetosis, which had been diagnosed for the first time in Queensland by Arthur L. Clay, District Veterinary Officer at Cairns. The disease was caused by a spirochaete and is often associated with unhygienic conditions. (*QAJ*, Vol. 43, May 1935, p. 492) All piggeries were subject to regular inspections by officers of the Dairy Branch in 1929. Co-operation by Pig Branch officers with entomologists and parasitologists in a survey of farmers' piggeries to ascertain the sources of liver infections and kidney worms was arranged; infestation of pork products by the bacon fly and weevil was also investigated.

Pig identification and dentition

The methods of identification of pigs as required by The Queensland Pig Industry Act of 1933 were described by Shelton; these included fire branding, body tattooing, earmarking, ear tattooing and paint and hair clip marking. In April 1935 Shelton published an illustrated article on "The Dentition of the Pig".

Shelton's activities and retirement

Ernest James Shelton, the initial Instructor in Pig Raising in the Department, spent a great deal of time in the decade 1929-39 travelling the pig-producing areas giving addresses, showing lantern slides, judging at shows, visiting bacon factories and attending school project club days. He also arranged for the Annual Pig Farmers' Schools at Gatton College, gave radio talks, and arranged a Farm Boys Camp at the Royal National Showgrounds during show week.

He also had oversight of the pig studs at Goodna, Sandy Gallop and Willowburn Mental Hospitals, the Home for the Aged at Dunwich, the Farm Home for Boys at Westbrook and the Jubilee Sanatorium at Dalby (now the Dalby Rural Training School) for the Home Secretary's Department and the Salvation Army Farm at Riverview and Thornborough College at Charters Towers.

In a tribute to E. J. Shelton, the *Live Stock Bulletin* had this to say:

No one would suspect that under the strictly utilitarian exterior Mr E. J. Shelton, Queensland's senior instructor in pig raising, has a soul for poetry. Give Mr Shelton but half a chance and he will pour into one's ear a glowing account of some sow that has done her duty nobly by raising

a litter of seventeen and doing them well. He will talk of ton litters and Durocs, and tuberculosis of the throat, and paralysis, and of the little parasites that infest the intestines of pigs, both large and small, but one will not hear a word of poetry from him.

When he writes to us, however, he generally slips into the envelope a verse or two, neatly typed out, that has appealed to him, and never are these verses about pigs. Here is one that came a day or two ago -

"To every man there openeth A Way, and Ways, and a Way, And the high soul climbs the High Way, And the low soul gropes the Low: And in between, on the misty flats, The rest drift to and fro: But to every man there openeth, A High Way and a Low, And every man decideth The Way his soul shall go." - John Oxenham.

It seems to us as we read that verse that it put into words Mr. Shelton's philosophy, and the philosophy of every man who tries to leave a herd, or a farm, or a flock, better than he found it. (*QAJ*, Vol. 33, May 1930, p. 352)

The Pig Branch was brought under the supervision of the Director of Dairying towards the end of Shelton's career when he was not in very good health and he concentrated on his correspondence courses. Fred Bostock became Officer-in-Charge of the Pig Branch on 6 August 1945. Shelton retired as an Adviser in Pig Raising on his 65th birthday, on 23 June 1949.

Sheep and wool

The Senior Instructor in Sheep and Wool, James Carew, carried out trials with drenches for stomach worms at Millmerran and Yeerongpilly in 1929. He finally recommended a mixture of 2 oz arsenic, 6 lb Epsom salts and 5 oz bluestone (copper sulphate) in 5 gallons of water administered at 2 fluid ounces per sheep. When war was declared and arsenic was difficult to obtain, F. H. S. Roberts recommended carbon tetrachloride. When this was found to be sometimes toxic he suggested bluestone-nicotine sulphate. In 1941 phenothiazine was introduced.

Carew concentrated on expanding the fat lamb industry on mixed farms where young crops or improved pastures could be grown. He suggested using Corriedale ewes mated to Border Leicester or Dorset Horn rams to provide the lambs. In 1933-34 British-bred rams were purchased and distributed to farmers with sheep and crops. J. L. Hodge was appointed Instructor in Sheep and Wool to assist Carew on 30 May 1929. The Farmers' Wool Scheme was becoming more popular and during 1929-30 one hundred and eight consignments were received from farmers with small flocks and seventy classes of wool were prepared and sold through the Queensland Primary Producers' Association as agents. Hodge advised about Merino wools and emphasised the need for selection of sheep for constitution, as "one live sheep is better than many dead ones". He warned about overstocking and stressed the need to choose "the type of sheep suited to your country". Hodge advised graziers to make a phosphorus lick such as "Calphos" available to sheep, preferably with the addition of protein such as linseed meal, some salt, Epsom salts and sulphate of iron. (*QAJ*, Vol. 43, April 1935, pp. 393-395)

A lamb-marking and blowfly treatment prescribed and compounded by the Department was proved to give satisfactory results.

J. H. W. Mules in 1928 had a young ewe which had excellent fleece and good show qualities but was handicapped by excessive wrinkling in the skin of the crutch and was frequently "struck" by sheep blowflies laying eggs in the folds, the resulting maggots being very troublesome. He decided to cut the wrinkles off at the base of the folds and found the wound healed quickly and fly strike was overcome. The operation was to become known as the "Mules" operation and was strongly recommended by the Departmental Wool Advisers. Mules described the operation in the *Journal*. (Mules, J. W. H., *QAJ*, Vol. 44, August 1935, p. 237)

Stock Inspectors were asked to ascertain the methods the graziers were using to feed sheep during the 1934 drought. The Mitchell grass downs west of Hughenden were the worst affected owing to a dry spell, with losses as a result of drought-breaking rains on weakened sheep. The best of the sheep only were fed with 3-4 oz maize grain or 1 lb of lucerne hay or 4 oz Meggitts meal per day plus a lick made up to 2 oz daily. Practically all lambs and a big percentage of old ewes in lamb were lost. Cost of handfeeding was 6d per head per month. The average price for agistment in the Central district was £20 per 1000 sheep per month. The sheep which were handfed early survived the best. (*QAJ*, Vol. 44, September 1935, pp. 326-332) J. M. Harvey in November 1940 discussed sheep-feeding methods, including drought management. (*QAJ*, Vol. 54, November 1940, pp. 361-363)

During 1936-37 the Queensland Government offered an area of land in the Cunnamulla district to CSIR for sheep experimental work including blowfly control. This was to become the Gilruth Plains Field Station. (*Rep. Dep. Agric. Stk*, 1936-37, p. 131)

Wastage in lambs between leaving the pasture and auction at market was studied. Losses of about 5 lb per head liveweight from Saturday morning to Monday morning were recorded. (Carew, J., *QAJ*, Vol. 43, April 1935, pp. 388-392)

Horses and mules

Sale of State stallions

It was decided in 1929 that State ownership of stallions would be terminated and four stallions - "General Wallace", "Premier Again", "Bold Wyllie" and "Prospector" - were offered at auction at the Royal National Exhibition sales in August 1929. (*QAJ*, Vol. 32, September 1929, p. 357)

Horses for India

The Government felt it necessary to revive the horse-breeding industry to provide a steady market of suitable types for India and the Dutch East Indies (Indonesia) A conference was

held at Mackay on 26 March 1931 when an association of breeders was formed. Eight hundred and fifty horses were exported overseas during 1930-31.

Importation of jack donkeys and mule breeding

A shortage of draughthorses for farm work in 1934 led to attention being given to mule breeding. The Department co-operated with sugarcane growers to import three jack donkeys from the United States for the purpose of breeding mules to work on the northern canefields. H. Joe Freeman of the Fruit Branch of the Department visited the United States in 1935 to study methods of fruit production and marketing. He was commissioned by the Hon. F. W. Bulcock to select three good-quality jack donkeys. He brought these donkeys back. Two jacks went to the Fairymead Sugar Co. at Bundaberg and one to the Burdekin. Freeman published an article on donkey and mule breeding. (Freeman, H. J., *QAJ*, Vol. 44, November 1935, pp. 647-653) In April 1937 Norman King wrote of the Bundaberg venture. Eleven foals were born to Clydesdale mares at Fairymead between October and late December 1936.

Stallion registrations

Regulations required the registration and publication of stallions approved and rejected by the Stallions Registration Board annually. In January 1937 the *Queensland Agricultural Journal* listed 95 thoroughbred stallions, 28 pony stallions, 7 trotting stallions, 139 draught stallions as certified for life; and 51 blood (thoroughbred) stallions, 26 pony stallions, 5 trotting stallions, and 232 draught stallions certified for the year 1936-37. Eighty-six stallions comprising all classes were rejected.

Ration for horses in the canefield

D. L. McBryde found that a suitable ration for working horses in the canefields was 18 lb "chop-chop" (chaffed sugarcane tops), 2 lb molasses and 1 lb linseed meal per head per day. (*QAJ*, Vol. 47, April 1937, pp. 388-389)

Poultry

Mount Gravatt Poultry Experiment Station

During 1928-29 a Poultry Experiment Station was established at Mount Gravatt, concentrating initially on feeding tests. The practice of using prepared rations to reduce costs was extending, and larger flocks were being kept. Local food-manufacturing plants were established to meet this demand. Feeding tests at Mount Gravatt to compare maize and wheat as feed components were commenced on 1 May 1929 and in September 1930 it was announced that maize and wheat could be interchanged in the ration according to prices, but any change from one grain to another must be done gradually. Maize did not produce overfat birds. (*QAJ*, Vol. 33, September 1930, pp. 332-335) Pellet feeding as done in America was tried for the first time on 16 March 1930. This method of feeding reduced feed wastage. Introduction of trap nests allowed farmers to identify and cull low producers. Caponising proved to have little effect on the growth of cockerels.

Egg-laying competitions

The egg-laying competition conducted by the NUPBA at Nundah was transferred to Mt Gravatt and conducted by the Department. During 1933-34 an egg-laying competition was started at Wynnum, bringing the number of active egg-laying tests to ten. Egg-laying tests at Mt. Gravatt were continued into the second laying season and results showed that breeders should conduct second-year testing as many of the best-producing birds in the first year failed as second-year producers. (Rumball, P., *Rep. Dep. Agric. Stk*, 1931-32, pp. 34-35)

Overseas visit by P. Rumball, Poultry Instructor

Percy Rumball sailed on the *Largs Bay* for England on 20 May 1930, being granted five months' leave of absence by the Department to enable him to attend the Fourth World Poultry Congress to be held at the Crystal Palace, London, from 22 to 30 July 1930, and to take part in the post-congress tour of Great Britain and Ireland.

Egg marketing

There was a surplus of eggs during 1929-30 and a record export of both eggs and egg pulp. More than fifty per cent of Queensland eggs were sold interstate and overseas. The overseas demand was for full-sized eggs in 15 lb packs. Demand was high in Great Britain till Christmas then tailed off until March, but the slack was taken up by Canada, where egg supplies were short during these months. Pullet eggs were hard to sell. There was a surplus also of slightly soiled eggs and eggs with lack of density in the albumen which could not be exported, though otherwise of export quality. These involved heavy losses when sold to southern States.

Canning of hens

To utilise old hens of the dominant Leghorn breed which were being discarded from egg production and which were unsuitable for the table-bird trade, arrangements were made with a business firm to can them.

Poultry experiments at the Animal Health Station, Yeerongpilly

Experiments with the raising of chickens were carried out during 1932-33. On 25 April 1933, J. E. Ladewig, Experimentalist, commenced nutrition experiments with poultry using low-, medium- and high-protein rations. Cockerels finished in seventeen weeks on an all mash ration as against twenty-one weeks on a maize-wheat ration and the costs were less. Milk was a necessary component of the ration where it was available, and variety in the ration was necessary to economically increase the protein level. Ladewig also proved that there was no advantage in feeding a high-protein ration to chickens after six weeks. He also proved that culled hens could not be economically fattened if they had had a satisfactory ration whilst laying. (Ladewig, J. E., *Rep. Dep. Agric. Stk*, 1933-34, pp. 158-160) A ration of 18% protein should be fed to Leghorn and other light breeds for the first six weeks, and to heavy birds for a longer period. After this time the protein content could be reduced to 14-15%. The inclusion of milk in the early chicken rations was desirable. These nutritional studies at Yeerongpilly were supplemented with numerous post-mortem examinations of diseased poultry on behalf of growers.

Poultry diseases

During 1931 Percy Rumball, the Poultry Expert, published a series of illustrated articles in the *Queensland Agricultural Journal* dealing with poultry diseases and post-mortem symptoms. He produced a chart to enable diagnosis of the specific diseases in sick birds. An outbreak of roup was put down by using a roup vaccine. Coccidiosis took heavy toll of chickens of 2-3 weeks of age and it was finally controlled by iodine treatment. Vaccines against fowl pox were being used.

Poultry as a sideline

Rumball encouraged the combination of poultry raising and fruit culture where the birds could help control pests and provide some organic fertiliser. He also encouraged its association with grain growing to utilise inferior grain now that day-old chickens were readily available.

Juvenile Poultry Clubs

These were encouraged by the officers of the Poultry Branch and addresses and demonstrations were frequently given to the children at their Club days.

The Poultry Farmers' Co-operative Society

Formed in 1921 with 85 members and a share capital of £514, it grew to 1600 members and a share capital of £6000 in 1935. It purchased and distributed foodstuffs and distributed information. In 1921, eight tons of bran and pollard were sold to members; in 1935 over 10 000 tons were handled. In 1923 the Society became the first co-operative poultrymen's association to ship Queensland eggs overseas. In October 1934 it produced its first bag of "Red Comb" laying mash.

Bees

Early in 1931 the American Foul Brood of bees was discovered in the Pine River district and the entire apiary, consisting of twenty-five colonies, was destroyed by burning. Henry Hacker of the Entomology Branch then inspected 116 apiaries within fourteen miles of the Brisbane General Post Office but found no further infestation. In the process he classified the apiaries into four grades-excellent, good, fair and bad-with respect to the condition of the apiary and extended his survey further afield to the Caboolture, Nambour and Yandina districts. R. B. Morwood, the Assistant Plant Pathologist, then published a detailed article in the March 1931 *Queensland Agricultural Journal* to make apiarists aware of the appearance of the disease so that quick action could be taken to contain it if an outbreak occurred.

Yields of honey were diminishing as urbanisation led to tree destruction of the honey flora in the suburban woodlands.
Henry Hacker of the Entomology staff at Head Office was chiefly employed on beekeeping matters in the 1930s. The remainder of his time was devoted to reorganisation of the insect collection at Head Office.

A series of articles on beekeeping by Hacker began with "The Honey Bee" in the *Journal* for August 1932, p. 139. In the April 1935 issue of the *Journal* he began articles on Beekeeping, beginning with a 24-page article entitled "An Introduction to Beekeeping", continuing the series in May 1935.

Native birds protection

The progress report of the Commonwealth Prickly Pear Board in Australia in June 1929 indicated that the Scrub Turkey (*Alectura lathami*) was feeding on the cactoblastis larvae, and an Order-in-Council was issued reducing the period of protection for brush or scrub turkey on prickly pear-infested land from an annual period of seven months to a period extending from 1 to 7 July in each year inclusive. (*QAJ*, Vol. 32, October 1929, p. 458)

During 1934-35 all islands within Queensland waters and the City of Greater Brisbane were declared sanctuaries for native fauna and fifteen other sanctuaries were declared throughout the State. (Graham, A. E., *Rep. Dep. Agric. Stk*, 1934-35, p. 6)

The Fauna Protection Act of 1937 became operative on 1 January 1938 and repealed The Animal and Birds Acts, 1921 to 1924. Co-operation of local authorities, the Forest Service and Lands Department, police and honorary protectors was obtained. Royalty at the rate of 10 per cent, on a fixed valuation, was payable on the sale of any protected fauna in respect of which permission had been granted for sale-mainly birds kept in aviaries or fauna for which an open season had been declared. The koala from now on was permanently protected. The Department of Agriculture and Stock and Main Roads Commission actively adopted a policy of protection of native flora. (*Rep. Dep. Agric. Stk*, 1937-38, pp. 14-15)

Stock diseases

Animal Health Station

The designation of the Stock Experiment Station at Yeerongpilly was changed to the Animal Health Station during 1932 and on 1 August 1932, J. A. Rudd, L.B.Sc.(Melb.), was appointed Acting Director, which position was later confirmed. On 1 October 1932, A. Forsyth Stewart took over the diagnostic and pathological work at the Station.

Stock Experiment Station, Oonoonba, Townsville

This station was handed over to the Council for Scientific and Industrial Research at the end of September 1931 for a period of five years to investigate animal health problems found in northern Australia. In conjunction with CSIR, mineral deficiencies in cattle were studied at Helenslie Field Station at Charters Towers by feeding phosphorus supplements; Dr John Legg studied tick fevers; CSIR entomologists tried to find a national enemy to control buffalo fly and a blood test to detect carriers of pleuro-pneumonia. When CSIR handed back the Station, C. R. Mulhearn took over as Acting Director in 1936.

Director of Veterinary Services

On 1 June 1940, Professor H. R. Seddon, Dean of the Faculty of Veterinary Science at the Queensland University, was appointed Director of Veterinary Services and he advised on the reorganisation of the Division of Animal Industry. By 1943, Dr John Legg had taken over as Director.

Grazing Districts Improvement Boards

In connection with the Grazing Districts Improvement Act, which came into force in March 1931, a number of Improvement Boards were constituted and passed by-laws dealing with travelling and depasturing stock. Departmental officers were co-operating with the Boards concerned relative to the issue of permits and travelling of stock.

Bovine pleuropneumonia

Dr John Legg noted during 1933-34 that inoculation of pleuropneumonia virus by means of the insertion of a saturated seton of the virus medium in the end of the tail could lead to contamination and recommended the use of a hypodermic syringe and needle.

C. R. Mulhearn in 1936 updated the knowledge of pleuropneumonia. (Mulhearn, C. R., *QAJ*, Vol. 45, February 1936, pp. 148-152) It is a contagious disease caused by an airborne virus and affects the respiratory system. It is highly fatal, with up to 50% mortality. Some apparently recovered animals carry diseased tissue in their lungs, which under stress may again become infectious, and act as carriers and are dangers in a travelling mob of cattle. The disease is constantly present on many of the large cattle stations of northern Australia and unfortunately it is impossible to eradicate it from these areas. No animal should be allowed to recover. If all infected animals and carriers could be detected and destroyed the disease could be eradicated from Australia, as it has been from other countries, within a few years.

Mulhearn reported that CSIR officers had developed a blood test to detect carrier animals which could expedite eradication in dairying areas. When an outbreak occurs all affected animals should be destroyed and "in-contact" animals inoculated and kept in quarantine. Inoculation is done with a hypodermic syringe, using fresh natural virus from the chest cavity from active cases of the disease, inserted near the tip of the tail. Prepared vaccine from a recognised laboratory is better (the Animal Health Stations supplied this) Inoculation can be done with setons or special spoon-shaped needles.

Tuberculosis

C. J. Pound traced the origin of tuberculosis in pigs to their being fed milk from tuberculous cows and recommended heating the milk to 180°F before feeding. Tuberculous cows should be identified and destroyed. He also recommended pasteurising separated milk and whey before feeding them to pigs. In August 1938 J. C. J. Maunder announced that the main infection was by ingestion of material contaminated by the dung of infected

cattle, more so than through drinking their milk. Maunder discussed the possibility of eradicating tuberculosis from dairy herds. (*QAJ*, July 1935)

During 1936-37 tuberculosis headed the list of diseases of condemned carcasses amongst Brisbane abattoir slaughterings, with 1592 positive infections.

In the April 1935 issue of the *Queensland Agricultural Journal* a list of eight herds which had been certified as tubercle-free was published.

Grass tetany

C. R. Mulhearn drew attention to the occurrence in southern Queensland in 1936 of grass tetany associated with high-producing cows consuming luscious green fodder crops. It was thought to be due to a mineral imbalance and could be corrected by intravenous injection of a solution of magnesium chloride $\frac{1}{2}$ oz, calcium chloride $\frac{1}{2}$ ozs in 10 ozs of sterile water. (*QAJ*, Vol. 46, January 1936, pp. 44-46)

Ergotism in dairy cattle

Maunder found that paspalum heads were heavily infected by a stage of ergot disease in 1936 and when these were ingested by dairy cattle the cows rapidly reduced milk production and carried lesions around the muzzle and on the teats. He recommended an early drench of Epsom salts 1 lb and ginger 1 oz in water.

Three-day sickness or Ephemeral fever

C. R. Mulhearn at Oonoonba recorded a new disease amongst cattle in north Queensland early in 1936 near Burketown, called three-day sickness or Ephemeral fever in tropical countries. Cattle of all breeds were susceptible and mature cattle were more susceptible than younger ones. It is infectious and probably transmitted by blood-sucking insects. The incubation period is 3 to 5 days and the fever lasts about twenty-four hours, and muscular stiffness and lameness occur. Recovery usually takes place in a day. Onset is sudden. The animal separates from the herd, there is a watery discharge from the eyes and nose on the first day. On the second day the animal lies down with its head turned to one side. If severe, there is usually a partial suppression of milk supply in dairy cows. The animal returns to normal in 3 to 4 days. Treatment includes care, isolation and adequate watering.

Professor Seddon, writing later about the disease, said it occurred in Indonesia. It was first reported on the Humbert River district in the Northern Territory in February 1936, reached the Queensland Gulf early March 1936, and the Kimberley district in Western Australia on 15 March 1936, Cairns in August 1936 and northern New South Wales in December 1936. (*QAJ*, Vol. 50, November 1938, pp. 601-610) Investigational work was commenced with the disease at the Animal Health Station, Yeerongpilly, in co-operation with the Entomologist of the Queensland University and the CSIR.

Contagious vaginitis and sterility in cattle.

In 1938 this was the major disease of cattle in central Queensland, up to 50% of cows returning to the bull for a second service. During the previous five years it had greatly

increased in Queensland. Marshal Irving recommended that the vagina be douched with a zinc sulphate solution and the vulva with lepol. (*QAJ*, Vol. 49, March 1938, pp. 219-232)

Brucellosis

During 1940-41 a bovine brucellosis-free scheme was founded and all pigs being imported to Queensland except for immediate slaughter at Cannon Hill had to be tested twice at intervals of thirty days and maintained in isolation.

Some first records of disease

Mycotic dermatitis was identified for the first time in Queensland in cattle in the Mount Perry district. The Stickfast flea in poultry was definitely diagnosed at Boonah for the first time in September 1941 and Swine erysipelas was recorded for the first time in 1942-43.

Several other commonly occurring diseases were dealt with by veterinary and specialist officers during the decade.

Tick fever

For many years it was considered that tick fever of cattle in Australia was caused by a single blood parasite - *Piroplasma bigeminum*. However, research by Dr John Legg, Animal Health Research Station, Oonoonba, Townsville and CSIR has shown that there are several. (Legg, J., *CSIR Pamphlet* No. 38, 1933 and *CSIR Pamphlet* No. 56, 1935) These parasites, under natural conditions, are transmitted by the cattle *tick (Boophilus microplus)* The causative organisms include:

- 1. *Piroplasma bigeminum*-the cause of piroplasmosis-which has an incubatory period of three to four weeks under natural conditions and as short as one week after blood inoculation. Temperature of the infected animal rises over a number of days to 104 108 F, appetite suffers, breathing becomes rapid and jerky. In severe cases urine becomes a dirty reddish colour, hence the term redwater. In fatal cases death occurs in a week. Inoculation with the blood of an infected animal causes a reaction between the seventh and fourteenth day. Fever can be reduced by treatment with piroblue or acaprin. (Mulhearn, C. R., *QAJ*, Vol. 45, January, pp. 32-41, August, pp. 192-195.
- 2. Anaplasma marginale-the cause of anaplasmosis-is also widespread through the tick areas. Anaplasmosis does not produce high fever nor red urine. It is a gradual wasting disease and death follows from gradual exhaustion. It can be treated with a vaccine prepared from *Anaplasma centrale*, a milder form of *A. marginale* from South Africa, which can be combined with *Piroplasma bigeminum* to control all forms of tick fever except occasional *B. argentinum*. No drug is effective against *Anaplasma marginale*.
- 3. *Babesiella argentinum*-the cause of babesiellosis-is a common cause of redwater in the field with an incubation period similar to piroplasma but it does not produce redwater, while jaundice is often a marked feature. It is not affected by piroblue but can be controlled with acaprin. Animals which have recovered from an attack of piroplasmosis have considerable resistance to *Babesiella*. It produces 90% of the losses from redwater.

4. *Thieleria mutans*-widely distributed throughout the tick areas but causes little harm.

The Townsville researchers found that by using a vaccine containing *Piroplasma bigeminum* and *Anaplasma centrale* all forms of tick fever could be controlled and from that time the Animal Health Station at Yeerongpilly distributed this vaccine. (Legg, J., *QAJ*, Vol. 46, January 1936, pp. 32-35)

The A. Qualischefski Dip

This was investigated by a Committee of Departmental experts and representatives of the United Graziers' Association and Selectors' Association. Qualischefski's claims that (1) the dip killed all ticks on a beast, (2) following two dippings at an interval of four weeks, cattle remained free for 3-4 months, and (3) female ticks from dipped cattle would not breed, were not substantiated. (*QAJ*, Vol. 55, June 1941, p. 521)

By 1938-39, Dr John Legg had decided on a vaccine made up of *Piroplasma bigeminum*, *Babesiella argentinum* and *Anaplasma marginale* at one inoculation. All reactions can be controlled by acaprin. (*Rep. Dep. Agric. Stk*, 1938-39, p. 99)

The war caused a heavy demand for acaprin, which had been manufactured in Germany and became unavailable. British firms manufactured pirovan and piroparo which proved suitable and was substituted. Acaprin was later manufactured in Australia. A Federal Cattle Tick Commission was in action during 1940-41. During 1941-42 some cattle ticks were found hard to kill with arsenic, and nicotine sulphate added to the dip helped. During 1941-42 some 850 000 acres in the South Burnett district were placed in Schedule T easing restrictions for passage of stock into New South Wales. (*Rep. Dep. Agric. Stk*, 1941-42, p. 16)

In his 1943-44 report, John Legg, Director of Veterinary Services, stated: "It would appear that increased resistance to destruction by the ordinary methods of treatment, i.e. the arsenic dipping vat, is becoming marked". Under the control of a special committee work was commenced to study this arsenic resistance in ticks, in association with officers of CSIR. (Legg, J., *Rep. Dep. Agric. Stk*, 1943-44, p. 19)

Buffalo fly

During 1931-32, Veterinary Surgeon A. F. S. Ohman and Entomologist F. H. S. Roberts, were sent to north-west Queensland to try to prevent the spread of the buffalo fly. They tried cleansing cattle trucks and incinerating all manure from the trucks which had carried stock from the fly area. A spraying plant was erected at Kajabbi to treat stock moving east and south.

After spraying the cattle were despatched immediately to prevent the fly from catching up with them. The trucks were sprayed with phenyl. The State Government wanted to create a buffer area but the Commonwealth disagreed and Major Cory said: "It is inevitable that the pest must sooner or later spread throughout the coastal districts of this and adjoining States unless some practical action is taken."

Wartime agriculture in Queensland and the Department's role

During the late 1930s a European conflict was anticipated. The United Kingdom discussed food and trade policies with Australia to be adopted in the event of war. The entire Australian wool clip would be purchased by the United Kingdom for the duration of the war and the export surplus of Australian meat, dairy produce, eggs, dried and canned fruits. Discussions had been held regarding the sale of sugar and base metals. The United Kingdom could not undertake to purchase the entire exports of wheat, barley, wine, apples and pears as war would dislocate shipping, and transport for products requiring refrigeration would be difficult, and storage space would be needed locally. (Crawford, J.G. et al, 1954)

The Australian Agricultural Council had been formed in December 1934, consisting of the State Ministers of Agriculture and members of their advisory, scientific and administrative staffs. It held its first meeting on 4 June 1935, but its second was not held till August 1937, when it dealt with matters of interest to all the States-wheat marketing, the Australian Dairy Produce Board, standards for citrus, a Federal Potato Advisory Committee, marketing of apples, import of pedigreed stock, soil erosion, a Central Food Laboratory, Alsatian dogs breeding with the dingo, plague grasshoppers, contributions to the Imperial Mycological Institute, water and fodder conservation, restriction of production and coordination of research in relation to stock diseases. (*QAJ*, Vol. 48, pp. 249-250) It was not ready to take over the administration of an agricultural war effort involving the whole of the Commonwealth.

Commonwealth control

Britain declared war on Germany on 3 September 1939, and a few hours later Australia followed suit.

At the outbreak of war the Commonwealth assumed the major role in agricultural production. Then followed some swift emergency action:

September 7 and 8 - Price control was instituted.

September 9 - The National Security and Trading with the Enemy Acts were passed.

September 13 - The Australian wheat crop was acquired by the Commonwealth Government for the duration of the war, with marketing through a compulsory wheat pool.

September 21 - The Australian Wheat Board was constituted under the National Security Regulations and the Queensland Wheat Board was told to handle the Queensland wheat crop on its behalf.

September 28 - The Central Wool Committee was set up under National Security Regulations.

October 15 - Great Britain agreed to buy the whole of Australia's exportable surplus of butter, cheese, eggs, meat, sugar, lead, zinc and copper, and the whole of the wool clip. October 28 - The Australian Barley Board was constituted.

November 9 - An Egg Supply Committee and Dairy Produce Control Committee were appointed.

November 30 - A Hides and Leather Industries Board was appointed.

Enlistment for military service

The immediate reaction to the declaration of war was that Great Britain would require more than anything else Australian men for the armed forces. Compulsory military training was instituted in October 1939. Enlistment for overseas service was on a voluntary basis. The pre-war service strength of 13 000 men rose to 203 000 by the end of 1940. A list of "Reserved Occupations" was drawn up but any man who really wanted to enlist could easily do so and some 172 Departmental staff served in the armed forces.

The loss of rural manpower was not at first serious as there was, at the outbreak of war, a pool of more than 298 000 unemployed men in Australia. In 1938 the Queensland Agricultural High School and College at Gatton commenced an Unemployed Youth's Training Scheme in agricultural work for young men between the ages of 18 and 25 years and 106 students were enrolled. In 1939 a further 82 students were trained. Many of these joined the armed services. (*Gatton College Magazine*, 1938-39)

Manpower problems began to become serious as war progressed. On 26 June 1941 the Commonwealth Department of War Organisation of Industry was formed and a Manpower and Resources and Rural Industries Committee was set up. Thereafter there was more attention paid to the agricultural, scientific and rural worker expertise distribution for the war effort. Departmental staff were heavily involved in food production organisation and output.

In May 1942 call-up of full-time rural workers ceased and after the victory in the Coral Sea battle the armed forces were reduced to man agricultural projects.

In July 1942 Cabinet approved the establishment of the Women's Land Army under the Director-General of Manpower. Initially there was the problem of accommodation and prejudice against additional women on farms, and only 2600 members were enrolled. Later Italian prisoners of war, voluntary city workers, schoolchildren, university students and military men too young for active service helped the labour situation and Departmental staff were heavily involved in their accommodation and location. During the 1944 drought, 150 soldiers were used as mulga scrub-cutters for sheep feeding in the Warrego and Maranoa areas.

The need of the armed forces in New Guinea for protection from malaria led to a call for scientists with entomological and allied training to man Malaria Control Units. Among Departmental officers who responded to the call were David O. Atherton, F. H. S. (Ossie) Roberts, Pat J. O'Sullivan (entomologists and parasitologists), Jack H. Simmonds, Ray R., N. Langdon and J. Errol C. Aberdeen (plant pathologists), Frank Birrill (horticulturist) and Bert Salmon (photographer) Some of these officers spent up to four years away.

With the vast increase in canning of fruit and vegetables, dairy produce etc. there was need for supervision of the processing, especially after food poisoning had occurred amongst some American troops. Dr H. W. Kerr, Director of the Bureau of Sugar Experiment Stations, was called temporarily to investigate canning procedures and later was asked to go to the Commonwealth Department of Supply in the Food Control Department as Chief Food Technologist for the duration of the war. He resigned as Director of the Bureau and was replaced by the then Assistant Director, Arthur F. Bell.

The Chief of CSIR sought out agricultural graduates because of their breadth of expertise for supervision of industrial hygiene and Alan A. Ross, later to become Director-General of the Department, was chosen from Queensland in the Manpower Call-up. He worked in shipbuilding yards and munitions establishments until released to return to the Department in 1942 to investigate boron nutrition of vegetables and zinc nutrition in fruit.

The Minister for Agriculture and Stock himself, the Hon. F. W. Bulcock, resigned on 15 December 1942 to become Wartime Director-General of Agriculture at the request of the Prime Minister, the Hon. John Curtin. Bulcock was to establish the Federal Department of Agricultural Production.

Throughout the war years the veterinary officers were required to stay at their posts to oversee the livestock population and provide the usual veterinary services and disease vigilance. With the American forces in Australia, higher standards of hygiene were expected. Dairy cattle and pigs received increasing attention. A comprehensive tuberculin testing programme for dairy cattle providing fresh milk was undertaken and tuberculosis in pigs was policed. Mastitis, milk fever, three-day sickness, worms and scours in calves, bloat, contagious abortion and blight in dairy cattle needed attention. Tuberculosis, large roundworm, erysipelas (first record) and salmonella infection in pigs, pullorum, coccidiosis, nutritional deficiency, fowl pox, fowl cholera, avian leucosis, spirochaetosis and the first occurrence of stickfast flea in poultry, sheep blowfly, malignant oedema, scabby mouth, pregnancy toxaemia, lice and fluorosis in sheep were all problems. The beef cattle industry was still plagued with ticks, pleuropneumonia, poison plants and the spread of the buffalo fly. C. R. Mulhearn and his colleagues in north Queensland were deeply involved in the preparation of plans to evacuate all cattle from north Queensland in the wake of probable Japanese advances but the plan was not put into effect.

Phenothiazine had been obtained by Bulcock early in February 1941 and experiments in its effectiveness against worms in livestock were quickly initiated. Acaprin for tick fever treatment was unavailable from Germany and pirovan was substituted from Britain and later Australia. Arsenic resistance in ticks appeared and nicotine sulphate added to the dip improved performance.

The Departmental Agricultural Chemical Laboratory, as ever, was heavily loaded providing analytical services to the several branches and policing the numerous Seeds, Fertiliser, Stock Foods, Pest Destroyers and Veterinary Medicines Acts, soil and water surveys, and dairy products.

The Administrative Staff shouldered a heavy burden amidst the additional duties required by readjustment to wartime conditions.

Tribute by the Minister

The Hon. T. L. Williams in his New Year message in January 1944, said:

I also desire to pay a well-deserved tribute to the officers of every branch of the Department which I have been called upon to administer. Through enlistments, transfers to Federal Departments and call-ups for other services, the staff has been considerably depleted, but those remaining have undertaken the consequent additional work in an admirable spirit, discharging their onerous duties with determination and efficiency. (*QAJ*, Vol. 58, January 1944, p. 5)

Queensland Emergency Supplies Committee

Under the National Security (Emergency Supplies) Regulations, the Commonwealth in 1941 delegated to the States power to make rules for an emergency supplies scheme. Costs of the scheme were shared by the Commonwealth and State in agreed proportions. The Queensland Treasurer gave guarantees to the Commonwealth Bank and to the sugar industry for the purpose of providing reserve stocks of emergency commodities and also made payments within the State on behalf of the State Government and the Commonwealth Treasurer, the Commonwealth Government having arranged to refund payments made on its behalf.

The Queensland Emergency Supplies Scheme was divided broadly into four parts:

- 1. storage on traders' premises;
- 2. certain stocks dispersed from traders' premises in coastal areas and stored inland in special storages as a safety measure;
- 3. special flour depots;
- 4. special depots containing Government-owned goods;

The scheme was designed to have reserves in all parts of the State to provide for emergency in the case of transport problems or a temporary interruption of production. Reserves were stored mostly in wholesale premises but in certain areas in retail premises, bakers being classed as retailers in order to provide for storage of flour. Some 344 registered wholesale suppliers and 2452 registered retail stores operated.

Commonwealth Regulations prescribed all commodities essential to the life and health of the community so they could be controlled.

The reserves built up helped considerably in north Queensland because of transport delays.

The policing of reserve stocks was done by local supply officers, without extra remuneration. Field officers of the Department of Agriculture and Stock, State school teachers, officers of the Department of Justice and other Government officers were selected for appointment as local supply officers. (Ogilvie, W. C., *Rep. Dep. Agric. Stk*, 1941-42, p. 28)

The Queensland Scheme was under the Minister for Agriculture and Stock, Bulcock, and a Departmental Advisory Committee assisted in the preparation of plans. The following Departmental local supply officers were appointed: S. E. Stephens (Instructor in Fruit Culture, Cairns), C. C. Barth (District Inspector of Stock, Townsville), S. C. Smith (Inspector of Stock, Mackay), and L. J. C. Mullen (Fauna Protector, Rockhampton). (*QAJ*, Vol. 56, September 1941, p. 255)

Departmental entomologists, chiefly W. J. S. Sloan, supervised control of stored food pests.

War Agricultural Committee Organisation

Faced with the need to produce more foodstuffs under wartime disabilities-such as the drain on rural labour, shortage of mechanical equipment, replacement and repair services-the Australian Agricultural Council in September 1942 set up an organisation of district war agricultural committees under the control of and centred on the Department of Agriculture in each State, with the Chairman an officer of the Department. Each Department liaised with Commonwealth Standing Advisory Committees associated with the Australian Agricultural Council. On administrative matters each State Department of Agriculture provided a channel of communication with the Federal Department of Commerce and Agriculture.

The Queensland organisation was made up of forty districts, each comprising one or more local authority areas. Three members of each district war agricultural committee-viz. a field officer of the Department as Chairman, a person selected from the urban community on a personal rather than an organisational basis, and a primary producer-were appointed by the Minister for Agriculture and Stock. In addition, district National Service Officers were associated with district war agricultural committees (DWACs) in an advisory capacity. Each district committee appointed three-man local subcommittees, as needed, on geographical or a commodity basis to ensure the assistance of commodity marketing boards and primary producers co-operative associations and selected primary producers and businessmen.

The Central Executive, under the Chairmanship of the Minister and including the Under-Secretary and heads of the various branches, operated within the Department of Agriculture and Stock. The Directorate of Manpower and the Queensland Council of Agriculture were also represented on the Central Executive. Assisted by an administrative staff of specialist officers and the part-time services of Marketing Branch Officers, the State Executive Officer was responsible for the administrative directions of the organisation.

Broadly the purpose of the War Agricultural Committee Organisation was to assist in decentralising wartime administration of agricultural interests. The district war agricultural committee was chiefly concerned with the attainment of production objectives fixed by the Food Production Executive of the Federal Cabinet and to this end with the organisation of the most efficient use of the labour resources of their districts, the pooling of and co-operative use of agricultural machinery and transport facilities and the general sponsoring of co-operative efforts to offset labour and other wartime disabilities. It was their function to organise the means of production as distinct from the planning.

The DWACs were an integral part of the organisation set up to administer the National Security (Agricultural Machinery) Regulations. A machinery control officer was attached to the administrative staff of the War Agricultural Committee Central Executive.

DWACs also acted in an advisory capacity through the Central Executive in such matters as the labour requirements of their district from outside sources, the needs of individual producers in respect of replacement parts for agricultural machinery, cars and trucks, liquid fuel, general farm equipment and materials, as well as the release by the Materials Supply Directorate of fencing wire and wire netting. An important function of the DWAC was to keep in touch with production trends and to report on any circumstance or condition militating against the attainment of production objectives.

In the employment of the Australian Women's Land Army, activities of the DWACs included organisation of accommodation and transport and the placing of labour.

The machinery of the War Agricultural Committee Organisation provided a means of regulating the distribution of materials and farm equipment in short supply, and their assistance was invoked by the Commonwealth authorities concerned with administration of control schemes of various kinds, e.g. pneumatic tyres for tractors, garden hose for growers of fruit and vegetables, and electricity supplies for rural areas. (Hunter, H. S., *Rep. Dep. Agric. Stk*, 1942-43, pp. 27-28)

H. S. Hunter, Director of Marketing, was appointed the first State Executive Officer. He was replaced on 11 May 1944 by A. F. Bell, Acting Director of the Bureau of Sugar Experiment Stations, who on the same date was appointed Acting Director of Agricultural Organisation. Following Bell's further promotion, Harry Barnes, who had been Director of Horticulture, became State Executive Officer on 31 May 1945.

Up to 30 June 1944, 3350 service personnel were released for the dairying, poultry, vegetable growing and meat industries nominated by the DWAC. Permanent camps for the Women's Land Army were established at Birkdale, Victoria Point, Redland Bay and Buderim for women engaged with vegetable crops. Seasonal camps were organised for harvesting fruit and vegetables at Stanthorpe, cotton in the Dawson and Callide Valleys, citrus at Gayndah, potatoes, tomatoes and other vegetables at Home Hill, Ayr and Gladstone, beans in the Gympie area, and ginger, beans and strawberries at Buderim.

Prisoner-of-war control centres were set up at Stanthorpe (168 men), Nambour (121), Home Hill (181), Kingaroy (132), Gayndah (96), Kenilworth (80), Boonah (71), Monto (112) and Atherton (53) Prisoners were billeted on farms in groups of two or three at a cost of accommodation, rations and £1 per person per week in 1944, raised to £2 in 1945. Figures in brackets indicate the 1945 numbers employed.

Some 10 750 applications for machinery were made and 5712 releases of machinery were granted under a permit from Machinery Control Officer, W. H. Bechtel. The main requests for machinery in 1944 were for tractors (4329), engines (3340), windmills (2216), irrigation plants (908), rotary hoes (370) and shearing equipment (228), with less demand for spray outfits and harvesting machinery.

Cotton

It was realised that unlimited amounts of cotton would be required during the war, not only for clothing, but also in the manufacture of munitions, tyres, etc. When war was declared the cotton varietal situation had been worked out by Departmental plant breeders, the advantages of a cotton/Rhodes grass rotation and supplementary irrigation had been proved, insect pests had been studied in depth and jassid-resistant varieties were being produced. In 1939 the Cotton Marketing Board brought from America one of the first mechanical cotton-picking machines manufactured in that country.

In August 1940 Bulcock called for more cotton to be grown. Cotton advisers were located at Ayr, Rockhampton, Mackay, Biloela, Bundaberg, Monto, Gayndah, Kingaroy, Brisbane and Bungeworgorai (Roma) The Commonwealth Government offered a new schedule of bounty payments for five years from 1 December 1940. To help farmers grow more cotton the Queensland Government arranged for farmers to obtain an irrigation plant at cost and have it installed at the cost of transport and installation through the Bureau of Rural Development. The money was lent without interest and repayment was spread over ten years. In return the farmer was required to grow and irrigate about ten acres of cotton every year. He had to supply his own water and power. (*QAJ*, Vol. 56, p. 3)

Fielding Chippendale was appointed Instructor in Cotton Irrigation on 1 August 1940 and stationed at Biloela. George Hubble was seconded from the Council for Scientific and Industrial Research for two years to undertake soil surveys at Theodore and Gibber Gunyah. Sixty irrigation plants were provided for supplementary irrigation during 1940-47 and several farmers using this method obtained 1000 lb or more of seed cotton per acre. This success led to 100 more plants being provided for the 1941-42 season.

Cotton seed of selected varieties was grown at the Biloela Research Station and elsewhere and enough seed to plant 73 500 acres was purchased for the 1941-42 season, compared with 45 000 acres for the 1940-41 season. Only 55 000 acres were sown in 1940-41 because of the poor season. During 1940-1 the Departmental entomological staff concentrated on cotton pests and permanent officers were stationed at Biloela, Rockhampton, Gayndah and Toowoomba, and were assisted by temporary officers during the summer. Trap crops of maize and lead arsenate-molasses sprays were used against depredations by the corn earworm. (Wells, W. G., *Rep. Dep. Agric. Stk*, 1940-41, pp. 13-14)

On 19 June 1941, R. Muir, General Secretary of the Queensland Cane Growers' Council, circularised growers suggesting they restrict their plantings of sugarcane to the Commonwealth Government's target of 600 000 tons for 1942 instead of the previous peak quota of 737 000 tons. When Japan entered the war by bombing Pearl Harbour on 7 December 1941, Australia declared war against Japan the next day.

H. K. Lewcock, Senior Research Officer in the Department of Agriculture and Stock, and A. Nagle had grown successful crops of cotton in the Burdekin during 1939 and 1940, and Lewcock on 19 December 1941 suggested that the Burdekin cane growers should grow cotton in lieu of sugarcane on all lands suitable for cotton growing. The cane growers advised the Manager of the Queensland Cotton Board and, through the Queensland Cane Growers' Council the Minister for Agriculture and Stock that they would welcome a new crop to supplement sugar but the guaranteed price of 5¹/₄d per lb of seed cotton would not cover the cost of growing cotton in the Burdekin.

Bulcock called to conferences in Brisbane representatives of all Queensland cane producing and milling organisations, who discussed the proposal with Dr H. W. Kerr and A. F. Bell of the Bureau of Sugar Experiment Stations, W. G. Wells and R. W. Peters of the Cotton Branch and H. K. Lewcock, Senior Research Officer. Later Bulcock addressed

growers in the Burdekin area suggesting 15 000 to 20 000 acres of cotton be grown under irrigation on "assigned" sugar lands and any other available land. Growers were uncertain of their success with a new crop and unhappy about the price, and feared interference with their individual 'farm peaks'; but they finally agreed almost unanimously to grow cotton and 8194 acres were promised to grow cotton from 528 cane growers in the Kalamia, Inkerman and Pioneer mill areas.

Lewcock was placed in charge of the scheme and several Departmental officers were brought into the Burdekin to supervise. Only 5537¹/₂ acres of the 8194 acres promised were planted. The crop was not the hoped-for success: unseasonal heavy rains followed warm weather which led to infestation by the corn earworm and subsequent deterioration of the crop; the crop was grown in the winter as an emergency measure and planting dates were uncertain; growers had to allocate tractors between sugar growing and cotton, with a tendency to favour their main sugar crop, and only a few did well. Complaints were made and claims for compensation were lodged. A Royal Commission dismissed the claims for compensation. Departmental officers declared the crops were more successful than in any other part of Queensland where cotton was grown that year. (*Royal Commission on Cotton Growing* (*Burdekin District*), 1944)

Fertilisers and stock foods

In October 1939, Dr H. W. Kerr, Director of the Bureau Of Sugar Experiment Stations, warned cane growers that potash would be difficult to obtain. Pre-war supplies of potash came from Germany, Spain, France and Palestine. Queensland had stockpiled fertiliser potash sufficient for two years. From results of his numerous field trials with potash fertilisers, Kerr was able to state that potash would not be needed for some time in the Burdekin and other alluvial soils in north Queensland but would be necessary in the red volcanic and schist soils. The fertiliser companies agreed to a plan to scrutinise sales of potash fertilisers. (*QAJ*, Vol. 52, October 1939, p. 437-438) Under The Agricultural Requirements Control and Conservation Act of 1939, assented to on 13 November 1939, potash and sulphate of ammonia were gazetted as essential agricultural requirements. No potash could be used as a straight fertiliser but must be used when required only in mixed fertilisers for sugarcane, pineapples, bananas, tobacco, vegetables, potatoes, strawberries, cotton, citrus fruits, deciduous fruits, papaws, custard apples, passionfruit and avocados.

Under the Act, F. B. Coleman, Officer-in-Charge of the Seeds, Fertiliser, Stock Foods, Pest Destroyers and Veterinary Medicines control was appointed Principal Officer-in-Charge and Inspector under the Act with R. A. Taylor as his Deputy in Queensland, and some inspectors were appointed to assist in carrying out the provisions.

Where sulphate of ammonia was normally used for sugarcane, Dr Kerr recommended the use of leguminous green manures and fallows. Nitrate of soda was available but was not favoured for cane.

On 13 January 1943 a Commonwealth Superphosphate Industry Committee was appointed under the National Security Regulations. Late in 1940 German raiders had sunk a number of vessels in Australian waters and raided loading installations at Nauru, interfering with the supply of 22% P phosphate rock, and later Japan seized Nauru and Ocean Islands,

closing these sources of supply. Supplies of poorer 18% P205 rock phosphate were then obtained from Florida, Makatea, Egypt and North Africa, and sulphur to produce sulphuric acid which formerly came from the United States, Italy and Japan had now to be produced by burning local pyrites in Western Australia. Superphosphate was not required for Queensland wheat crops, but was necessary especially for vegetable production, sugar and some pastures. Departmental officers, with their expertise, were involved with war agricultural committees in allocation of supplies of fertilisers where they were needed for priority crops. Fertiliser transport and distribution were difficult.

F. B. Coleman was also in charge of rationing of stock foods such as meat meal and mill offals, blood and bone meals, bran and pollard for livestock from 1 June 1945 and permits were required to obtain these under the National Security (General Regulations) Control of Stock Foods and Remedies Order. Stock licks containing more than thirty per cent by weight of mineral matter were prohibited.

Fruit and vegetables

Apples and pears were in excess supply in southern Australia and an Apple and Pear Marketing Board was set up on 6 December 1940. Granite Belt growers were not greatly involved, but lack of fertilisers led to Departmental trials with several green manures such as lupins, golden tares, black winter rye, 'Sunrise' oats and 'Cape' barley. Codling moth control experiments were continued. J. H. Gregory, the Packing Instructor, advised on fruit and vegetable packing.

Fruits in heavy demand during the war were pineapples for fresh fruit and canning, papaws, bananas, passionfruit for canning as fruit salad as well as fresh consumption, citrus for fresh consumption and juice, and strawberries for jam. The fruit salad pack brought the papaw into prominence as the many partially blemished fruit could be selectively cut for fruit salad. In the 1930s H. K. Lewcock had a strong team working on pineapples and practically doubled production from the same acreage; it is hard to understand his transfer to the Burdekin cotton scheme in the early 1940s. Hubert Groszmann continued his effective pineapple selection work and W. G. Hancock developed pineapple production at Bowen throughout the war.

Entomologists worked on fruit pests. Mango and papaw selection work was done at South Johnstone by G. W. J. Agnew and Dr L. G. Miles; during the war these selections were transferred to a five-acre plot on the old Kamerunga nursery in charge of S. E. Stephens, who also had a tropical fruit plot in the Cairns Botanic Gardens. Agnew was later transferred to Nambour and continued his interest in papaw improvement. Five new strawberry strains were imported from USA to Nambour. With ginger supplies from China decreasing, ginger growers at Buderim produced 77 tons in 1942. In September 1941 the Buderim Co-operative Ginger Growers Association Limited erected a pre-treatment factory.

The first Australian troops left for the Middle East on 15 December 1940 and there were several training camps in Australia bringing new recruits up to combat level. A demand for vegetables was created. Late in 1941 the Federal Department of Supply and Development sought increased production of green beans for canning for the forces. The Epicure variety

was chosen but the project was defeated by the ravages of the bean fly (*Agromyza phaseoli*) and entomologists were called in to combat this menace. W. A. T. Summerville, Senior Research Officer in the Horticultural Branch, worked on a bean fertiliser programme at Nambour. (*QAJ*, Vol. 55, April 1941, pp. 288-290)

A huge demand for vegetables was created by the large numbers of Australian and United States forces in Australia after Australia entered the war against Japan on 8 December 1941. During 1941-42 a Vegetable Production Committee was set up by the Commonwealth Government to arrange contracts between the Department of Supply and Development and farmers for the production of vegetables. Vegetables became one of the "priority" crops for seed, machinery, fertiliser and manpower. Contracts were issued by State Departmental officers on behalf of the Commonwealth Government at guaranteed prices. Farmers were diffident about contracting unless they could get labour and machinery, so in April 1942 the Manpower Directorate invited the Agricultural Departments and farmers to nominate the men necessary for vegetable growing and these were protected from the call-up.

By the end of June 1942 some 480 contracts had been arranged and practically the whole of the vegetable requirements of the forces in Queensland had been contracted for some months ahead. Fertilisers were made available and forty-five per cent of all fertilisers used (mainly nitrogenous) during 1943-44 was allocated to vegetable growing in Australia. To ensure the supply of vegetable seed a Vegetable Seed Committee was appointed under the National Security Act and contracts were let at guaranteed minimum returns per acre as the major incentive plus priorities in the allocation of fertilisers and materials. The Commonwealth appointed the Committee of Direction of Fruit Marketing as Queensland's sole distributor to contract vegetable growers. This organisation also acted as the buying authority of the vegetable and fruit requirements of the Australian and Allied Forces in Queensland and Papua.

The major vegetables grown under contract were tomatoes, carrots, cabbages, swede turnips, onions, beetroot and parsnips. In Queensland vegetable production was mainly undertaken by small-scale growers in the neighbourhood of Brisbane extending to Boonah and to the north coast, and to a lesser extent on the Atherton Tableland. C. Newton Morgan was the main officer in charge in southern coastal Queensland; he wrote several articles in the *Queensland Agricultural Journal* dealing with the production of individual vegetables and also produced a pamphlet for "backyard gardeners" who were encouraged to make their own individual contribution to the war effort. Other Departmental officers assisted from time to time and Alf Brimblecombe provided the entomological expertise. A. A. Ross and F. W. Blackford investigated mineral problems.

On the Atherton Tableland S. E. Stephens encouraged general vegetable production with local advice and through the *Queensland Agricultural Journal*. Alec Schroder, one of the brothers who were large growers of vegetables at Tolga during the war, later joined the Agricultural Branch of the Department.

Chemical weed control in carrots by spraying with power kerosene was introduced at this time by C. W. Winders.

Mechanisation of the vegetable industry by the use of small units was greatly enhanced by American Landlease support. Early in 1942 a Combined Raw Materials Board, Combined Shipping Adjustment Board and Munitions Assignment Board was set up in Washington and on 3 January 1942, L. R. McGregor, the first Secretary to the Queensland Primary Producers' Organisations and the first Director of Marketing, who was then Australian Trade Commissioner in the United States, was appointed Director-General of War Supplies Procurement in the United States. The Queensland Government purchased £50 000 worth of agricultural machinery in November 1943 and an Advisory Committee made a provisional allotment of these machines.

Vegetable production and the production of fodder for the dairying industry received priority. Particulars were sent to the District War Agricultural Committees; applications by farmers were made to the Chairman of the Committee and allocations were made by the local committee. Preference was given to purchase by co-operative groups of farmers and to approved contractors. Sales were made at retail prices and with the usual service provided by the selling companies, and the Agricultural Bank helped with finance. On 13 April 1944, W. Hermann Bechtel, Instructor in Agriculture, was appointed to be also Acting Agricultural Machinery Officer in connection with the District War Agricultural Committees of the Department of Agriculture and Stock; Peter Mitchell, Inspector, Diseases in Plants Acts, became Acting Machinery Officer for the North Coast; and C. Newton Morgan was Acting Machinery Officer for the South Coast.

Navy bean seed was distributed among a number of growers for production under contract to the Commonwealth Department of Supply and Development during 1942 and J. A. Kerr, the Departmental Adviser in Agriculture at Kingaroy, was active in promoting the development of this new crop for canning purposes throughout the South Burnett.

Potatoes were destined to be an important food crop during the war years. On 27 April 1942 an Australian Potato Committee was appointed under the National Security Act. In 1942 potato plantings increased overall in Australia by fifty per cent over the previous year. In September 1942 potato production goals had been approved by the Production Executive of Cabinet. Potato acreage rose from 99 000 acres in 1941-42 to 242 000 acres in 1944-45.

In the first year of operations a floor price was introduced but in later years contracts were arranged. Retail prices were pegged at 5 pounds for 6d from May 1943 and a Government subsidy was introduced to enable the Committee to sell at this price and still offer lucrative contracts to growers. This subsidy was £1.7 million in 1933-34, \$2.5 million in 1944-45. By the war's end the Australian Potato Committee was working contracts for some £10 million worth of potatoes. To equalise transport costs, increased contract prices were offered above the base £12.10 per ton to £15 in southern Queensland and £16 in north Queensland, with special premiums for out-of-season potatoes which were grown during the winter in the Burdekin, Woodstock, Mackay and other northern areas. Most of the potatoes were for civilian consumption. In 1945 some 343 000 tons were used by civilians and 70 000 for servicemen. Dehydration for servicemen's needs totalled an additional 59 000 tons.

The Departmental district instructors in agriculture were active in promoting potato production, one of the real success stories of the war. The Council of Agriculture made its Secretary and staff available to administer the Commonwealth Potato Control Plan in Queensland and to perform secretarial work associated with the investigation of the dairying industry in Australia on behalf of the Commonwealth Government.

Wheat and other feed grains

On 13 September 1939 the Australian wheat crops were acquired by the Commonwealth Government for the duration of the war. Marketing was done through a compulsory wheat pool. On 21 September the Australian Wheat Board was constituted under the National Security Regulations and the Queensland Wheat Board handled the Queensland crop on its behalf. In November 1940 a Wheat Stabilisation Scheme was announced. A guaranteed price of 3s 6d per bushel, f.o.b. ports, bagged, was offered; growers were to be licensed to control production; and a loan of £2 700 000 was approved for drought relief. On 18 November 1940 the payment per bushel was raised to 3s 10d.

Wheat was in good supply and shipping was needed more urgently for other products. Superphosphate was rationed and some wheat land was transferred to sheep raising in southern Australia. On 2 July 1942 a wheat agreement was reached between the Governments of Argentina, Australia, Canada, the United Kingdom and the United States of America.

During 1944 there was a major drought in the cereal-growing areas and the Commonwealth Government granted $\pounds 1$ million in drought relief.

With the loss of export markets, stocks of wheat rose from 21 million bushels in November 1939 to 104 million bushels in 1942 and 154 million bushels in November 1943. Diverting wheat for distillation into alcohol was considered. A drought during 1944-45 and heavy demands for stockfeed and export cut this 1943 stock from 154 million to 12 million bushels in 1945. Following this decline the acreage licensed in Queensland was kept above pre-war levels and wheat production was encouraged, especially as superphosphate was not used to a significant extent in Queensland. The 1945-46 Queensland yield of 8 000 000 bushels exceeded the pre-war 1939 crop of 7 000 000 bushels.

During 1938-39 of the thirty recorded wheat varieties grown in Queensland no fewer than fifteen had been bred by R. E. Soutter at Roma and these occupied sixty per cent of the area sown. Naturally the Department was keen to keep this breeding material and the wheat-breeding programme was continued throughout the war. Similarly, the new grain sorghum types being developed by Dr Gordon Miles at the Biloela Research Station, which were to replace maize grain as a livestock feedstuff, were considered so important that breeding work continued. Maize selections which had been developed on the Atherton Tableland were moved to Biloela for safe storage.

Sugar

In July 1942 the Australian Food Council appointed an interdepartmental committee to determine production goals for farm products. Goals were set for sugar and approved by the Production Executive of Cabinet in September 1942. At the outbreak of war the United Kingdom contracted with the Queensland Government to purchase surplus production of

raw sugar. Subsequently the agreement was renewed each year throughout the war. Retail prices of sugar were stabilised at 4d per lb from 1941 to 1944. The location of the sugar industry in Queensland meant that it was particularly hard hit by manpower shortages and by transport difficulties and even by impressment of tractors early in the war. The industry was also very dependent on sulphate of ammonia, which was unavailable or rationed during the war, and nitrate of soda was not very satisfactory. Sugarcane, however, was a "priority crop" for fertilisers. When the United States troops arrived, transport of sugar from coastal ports of Cairns and Townsville had to give way to the precedence taken by the army in the use of port facilities.

Manpower problems in harvesting were acute and even in 1943 and 1944, at the height of the war, special releases from the army were made to cut cane. For the 1944 harvest, 5672 men were needed and 346 soldiers were temporarily released. The pre-war acreage of sugarcane of approximately 370 000 acres was maintained till 1940-41, but declined to 329 000 by 1942-43, and production declined from 800 000 tons pre-war to 524 000 tons in 1943-44. Shortage of fertiliser was the main cause of lower production. The Government was reluctant to abandon the severe peacetime restrictions on the industry, even as a temporary wartime measure. (Crawford et al., 1954)

Civilian rationing of sugar to one pound per head per week occurred in 1944 because of the drought. Up to June 1945 US forces had consumed 79 200 tons of sugar.

The Bureau of Sugar Experiment Stations staff were actively engaged during the war in preserving the excellent control of growing the crop already established and making necessary adjustments to war conditions. Thanks to the numerous farm fertility trials which had been conducted pre-war by Dr H. W. Kerr and his staff, when fertiliser rationing was imposed the Bureau was in a very sound position to advise on its allocation. In *The Cane Growers Quarterly Bulletin* of 1 October 1939, Dr Kerr gave an indication of the needs of the various districts in relation to expected shortages, mainly potash. After the fall of France potash became very scarce and Departmental officers met to decide on a plan for the best distribution of limited supplies. As far as sugar was concerned it was decided that:

- 1. no fertiliser containing more than 14.5 per cent of potash could be purchased. In no case could muriate or sulphate of potash be sold except in mixed fertilisers;
- 2. only those cane farmers cultivating areas of red volcanic soil would be able to purchase mixtures containing more than 7.5 per cent of potash except where they held a permit to purchase richer mixtures;
- 3. farmers on the Burdekin could not purchase any fertiliser containing potash.

C. G. Story of the Bureau carried out trials with molasses as a source of potash and Dr Kerr advised growers that one ton of molasses was equal in potash value to $1\frac{1}{2}$ cwt of muriate of potash.

In late 1941 a shipment of imported sulphate of ammonia intended for Australia was diverted for other uses. This plus its demand by munitions manufacturers resulted in cane growers being reduced to less than half their normal supplies for 1942 except for Burdekin

growers, who were allowed five-sevenths of their previous year's quota. Rationing of fertilisers in 1942 was based on Bureau research results in farm fertility trials regarding three basic constituents-nitrogen, phosphorus and potash. Queensland cane growers were required to apply for a certificate to enable them to buy any fertiliser. The certificate was presented to the firm supplying it. The farmer was free to buy "straight" fertilisers (superphosphate, meatworks manure, sulphate of ammonia) or mixtures which by now could contain up to 20 per cent potash compared with 14.5 per cent earlier. (*Cane Growers Quarterly Bulletin*, Vol. 9, January 1942, pp. 69-70)

To substitute for some nitrogen requirements close attention was given by N. J. King at the Bundaberg Sugar Experiment Station and J. H. Buzacott of Meringa to the use of green manures-New Zealand Blue lupin, gambia pea (*Crotalaria goreensis*) and *C. usaraemoensis*, and *Dolichos biflorus* with sorghum as a nurse crop. Where horses could be used to save fuel, growers were advised to grow sudan grass for feed while Dr M. White advised them on general horse nutrition and F. H. S. Roberts on internal parasite control. The pathological work was supervised by A. F. Bell and included declaration of approved varieties for the various mill areas, and control of the most important cane disease, Downy Mildew. A school for cane disease inspectors was held at the Bundaberg Sugar Experiment Station from 12 to 16 May 1941, with fifteen inspectors present.

Cane pests were dealt with mainly by R. W. Mungomery and J. H. Buzacott and centred around grub control (it included the giant toad), while W. A. McDougall advised on rat control. A conference of Cane Pest Board members and field days at Bundaberg and Meringa were held. In 1941 a Canegrowers Tractor School was held at the Queensland Agricultural College, Gatton, for two weeks and included tractor maintenance, soil testing and general lectures on tropical subjects. Charcoal gas units had been attached to some tractors to save the usual fuels.

The flood in the Burdekin on 7 April 1940 was the worst in history and Bureau officers were called in to advise on methods of recovery and soil conservation work over the next few years. Cane-breeding work was expanded with the introduction of six new seedlings from Hawaii in late 1939.

Tobacco

Wartime work on tobacco involved some variety trials in all agricultural divisions including some crossbreeding work at Rockhampton by G. B. Brooks, involving native species of tobacco to improve disease resistance. The problem of "yellow patch" in tobacco seedlings was traced to excessive quantities of organic matter in the seedbed fertilisers and the use of nitrate of soda in the seedbeds cured the condition.

To minimise nitrogen use, R. C. Cannon investigated green manure crops, legumes not susceptible to nematodes proving the best treatment in a rotation. Recommendations to growers were to grow seedlings in concrete-constructed beds, fumigate for blue mould control under galvanised iron covers for 12 hours at least and preferably 48 hours in every 72 hours, save labour by using a planting machine, plough-cultivate throughout the crop, top high the first time and lower if necessary when suckering and grade the leaf on the farm. (*Rep. Dep. Agric. Stk*, 1941-42, p. 10)

Bureau of Tropical Agriculture

At the outbreak of war great success was being achieved with the fattening of cattle on improved tropical pastures of mixed grasses and legumes and with improvement of mangoes, papaws, granadillas and passion fruit. As the war progressed emphasis was shifted to the production of rubber from *Hevea brasiliensis* by early and complete harvesting, and the investigation of the Madagascar rubber vine (*Cryptostegia grandiflora*) at Charters Towers -Ravenswood - Georgetown as a source of much-needed rubber. Investigations were extended into the production of derris dust as an insecticide from *Derris elliptica*, papain from papaws, fibre from three varieties of jute and sunn and Deccan hemp and the native *Urena lobata* and, in conjunction with CSIR the drugs ipecacuanha from *Cephaelis ipecacuanha*, strychnine from *Strychnos nux-vomica*, and quinine from *Cinchona* sp.

Further south in the West Woombye area, the drug plants *Duboisia myoporoides* and *D. leichhardtii* were being cultivated in conjunction with the Council for Scientific and Industrial Research officers, for the production of the heart drugs hyoscine and hyocyamine, *Cinchona* sp., *Strychnos nux-vomica, Erythroxylon coca* for cocaine and *Strophanthus* sp. for strophanthin, T. G. Graham was posted to South Johnstone to look after the pastures and crops on 8 May 1941.

A small area at the Yeerongpilly Animal Health Station was set aside for promising rubber-bearing plants in south-east Queensland.

As war tension increased with the Japanese advances some women and children were evacuated from northern areas, and Bureau departmental staff were transferred further south-Dr Miles to Biloela, Agnew to Nambour and J. L. Schofield to Brisbane.

Bureau of Investigation Research Station

As irrigation had proved of such great value during the early war years it was considered necessary to set up an irrigation research station. The Bureau of Investigation of Land and Water Resources had been established in 1943 to provide a continuous investigation of the land and water resources of the State. A. F. Bell was the Department of Agriculture and Stock's representative on the Bureau and later Deputy Chairman. The Bureau was under the administration of the Lands Department.

On 15 December 1944, a committee was set up by the Hon. A. Jones, Minister for Lands, for the purpose of advising upon the establishment and administration of an Irrigation Research Station at the Queensland Agricultural High School and College. The committee comprised: Arthur Frank Bell, B.Sc.(Qd), M.S.(Calif.), D.I.C. (London), as Chairman; Neil William Briton, B.V.Sc., Principal, Queensland Agricultural High School and College; Robert Veitch, B.Sc.(Agr.), B.Sc.(For.), F.R.E.S., Director, Division of Plant Industry (Research); George Stephen Brimblecombe, farmer, Forest Hill; and Richard Grimes Watson, accountant and farmer.

Dairying

Dairying in Queensland just prior to World War II was in a very sound position. The Department had instituted a "Better Bull Scheme" and a "Dairy Cattle Improvement Scheme" to improve herd quality. Dairy Research Laboratories had been established and butter and cheese improvement schemes launched. General hygiene had been upgraded. Schools for butter factory employees had been held at the dairy research laboratories and field days for farmers on highly improved private farms. Production recording of herds was increasing. Veterinary services to the dairy farmers had been strengthened. Dairy cow nutrition and fodder conservation information was widely distributed.

The United Kingdom agreed at the outbreak of war to purchase all the surplus butter and cheese available at a satisfactory price and initially farmers were well recompensed. However, enlistments and transfer of manpower to the better-paid munitions production units gradually led to declining production, and wartime shortages of cement, barbed wire, machinery and fertilisers also became serious problems. In April 1942 the State Agricultural Departments and the farmers and manufacturers involved were asked by the Directorate of Manpower to nominate the labour to be retained on dairy farms and in the manufacture of butter, cheese and bacon, and these were agreed to according to the scale of production.

In May 1942 a deferment call-up for military duty of all persons remaining in rural production was imposed. In July 1942 only 68 per cent of the pre-war permanent labour remained on Australian farms. Dairy Technologist L. E. Nichols investigated the possibility of persuading farmers to cease stripping out of the cows after they had been milked by machines to save labour and showed that production was not affected, time and manpower were saved, and there was no increase in udder disorders-an important finding in relation to dairying labour. (*QAJ*, Vol. 59, December 1944, pp. 357-360) C. R. Tummon showed that calves could be reared satisfactorily on milk substitutes. (*QAJ*, Vol. 58, April 1944, pp. 230-231) E. B. Rice and D. J. Sheehan introduced bull indexing as a means of selecting outstanding bulls. (*QAJ*, Vol. 56, February 1941, pp. 126-128)

With the Japanese advance, serious consideration was given to the mass evacuation of dairy and beef cattle from the north-eastern coast, and a Committee with Professor H. R. Seddon as Chairman and Departmental and industry representatives met with military authorities. A detailed scheme was drawn up but it was considered impractical.

In July 1942 the concept of production goals for farm products was recognised and these were determined by the Food Council for dairy products, meat, eggs, sugar, dried vine fruits, canned fruits, peanuts, potatoes and field peas. These were approved by the Production Executive of the Federal Cabinet in September 1942. The Production Goals Committee comprised representatives of all Departments and continued until 1946. This Committee collaborated with State authorities through the Australian Agricultural Council.

On 1 October 1940 petrol rationing was introduced. This had a serious effect on transport and machinery use in the dairying sector. Farmers began to use producer gas units on their tractors. But it was in the milk and cream transport area that new organisation was needed. Dairy farmers were zoned to a factory to reduce transport to a minimum and gas producer units were fitted to the trucks. Departmental field officers were actively engaged in organising this system. F. G. Few designed charcoal coolers for milk and cream on dairy farms. (*QAJ*, Vol. 60, pp. 302-311)

Dairying had declined during the war and subsidies were needed to keep the industry viable. In 1942-43 a £1.5 million subsidy was distributed to dairy farmers based on costs of production. A further £6.5 million was granted under The Dairy Assistance Act of 1943 to maintain stability and provide for adequate wages for the period April 1943 to March 1944, from April 1944 to March 1945 a further £7.5 million was provided. There had been a severe drought during 1944 and many dairymen were forced to handfeed. W. J. Park of the Dairying Branch submitted a paper entitled "Handfeeding Dairy Stock on the Darling Downs". (QAJ, Vol. 59, August 1944, pp. 102-104)

From the factory point of view there were changing demands. The shipping position in 1941 caused curtailment of butter manufacture and an increase in the demand for cheese, and the price of cheese was increased by ten per cent. A Dairy Produce Control Committee was appointed by the Commonwealth on 2 December 1943 to adjust proportions of butter, cheese, milk powders and condensed milk. Cheese production in 1942-43 reached its highest level in Queensland, at 28 501 000 pounds.

Fifteen new cheese factories were established in Queensland under the Cheese Production Expansion Scheme and thirty-five existing factories were enlarged and better equipped. The Dairy Produce Control Committee indemnified factories to £130 000 against closure after the war. (Rice, 1959) The Department conducted a special course for cheese factory operators to cope with this increased production. This was held at the Queensland Agricultural College. R. M. K. Snell was appointed Acting Instructor in Cheese Making on 21 May 1942.

From 1942 onwards there was an increasing demand for food for the forces. In late 1943 there were 685 000 enlisted in the Australian Services and 307 000 US personnel in Australia and New Guinea. During the war up to June 1945, 7 600 000 gallons of fresh milk, 38 000 tons of processed milk and 35 200 tons of butter were supplied by Australia to the US forces.

In June 1943, Australian civilians were rationed to 8 ounces of butter per person per week and in June 1944 to 6 ounces per week as there were insufficient supplies for civilian and army needs. Scientists produced a tinned butter named "Tropical Spread" of almost pure butterfat from inferior grade butters to reduce shipping space and improve keeping qualities. This was produced at Hamilton in Brisbane.

Meat

Beef cattle numbers in Queensland during the war years remained at about the same level as pre-war, at around six million head. For the first two years of the war, the Australian Meat Board continued to buy canned meat from individual canners but in July 1941, faced with grave reductions in the quantities of meat to be shipped to Britain, the Commonwealth Government initiated a Meat Purchase Plan, buying at prices lower than those charged to the United Kingdom and creating a fund to subsidise the canning and storage of mutton and lamb until such time as it could be disposed of locally or shipped overseas. In January 1942 it was extended to the purchase of beef and pig meats and the Commonwealth Meat Canning Committee was set up on 17 February 1942 to buy fresh and canned meat and to store and distribute it. (Crawford et al, 1954)

The 1940-41 output of canned meat of 36 000 tons was more than doubled in 1942 and subsequently increased to five times the pre-war figure. Cold storage accommodation was expanded by meat companies to hold six weeks' kill, and the Commonwealth found 50 per cent of this additional cost.

Dehydration plants were built in several States, including one in Queensland in 1943, but did not operate because of lack of supplies of old sheep. Overseas shipping of chilled meat ceased during the war and fresh meat had to be shipped in the frozen condition. Deboning of frozen meat after 1940-41 contributed to saving of refrigerated shipping space.

On 30 October 1942 the Australian Meat Industry Commission was set up to encourage the supply of meat for the defence forces and civilians in Australia and for export to the United Kingdom and forces overseas. On 20 January 1943 a Controller of Meat Supplies was appointed. Control of quantities released to the civilian market was in operation during 1943. Coupon rationing of meat was instituted on 17 January 1944, allowing 2¼ lb of meat per adult per week of meat-beef, mutton or lamb only. In February 1945, because of drought, the ration was reduced further and in May 1945 to an allowance of 1.84 lb per head per week (including bacon and ham, offal and canned meat).

The Commonwealth Government introduced the Pigmeat Acquisition Plan, involving carcasses over 100 lb on a cold-dressed weight basis at a fixed price for two years from 14 June 1943 at licensed works listed by the Commonwealth Government. Later baconers were accepted up to 200 lb instead of 180 lb, with a price increase to 9d per lb export quality. A ban was initially placed on the slaughter of porkers less than 100 lb carcass weight, but owing to feed problems the lower limit was reduced to 82 lb. The pig branch staff of E. J. Shelton and F. Bostock and the Agricultural Chemist, Dr M. White, gave detailed recommendations on feeding methods to growers through the *Queensland Agricultural Journal* and Shelton also conducted a correspondence course in pigraising.

Poultry and eggs

On 15 October 1939 Great Britain agreed to buy the whole of Australia's exportable surplus of eggs. On 9 November 1939 an Egg Supply Committee was set up under Australia's National Security Regulations. Early in 1941 the United Kingdom and Australian Governments agreed to build plants for egg dehydration as, because of shortage of shipping space, the United Kingdom could not take eggs in shell. There was also a shortage of machines and much later an Australian-made machine was set up in Queensland. In July 1943 a Commonwealth Controller of Eggs was appointed and all eggs had to be marketed to agents of the Controller, in Queensland's case the Egg Marketing Board.

In April 1942 wheat was made available for poultry food at 6d per bushel below local Australian Wheat Board prices. Egg prices were controlled from August 1942. By 1944 there was a shortage of eggs: the demand was for 128 million dozen and the forecast supply was 90 million dozen. An "egg priority" scheme operated for nursing mothers from

February to July 1945. Up to June 1945, United States troops in Australia had consumed 55 million dozen eggs.

During 1941-42, L. G. Newton (Veterinary Officer) and P. Rumball, the Departmental Poultry Expert, prepared a comprehensive publication to be included in *the Queensland Agricultural and Pastoral Handbook* series, which was published instead as a series of articles, "Poultry Farming in Queensland", in the *Queensland Agricultural Journal* for July and August 1941. It included the anatomy of the fowl, poultry feeding and breeding, and intermittently thereafter in 1943-44 as the *Journal* was suspended from publication in 1942. Newton pointed out the causes of wastage in poultry flocks in a comprehensive article in the November 1943 *Journal* in an attempt to improve production and Rumball encouraged hatcheries to increase output by fifty per cent.

Sheep and wool

On 28 September 1939 the United Kingdom Government agreed to take, for the term of the war and one year thereafter, the whole wool clip at a flat rate of 13.427d per lb greasy, plus 0.75d per lb for administration in Australia and half of the profits of any resale out of the United Kingdom. In May 1942, the price of greasy wool was increased to 15.45d per lb. A Central Wool Committee was set up under National Security Regulations. Just prior to the war Australia exported 93 per cent of its greasy wool clip, of which 43 per cent went to the United Kingdom. All wool had to be submitted to appraisement. Upon appraisal ownership passed from the Commonwealth to the United Kingdom and Australia held it pending shipping. In December 1940 the United States at their suggestion agreed to store a strategic reserve of wool and over the next three years accumulated 752 million pounds.

By 1945, 388 wool stores had been constructed by the Central Wool Committee in Australia. Increasing wool stocks and shortage of meat as war progressed led to increased crossbreeding of sheep and encouragement of the fat lamb industry. During the war years, James Carew concentrated on promoting the fat lamb industry.

During 1941-42, in co-operation with CSIR and through the assistance of the Australian Wool Board, refresher schools of instruction for departmental officers in connection with the control of sheep parasites were conducted at the McMaster Field Station near Sydney. Four Queensland officers attended. Two subsequent schools were conducted in Queensland at the Yeerongpilly Animal Health Station under the direction of F. H. S. Roberts and these were followed by demonstration schools throughout the Queensland wool-growing areas. (Seddon, H. R., *Rep. Dep. Agric. Stk*, 1941-42, p. 14-15)

Schools of Instruction in Sheep Blowfly Control were also held by the Joint Blowfly Committee of CSIR and the NSW Department of Agriculture at the Animal Husbandry Farm outside Sydney. The Minister, Bulcock, and four Queensland Veterinary Officers-G. R. Moule, J. C. J. Maunder, R. D. Chester and O. H. Brooks-attended. A further school to disseminate information was held on 5 to 8 August 1941, dealing with blowfly control by jetting, crutching and the Mules operation at Yeerongpilly, and subsequently at Blackall, Longreach, Winton and Julia Creek. During the 1944 drought, Moule wrote an article on supplementary feeding of sheep in the central west with rations of protein meal, salt and ground limestone. (*QAJ*, Vol. 58, January 1944, p. 53)

Publicity

The *Queensland Agricultural Journal* continued its valuable contribution to the rural industries until December 1941 when, owing to wartime restrictions, it ceased publication. But such was the demand for wartime production of foodstuffs that it was again brought into circulation in July 1943. There was also heavy demand for the *Queensland Agricultural and Pastoral Handbooks*:

Vol. I, Farm Crops and Pastures, published in 1941-42; Vol. II, Horticultural Crops, published in 1940-41; and Vol. III, Insect Pests and Plant Diseases, published in 1937-38.

Copies of one of these publications had already been exhausted by 1942.

REORGANISATION INTO DIVISIONS, AND POST-WAR RECONSTRUCTION 1945-1957

The Department under Thomas Williams, 1942-1946

Thomas Lewis Williams

Thomas Lewis Williams was born at Bundamba, Queensland, on 21 December 1886, the son of a coal-miner. He was educated at the Bundamba and Newtown State Schools and St Mary's College, Ipswich. He joined the Department of Public Instruction as a pupil teacher at Bundamba, then became headteacher at Bon Accord in 1905. In 1910 he was given charge of the Gayndah Aboriginal School, later opened the new Coalstoun Lakes school and then served in schools at Chinchilla and Wallangarra. In all Williams served sixteen years in the field of education and with the Home Secretary's Department. He then joined the staff of the *Queensland Times* (Ipswich) and the *Daily Mail* (Brisbane).

Williams was a member of the Queensland Preference League, the Water and Fodder Conservation League of Queensland, and the Travel Promotion League of Queensland; an Honorary Inspector for the Queensland Society for the Prevention of Cruelty; and Queensland Representative of the Wild Life Protection League of Australia. He instituted the Farm Boys' Camp Movement at the Royal National Show and was Manager of the Movement from 1928 to 1931. He was State Director of the Queensland Junior Farmers' Organisation, a new section of the Department of Public Instruction from 1948 to 1952. He was a member of the Queensland Ambulance Transport Brigade State Council 1955-65, the Royal Historical Society and Royal Geographical Society, and the Gayndah Town Council. He was also Justice of the Peace.

Williams was M.L.A. for Port Curtis from 11 June 1932 to 3 May 1947, Minister for Agriculture and Stock from 17 December 1942 to 7 March 1946, and Minister for Public Instruction from 7 March 1946 to 15 May 1947. He died on 17 August 1970 at St Vincent's Hospital, Toowoomba.

Legislative Acts during the Williams Ministry

1. *The Land and Water Resources Development Act of 1943* (7 Georgii VI. No. 38, *Qd. Govt. Gaz.*, No. 143, 30 November 1943) was assented to on 25 November 1943. This Act was to be administered by the Department of Public Lands. It established the Bureau of Investigation of Land and Water Resources under the chairmanship of John Kemp (later Sir John Kemp). Co-ordinator General of Public Works and Main Roads Commissioner. The Deputy Chairman was Arthur Frank Bell, Under-Secretary, Department of Agriculture and Stock.

The Bureau was constituted in the Department of Public Lands. The Bureau was charged to:

- i. make all such investigations and/or surveys as required by the Lands Administration Board;
- ii. make any investigation and/or survey requested by any department of the Public Service, Crown instrumentality or instrumentalities representing the Crown.

It was also, subject to the Land Administration Board, to carry out a continuous investigation of the development of the lands in each district as defined in The Land Acts, 1910 to 1943 with the following objects, namely:

- i. classifying the lands in each such district,
- ii. continuously recording the economic development of each such district, and
- iii. continuously recording the physical land and water developments of each such district.

The Land Commissioner for the district would be an ex officio member of the Bureau.

Every Department of the Public Service was to cooperate with the Board and the Bureau in carrying out these objectives in the way of statistical, technical, financial or other information. Thus the Department of Agriculture and Stock was heavily involved in the investigations. Three field officers-a Pastoral Resources Officer (J. F. Kennedy), an Agricultural Resources Officer (P. J. Skerman) and a Soil Conservation Officer (A. F. Skinner)-initially carried out wide-ranging surveys of soil and vegetation while the Irrigation Commission handled the water resources. Soil samples collected by the field officers were analysed by the Agricultural Chemists and plant identifications were confirmed by the Government Botanist's branches. Field officers also consulted the field officers of the Department in the districts wherein they were working to finally present their reports to the Bureau.

- 2. The Co-ordination of Rural Advances and Agricultural Bank Act Amendment Act of 1943 (7 Georgii VI. No. 40, *Qd. Govt. Gaz.*, No. 145, 30 November 1943) was assented to on 25 November 1943, to be incorporated in The Co-ordination of Rural Advances and Agricultural Bank Acts, 1938 to 1943. An Agricultural Bank Board was constituted, the Bureau of Rural Development was abolished and the Agricultural Bank passed to the control of the Treasury.
- 3. *The Dairy Produce Acts Amendment Act of 1944* (8 Georgii VI. No. 12, *Qd. Govt. Gaz.*, No. 113, 8 December 1944) was assented to on 1 December 1944, to be incorporated in The Dairy Produce Acts 1920 to 1944. This amendment required every owner of a dairy, cold store, depot or factory to register his premises in his own name and keep them registered.
- 4. *The Diseases in Stock Acts and Another Act Amendment Act of 1944* (9 Georgii VI. No. 6, *Qd. Govt. Gaz.*, No. 132, 21 December 1944) was assented to on 14 December 1944, to be incorporated in The Diseases in Stock Acts, 1915 to 1944. The Stock Diseases Compensation Fund was established in the Treasury; into it all assessments, levied and paid, were placed and any payments from Consolidated Revenue

appropriated by Parliament. A levy of not more than one half of a penny per gallon of milk supplied for consumption within the City of Brisbane or other prescribed area was imposed on producers except those with certified tuberculosis-free herds. Government Veterinary Surgeons were given power to enter holdings and test animals for tuberculosis, identify reactors with a mark and demand their destruction. The owner would be entitled to compensation at a prescribed rate.

- 5. *The Brands Acts Amendment Act of 1945* (9 Georgii VI. No. 31, *Qd. Govt. Gaz.*, No. 176, 13 December 1945) was assented to on 6 December 1945, to be incorporated in The Brands Acts, 1915 to 1945. This Act provided for branding irons for horses and/or cattle symbol brands to be not less than one and one-quarter inches in length or more than three inches in length.
- 6. The Fruit Marketing Organisation Acts Amendment Act of 1945 (10 Georgii VI. No. 9, Qd. Govt. Gaz., No. 206, 27 December 1945) was assented to on 18 December 1945 to be incorporated in The Fruit Marketing Organisation Acts, 1923 to 1945. This Act provided new definitions of "Marketing", "Sectional Group Committee", "Vegetables" and constituted a Sectional Group Committee in relation to vegetables to be called the "Vegetable Sectional Group Committee", the first members being appointed by the Minister and thereafter elected, the first elected members to be elected during August 1946.

The Act also defined powers of the Committee of Direction to buy fruit or vegetables both within and outside Queensland. The Minister for Lands could acquire land on behalf of the Committee of Direction by resumption if not by agreement. The Governor-in-Council by Order-in-Council could require the Committee of Direction to carry on the business of supplying fruit and vegetables in Local Authority Areas. The Committee of Direction could issue instructions re directions. Officers of the Department of Agriculture and Stock had right of entry to inspect produce.

The Committee of Direction would be a permanent body corporate and would be constituted by the appointment by the Minister of not more than two representatives of each and every sectional group committee elected by the sectional group committees. The Director of Marketing in the Department of Agriculture and Stock would be an ex officio member. Members would hold office for three years. Fees and allowances could be paid to members and the COD should have power to establish a superannuation fund for its employees.

Staff changes under the Williams' Administration

During 1944-45, John Irwin of the Public Service Commissioner's Department and A. F. Bell of the Department of Agriculture and Stock were appointed to draw up a plan of reorganisation of the Department. A plan had been initiated by Professor E. J. Goddard in 1936 when he was appointed Scientific Co-ordinating Officer, and Professor H. R. Seddon had been consulted regarding a Division of Animal Industry. Goddard had seen the creation of a Division of Plant Industry before World War II. Out of these beginnings Irwin and Bell formulated the following appointments which were approved on 31 May 1945 (*Qd. Govt. Gaz.*, No. 142, 2 June 1945) and on 14 June 1945 (*Qd. Govt. Gaz.*, No. 149, 16 June 1945) creating five Divisions.

Details of the present positions and the proposed positions were given in the *Gazettes*. The positions henceforth would be:

Administration

Arthur Frank Bell, M.Sc., D.I.C., A.A.C.I., Director of Sugar Experiment Stations and Assistant Under-Secretary (Technical)
Malcolm Lorne Cameron, Assistant Under-Secretary
Henry Barnes, Special Administrative Officer and State Executive Officer, War Agricultural Committees
Virgil Francis John Bohan, Sub-Accountant
Leo Cain, Records Clerk
Charles Schindler, B.Sc.Agr., Acting Librarian, Publicity Branch
Ephraim Cecil Roy Sadler, A.A.U.Q., Clerk (Staff and Salaries)
Francis Treacy, A.F.I.A., Clerk (Commercial and Despatch)
Dermot Sydney Beavon Davis, A.F.I.A., Clerk and Inspector, Accounts Branch
Harry Hooper, A.F.I.A., ditto
Hamilton John Evans, A.F.I.A., A.A.U.Q., Clerk (Expenditure Analysis)
John Percy Thomas McKay, A.A.U.Q., Clerk (Receiving)
Isaiah Tucker, Clerk (Records)

Marketing Division

Henry Samuel Hunter, Director of Marketing Harry Kingsley Lewcock, M.Sc., B.Sc.Agr., Acting Assistant Director of Marketing and Senior Marketing Officer Fritz Burfield Coleman, Standards Officer Charles Herbert Powis Defries, B.Comm., H.D.A., Production Statistics Officer Arthur Christopher Peel, D.I.C., Technical Advisory Officer, Standards Branch Eric Stephen Keehn, B.A., Senior Clerk, Marketing Branch Allen John Everist, Marketing Officer and Registrar, Primary Producers' Co-operative Associations John Robert Winders, A.F.I.A., A.I.I.S., Senior Inspector, Marketing Branch Frederick Percival Charles Bell, Senior Inspector, Standards Branch Robert Joseph Holdsworth, Seed Analyst, Standards Branch George Frederick Young, Inspector, Standards Branch Jack Edward Bean, Q.D.A., ditto Noel Dudley Irwin, Registration Officer and Clerk, Standards Branch William Ernest Hagger, Registration Officer, Standards Branch

Plant Industry Division

Robert Veitch, B.Sc.Agr., B.Sc.For., F.R.E.S., Director, Division of Plant Industry Charles John McKeon, Q.D.A., Director of Agriculture William Alan Thompson Summerville, D.Sc., Director of Horticulture Montgomery White, M.Sc., Ph.D., A.A.C.I., Agricultural Chemist and Biochemist Walton Garrett Wells, Specialist Adviser Experiment Stations, and Cotton Specialist Edmond Rowlands Behne, M.Sc.App., A.A.C.I., Assistant Director and Chief Mill Technologist, Bureau of Sugar Experiment Stations Jacob Harold Smith, M.Sc., B.Sc.Agr., Officer in Charge, Science Branch John Howard Simmonds, M.Sc., Senior Pathologist Reginald William Mungomery, Officer-in-Charge, Entomology and Plant Pathology, Bureau of Sugar Experiment Stations David Ord Atherton, M.Sc.Agr., Assistant Director of Agriculture Chelmers Roy St. Clair von Stieglitz, F.A.C.I., Officer-in-Charge, Plant Nutrition Section Stanley Alan Trout, Ph.D., M.Sc., Assistant Director of Horticulture, on probation for twelve months Lawrence Gordon Miles, B.Sc.Agr., Ph.D., Senior Plant Breeder Lewis Folk Mandelson, B.Sc.Agr., Tobacco Specialist James Hipwood Nicklin, B.E., Technologist (Engineer), Bureau of Sugar Experiment Stations, on probation for twelve months William Cottrell-Dormer, B.Sc., Horticulturist, Division I William Robert Winks, B.Sc., A.A.C.I., Chemist, Division I, Toxicology and Therapeutics Section William John Cartmill, B.Sc., A.A.C.I., Soils Chemist, Division I, Agriculture Branch Lewis George Vallance, M.Sc., Chemist, Division I, Sugar Experiment Stations Harold Edwin Young, D.Sc.Agr., Pathologist, Division I Norman Ernest Handley Caldwell, M.Sc.Agr., Entomologist, Division I William James Stuart Sloan, M.Sc.Agr., Agronomist, Division I, Sugar **Experiment Stations** Wilhelm Hermann Bechtel, Chief Adviser in Agriculture Richard Ernest Soutter, Plant Breeder, Division I Hubert Jarvis, Entomologist, Division I John Arthur Weddell, Entomologist, Division I William Alexander McDougall, M.Sc., Entomologist, Division I Roy Bilbrough Morwood, M.Sc., Pathologist, Division I Keighley Mansfield Ward, M.Sc.Agr., Horticulturist, Division I Reginald Walter Peters, Plant Breeder, Division I Henry Maurice Finucan, B.A., Biometrician, Division I William George McKechnie, A.A.C.I., Chemist, Division II John Luigi Fidelis Foran, Acting Chemist, Division II Charles William Winders, B.Sc.Agr., A.I.I.S., Agrostologist, Division II William Douglas Francis, Botanist, Division II Alfred Roy Brimblecombe, M.Sc., Entomologist, Division II, Science Branch Frederick William Blackford, M.Sc.Agr., Pathologist, Division II, Science Branch John Errol Chandos Aberdeen, B.Sc.Agr., Pathologist, Division II, Science Branch Stanley Marriott, B.Sc.Agr., Plant Breeder, Division II, Agriculture Branch Charles Shearer Clydesdale, Q.D.A., Senior Adviser in Agriculture Alfred Nagle, Q.D.A., Senior Adviser in Agriculture Norman Ernest Goodchild, Senior Adviser in Agriculture Oswald Lloyd Hassall, Senior Adviser in Agriculture Edward Roy Ashburn, Senior Adviser in Agriculture and Manager, Hermitage State Farm William Rothwell Straughan, Senior Adviser in Agriculture

Arthur Hamilton, H.D.A., H.D.D. Senior Adviser in Agriculture James Arthur Kerr, Q.D.A., Senior Adviser in Agriculture Harold Joe Freeman, Supervisor of Field Staff, Horticulture Branch Alan Alexander Ross, M.Sc.Agr., Q.D.A., Horticulturist, Division II Stephen Ernest Stephen, Horticulturist, Division II Raymond Lismore Prest, Senior Adviser in Horticulture William Joseph Ross, Senior Adviser in Horticulture Henry St John Pratt, Senior Adviser in Horticulture Peter Mitchell, Senior Adviser in Horticulture Charles Newton Morgan, Q.D.D., Q.D.S., Senior Adviser in Horticulture James Hardie Buzacott, M.Sc., Entomologist, Division II, Sugar Experiment Stations Cecil Graham Hughes, B.Sc.Agr., Pathologist, Division II, Sugar Experiment Stations Arthur Harold Praeger, M.Sc.App., A.A.C.I., Mill Technologist, Division II, Sugar **Experiment Stations** John Lindsay Clayton, M.Sc.App. Mill Technologist, Division II, **Sugar Experiment Stations** David Richard Louis Steindl, Pathologist, Division II, Sugar Experiment Stations Gilbert Bates, H.D.A., Senior Adviser, Sugar Experiment Stations Norman Joseph King, D.I.C., Senior Adviser, Sugar Experiment Stations Royce Clyde Cannon, B.Sc.Agr., Assistant Entomologist Selwyn Lawrence Everist, B.Sc., Assistant Botanist Hubert Martin Groszmann, B.Sc.Agr., Assistant Horticulturist Edwin Warner Brandon DaCosta, B.Sc.Agr., Assistant Pathologist Henry Lambart Wood, B.Sc., Analyst Alan Walter Sydney May, B.Sc.Agr., Assistant Entomologist Stanley Thatcher Blake, M.Sc., Assistant Botanist Lindsey Stuart Smith, B.Sc., Assistant Botanist Tom McKnight, B.Sc., Assistant Pathologist William Alexander Ronald Cowdry, Manager, State Farm, Biloela Charles George Williams, Adviser, Horticulture Branch Francis Alexander Lascelles Jardine, Adviser, Horticulture Branch Kurt King, Adviser, Horticulture Branch John Manifred McGregor Wills, ditto Eric Percy Williams, ditto Michael Aloysius Hannigan, Q.D.H., ditto Albert Mead Richardson, ditto Kevin D'Rohan Hoffmann, ditto John Arthur Mobbs, ditto Gerald William Hancock, ditto James Herbert Saint-Smith, Q.D.A., B.Sc.Agr., Acting Adviser, Horticulture Branch (Transport) Richard Aylmer Tarrant, Adviser in Agriculture Thomas Gerald Graham, Q.D.A., ditto Evan William Baird, Q.D.A., ditto Hugh McNee, Q.D.A., ditto George Wallace Smith, Q.D.A., ditto Ronald Eric Haseler, Q.D.A., ditto Kenneth Valentine Henderson, Q.D.A., ditto Wiiliam Gerald Steele, Q.D.A., ditto

Fielding Chippendale, B.Sc.Agr., ditto Edwin James Reuben Barke, Adviser (Sugar Cane Culture) Herbert Golding Knust, ditto George Arthur Christie, Q.D.A., ditto Colin George Story, Q.D.A., ditto Oswald William Selwyn Skinner, Q.D.A., ditto George William John Agnew, Q.D.A., Q.D.D., Assistant (Horticulture) Harold Frank Wylde Ball, Senior Clerk, Agriculture Branch Hugh Gordon Crofts, Senior Clerk, Horticulture Branch Leslie Cameron Home, Assistant Analyst, Bureau of Sugar Experiment Stations Ernest Leonard Victor Filer, Assistant Adviser, Horticulture Branch James Hunter Mitchell, ditto John Reuben Horsley, ditto Reginald Letters, Q.D.H., ditto Edward Francis Tree, ditto Leonard George Trim, ditto Kenneth Gordon Fisher-Webster, Q.D.A., ditto William Whiting Manley, Assistant Illustrator

Animal Industry Division

John Legg, D.V.Sc., B.Sc., M.R.C.V.S., Acting Director, Division of Animal Industry, for a period of twelve months Laurence Daniel Carey, Chief Inspector of Stock and Chief Inspector of Slaughterhouses Frederick Hugh Sherston Roberts, D.Sc., Acting Director of Research, Division of Animal Industry, for a period of twelve months Albert Fredrick Sigurd Ohman, M.V.Sc., Divisional Veterinary Officer John Colin James Maunder, B.V.Sc., H.D.A., Divisional Veterinary Officer Arthur Lineham Clay, B.V.Sc., H.D.A., Divisional Veterinary Officer Clarence Rodrick Mulhearn, B.V.Sc., Divisional Veterinary Officer Marshall Roland Irving, B.V.Sc., Divisional Veterinary Officer Frederick Bostock, Officer-in-Charge, Pig Branch, for twelve months Percival Rumball, Officer-in-Charge, Poultry Branch Arthur Ross Nott, B.V.Sc., Government Veterinary Officer Roland Erskine Churchward, B.V.Sc., Government Veterinary Officer Robert Davis Chester, B.V.Sc., Government Veterinary Officer Keith Macdonald Grant, B.V.Sc., Government Veterinary Officer Alexander Kennedy Sutherland, B.V.Sc., Government Veterinary Officer John Lewis Hodge, Senior Adviser, Sheep and Wool Branch John William Munro, Senior Clerk, Division of Animal Industry, and Registrar, Veterinary Surgeons Board James Philip Herbert Clark, District Inspector of Stock Neville Charles Copeman, District Inspector of Stock Stephen Charles Smith, District Inspector of Stock George Russell Moule, B.V.Sc., Q.D.S., Seconded as Veterinary Officer, Sheep and Wool Branch Leslie Gilbert Newton, B.V.Sc., Q.D.A., Assistant Veterinary Officer Owen Henry Brooks, B.V.Sc., Q.D.A., Assistant Veterinary Officer Archibald McDowall, B.V.Sc., Assistant Veterinary Officer

Russell Fredwin Riek, B.V.Sc., Assistant Veterinary Officer John James McLachlan, Adviser, Poultry Branch Charles John Forrest Swinburne, Adviser, Sheep and Wool Branch Ernest James Shelton, Adviser, Pig Branch Brian Reid Martin, B.Sc., Adviser, Pig Branch Stuart Maxwell Seamer, Inspector, Division I, Diseases in Stock and Brands Act James Bishop, ditto Jack Davies, ditto Edmund Charles Dunn, ditto Thomas Douglas, ditto Stanley Crawford Allan, ditto Harold James Donald McBean, ditto Hugh Bird Ford, ditto Joseph Ahearn Leslie Rheuben, Inspector, Division I, Slaughtering Act Edwin Campion Todd, ditto Andrew Frederic Hamilton, ditto Dabee Singh, ditto Thomas Edward Tuck, ditto Christopher Caswell, ditto Frank Herbert Jones, ditto George Richard Irwin Anderson, ditto Archibald Dick. ditto Brian Dunbavand, ditto Harry James Walker, ditto Joseph Robert Canty, ditto James William Moy, ditto George John Ryan, Inspector, Division II, under above Acts George Charles Kenny, ditto Patrick McCallum, ditto Thomas Wilson Murray, ditto Henry Bell, ditto Werner Kleinschmidt, Q.D.A., ditto Horace Hector Riley Walker, ditto Hugh Hector Harold Hodges, Q.D.A., ditto Francis Thomas Gibney, Registrar of Brands Thomas Abell, Q.D.S., Assistant Adviser, Pig Branch Charles Royal Grieve, Q.D.A., ditto

Dairying Division

Ernest Brooke Rice, D.I.C., Director of Dairying Leonard Alfred Burgess, D.I.C., A.A.C.I., Standards Officer, Dairy Technologist, Division I Leslie Edwin Nichols, B.Sc.Agr., Dairy Technologist, Division I Frederick George Few, B.Sc.App., Dairy Technologist, Division II John Dorward Wears Ogilvie, Senior Adviser in Dairying Cornelius Leonard Moran, Q.D.A., Q.D.D., ditto Edward Chaloner Olive, ditto Douglas Francis Keith, Grading Inspector Ludwig Frederick Andersen, Senior Adviser (Herd Testing) Leigh Walter Bernard Verney, Senior Adviser in Dairying Daniel James Callaghan, Senior Adviser in Dairying Leonard Moriarty, Acting Senior Adviser in Dairying Frank Clifford Coleman, Q.D.D., Senior Adviser in Dairying Wynford Barron Horneman, Q.D.D., Dairy Adviser Max Rose Muller, Q.D.D., ditto Samuel Ernest Pegg, Q.D.D., ditto Gordon Robert Sigley, Q.D.D., ditto William James Park, Q.D.D., ditto Victor Joseph Brimblecombe, Q.D.D., ditto William Peter Dower, Clerk, Division of Dairying

Richard Patrick Montfort Short, the existing Under-Secretary, continued in office, as did J. F. F. Reid, Editor of the *Journal*.

The position of J. Harold Smith as Officer-in-Charge of the Science Branch was relinquished in favour of John Howard Simmonds on a subsequent appeal. J. H. Smith was then appointed Senior Entomologist on 28 February 1946.

The Department under Harold Collins, 1946-1957

Harold Henry Collins

Harold Henry Collins was born on 9 August 1887 at Yarick, Victoria, and was thus only two months old when the Queensland Department of Agriculture was founded. He was the son of a farmer. He was educated at King's College, Melbourne. Arriving in Queensland in 1909 he spent his early years droving and shearing. He became overseer and book-keeper for the Queensland Federal Shearing Co. He next managed a sheep station in the Hughenden district, then engaged in mixed farming on the Atherton Tableland in 1913. He was President of the Atherton Show Society from 1922 to 1925, chairman of the Atherton Maize Marketing Board in 1923, a member of the North Queensland Pig Industry Board, president of the Atherton Hospital Board from 1928 to 29, a member of the Atherton Maize Pool Board from 1923, and a member of the University of Queensland.

He was a Councillor of the Atherton Shire from 1916 to 1917 (Tinaroo Shire Council) and a member of the Cairns Harbour Board from 1932 to 1935.

Collins was M.L.A. for Cook from 11 May 1935 to 29 April 1950 and for Tablelands from 29 April 1950 to 3 August 1957 and Minister for Agriculture and Stock from 7 March 1946 to 12 August 1957. He died on 12 July 1962 in Brisbane. He served under two Premiers, the Hon. E. M. Hanlon from 7 March 1946 to 17 January 1952, and then under the Hon. Vincent Clair Gair until 12 August 1957.

Legislative Acts during the Collins Ministry, 1946-57

- 1. *The Stock Returns Amendment Act of 1946* (10 Georgii VI. No. 26, *Qd. Govt. Gaz.*, No. 113, 8 May 1946) was assented to on 30 April 1946, to be incorporated in The Stock Returns Acts 1893 to 1946. This Act repealed Section two of the Principal Act and provided for every owner of stock or drover or person in charge of travelling stock within one month after the first day in January in each year to make a return of stock kept or being travelled within any Local Authority area upon the date prescribed, and forward the return to the nearest Clerk of Petty Sessions. Section 3A of the Principal Act was repealed and in its place the Act provided that the Government Statistician should cause to be printed in each year commencing with the year 1946 and publish a list of all returns under this Act and this publication could be used in evidence in courts as representing the original return.
- 2. *The Fruit Tree Standards Act of 1946* (10 Georgii VI. No. 32, *Qd. Govt. Gaz.*, No. 119, 8 May 1946) was assented to on 30 April 1946. This Act provided for all fruit trees or fruit plants except for imported trees, to be sold by registered nurserymen. All imported trees and plants were to be inspected. All trees were to be labelled with a label bearing the name of the nurseryman who propagated them, the name of the fruit and the variety, the name of the rootstock and the designation of the prescribed grade or subgrade to which the trees or plants conformed.

Nurserymen were registered yearly, had to keep proper records of sales, varieties grown by them, their location, and pay a fee. The Government would appoint inspectors, with necessary powers under the Act. Regulations would be made after the passing of the Act.

3. *The Poultry Industry Act of 1946* (10 Georgii VI. No. 33, *Qd. Govt. Gaz.*, No. 120, 8 May 1946) was assented to on 30 April 1946. Under this Act the Governor-in-Council could declare districts under the Act and the boundaries thereof, abolish districts, declare any birds to be poultry under the Act, declare diseases, declare infected areas, prohibit sales, require inspection and disinfection and specify routes of conveyance of infected poultry.

A Poultry Advisory Board was set up, consisting of the Minister ex officio as Chairman, the Officer-in-Charge of the Poultry Branch of the Department as an ex officio member, one other departmental officer nominated by the Minister, and four members nominated by the Minister after consultation with association members of the industry, provided that one member represented growers supplying eggs to the Queensland Egg Board and one represented shareholders of the Poultry Farmers Cooperative Society. The Advisory Board would elect one of its members to be deputy Chairman.

The Advisory Board would advise the Minister of problems within the industry, assist the Minister in experimental work, advise on accreditation of poultry-breeding establishments and hatcheries, and have other responsibilities.

The Governor-in-Council would appoint a Chief Inspector and egg graders, live and dressed poultry graders, inspectors and other officers. The Act provided for registration

of stock suppliers hatching chickens for sale, supplying fowl eggs for hatching, or of a poultry dealer.

The Chief Inspector would keep a Register of Poultry Stock Suppliers open for inspection by any person at the office of the Officer-in-Charge of the Poultry Branch. The Under-Secretary would register holdings as accredited hatcheries or breeding establishments or both on payment of a fee. He would also issue a certificate of freedom from pullorum disease if approved. Licensing of persons qualified to determine the sex of day-old chickens would be issued by the Officer-in-Charge of the Poultry Branch as first class or second class licences. The first class licence implied a ninety-five per cent accurate classing, and a second class licence between 90 and 95 per cent. Licences were current for a year but could be renewed. All day-old male chickens so classed would be marked. The vendor had to specify the sex of day-old chickens. In respect of diseases in poultry, inspectors could quarantine any necessary places, and destroy infected poultry if necessary. Owners were required to notify diseases. Inspectors could inspect stock and no diseased poultry could be sold. Vendors purchasing poultry for sale were required to obtain a delivery note. Regulations would be drawn up relating to the Act.

- 4. *The Co-operative Societies Act of 1946* (10 Georgii VI. No. 50, *Qd. Govt. Gaz.*, No. 157, 16 December 1946) was assented to on 9 December 1946. This Act consolidated and amended the law relating to Industrial and Provident Societies, and made further provision relating to co-operation in respect of businesses, trades, industries, production and distribution of commodities.
- 5. The Sugar Experiment Stations Acts Amendment Act of 1946 (10 Georgii VI. No. 51, *Qd. Govt. Gaz.*, No. 158, 16 December 1946) was assented to on 9 December 1946 to be incorporated in The Sugar Experiment Stations Acts, 1900 to 1946. The Act gave the Cane Pest and Disease Control Board power to pay, with the consent of the Minister, subsidies in respect of costs incurred by any persons for approved baits, fumigants, fungicides, poisons, materials, equipment, machinery, services or operations for the destruction and prevention within its area of cane pests and diseases, and apportion such payments.
- 6. *The Veterinary Surgeons Act Amendment Act of 1946* (10 Georgii VI. No. 52, *Qd. Govt. Gaz.*, No. 159, 16 December 1946) was assented to on 9 December 1946 to be incorporated in The Veterinary Surgeons Acts, 1936 to 1946. This Act replaced the Dean of the Faculty of Veterinary Science, University of Queensland, by the Under-Secretary, Department of Agriculture and Stock, as Chairman of the Veterinary Surgeons Board. It also prohibited any person not registered as a veterinary surgeon from advertising as such or from collecting a fee.
- 7. *The Wheat Industry Stabilisation Act of 1946* (11 Georgii VI. No. 7, *Qd. Govt. Gaz.*, No. 194, 31 December 1946) was assented to on 20 December 1946. The Act provided for the licensing of wheat growers. Licensed receivers of wheat were to be appointed by the Board to hold wheat on behalf of the Board. A Wheat Industry Stabilisation Committee would be appointed by the Minister and paid by the Board. The duties of the Committee were to advise the Minister on matters connected with the stabilisation and control of the industry, control the registration of wheat farms and license persons to grow wheat, appoint such Advisory Committees as it saw fit, and co-operate with
the Commonwealth Wheat Industry Stabilisation Board to ensure uniformity of administration by the Commonwealth and the State.

Under the issue of a licence to grow wheat each wheat grower could not sow with wheat a greater number of acres of land than the Committee determined to be grown on his registered farm. No wheat grower could harvest grain other than from a registered farm and no person not being a wheat grower could harvest any wheat for grain.

- 8. *The Diseases in Stock Acts Amendment Act of 1946* (11 Georgii VI. No. 10, *Qd. Govt. Gaz.*, No. 197, 20 December 1946) was assented to on 20 December 1946, to be incorporated in The Diseases in Stock Acts, 1915 to 1946. This Act included the words "or territory" where "State" was mentioned. It gave power to the Minister to declare a "protected area" in connection with any disease. He could also delegate his powers to officers of his Department. Cattle reacting to a tuberculin test were held to be suffering from or affected with tuberculosis. The word "Surgeon" was replaced by the word "Officer". The Act also provided for payment of compensation for destruction of cattle ordered to be done by an inspector.
- 9. The Primary Producers' Organisation and Marketing Acts Amendment Act of 1946 (11 Georgii VI. No. 13, Qd. Govt. Gaz., No. 200, 31 December 1946) was assented to on 20 December 1946 to be incorporated in The Primary Producers' Organisation and Marketing Acts, 1926 to 1946. This Act included the Innisfail district in the area under the control of the Northern Pig Board and made minor amendment to the wording "pigs and carcasses". It also provided for Commodity Boards: the Council, the State Wheat Board, the Brisbane Milk Board and the Committee of Direction of Fruit Marketing could establish an individual or a group superannuation or provident schemes or plans or trusts approved by the Minister with respect to employees and their dependants and to subsidise and to contribute and make payments from the funds of the Board.
- 10. *The War Service (Sugar Industry) Land Settlement Act of 1946* (11 Georgii VI. No. 19, *Qd. Govt. Gaz.*, No. 7, 6 January 1947) was assented to on 24 December 1946. This Act provided certain controls over the transfer to assigned lands for two years following the passing of the Act, and the right of an eligible person (discharged members of the naval, military and air forces and other eligible persons) to acquire assigned land with the approval of the Central Sugar Cane Prices Board. New assignments could be made available to individual mills of up to three per cent of the existing mill peak, and persons acquiring such land were to hold it without transfer for at least five years after the granting of the assignment and farming it personally according to the accepted practice of sugar growing. The additional tonnage of 94 net titre sugar granted to each mill was listed in the Schedule.
- 11. The Fruit and Vegetables Act of 1947 (11 Georgii VI. No. 129, Qd. Govt. Gaz., No. 129, 25 November 1947) was assented to on 20 November 1947. This Act repealed The Fruit and Vegetable Acts, 1927 to 1939 and was framed to regulate packaging for sale and sale of fruit and vegetables. It provided for prescribed packing and grading, cleanliness, dimensions of packages, grade standards, marking of containers with details of grades and name of the packer, prevention of "topping" of fruit and vegetables; powers of entry of inspectors; and examination and legal aspects of contravention of the Act. Regulations concerning packaging, grading, marking,

handling and the keeping of necessary records would be issued, and published in the *Government Gazette*.

- 12. *The Sugar Experiment Stations Acts Amendment Act of 1947* (11 Georgii VI. No. 41, *Qd. Govt. Gaz.*, No. 165, 10 December 1947) was assented to on 9 December 1947, to be incorporated in The Sugar Experiment Stations Acts, 1900 to 1947. This Act increased the rate of assessment in Section seven from "one penny" to "three pence" and in the second paragraph from "one halfpenny" to "one penny and a halfpenny".
- 13. The Apiaries Act of 1947 (11 Georgii VI. No. 42, Qd. Govt. Gaz., No. 166, 10 December 1947) was assented to on 9 December 1947. The Apiaries Act of 1938 was repealed. The Governor-in-Council was given power to declare Districts under the Act and initially four districts were declared-Apiaries District No. 1 (Moreton), No. 2 (Darling Downs), No. 3 (Wide Bay) and No. 4 (Burnett). It required the yearly registration of beekeepers with the Under-Secretary and included the declaration of apiaries, their sites and the number of hives in each apiary, on or before 31 March. Apiaries were to be classified as Apiary Class A (fewer than forty hives), Apiary Class B with not fewer than forty hives, Apiary Class C (apiaries not of Class A in which queen bees are bred for sale and so classified in a certificate), and Apiary Class D (carrying at least one hundred and fifty individual apiaries containing a minimum of forty hives. The site was to be suitable as declared by an Inspector.

The Act regulated distances between apiaries, establishment or removal of apiaries, declared prohibited apiary sites, required notice of sale, registration and marking of hives, control and restriction of diseases and pests. The beekeeper was required to notify of disease and inspectors were given necessary powers to inspect, order cleansing of hives and, through the Under-Secretary, the destruction of bees or equipment. A person could not introduce into Queensland bees, bee combs, beeswax, hives, honey and/or appliances without their being accompanied by a certificate of freedom from Foul brood (*Bacillus* larvae, *Bacillus pluton* or *Bacillus alvei*), Isle of Wight Disease (Acarine disease), Nosema disease (Nosema of apis), Bee Louse (*Braula caeca*), Sacbrood (Virus) or any other proclaimed disease, from an approved officer of the Department of Agriculture in the Country or State of origin.

The Act provided for the Department of Agriculture and Stock in William Street, Brisbane, to be a Quarantine Area, and gave the Minister power to declare other quarantine areas as necessary. Inspectors would be appointed. Information about queen bees supplied by a beekeeper was to be kept, honey containers marked.

Regulations, Proclamations, Orders-in-Council would be published in the *Government Gazette*.

14. *The Queensland-British Food Production Act of 1948* (12 Georgii VI. No. 16, *Qd. Govt. Gaz.*, No. 87, 6 April 1948) was assented to on 2 April 1948. This Act, under the control of the Premier, provided for the development and extension of primary industries by establishing a Corporation charged with the general duty of securing the production and processing of foodstuffs and other agricultural products, and the marketing thereof, and in particular the special duty of increasing the supply thereof to the United Kingdom and for other purposes. Under this Act the Queensland-British Food Corporation, a Deputy

Chairman (nominated by the Queensland Government) and four to seven other members. Two-thirds of the total membership including the Chairman and Deputy Chairman were to be nominees of the Overseas Food Corporation. Two other members additional to the Deputy Chairman were to be nominated by the Governor-in-Council. The Corporation could appoint and employ the necessary staff.

The Corporation was virtually charged to produce food for the United Kingdom. It could acquire property, produce, process and market produce, enter into contracts, cooperate with other organisations and Government authorities, borrow money within the Laws of the State of Queensland. It was to establish a reserve fund and produce an annual report.

The members of the Corporation were to be appointed for a period not exceeding seven years. A superannuation scheme could be founded. Land could be acquired by the Crown by negotiation or resumption through the Co-ordinator-General of Public Works under The State Development and Public Works Organisation Acts, 1938 to 1940 and compensation paid. The lands acquired by the Corporation were to be held under lease of any tenure under The Lands Acts, 1910 to 1948 and subject to the provisions of those Acts. Other land could be acquired under The Electric Supply Corporation (Overseas) Limited Agreement Act of 1947.

Moneys could be borrowed from the Overseas Food Corporation and the Treasury of the Queensland Parliament. The Treasury was limited to advancing up to one-third of that advanced by the Overseas Food Corporation or £500 000, whichever was the lesser.

The Corporation could employ sharefarmers, lease land or subdivide holdings or form a co-operative society.

The Act gave power to the Corporation to employ a person holding an appointment under any other Act, but he could maintain his previous office during the period of his membership of the Corporation.

Under The Public Service Acts, 1922 to 1945, the Governor-in-Council could second any officer of the Public Service for employment with the Corporation and that officer would, during such employment, retain his classification and seniority in the Public Service as if he had not been so seconded. The Corporation was not exempted from liability for any tax, duty, rate, levy or other charge, whether general or local.

All Orders-in-Council or regulations under the Act were to be published in the *Government Gazette*.

- 15. *The Diseases in Stock Acts Amendment Act of 1948* (12 Georgii VI. No. 19, *Qd. Govt. Gaz.*, No. 19, 12 April 1948) was assented to on 6 April 1948, to be incorporated in The Diseases in Stock Acts, 1915 to 1948. This Act made provision for the appointment of Approved Veterinary Surgeons.
- 16. The Sugar Experiment Stations Acts and Another Act Amendment Act of 1948 (12 Georgii VI. No. 35, Qd. Govt. Gaz., No. 145, 28 October 1948) was assented to on

25 October 1948, to be incorporated under The Sugar Experiment Stations Acts, 1900 to 1948. This Act provided for payments from the fund for any purposes recommended to the Minister by the Advisory Board in relation to the promotion of the well-being of the sugar industry.

Another part of the Act made amendments to The Regulation of Sugar Cane Prices Acts, 1915 to 1941, to become The Regulation of Sugar Cane Prices Acts, 1915 to 1948. The Act provided conditions under which a Mill Suppliers' Committee could appeal to the Central Board; the requirement regarding returns by canegrowers and millowners to the Central Board on a prescribed date; and the granting of easements to growers for tramway purposes by the Central Board, any compensation to be determined by the Board. The Act also gave details relating to the election of Local Boards.

- 17. *The Diseases in Stock Acts Amendment Act of 1948* (No. 2) (13 Georgii VI. No. 1, *Qd. Govt. Gaz.*, No. 222, 16 December 1948) was assented to on 13 December 1948, to be incorporated into The Diseases in Stock Acts, 1915 to 1948. This Act provided for a levy to be imposed by the Minister upon the production of milk and cream by producers within the City of Brisbane or other proclaimed areas to the value of one half of a penny per gallon of milk and one penny per pound of butter manufactured from cream supplied. The money so collected would go to payment for compensation for dairy cattle destroyed because of the diseases tuberculosis, brucellosis or mastitis. The Act also required a permit from an inspector to travel stock.
- 18. *The Diseases in Plants Acts Amendment Act of 1948* (13 Georgii VI. No. 2, *Qd. Govt. Gaz.*, No. 223, 16 December 1948) was assented to on 13 December 1948. This Act included the word "appliance" with "plant parts" regarding movement from one farm to another or one State to another without thorough cleansing of the appliance and inspection before removal.
- 19. *The Wheat Industry Stabilisation Act of 1948* (13 Georgii VI. No. 9, *Qd. Govt. Gaz.*. No. 234, 22 December 1948) was assented to on 17 December 1948. This Act repealed The Wheat Industry Stabilisation Act of 1946. Under the Commonwealth Wheat Industry Stabilisation Act of 1948 the State Wheat Board could nominate one of its wheat-growing members to the Commonwealth Board to represent wheat growers in this State. Wheat delivered to the State Wheat Board or to a licensed receiver was to be deemed to have been delivered to the Commonwealth Board. The Commonwealth Wheat Board was given power to handle wheat, wheaten flour, semolina, corn sacks, jute or jute products. Until the proclamation of this Act the Australian Wheat Board constituted under the National Security (Wheat Acquisition) Regulations of the Commonwealth would have all the functions of the Australian Wheat Board under this Act.

All wheat harvested before the 1948-49 season, wheat retained by the growers, or wheat previously sold to the Board before this Act was passed was exempt; otherwise all wheat was to be sold to the Board or its licensed receivers. The Board would determine prices to be paid for the wheat and determine a home consumption price.

The Act also lifted the restriction on an alien, the citizen or subject of the United States of America or any other friendly State named in a Proclamation to take and hold any land or interest therein.

- 20. *The Abattoirs Acts Amendment Act of 1949* (13 Georgii VI. No. 28, *Qd. Govt. Gaz.*, No. 124, 3 May 1949) was assented to on 22 April 1949, to be incorporated in The Abattoir Acts, 1930 to 1949. This Act altered the term "Meat Industry Board" to the "Queensland Meat Industry Board". The area of the City of Brisbane was constituted the Metropolitan Abattoir Area but could be extended by the Governor-in-Council to contiguous areas outside the City of Brisbane. It made provision for the establishment of public abattoir areas outside the metropolitan area, and local abattoir areas presided over by a Local Abattoir Board constituted for it by the Governor-in-Council, members to hold office for three years. The Local Board would provide a local abattoir for the local abattoir area, approved by the Minister and the Governor-in-Council and *Gazetted*. The Local Board would be a body corporate and could borrow money from the Treasury or sell debentures. An annual budget and a Financial Statement had to be furnished to the Minister. Land could be resumed for the establishment of the abattoir, public saleyards or meat market by the Co-ordinator-General of Public Works, and the Local Board could operate these instrumentalities.
- 21. *The Diseases in Stock Acts Amendment Act of 1949* (13 Georgii VI. No. 40, *Qd. Govt. Gaz.*, No. 144, 7 November 1949) was assented to on 28 October 1949, to be incorporated in The Diseases in Stock Acts, 1915 to 1949. This Act gave the Minister power to amend any assessments on milk and cream levied under the 1948 Act, for different areas and factories.
- 22. *The Burdekin River Development Act of 1949* (13 Georgii VI. No. 58, *Qd. Govt. Gaz.*, No. 205, 14 December 1949) was assented to on 8 December 1949. This Act was under the administration of the Premier and Chief Secretary operating through the Coordinator-General of Public Works. The Government defined the boundaries of the Burdekin River Area and established a Burdekin River Authority consisting of the Coordinator-General as Chairman, the Commissioner for Irrigation and Water Supply, the Commissioner for Electricity Supply and other members representing the Commonwealth, one of whom would be Deputy Chairman. The Authority was mainly concerned with water conservation, flood mitigation, irrigation and electricity development. The Department of Agriculture and Stock officers were to be deeply engaged in subsequent development.
- 23. *The Diseases in Stock Acts Amendment Act of 1950* (14 Georgii VI. No. 13, *Qd. Govt. Gaz.*, No. 161, 29 November 1950) was assented to on 23 November 1950, to be incorporated in The Diseases of Stock Acts, 1915 to 1950. This Act amended the assessment on owners of stock to be paid yearly at rates fixed by the Minister. The rates for cattle, horses or cattle and horses together was to be not more than one pound on every hundred head or part thereof, and for sheep not more than five shillings on every hundred head or part thereof. Owners of fewer than eleven head of cattle, horses or cattle and horses, or of fewer than one hundred head of sheep were exempt from the levy.
- 24. The Margarine Acts Amendment Act of 1950 (14 Georgii VI. No. 15, Qd. Govt. Gaz., No. 162, 29 November 1950) was assented to on 23 November 1950, to be incorporated in The Margarine Acts, 1910 to 1915. The Act repealed Section seven and Section twenty of the Principal Act relating to periods of time.

25. The Poultry Industry Act Amendment Act of 1950 (14 Georgii VI. No. 15, Qd. Govt. Gaz., No. 163, 29 November 1950) was assented to on 23 November 1950, to be incorporated in The Poultry Industry Acts, 1946 to 1950. This Act made amendments to the composition of the Poultry Industry Advisory Board, making it four members representing the poultry industry, three nominated by Marketing Boards and one connected with the poultry industry. The Advisory Board would make recommendations to the Minister respecting the amount of precepts to be issued on Egg Marketing Boards. It established in the Treasury The Poultry Industry Fund, out of which would be paid the expenses incurred under this Act. The Advisory Board was empowered to use the fund, on the approval of the Minister, for promoting the poultry industry. All fees received under the provisions of the Act would be paid into the Fund. The Minister could issue from time to time to each and every Egg Marketing Board a precept stating the amount to be paid to the credit of the Fund, the amount to be paid by a levy imposed by the Egg Marketing Board. The total amount of precepts issued by the Minister in any one year could not exceed £10 000. In each and every year the Treasurer would pay into the Fund from Consolidated Revenue an amount not exceeding £10 000 in addition to a sum equal to the total amounts of all precepts issued in that year, provided the Treasury contribution did not exceed £15 000 in any one year.

The Act also provided for inspection of slaughterhouses for poultry, inspection fees and nomination by Egg Marketing Boards of representatives on the Advisory Board.

26. *The Slaughtering Act of 1951* (15 Georgii VI. No. 9, *Qd. Govt. Gaz.*, No. 123, 4 April 1951) was assented to on 20 March 1951. The Slaughtering Act of 1898 was repealed. This Act gave the Governor-in-Council power to appoint a Chief Inspector of Slaughterhouses and other officers, declare districts and appoint inspectors to districts. Inspectors could enter premises for inspection; inspect stock intended for slaughter, appliances, water supply, vehicles; take any samples necessary for analysis; order premises to be cleaned and condemn stock. Licensees were required to notify of disease and neither diseased stock nor diseased meat was to be sold.

Horses could not be slaughtered for human consumption at slaughter houses where stock were so slaughtered and horseflesh could not be sold from these premises. Horseflesh could only be sold at food shops in sealed containers and could not be carried on vehicles carrying meat.

Carcasses could not be sold for human consumption from boiling-down works. All slaughterhouses, butchers' shops and boiling-down works were to be licensed, and standards were set for their construction. Swine, poultry, dogs or cats were prohibited at boiling-down works, slaughterhouses, butchers' shops and small-goods shops. Removal of offal, preservation of hides and skins, and destruction of diseased stock were regulated.

The branding and grading of meat were prescribed.

Fees were scheduled and the necessary bookkeeping was required.

- 27. *The Sugar Experiment Stations Acts Amendment Act of 1951* (15 Georgii VI. No. 10, *Qd. Govt. Gaz.*, No. 124, 4 April 1951) was assented to on 30 March 1951, to be incorporated in The Sugar Experiment Stations Acts, 1900 to 1951. This Act removed the operations of the Bureau of Sugar Experiment Stations from the administration of the Minister for Agriculture and Stock to the Sugar Experiment Stations Board established under this Act. The Board would consist of four members appointed by the Governor-in-Council, namely:
 - (a) the Minister, who would be ex officio a member and the Chairman of the Board;
 - (b) the Under-Secretary who would be ex officio a member and the Deputy Chairman of the Board;
 - (c) a member representative of the growers of sugarcane, nominated by the Queensland Canegrowers' Council; and
 - (d) a member representative of the manufacturers of cane sugar, nominated by the Australian Sugar Producers' Association.

The Board would be a body corporate. It could appoint Committees to advise it on any matter regarding the Board's responsibilities.

All buildings, plant, laboratories, etc. were transferred to the Board and the Sugar Experiment Stations Advisory Board was abolished. The balance at the Treasury of the Sugar Fund was transferred to the Board and the Sugar Fund abolished. All officers of the Crown employed under the old Act would not become employees of the Board.

The Board was required to furnish financial details when required by the Minister. Salaries, wages and expenses would be paid by the Board.

- 28. *The Stallions Registration Acts Suspension Act of 1951* (15 Georgii VI. No. 23, *Qd. Govt. Gaz.*, No. 31, 5 October 1951) was assented to on 3 October 1951. This Act suspended the operations of The Stallions Registration Acts, 1923 to 1940 and provided for its future operation at a date to be proclaimed.
- 29. *The Soil Conservation Act of 1951* (15 Georgii VI. No. 24, *Qd. Govt. Gaz.*, No. 32, 5 October 1951). Under this Act an Advisory and Co-ordinating Committee on Soil Conservation was established consisting of:
 - (a) the Under-Secretary who would be ex officio a member and Chairman;
 - (b) the Chief Soil Conservationist who would be ex officio a member and Deputy Chairman;
 - (c) and one member nominated by each of-
 - i. the Department of Irrigation and Water Supply,
 - ii. the Department of Main Roads,
 - iii. the Department of Local Government, and
 - iv. such other Departments as determined by the Governor-in-Council.

The Advisory Committee would -

- (a) consider the general aspects of soil erosion, soil conservation and soil erosion mitigation as they affected the State;
- (b) coordinate the activities of the various public authorities;
- (c) recommend any action which should be taken to prevent erosion or restore affected land.

The duties of the Department of Agriculture and Stock would be:

- (a) to carry out investigations to ascertain the nature and extent of erosion throughout the State;
- (b) to investigate and design remedial measures and the planning of the utilisation of lands accordingly;
- (c) to carry out experiments in soil conservation and soil erosion mitigation and establish soil conservation demonstration areas;
- (d) to record and publish the results of such investigations, designs, experiments and demonstration areas;
- (e) to disseminate information with regard to soil erosion, soil conservation and soil erosion mitigation;
- (f) to instruct and assist landholders in all matters relating to erosion.

The Minister would co-operate with others to conduct experiments and employ necessary workmen. Powers of entry to land were given to any member of the Advisory Committee or person authorised in writing by the Under-Secretary to survey, peg, dig or set out lines in connection with soil conservation.

The Government could set aside conservation reserves. The Minister could declare areas of erosion hazard and issue soil conservation orders. He could also prepare schemes for soil conservation projects for areas of soil erosion hazard, soil conservation reserves, or Local Authority, and co-opt other Departments. A Joint Local Authority could be constituted, and the Local Authority concerned would carry out the project. Any lands for the project could be resumed by the Co-ordinator General and compensation paid.

Regulations would be made as necessary and published in the Gazette.

30. The Primary Producers' Organisation and Marketing Acts Amendment Act of 1951 (15 Georgii VI. No. 25, Qd. Govt. Gaz., No. 33, 5 October 1951) was assented to on 3 October 1951, to be incorporated in The Primary Producers' Organisation and Marketing Acts, 1926 to 1951.

This Act gave power to the Governor-in-Council to dismiss a Board for contravention of the Act and appoint replacements. It required the Board to provide a continuous supply of a commodity to the consumers and direct growers to produce and deliver to the Board certain produce as needed. A person authorised by the Board could seize any quantity of the commodity from a grower who was not complying w!th a request from the Board.

31. The Regulation of Sugar Cane Prices Acts Amendment Act of 1951 (15 Georgii VI. No. 28, Qd. Govt. Gaz., No. 49, 16 October 1951) was assented to on 11 October 1951, to be incorporated in The Regulation of Sugar Cane Prices Acts, 1915 to 1951. This Act made provision for extra payments by the Central Board in relation to long crushing seasons; and set out the powers of a mill in relation to tramways. It provided for continuous sampling of sugar juice for analyses.

- 32. *The Liens on Crops of Sugar Cane Acts Amendment Act of 1951* (15 Georgii VI. No. 29, *Qd. Govt. Gaz.*, No. 29, 16 October 1951) was assented to on 11 October 1951. The Act provided for the payment to any Cane Pest and Disease Control Board for the supplying of fumigants, insecticides, fungicide or poison secured by a lien duty registered under this Act, as a priority over mortgages of the growing crop.
- 33. *The Wheat Industry Stabilisation Act Amendment Act of 1951* (15 Georgii VI. No. 49, *Qd. Govt. Gaz.*, No. 149, 6 December 1951) was assented to on 30 November 1951, to be incorporated in The Wheat Industry Stabilisation Acts, 1948 to 1951.

The Act increased the price of wheat for stock feed from the Australian home consumption price to the International Wheat Agreement Price. On 1 December 1951 the Australian home consumption price rose from 7s 10d to 10s per bushel. The International Wheat Agreement price was 16s 1d per bushel.

The Commonwealth agreed to pay a subsidy of 4s 1d per bushel on an annual quantity of 26 million bushels of wheat supplied to the poultry, pig and dairying industries, which would be available at 12s per bushel. The Australian Wheat Board was liable for interstate freight on wheat transported interstate to meet shortages.

- 34. *The Second-Hand Fruit Cases Act continuation Act of 1951* (15 Georgii VI. No. 51, *Qd. Govt. Gaz.*, No. 151, 6 December 1951) was assented to on 30 November 1951, to be incorporated in The Second-hand Fruit Cases Acts, 1940 to 1951. The Act allowed the former Act to continue in force until a date on which it would be repealed as wartime conditions had accentuated the problem.
- 35. *The Sugar Experiment Stations Acts Amendment Act of 1952* (1 Elizabethae II. No. 7, *Qd. Govt. Gaz.*, No. 177, 28 April 1952) was assented to on 17 April 1952. This Act provided for an increase in the levy upon sugar cane from 3d to 42 d per ton on every ton of sugar cane delivered at a sugar mill for crushing, the levy being shared equally between miller and grower. Provision was made for future adjustment by the Governor-in-Council upon the recommendation of the Sugar Experiment Stations Board. Collection of the levy was changed from payment at the end of the crushing season to periodical instalments as the cane was crushed.
- 36. *The Dairy Produce Acts Amendment Act of 1952* (1 Elizabethae II. No. 6, *Qd. Govt. Gaz.*, No. 176, 28 April 1952) was assented to on 17 April 1952. This Act required owners of dairies where milking machines were installed to use approved water boilers or steam sterilisers for cleansing and sterilising the machines and other apparatus. Milk processors at their option could buy milk either on the number of gallons supplied or only the butter fat content, or on the basis of the amount of butter or cheese obtained from the milk purchased. Milk processors could have cream separators in their factories sited as the Minister directed.

The Act prohibited factory owners from canvassing suppliers of other factories.

37. *The Agricultural Standards Act of 1952* (1 Elizabethae II. No. 12, *Qd. Govt. Gaz.*, No. 188, 30 April 1952) was assented to on 22 April 1952. This Act consolidated and amended the laws of the State relating to the sale of seeds, fertilisers, growth-regulating materials, lime, pest destroyers, veterinary medicines and stock foods, and regulated the sale of marking preparations and testing reagents (designated agricultural requirements). The aim was to protect the purchasing public against the sale of inefficient material.

Earlier Acts were repealed. All agricultural requirements were to be registered with the Standards Branch of the Department of Agriculture and Stock before being marketed. Every application for registration was referred to the Agricultural Requirements Board consisting of:

- i. the Agricultural Chemist of the Department (Chairman),
- ii. the Standards Officer of the Department,
- iii. an entomologist (plants),
- iv. a parasitologist (veterinary),
- v. a pathologist (plants),
- vi. two veterinary surgeons.

Efficiency tests could be undertaken by the Department for a manufacturer on payment of a deposit of ± 500 to meet the cost of the investigation.

The Act also regulated the production in Queensland of seeds for planting and their certification with respect to hybridism, variety or strain, freedom from or resistance to disease etc. The administration of this part of the Act would be carried out by a Seed Certification Committee and field officers. This Committee would prepare and carry out certification schemes. The Act provided for the supervision of the production in Queensland of certified seed from the planting of the crop to its harvesting and the packeting and labelling of the certified seed.

The Act also regulated the packeting and labelling of agricultural requirements and contained provisions for the inspection, sampling and analysing of agricultural requirements by Departmental officers, as well as other provisions.

- 38. *The Fauna Conservation Act of 1952* (1 Elizabethae II. No. 13, *Qd. Govt. Gaz.*, No. 189, 30 April 1952) was assented to on 22 April 1952. The objects of this Act were:
 - i. to make better provision for the conservation and protection of Queensland's fauna;
 - ii. to retain certain other laws relating to the destruction of dingoes, foxes, rabbits, hares and wild pigs;
 - iii. to regulate and control the introduction into and liberation in Queensland of exotic fauna.

Fauna was divided into three classes - permanently protected fauna, protected fauna and pest fauna. Every koala, platypus and echidna was permanently protected, with power to add other animals. Penalties for breach of the Act were severe.

Protected fauna could be killed during the open season under permit. The idea was to ensure the survival of sufficient numbers. Every State Forest and National Park in Queensland was declared a fauna sanctuary with power to add animals.

Killing with cyanide of potassium or bird lime or by use of electric or acetylene lamps or other artificial lighting was prohibited.

Fauna could be kept in captivity only with a special permit. Persons dealing in skins or fauna were to be licensed. Permits for moving fauna were required.

Royalty was required to be paid as prescribed. Holding a permit to kill during the open season did not confer the right of entry upon land the property of another.

39. *The Milk Supply Act of 1952* (1 Elizabethae II. No. 38, *Qd. Govt. Gaz.*, No. 137, 10 December 1952) was assented to on 2 December 1952. This Act repealed The Milk Supply Act of 1938. The original Act placed under the control of the Brisbane Milk Board about 50% of the metropolitan milk supply of 11,000 gallons a day. Now it handled 85%, or 40,000 gallons a day. This Act opened up new sources of supply of milk to cope with the increasing demand, and enabled the Brisbane Milk Board to license country producers and ex-metropolitan factories which supplied milk to the Brisbane Market and also the carriers of this milk.

The new Act allowed the supply of raw milk (warm milk), which the 1938 Act had not. The raw milk usually went to householders. This Act did not cover milk used for the manufacture of cheese, dried milk, condensed milk, concentrated milk, evaporated milk, butter or ice cream.

The Brisbane Milk Board in a modified form was the controlling authority. The new Board consisted of the Director of Marketing, two producers' representatives (one representing the wholesale vendors), one of the retail vendors, and a consumers' representative.

The Milk Board established for an area had to ensure that its area would at all times be adequately supplied with milk and cream of the standards required by law.

The Board was empowered to require all producers, wholesale vendors, and retail vendors who supplied or sold milk and cream within its area to register with it, and to license carriers.

The Board would determine the minimum number of different brands of milk which a retailer must always have available for sale. Suppliers had to be paid within fifteen days after the closure of the month of supply.

The Board could buy and sell milk or milk products. The Board in cases of shortage could be given all the milk supplied for use in the district by the Governor-in-Council.

Attempts to monopolise demands for milk would be an offence under the Act. The Milk Board had power to determine "goodwill" values. The marketing of standardised

milk was prohibited unless with the consent of the Governor-in-Council. If granted it had to be easily identifiable.

- 40. *The Diseases in Stock Acts Amendment Act of 1952* (1 Elizabethae II. No. 39, *Qd. Govt. Gaz.*, No. 138, 2 December 1952) was assented to on 2 December 1952, to be incorporated in The Diseases in Stock Acts, 1915 to 1952. The Act provided for the annual returns of stock depastured on the first day of January in each year made to the Clerks of Petty Sessions to be then forwarded to the Department of Agriculture and Stock instead of the Government Statistician as formerly. This put the stock returns and levying of assessments under one Authority.
- 41. *The Second-hand Fruit Cases Acts Amendment Act of 1952* (1 Elizabethae II. No. 40, *Qd. Govt. Gaz.*, No. 139, 10 December 1952) was assented to on 2 December 1952, to be incorporated in The Second-hand Fruit Cases Acts, 1940 to 1952. This Act provided for the extension of the original Act to other areas beyond south-east Queensland by proclaiming the area of extension. It extended it to Rockhampton and other areas as necessary. The Second-hand Fruit Cases Committee's authority was extended to any area contiguous to the present one but a new committee would be required for any non-contiguous area. The existing committee was changed to The Southern Queensland Second-hand Fruit Cases Committee. A committee was empowered to direct dealers to supply specified growers to secure equitable distribution if supplies were available. Dealers were required to purchase all second-hand fruit cases offered to eliminate unsightly empty case heaps. Diversion by holders such as shopkeepers of second-hand fruit cases to other trade purposes was forbidden.
- 42. *The Animals Protection Act Amendment Act of 1952* (1 Elizabethae II. No. 44, *Qd. Govt. Gaz.*, No. 151, 15 December 1952) was assented to on 4 December 1952, to be incorporated in The Animals Protection Acts, 1925 to 1952. This Act made minor changes to definitions of domestic and captive animals. It included dogs and horses as captive animals and provided for adequate food and drink and exercise for such. It provided for owners of cattle, sheep, horses, swine or poultry worried by dogs to take legal action and allowed police to take steps to destroy such animals, the destruction of injured animals being after notice to the owner. Transport of pigs and calves in separate compartments in a vehicle is required and penalties are prescribed for breaches of the Act.
- 43. *The Farm Produce Agents Acts Amendment Act of 1952* (1 Elizabethae II. No. 46, *Qd. Govt. Gaz.*, No. 161, 22 December 1952) was assented to on 11 December 1952, to be incorporated in The Farm Produce Agents Acts, 1917 to 1952. This Act required farm produce agents to issue and deliver invoices or dockets with farm produce sold. Thus records of sales by farm produce agents would be available to the Commissioner of Prices for price-fixing purposes.
- 44. *The Sheepskins (Draft Allowance Abolition) Act of 1953* (2 Elizabethae II. No. 5, *Qd. Govt. Gaz.*, No. 56, 14 October 1953) was assented to on 8 October 1953. This Act prohibited the system of draft allowance deductions on the sale of sheep skins.
- 45. *The Wheat Marketing (Amendment) Act of 1953* (2 Elizabethae II. No. 9, *Qd. Govt. Gaz.*, No. 71, 29 October 1953) was assented to on 27 October 1953, to be incorporated in The Wheat Marketing Acts, 1948 to 1953.

The 1948 legislative scheme did two things. Firstly, by setting up an Australia-wide pool for the marketing both at home and abroad of all wheat produced in the Commonwealth, it ensured every grower of his fair share of the export market. This benefited Queensland growers, particularly as over the period comparatively little Queensland-grown wheat was available for export. Secondly, the scheme assured to Australian growers a stabilised price over the five-year period of its operation, thus protecting them against a sudden and disastrous collapse in the overseas wheat market. The five-year period of the 1948 scheme expired in September 1953. Negotiations for the continuance of both orderly marketing and stabilisation were unsuccessful. But in October 1953 it became necessary to make provision for at least continuing the Australia-wide pooled marketing of the Commonwealth's wheat in order to enable the Commonwealth Government to sign the International Wheat Agreement. Under this agreement producer nations agree to supply, and consumer nations agree to buy, wheat at an agreed price over a period.

After much negotiation and differences of opinion between States, a compromise home consumption price of 14s per bushel was agreed upon and a Bill for this Act was then brought down to implement a Commonwealth-wide scheme for the pooled marketing of Australian wheat of three seasons, commencing with the 1953-54 crop.

The scheme decided on was a pool of each season's wheat, thus assuring to each and every producer a uniform return. The scheme would be controlled by the Australian Wheat Board. The home consumption price was to be 14s per bushel while the International Wheat Agreement price continued above that figure. If the International Wheat Agreement price dropped below 14s, the home consumption price was to be reduced accordingly. Should the International Wheat Agreement cease to operate then the home consumption price was to be tied to export parity. In the event of the cost of production of wheat rising above 14s, the home consumption price was to be increased. The 14s per bushel was the basic price for wholesale sales of bulk wheat of fair average quality f.o.r. rails at ports. Special provisions were made for Tasmania and Western Australia regarding transport distances.

This Act did not continue the Stabilisation Scheme which still had to be agreed upon by the States and Commonwealth.

46. *The Stock Acts Amendment Act of 1953* (2 Elizabethae II. No. 17, *Qd. Govt. Gaz.*, No. 121, 10 December 1953) was assented to on 4 December 1953, to be incorporated in The Stock Acts, 1915 to 1953. This Act changed the title of the original Act, the principal objective of which became the provision by the Department of Agriculture and Stock of animal husbandry services for improving Queensland's flocks and herds. With the creation of the Division of Animal Industry in 1945 a considerable expansion of research and investigation followed. A wool laboratory was provided to enable the assessment of fleece weights and factors affecting the quality of wool. The Toorak Field Station and Rocklea Animal Husbandry Stations were established. Many of the industry's problems had been investigated and the results passed on to the industry. Substantial finance was required to give these services and this new Act provided for their financing from a special fund established under it-the Stock Fund.

The revenues of this Fund were mainly provided by a levy on cattle, sheep and horses, plus a government subsidy of 16s in the pound. This Act increased the maximum levy which could be made upon cattle, sheep and horses, and extended the levy to pigs, viz:

(i) cattle (ii) horses (iii) cattle and horses together	A rate of not more than two pounds on every one hundred head or part of one hundred head.
(iv) sheep	A rate of not more than ten shillings on every one hundred head or part of one hundred head.
(v) swine	A rate of not more than ten shillings on every one hundred head or part of one hundred head.

Small stock owners-owners of fewer than eleven head of cattle, or of horses or of both cattle and horses together, or of sheep-were exempted from the levy. A minimum levy of $\pounds 1$ was payable by an owner of eleven or more sheep.

Under the Act compensation was payable to dairymen for loss occasioned through the destruction of dairy stock suffering from tuberculosis. This compensation was paid out of a special fund financed by a levy on milk and cream.

This Act also authorised the destruction and disposal of travelling stock which in the opinion of a stock inspector were in a moribund state or so seriously injured as either to be incapable of being travelled at all or could only be travelled with cruelty.

- 47. *The Queensland-British Food Corporation (Winding Up) Act of 1953* (2 Elizabethae II. No. 27, *Qd. Govt. Gaz.*, No. 149, 28 December 1953) was assented to on 18 December 1953, to be read with The Queensland-British Food Production Acts, 1948 to 1951. This Act was handled by the Premier's Department but was of interest to the Department of Agriculture and Stock. It dissolved the Queensland-British Food Corporation and made provision for payment to the United Kingdom and disposal of assets.
- 48. *The Sugar Experiment Stations Acts Amendment Act of 1954* (3 Elizabethae II. No. 11, *Qd. Govt. Gaz.*, No. 11, 5 May 1954) was assented to on 27 April 1954, to be incorporated in The Sugar Experiment Stations Acts, 1900 to 1952. There were 32 to 33 diseases and 60 to 70 pests menacing sugarcane growing in Queensland and Cane Pests and Diseases Boards had been set up to control these by eradication as far as possible. The work of these Boards was financed by a levy on all sugarcane grown in the infested area and delivered to a sugar mill for crushing. One half of the levy was payable by the mill owner, the other half by the grower through the mill owner. This Act provided for the payment by the mill owners direct to the Board instead of to the Bureau of Sugar Experiment Stations. This Act provided for the payment in full within one month of completion of the mills' crushing.
- 49. *The Stock Acts Amendment Act of 1954* (3 Elizabethae II. No. 22, *Qd. Govt. Gaz.*, No. 50, 11 October 1954) was assented to on 4 October 1954, to be incorporated in The Stock Acts, 1915 to 1954. This Act provided for dealing with an emergency resulting from an outbreak of foot and mouth disease in Queensland. Dealing with this disease meant quarantining human beings as well as cattle.

For the more effective control of diseases affecting the poultry industry, measures for controlling them were transferred from the Poultry Diseases Act to the Stock Acts. This allowed poultry diseases to be treated and dealt with by the veterinary officers under the Stock Acts.

Stock owners who suffered outbreaks of contagious diseases could publicise the presence of such diseases by placarding their properties where travelling stock might contact the disease, at the discretion of the stock inspector.

Provision was made for the registration and supervision of boarding kennels for cats and dogs.

A campaign to free dairy herds from tuberculosis was financed by a levy upon milk and cream.

- 50. *The Animals Protection Acts Amendment Act of 1954* (3 Elizabethae II. No. 23, *Qd. Govt. Gaz.*, No. 51, 11 October 1954) was assented to on 4 October 1954. This Act prohibited shooting matches, competitions or contests in which animals or birds were released from captivity for the purpose of shooting. Pigeon shooting matches were the main target.
- 51. *The Primary Producers' Organisation and Marketing Acts Amendment Act of 1954* (3 Elizabethae II. No. 29, *Qd. Govt. Gaz.*, No. 83, 2 November 1954) was assented to on 28 October 1954, to be incorporated in The Primary Producers' Organisation and Marketing Acts, 1926 to 1954. This Act allowed more than one deputy of the Director of Marketing on marketing organisations to cope with the increasing number of organisations. The Act also allowed a marketing organisation to act as marketing agent for producers.

The Act gave power to the Governor-in-Council to appoint a provisional liquidator to wind up affairs on any Marketing Board's closure. Any moneys remaining went to the Treasury to the benefit of producers of the commodity. The Auditor-General was given control under this Act over the auditing of the accounts of mill suppliers' committees and district cane growers' executives. The Queensland Cane Growers' Council was authorised to hold land upon trust for mill suppliers' committees and district cane growers' councils.

52. *The Wheat Industry Stabilisation Act of 1954* (3 Elizabethae II. No. 43, *Qd. Govt. Gaz.*, No. 129, 9 December 1954) was assented to on 6 December 1954. This Act was complementary to similar legislation passed by the Commonwealth and all other States to secure the organised marketing of, and a stable price for, all wheat grown in Australia during the five seasons 1953-54 and 1957-58 inclusive.

Under this Act the Commonwealth Government guaranteed a return to growers of the ascertained cost of production in respect of up to 100 million bushels of wheat exported from Australia from each of the five crops. The guarantee was based on a stabilisation fund contributed by an export tax of 1s 6d per bushel of wheat more or less. The maximum amount of the stabilisation fund was to be £20 million and if it reached that maximum the excess would be distributed to a revolving fund, earliest contributors benefiting first.

The home consumption price for wheat of fair average quality would not be less than the cost of production determined for each season. The home consumption price was to be 14s per bushel unless it was less than the cost of production and the International Wheat Agreement price was at or above this figure. A premium was to be allowed to Western Australian growers who were close to the overseas market and Queensland would hold any premiums on its wheat. 53. *The Regulation of Sugar Cane Prices Acts Amendment Act of 1954* (3 Elizabethae II. No. 46, *Qd. Govt. Gaz.*, No. 146, 15 December 1954) was assented to on 10 December 1954, to be incorporated in The Regulation of Sugar Cane Prices Acts, 1915 to 1954. Surplus cane in good seasons had to be crushed to provide a reserve stock of sugar to make up a lean year's deficit. Provision for acquiring and paying for these reserve stocks could be made under The Sugar Acquisition Act of 1915. But crushing was dealt with under The Regulation of Sugar Cane Prices Acts, 1915 to 1951, and special authority to Local Boards, or failing them, the Central Sugar Cane Prices Board, to require sugar mill owners to crush a quantity of cane in excess of farm peaks was contained in this Act. This Act provided a solution to this problem.

For the purpose of calculating price, the Act also gave permission for a relative payment scheme based on each week's average sugar content of cane crushed compared to the season's average. A Mill Suppliers' Committee had been given permission to appeal against the award of a Local Board, instead of the mill owner plus 20 growers as before.

- 54. *The Primary Producers' Organisation and Marketing Acts Amendment Act of 1955* (4 Elizabethae II. No. 43, *Qd. Govt. Gaz.*, No. 134, 7 December 1955) was assented to on 2 December 1955, to be incorporated in The Primary Producers' Organisation and Marketing Acts, 1926 to 1955. This Act repealed certain emergency provisions which were enacted in 1951 to counter a threat by butter factories to withhold supplies of butter from the consuming public in Queensland. The threat arose out of a dispute between the Governments of the Commonwealth and certain of the States as to what should be the price for butter. As at the time the Federal Government fixed the price for butter ex-factory the circumstances which originated the 1951 legislation were unlikely to occur and hence the repeal of the 1951 Act.
- 55. *The Fruit Marketing Organisation Acts Amendment Act of 1956* (5 Elizabethae II. No. 10, *Qd. Govt. Gaz.*, No. 78, 7 November 1956) was assented to on 5 November 1956, to be incorporated in The Fruit Marketing Organisation Acts, 1923 to 1956. This Act made a minor alteration to appointments and the validity of acts and proceedings of Committees.
- 56. *The Primary Producers' Organisation and Marketing Acts Amendment Act of 1957* (6 Elizabethae II, No. 9, *Qd. Govt. Gaz.*, No. 105, 15 April 1957) was assented to on 11 April 1957, to be incorporated in The Primary Producers' Organisation and Marketing Acts, 1926 to 1957. This Act provided for Commodity Boards to licence for carriage by road any commodity or commodities, prescribe the circumstances under which such carriage was prohibited save under licence, control licences, inspect vehicles on the roads suspected of carrying commodities in violation of the Act, seize vehicles, and obtain information from growers as to sale of produce, and gave right of entry to land to inspect commodities, and to impose penalties for breaches.

The Act also provided for ownership of commodities on the occasion of the extension of the life of a Commodity Board.

Some features of the Collins Ministry

The Collins Ministry started soon after the victory of the Allies in World War II and it organised the reconstruction of agriculture throughout the State. A. F. Bell, who, with J. Irwin, Deputy Public Service Commissioner, had prepared a plan of reorganisation for the Department, which he saw adopted in September 1945 under T. L. Williams as Minister, was appointed Under Secretary following R. P. M. Short's retirement. The Hon. H. H. Collins had been allocated the portfolio of Minister for Agriculture and Stock in March 1936.

War activities and reorganisation

In January 1950 Bell cast a glance at the efforts of the Department during the war years and then traced developments since the reorganisation. (*QAJ*., January 1950, pp. 2-13)

Bell summarised developments from reorganisation up to January 1950. Collins continued as Minister for Agriculture and Stock till 1957. Developments from 1950, are described below.

Experiment stations and laboratories

Land was acquired in the Julia Creek district during 1950-51 with assistance from the Commonwealth Wool Fund. Special emphasis was placed on the study of seasonal infertility in rams and neo-natal mortality of lambs. This was named the Toorak Sheep Field Station. A new farm was acquired by the Animal Health Station for the purposes of Animal Husbandry Research, to be known as the Rocklea Research Farm.

A Wool Biology Laboratory was established in Brisbane in 1951; its first full year's work was done during 1953-54.

Belmont Research Station was established by the Australian Meat Board and developed by CSIRO, and "Brian Pastures" at Gayndah was established and staffed by the Department of Agriculture and Stock for grazing and related trials.

A field station was established at Coolum in 1952 for research on development of the wallum lands, mainly for the establishment of coastal improved pastures.

Regional laboratories for soil survey were set up at Ayr and Atherton during 1954-55 and on 30 June 1955 Robert Veitch reported that Plant Pathological Laboratories were established at Nambour, Stanthorpe, Yarraman, Rockhampton, Ayr and South Johnstone. New sites of virgin land were set aside during 1952-53 for a Tobacco Experiment Station at Parada near Mareeba and an experiment station of some 400 acres at Millaroo in the Burdekin; both were developed during the next few years, and a Tobacco Experiment Station established at Inglewood. The Millaroo Station was for multi-purpose development.

An exploratory farm for testing the feasibility of growing supplementary crops for beef cattle was established at Wrotham Park at the base of Cape York Peninsula during 1949-51.

The Queensland Government voted £114 000 to erect a Food Preservation Laboratory at Hamilton during 1956-57; it was later named the Sandy Trout Food Preservation Laboratory.

Its function was to study the preservation, storage and transport of fruit. Artificial insemination centres were established that year at Yeerongpilly and Atherton. The Malanda and Murgon Co-operative Dairy Companies offered the Department rooms for laboratories, and the Port Curtis Co-operative Dairy Association had a laboratory at Gladstone.

The Animal Health Station at Yeerongpilly was renamed the Animal Research Institute during 1956-57 to indicate its changing functions.

Overseas visits by the Minister and Department staff

The Collins - Bell administration team encouraged overseas experience for Departmental officers. In many cases outside grants were made available so that the Departmental Budget was not involved financially. In reply to some criticism from the public about "overseas jaunts at the expense of the taxpayer" Arthur F. Bell, Under-Secretary, published this story. "Once a rooster managed to crawl through the fence into the turkey yard. He was totally amazed at the size of a turkey egg he found lying on the ground and with some difficulty managed to roll it back through the fence into the hens' enclosure. When the hens gathered around he said-'There you are girls, I don't want to complain, but that is what others are doing" Details of these overseas visits are given in the staff notes, but participants included the Minister, A. F. Bell, W. A. T. Summerville, A. K. Sutherland, W. J. S. Sloan, S. L. Everist, G. R. Moule, K. Howard, W. D. Mitchell, T. Morris, J. C. Skinner, R. C. Cannon, A. L. Clay, L. E. Nichols, L. G. Newton, W. Webster, B. R. Champ, H. S. Hunter, F. N. J. Milne, D. J. McKerrow, W. A. Smith, J. R. Wolfe, R. C. Menary, G. I. Alexander, E. B. Rice, S. Marriott, G. Lee, C. H. P. Defries, C. G. Hughes and J. H. Buzacott. W. A. Smith, Entomologist, visited USA on behalf of the Biology Section of the Lands Department to study parasite control of Noogoora burr.

Royal Commission on Soldier Settlement in Sugar Lands, 1946

A Royal Commission consisting of J. S. Hutcheon, H. Freeman and F. J. Wheeler recommended in its report of 14 June 1946 that an increase of three per cent in sugar mill peaks should be made to accommodate returned soldiers wishing to enter the sugar industry. (Q.PP., 1946, pp. 573-604)

Royal Commission on the Sugar Industry, 1950

This commission was appointed in March 1950 to formulate a policy for industry expansion during the next twenty-five years.

Transfer of control of the Bureau of Sugar Experiment Stations to a Board

The amendment of the Bureau of Sugar Experiment Stations Act assented to on 30 March 1951 placed the control of the Bureau directly under a Board comprising the Minister for Agriculture and Stock (Chairman), the Under-Secretary, one growers' representative and one mill owners' representative. The sugar industry leaders had been perturbed by the lack of adequate staffing of the Bureau (*Aus. Sugar J.*, 16 February, 15 June, 15 July 1948) and

especially the loss of three Directors-H. W. Kerr, A. F. Bell and E. R. Behne-over a short space of time to more highly paid positions. This amendment to the Act placed the Bureau outside the Public Service and appointments of staff, salaries and conditions could now be determined by the Board.

Creation of Dairy Research and Field Services Branches

Owing to the rapid increases in staff it was found necessary to create two branches within the Division of Dairying, L. E. Nichols and R. A. Paul becoming Directors on 27 July and 31 August 1950, respectively.

Royal Commission on Pastoral Land Settlement 1950

This Commission, appointed on 31 August 1950, including the Under-Secretary, Arthur F. Bell, looked at land policy and administration, production and development, supplementary stock feeding, irrigation, stock routes, animal and vegetable pests, rural population and employment and transport. Departmental officers prepared submissions for the Commission, and the Commission's recommendations-especially for intensification of land usage by improved pastures, better cattle, supplementary feeding and breed control-provided blueprints for future Departmental research and extension.

Sugar Agreements and Sugar Inquiry

During 1951 a new Sugar Agreement was concluded between Commonwealth and State giving a price for home consumption sugar of £53.6.8 per ton or $6\frac{1}{2}$ per lb retail. In 1952 a further increase to £65 12s 10d per ton and 8d per lb. was agreed to by the Commonwealth, and the Federal Government set up a Committee of Inquiry to investigate in detail costs of growing, milling and refining sugar. A. F. Bell was a member of this Committee, which submitted its report on 15 September 1982. An increase to £73 16s 4d per ton and 9d per lb. retail was granted. During October-December 1951 conferences were held in London between the British Commonwealth's sugar-exporting countries and the Ministry of Food and an Agreement was formalised whereby Australia was allocated a total export quota of 600,000 tons of sugar, made up of 314,000 tons to be sold at a price to be negotiated annually and 286,000 tons to be sold at world parity plus preferences. The Minister and Under-Secretary were members of the delegation.

Enquiry into the Queensland-British Food Corporation

An enquiry committee into the failure of this venture was set up by the Government and the Under-Secretary was a member of a special committee which submitted a report to the British and Queensland Governments.

Soil Conservation Advisory Committee

An Advisory Committee was set up under The Soil Conservation Act of 1951 to advise the Minister on soil conservation matters. It was made up of representatives of the Department of Agriculture and Stock, Irrigation and Water Supply, Main Roads and Local Government.

Importation of Santa Gertrudis cattle from Texas

The Department gave special leave to Ken Howard of the Cattle Husbandry Branch to enable him to proceed to Texas and return to Queensland with the first group of Santa Gertrudis bulls to be introduced to Australia.

Brigalow control

Following a broad survey and publication of a map of the brigalow country in Queensland by P. J. Skerman of the Bureau of Investigation, S. L. Everist of the Government Botanists group began investigations at "Cypress Downs", Yuleba, on aerial spraying of brigalow with the new herbicides 2,4-D/2,4-5T in April 1951. Everist visited the United States to attend an International Grassland Congress and made a special study of the destruction of mesquite stands in Texas by aerial spraying. This method of destruction of young brigalow sucker growth was taken to a successful conclusion by R. W. Johnson, later to become Government Botanist.

Copper deficiency in livestock

Copper deficiency in sheep, which affected wool growth, was confirmed by Dr M. White in 1945-46 and copper deficiency affecting cattle depastured on coastal areas between the southern border and Rockhampton was confirmed by Departmental officers in 1950. A team of crop and pasture specialists was allocated to work with livestock officers on the problem.

Minimum percentage of Australian leaf in manufactured tobacco

The introduction of a compulsory minimum percentage used by manufacturers to qualify for tariff concessions gave some relief to growers but most of the 1952 crop was rejected by manufacturers. On appeal by the State Government and growers the minimum percentage of Australian leaf to be used was doubled. This virtually saved the tobacco industry. For the 1956-59 seasons the minimum percentages required were announced in 1956.

	Minimum % in cigarettes	Minimum % in cut tobacco
1956-57	7½	17½
1957-58	12½	21
1958-59	14½	221/2

"Trend lines" in production

"Trend lines" in production were prepared by the Division of Marketing for the thirty years up to 1955 to spotlight both achievement and failure and to show where investigation and extension were most needed. They showed beef and veal production per head of cattle population had increased by 50% and wool by 10% per head of sheep population, but a downward trend was noted in dairy production.

Herd-recording scheme

A new herd-recording scheme was arranged after World War II, with the Commonwealth Government, the State Government and participating farmers sharing the costs. Under this new scheme the district herd recorder visited each farm at regular intervals, took the samples himself and provided the farmer with a monthly statement of the results.

State Weeds Co-ordinating Committee

The responsibility for weed control in Queensland was divided among several authorities. The Department of Agriculture and Stock had no regulatory powers with respect to weed control-these were vested in the Department of Lands and local authorities. Neither the declaration of plants as noxious, nor regulatory action to enforce destruction came within the ambit of the Department of Agriculture and Stock. The Standards Act administered by the Department of Agriculture and Stock had, however, power to act in respect of weeds in seeds, fodders, etc. The Department also handled identification advice and experimentation. In order to establish priorities and prevent overlapping, the State Weeds Co-ordinating Committee was established during 1954-55.

Dairy Extension Advisory Committees

These were set up at Atherton, Gympie and Oakey, each consisting of three industry representatives and three Departmental representatives.

State Poultry Improvement Plan

An increased grant from the Commonwealth Extension Services Grant enabled the Department to institute a Poultry Improvement Plan. Provision of poultry houses at the Rocklea Animal Husbandry Station and the Regional Experiment Station at Kairi during 1955-56 enabled a marked increase in poultry experimental work.

Collection of stock returns

Following an amendment to the Diseases in Stock Act in 1952 the collection of stock returns was transferred from the Government Statistician to the Department.

Extension Consultant Service

Following the visit of G. R. Moule to the United States in 1952, under a grant available through US Public Law 402, in May 1954 the Commonwealth Government under the Commonwealth Extension Services Grant financed an Extension Consultant Service, with

Moule as Extension Co-ordinator. The Information Branch Photographic Section and Library were consolidated under this service.

Its function was threefold:

- i. to assist in co-ordinating extension services throughout the Department,
- ii. to train staff in extension methods,
- iii. to serve as consultant to divisions and branches in programme planning and all extension activities.

Pasture Liaison Committee

Following the posting of Dr Jack G. Davies to Queensland as Associate Chief of the CSIR Division of Plant Industry in charge of a pasture research team, a Pasture Liaison Committee was set up by CSIRO in 1952-53 comprising representatives of CSIRO, the University of Queensland and the Department, to expand pasture research, prevent overlapping and bring research and extension into closer collaboration.

Pastoral Advisory Committee

A Pastoral Advisory Committee was also set up consisting of the Minister (Chairman), the Under-Secretary, two cattle industry representatives, two sheep industry representatives and the Director of Animal Industry, to advise the Minister and the Department on the provision of technical services to the pastoral industry.

Cereals Advisory Committee

A Cereals Advisory Committee was set up during 1953-54 consisting of three industry representatives nominated by the Queensland Grain Growers Association and two Departmental representatives.

Wheat Stabilisation Plan

The State and Commonwealth Governments agreed to a Wheat Stabilisation Plan in July 1954 for five years based on a guaranteed domestic price of 14s per bushel f.o.r. ports or the ruling International Wheat Agreement price, whichever was the lesser, but provided the price should not be lower than the ascertained cost of production. Preparation for the bulk handling of wheat by the State Wheat Board was in hand, with bulk stores being erected at three centres on the Darling Downs, and plans were advanced for a bulk terminal at Pinkenba.

Tobacco Industry Trust Account

In October 1955 the Commonwealth Government established a Tobacco Industry Trust Account to finance tobacco industry research and extension carried out by the CSIRO, State Departments and other research institutions. The Commonwealth Government and manufacturers each contributed half of the estimated capital expenditure of £168,000 and

estimated annual maintenance costs would be met by contributions of £14,000 from growers, £22,000 from manufacturers and \$21,000 from the Government. Queensland was allocated £30,650 for capital expenditure, £22,000 for annual maintenance and £3,000 for undergraduate student scholarships and an overseas visit by a Departmental officer. The Queensland allocation was used partly to equip the Parada and Inglewood Tobacco Experiment Stations. A State Advisory Committee and a Commonwealth Tobacco Advisory Committee were formed to facilitate industry participation.

Accommodation

During 1955-56 new and more spacious accommodation was occupied in Maryborough; additional offices were secured in the Government buildings in Townsville, Rockhampton, Innisfail, Wandoan and Wallangarra; extensions were made to buildings occupied at Caboolture and Pittsworth; better accommodation was provided in new courthouses at Ingham and Goondiwindi; some of the staff at Ayr were transferred to the Regional Experiment Station; and better private premises were based at Cooroy.

Staff movements under the Collins Administration

With the recent reorganisation of the Department in 1945 there were to be no major staffing changes for some years, except for retirements or deaths and sequential changes, the staffing associated with new Acts and expansion of services.

Administration

With the retirement of R. P. M. Short as Under-Secretary on 30 June 1947, the era of nongraduate occupants ceased and a new concept of overall administration of the Department emerged. The previous Under-Secretaries, generally denied further training because of the lack of training facilities in many of their chosen fields, learnt by experience in working with one another and in contact with the public and brought honour to the Department by long periods of service.

However, the Department had to join in the scientific revolution, and to direct its future it needed scientifically trained minds at the helm, supported by sound administrative personnel.

Appointment of Arthur Frank Bell as Under-Secretary. In preparation for the change in the administrative head Bell had been appointed Assistant Under-Secretary (Technical) in the 1945 reorganisation in addition to his position of Director of the Bureau of Sugar Experiment Stations. On 29 May 1947 he relinquished his position as Director of the Bureau of Sugar Experiment Stations and then succeeded R. P. M. Short as Under-Secretary on 1 July 1947.

Prior to his appointment as Under-Secretary Bell was made a member of the Bureau of Industry for three years from 1 January 1946. On 31 August 1950 he was appointed one of six Commissioners to a Royal Commission to investigate certain matters relating to the Pastoral Industry in Queensland (Royal Commission on Pastoral Land Settlement Queensland). Its report was published in 1951. On 21 May 1953 he was made Chairman of the Brisbane Milk Board, to take office from 1 July 1953.

Bell was awarded the Farrer Memorial Medal at the Annual Congress of the Agriculture Bureau of New South Wales in 1956 and the Medal of the Australian Institute of Agricultural Science.

Malcolm Lorne Cameron, Assistant Under-Secretary under Short, had been appointed General Manager of the Corporation of the Agricultural Bank on 23 May 1946 and left the Department.

Sequential vacancies

With the transfer of Cameron, William Thomas Gettons became Assistant Under-Secretary on 15 August 1946 and Robert Veitch, Director of the Division of Plant Industry, succeeded Bell as Assistant Under Secretary (Technical) on 3 July 1947. He retired on 31 December 1956 and was succeeded by Dr W. A. T. Summerville on 1 January 1957. Edmond Rowlands Behne, B.Sc.M.Sc. (Applied), A.A.C.I., Assistant Director and Chief Mill Technologist, became Director of the Bureau of Sugar Experiment Stations following Bell on 29 May 1949.

Ephraim Cecil Roy Sadler, A.A.V.Q., succeeded Gettons as Accountant on 3 April 1947.

John Francis Fergusson Reid, Editor of Departmental Publications including the *Queensland Agricultural Journal* from 3 January 1929, retired on 30 June 1948, and was succeeded as Editor and Officer-in-Charge, Information Branch, from 1 July 1948 by Charles William Winders, B.Sc.Agr., A.C.I.S., Agrostologist, Division of Plant Industry, and Editor, *Queensland Journal of Agricultural Science*.

Charles Schindler, B.Sc.Agr., was appointed Librarian on 14 November 1946.

Arthur Robert Fisher was appointed Agricultural Journalist, Information Branch, on 14 January 1954.

Division of Plant Industry

William Alan Thompson Summerville, D.Sc., Director Of Horticulture, succeeded Robert Veitch as Director of the Division of Plant Industry on 3 July 1947 and was succeeded by Walton Garrett Wells on 1 January 1957. Norman Joseph King, D.I.C., Senior Adviser, became Assistant Director, Bureau of Sugar Experiment Stations, under E. R. Behne on the same date. Behne resigned as Director of the Bureau of Sugar Experiment Stations to enter private enterprise with the Pioneer Sugar Company and N. J. King replaced him as Director on 20 May 1948, with Lewis George Vallance, Senior Soils Technologist, becoming Assistant. During 1950-51 Cecil Graham Hughes (Pathologist) and James Hardie Buzacott (Senior Plant Breeder) of the Bureau of Sugar Experiment Stations visited the Central Highlands and other parts of New Guinea to collect commercial and wild canes for testing and breeding. J. C. Skinner was granted a two-year travelling scholarship in

sugar cane genetics to study at the University of Manchester in October 1950 and visited the West Indies, United States mainland and Hawaii before returning to Australia.

Science Branch - Botany Section

Death of C. T. White.

Cyril Tenison White Government Botanist, joined the Botany Branch as a lad of fifteen years on 21st November 1905 under his grandfather, F. Manson Bailey, then seventy-eight years old. In 1915 F. M. Bailey died and was succeeded by his son, J. F. Bailey, who was both Government Botanist and Curator of the Botanical Gardens. C. T. White was appointed Acting Government Botanist when his uncle J. F. Bailey resigned to become Director of the Adelaide Botanic Gardens in 1907 and in 1918 White was appointed to the full position as Government Botanist, a position to be held until his death at his home in Kangaroo Point on 16th August 1950. C. T. White had a reputation not only in Queensland but in other States. In 1918 he accepted the invitation of Sir Herbert Murray, the Lieutenant-Governor of Papua, to visit the Territory of Papua and the records of his trip were published as his first long paper in the Proceedings of the Royal Society of Queensland for 1919. In 1923 he was approached by Dr C. S. Sargent, Director of the Arnold Arboretum, Boston, USA, to collect woody plants, especially conifers in New Caledonia. The identifications were carried out by Dr A. Guillaumin at the Musée d'Histoire Naturelle at Paris and published in the Journal of the Arnold Arboretum in 1926. On White's suggestion, the Arnold Arboretum appointed L. J. Brass, a former collector on the Queensland Herbarium staff, to collect in Papua from October 1925 to June 1926 and C. T. White identified the collection, the results being published in the Journal of the Arnold Arboretum in October 1929.

White also published "Contributions to the Flora of Queensland" in the *Proceedings of the Royal Society of Queensland* and also numerous local economic notes on poisonous plants and plants forwarded for identification from farmers and graziers through the *Queensland Agricultural Journal*. In January 1939 he went to the Royal Botanical Gardens, Kew, as liaison officer to examine type material of Australian plants and returned to Brisbane in November as a result of the outbreak of World War II. In 1944 he spent six weeks in the Territory of New Guinea as an Instructor to Forest Companies of the Australian Army and in 1945 spent six months in the Solomon Islands doing a forest survey.

In 1946 the Australian and New Zealand Association for the Advancement of Science at its twenty-fifth meeting in Adelaide awarded him the Mueller Memorial Medal for his contributions to botanical science and in 1948 the Honorary Degree of Master of Science was conferred on him by the University of Queensland.

C. T. White was Past President of the Royal Society of Queensland, The Queensland Naturalists' Club, the Horticultural Society of Queensland, the Queensland Orchid Society and the Royal Geographical Society of Australasia (Queensland Branch). For over twenty years he lectured on Forest Botany in the University of Queensland. (Herbert, D. A., *The Queensland Naturalist*, Vol. 14, 1951, pp. 43-47)

Death of W. D. Francis. William Douglas Francis, who joined C. T. White on 14 July 1919, succeeded him as Government Botanist on 12 October 1954, retiring on 30 June 1954. He died at his Kangaroo Point home on 2 January 1959. He was most widely known

as the author of Australian Rain Forest Trees, first published in 1929 and revised in 1951. It originated as a series of articles in The Queenslander, illustrated by the author's own excellent photographs. A subsidy from the Prime Minister's Department enabled it to be published in book form. The second edition was published by the Commonwealth Forestry and Timber Bureau. His official duties as a systematic botanist left him little time for research, and his work on plant anatomy, represented by papers in the *Proceedings of the Royal Society of Queensland*, was mainly done at home in his spare time. His absorbing interest for some years was in the controversial subject of the origin of life. He was convinced that his experiments with iron in culture solutions had resulted in the formation of a nucleoprotein, and took the adverse criticism of his technique and conclusions very much to heart. For many years he had been the efficient Secretary of the Royal Society of Queensland, but after this he resigned and published his paper privately at his own expense. During his retirement he worked on the anatomy and properties of the Stinging Tree, but failing health prevented a full return to the hobbies of his earlier years. (*Aust J. Science*, 1959, pp. 215)

Francis was succeeded on 1 July 1954 by Selwyn Lawrence Everist, who had joined the Department on 29 January 1929 as a Cadet Clerk and had later completed a Bachelor of Science degree course at the University by part-time study, graduating in 1936. He had joined the Botany Section and was Junior Assistant Botanist in 1932.

Science Branch - Plant Pathology Section

On 30 June 1953 Roy Bilbrough Morwood, Senior Pathologist, resigned after some thirty years' valuable service, especially in the pathology of grain crops but with a much wider spectrum.

During 1953-54 the three components of the Science Branch-botany, entomology and plant pathology-were given administrative independence from an overall Officer-in-Charge and became directly responsible to the Director of Plant Industry.

Regional Experiment Stations

- General Branch. W. G. Wells, who had been appointed Director of Regional Experiment Stations on 31 May 1945, became Director of the Division of Plant Industry, succeeding Summerville, on 1 January 1957. He was succeeded by William John Cartmill, B.Sc., A.A.C.I., previously Chief Soil Conservationist, on 13 December 1956.
- 2. Soil Conservation. Following the passage of The Soil Conservation Act of 1951, an Advisory and Co-ordinating Committee on Soil Conservation was established and provision was made for the appointment of a Chief Soil Conservationist. W. J. Cartmill was the first appointee on 25 January 1951. A strong soil conservation group was formed and Jasper Edward Ladewig, B.Sc.Agr., Q.D.A, who had been recalled from the New South Wales Soil Conservation Service as Soils Conservationist on 16 April 1947, succeeded Cartmill as Chief Soil Conservationist on 13 December 1956.
- 3. *Regional Experiment Stations*. With the reopening of the old Kairi State Farm as a Research Station after several years of Army occupation, James Harris was appointed Manager on 31 July 1947, but resigned on 31 March 1951, being replaced by Wilfred

Bott, Q.D.A., as Temporary Adviser on 12 December 1951 and Experimentalist from 27 March 1952. The Biloela Research Station became a Regional Research Station with William Alexander Ronald Cowdry as Manager from 31 May 1945. He was succeeded by J. G. J. Stevens as Adviser in Agriculture on 6 October 1949. The old Hermitage State Farm was also converted into a Regional Research Station during 1945-46 with Edward Roy Ashburn as Senior Adviser in Agriculture and Manager, a position he relinquished on 3 December 1953.

A Regional Experiment Station was established at Ayr on the site developed by the Commonwealth Department of Commerce and Agriculture at Macdesme to provide fresh vegetables for the armed services. In 1948 it was taken over by the Department to study agricultural and pastoral problems. Its area was 56 hectares (140 acres). It was divided into an area for general agricultural investigations, an area of irrigated pastures for beef cattle finishing, and a leased area of about 11 hectares (27 acres) to investigate horticultural crops. Cowdry was transferred from Biloela to manage this new station on 6 October 1949.

4. *Bureau of Tropical Agriculture, South Johnstone.* Joseph Leeming Schofield, Director of Tropical Agriculture at South Johnstone just prior to World War II, moved to Brisbane during the War as Agrostologist Division II. He resigned from the Department on 28 February 1946 and moved later to a mixed farm in Kenya. Thomas Gerald Graham, Q.D.A., Adviser in Agriculture, was moved to South Johnstone on 4 November 1943 and took over the supervision of the centre as Agrostologist Division II on 22 April 1948.

Agriculture Branch

During May 1946, C. J. McKeon, Director of Agriculture, went to the United States to study the soybean industry. McKeon was seconded from the Department to join the Queensland-British Food Corporation and David Ord Atherton, M.Sc.Agr., Q.D.A., Assistant Director of Agriculture, became Director on 20 May 1948. William James Stewart Sloan was appointed Assistant Director on the same day. The increase in problems and staff in northern parts of the State, where some forty-five officers of the Division of Plant Industry were located, led to the appointment of D.O. Atherton as Director of Tropical Agriculture based on South Johnstone, and later at Cairns on 20 October 1955. Sloan became Director of Agriculture based in Brisbane on 7 January 1954. Dr Lawrence Gordon Miles, Senior Plant Breeder, was promoted to Assistant Director of Agriculture. Sloan was awarded a Rockefeller Travel Grant for seven months' study in the United States during 1957. Meanwhile Richard Ernest Soutter, the noted Queensland wheat breeder, retired on 30 June 1948.

With the rapid development of machinery use on farms after World War II an agricultural engineer, Colin George Wragge, was appointed on 27 May 1954 to advise farmers and extension officers on engineering matters and liaise with manufacturers.

To cater for the expanding tobacco industry Fielding Chippendale, M.Sc.Agr., Senior Soils Technologist, was appointed Senior Agronomist on 21 April 1955 to lead a tobacco investigational team.

In the agrostology (pasture) arena, Charles William Winders, B.Sc.Agr., had been appointed an Assistant Agrostologist in December 1936 after being previously appointed Assistant (Agronomy), thus bringing the title "Agrostologist" into the Department for the first time. He was later promoted to Agrostologist. He had involved himself mainly with south Queensland pastures while at the Bureau of Tropical Agriculture, South Johnstone. Schofield and Graham had worked with tropical species. Winders was appointed Agrostologist and Editor of Queensland Journal of Agricultural Science from its first edition and then Officer-in-Charge of the Information Branch and Editor of the Queensland Agricultural Journal on 1 July 1948, leaving the field of Agrostology. Schofield had left the Department on 28 February 1946 with no graduate in the agrostology field. Stanley Marriott, B.Sc.Agr., was brought to Brisbane from his position as Plant Breeder (Cotton Section), Biloela, to become Agrostologist Division I on 19 August 1948. Dr W. A. T. Summerville, who became Director of the Division of Plant Industry in 1947, set about expanding pasture improvement throughout the State through an Agrostology Section, and with Marriott over the next ten years, located agrostologists to serve most of the new 750 mm (25 inch) annual rainfall areas of the State. Graham had been promoted to Agrostologist Division II at the Bureau of Tropical Agriculture, South Johnstone, on 22 April 1948. With the opening of "Brian Pastures" Field Station at Gayndah on 1 July 1953, Graham became the first manager to develop the Station; he was then transferred to Rockhampton in 1956, where he worked closely with the CSIRO National Cattle Breeding Station at "Belmont" and in the development of the Spear grass pastures with Shaw and Bisset of CSIRO. Graduate appointments followed in quick succession, with Brian Wells Butler based at Warwick in 1950, followed by Frank H. Bollman in 1952 and Graham Robert Lee in 1953, Norman F. Fox (later to become Director-General) at Brisbane 1952 and Gayndah 1953, Robert Sydney Wetherell at Gatton (1952), Bela Grof (Biloela 1953), Leonard Ross Humphreys (Brian Pastures 1956), Austin Hegarty (later to become Assistant Director-General, Brisbane, 1956), Neil Young (Gayndah 1956) and John K. Leslie at Toowoomba in 1957.

Stanley Marriott was promoted to Chief Agrostologist on 22 September 1955. In addition, the Bureau of Investigation of Land and Water Resources had set up an Irrigation Research Station on a portion of the Queensland Agricultural College land in the Lockyer Valley in 1946 and Alfred Nagle, Q.D.A., was seconded from the Department as Acting Officer-in-Charge. He set up a series of trials with irrigated pasture mixtures for use in south-east Queensland. Later the Department took over the Irrigation Research Station with Nagle as Irrigationist on 24 February 1949.

Marriott and Lee attended the VIIIth International Grassland Congress, Massey Agricultural College, New Zealand, in November 1956.

Horticulture Branch

Dr Stanley Alan Trout, M.Sc., Ph.D., followed Summerville as Director of Horticulture, and Norman Ernest Handley Caldwell, M.Sc.Agr., moved from the Entomology Section to be Assistant Director of Horticulture on 28 August 1947. Caldwell resigned to join Imperial Chemical Industries on 12 November 1948 and Jacob Harold Smith, M.Sc., B.Sc.(Agr.), Senior Entomologist, replaced him on 25 November 1948 as Assistant Director of Horticulture and on the Banana Industry Protection Board. During 1952-53 Royce Clyde Cannon, B.Sc.Agr., Horticulturist Division I, visited Hawaii on behalf of the

Pineapple Sectional Group Committee of COD to study tropical fruit production with special reference to pineapples. On 15 May 1952 he was appointed Senior Horticulturist (Plantation Crops) and Keighley M. Ward was appointed Senior Horticulturist (Vegetable Crops). Robert C. Menary, B.Sc., of the Horticulture Branch proceeded to the University of California in September 1956 to study for a higher degree.

Chemical Laboratory. On the death of Dr Montgomery White in September 1955 Chelmers Roy St Clair von Stieglitz, Officer-in-Charge of the Plant Nutrition Section, was appointed Agricultural Chemist, Division of Plant Industry, on 12 January 1956. Some reorganisation took place in the meantime and seven chemists were transferred to the Division of Animal Industry.

Division of Animal Industry

Veterinary Scholarships were instituted in 1945 to provide additional staff for the Department.

William Webster, B.V.Sc.,H.D.A., came from the New South Wales Department of Agriculture to be Director of the Division of Animal Industry from 21 July 1947; John Legg, D.V.Sc., B.Sc., M.A.C.V.S., Acting Director of the Division, was appointed Director of Research at the Animal Health Station, Yeerongpilly, at the same time, replacing Dr Frederick Hugh Sherston Roberts, Acting Director of Research, who had resigned on 30 June 1947. Webster made a special overseas visit during 1953-54 to investigate the latest research on the cattle tick problem, with a view to intensifying future research in Queensland. John Colin James Maunder, B.V.Sc., was appointed Chief Inspector of Stock and Chief Inspector of Slaughterhouses from 6 July 1947. He was also nominated as Departmental representative under The Stock Routes and Rural Lands Protection Act of 1944 to be a member of the Co-ordinating Board vice Laurence Daniel Carey, deceased. He resigned as Director of Veterinary Services (changed from Chief Inspector of Stock) and Chief Inspector of Slaughterhouses on 1 February 1951 and was succeeded by Clarence Roderick Mulhearn on 15 March 1951. Arthur Lineham Clay, B.V.Sc., D.V.O., Toowoomba, was appointed Assistant Director, Division of Animal Industry, on 11 August 1949. During 1952-53 Clay attended the International Veterinary Conference in Stockholm as Commonwealth representative and then visited Europe and USA studying dairy cattle, pig and poultry nutrition. Keith McDonald Grant was appointed Assistant Director of Veterinary Services on 5 November 1953.

In 1947 four Divisional Veterinary Officers (D.V.O.) were in office and by 1957, at the end of the Collins Ministry, seven stations were manned. Successive officers at each station were as follows:

Brisbane
A. F. S. Ohman (1947, resigned 17/1/50), D. N. Sutherland (1950-54), C. P. Craven (1954-57).
Toowoomba
A. L. Clay (1947-49), A. R. Nott (1949-53), C. P. Craven (1953-54),
B. A. Woolcock (1954-).
Kingaroy
C. R. Mulhearn (1947).

Rockhampton A. R. Nott (1947-49), O. H. Brooks (1949-). Maryborough C. R. Mulhearn (1948-51), K. M. Grant (1951-54); B. Parkinson (1954-). Townsville K. M. Grant (1948-51); D. N. Sutherland (1951-54); D. J. Mahoney (1954-). Cairns D. W. Lavers (1956-). Roma M. S. Stevens (1957-).

The Kingaroy office was moved to Maryborough in 1948. A. Ross Nott died in office during 1953 and Colin Craven filled in for some months until appointed to Brisbane. Bryan Woolcock moved in an Acting D.V.O. capacity to Toowoomba where his position was finally confirmed on 15 December 1955.

The Animal Health Stations. The Animal Health Stations came under the supervision of Dr F. H. S. Roberts as Acting Director of Research at the beginning of the Collins Ministry. He resigned on 30 June 1947 and Dr John Legg succeeded him as Director of Research on 21 July 1947. He had supervision of the Animal Health Stations at Yeerongpilly and at Oonoonba near Townsville, being himself stationed at Yeerongpilly. C. R. Mulhearn was Officer-in-Charge at Oonoonba before and after World War II up to 1948. He was followed as Officer-in-Charge by Leslie Gilbert Newton in 1948. Newton visited South Africa on a Commonwealth Grant in 1951 to look at tick-control measures with the new chlorinated hydrocarbons, spray races and exotic diseases. He was based on Onderspepoort but travelled through all of south-eastern Africa. He then visited pig-testing stations in Denmark and enquired into foot and mouth disease in Italy. Newton returned to Oonoonba where Alan Thomas Bell had been Acting Officer-in-Charge during his absence, but on 5 November 1953 Newton moved to become Chief Pathologist of the Pathology Branch at Yeerongpilly, succeeding A. K. Sutherland, and Alan Bell became Officer-in-Charge at Oonoonba. On 6 October 1955 Bell was appointed Assistant Director of Sheep and Wool and William Thomas Kerr Hall succeeded him at Oonoonba in 1955.

At Yeerongpilly the Toxicology and Therapeutics Section under W. R. Winks and the Biochemical Section under J. M. Harvey were part of the Chemical Laboratory staff after the reorganisation and did not come under the Division of Animal Industry. After Dr Montgomery's death in September 1945, James Meiklejohn Harvey (later to become Director-General) was moved to the position of Biochemist in the Division of Animal Industry and Cornelius William Roy McCray was appointed Senior Toxicologist to create two new sections.

Alexander Kennedy Sutherland undertook a two years' study course at the College of Veterinary Science, Illinois, USA, in 1946. He was appointed Senior Veterinary Pathologist on 2 February 1948. It was decided to introduce drought feeding trials associated with Yeerongpilly, and Husbandry Officers were appointed. Sutherland became Chief Husbandry Officer in a Husbandry Research Branch on 5 November 1953. He resigned on 28 July 1955 to join the Nicholas Institute in Melbourne and John William Ryley took over as Senior Husbandry Officer, becoming Chief Husbandry Officer on

16 October 1955. The Animal Health Station was renamed the Animal Research Institute on 9 December 1954.

Patrick James O'Sullivan, B.Sc.Agr., Q.D.A., was appointed Parasitologist Division I on 2 August 1951.

Geoffrey Dunsandle Daly was appointed Assistant Bacteriologist at Yeerongpilly on 22 November 1946, coming from Oonoonba to join Geoffrey Clive Simmons, Assistant to Bacteriologist, who later became Bacteriologist Division I from 11 March 1955. He is still Bacteriologist at the time of writing (November 1983).

Sheep and Wool Branch. Plans were made to improve services to the sheep and wool industry with the appointment of George Russell Moule, B.V.Sc., Q.D.S., one of the first three veterinary graduates from the Queensland University, in 1941 as Officer-in-Charge, Sheep and Wool Branch. He joined the Department as an Assistant to Veterinary Officers on 2 January 1941 and served at Blackall in the sheep industry before coming to Brisbane. John Lewis Hodge, Senior Adviser in Sheep and Wool, previously in charge of the Sheep Branch, retired on 28 July 1947. George Moule was appointed Officer-in-Charge on 10 July 1947.

Moule set about building up an effective extension service by recruiting advisory staff from the industry and giving them intensive short courses at Yeerongpilly and elsewhere before posting them to districts. The serious drought of 1946 and the buoyant wool prices provided a favourable environment for a new approach. During the drought Moule, in conjunction with Selwyn Everist of the Botany Branch, who had been an RAAF Meteorological Officer during the war, made a detailed analysis of the climatology of Queensland on a grant from the Wool Research Trust Fund. This was a basis for the study of summer infertility of rams. Moule also organised field days with local United Graziers Associations and wrote several extension articles for publication. Neo-natal mortality of rams was studied by the Advisers in Sheep and Wool, keeping a constant watch on lambing and early growth. Sheep and Wool advisory officers were located at Warwick, Dalby, Roma, St George, Charleville, Emerald, Blackall, Barcaldine, Longreach, Winton, Hughenden and Julia Creek. In addition to these Advisers, veterinary graduates were appointed to the Branch as Husbandry Officers; the first was Keith J. D. Astill, appointed Assistant Husbandry Officer on 9 February 1950 and located at Blackall in June; he was followed by Sydney J. Miller, appointed 2 February 1951 and located at Cunnamulla in August. The Toorak Field Station was established near Julia Creek in 1951, renovated with funds from the Commonwealth Government and prepared to study handfeeding of sheep, the incidence of oestrus in Merinos and the use of urea as a protein supplement. Moule spent four months of the 1952-53 year in the United States under an Extension Leadership Grant and studied co-operative agricultural extension services. On his return he built up the Sheep and Wool Branch as an extension medium. In 1954 two graduates in veterinary science sponsored by the Commonwealth Sheep and Wool Extension Services Scholarship plan joined the staff. Francis Ward was posted to the Toorak Field Station as Assistant Husbandry Officer on 29 April 1954 and John Gibb moved to Cunnamulla to replace Sydney Miller who resigned on 17 June 1955 to become a research veterinarian to the "Buckinbah" Merino Stud owned by Claude Bowhay at St George. Moule was anxious to establish a Fleece Testing Unit in a Wool Biology Laboratory. Frederick Bryant, a Science graduate, was appointed Assistant (Wool Technology) on 7 January 1946 and resigned on 10 July 1947. On 5 October 1950 Maurice Dudley Richards, D.I.C., was appointed Senior

Technical Assistant, Fleece Testing Unit, and Joan Anderson, B.A., became Female Assistant, Fleece Testing, on 4 February 1954 until 14 April 1954. On 1 November 1956 Sidney John Palmer became Senior Technical Assistant, Wool Biology Laboratory.

Moule had been appointed Director of Sheep and Wool on 12 January 1950 and Alan Thomas Bell moved from Officer-in-Charge, Animal Health Station, Oonoonba, to be Assistant Director of Sheep Husbandry on 6 October 1955. George Moule, who meanwhile had been awarded a Doctorate of Veterinary Science, resigned as Director from 13 June 1957, the day the Hon. H. Collins lost his Agriculture and Stock portfolio. Moule's resignation was effective from 28 June 1957 when he moved to the CSIRO Division of Animal Physiology; in 1959 he began publishing his series, "Sheep Liaison Notes", numbering forty issues over the 1959-71 period. He was a consultant to the UNESCO Arid Zone programme, a member of FAO's Expert Panel on infertility in stock, represented Australia at International Congresses on Animal Production and was Colombo Plan Fellow in India in 1962 to advise on sheep breeding. In 1971 he published his hundredth scientific paper. He was elected a Fellow of the Australian Society of Animal Production in 1971 but died on 21 December 1971 before the actual presentation. (*Proceedings Aust. Soc. Anim. Prod.*, Vol. 9, 1972 pp. x-xi)

Moule was born at Mount Morgan, Queensland, on 29 April 1914, spent his early life at Kureen on the Atherton Tableland, took the Queensland Diploma in Stock at the Queensland Agricultural High School and College, Lawes, with First Class Honours and his Bachelor of Veterinary Science from the Queensland University, also with First Class Honours.

Moule's death at the early age of fifty-seven years was a severe loss to Australia as a whole and to Queensland in particular, as he had played a major role in the development of the sheep industry.

D. J. McKerrow, Senior Adviser at Charleville, went to Pakistan during 1953-54 to help establish a Sheep Experiment Station in the Thal Valley.

Cattle Husbandry Branch. During 1947-48 it was decided to improve the productive aspects of the cattle industry such as feeding and breeding. A Cattle Husbandry Branch was formed to encourage improved pasture utilisation for maximum returns in beef and dairy products, crop fattening of cattle, supplementary feeding and other matters of production. Robert Davis Chester, B.V.Sc., the Veterinary Officer at Rockhampton, was appointed Officer-in-Charge of this new branch on 9 October 1947. He was sent to southern States to study cattle problems and especially to discuss animal nutrition with Dr M. C. Franklin of CSIRO. On his return he decided to work closely with the dairy herd recording units to encourage better feeding through added supplements.

On 23 December 1948 Richard William Hewetson, a diplomate from Hawkesbury Agricultural College, N.S.W., and a graduate in veterinary science from Sydney University, joined Chester as an Assistant Husbandry Officer. On 5 May 1949 an Agricultural Science graduate, John Gregory Young, joined the branch. Hewetson resigned on 28 March 1951. In early 1953 veterinarians John Herbert Thomas and James Norman Shelton joined the staff. Shelton was located as Assistant Husbandry Officer at Townsville. Thomas resigned on 19 March 1954. Graham Rocheford Fallon was

appointed Assistant Husbandry Officer on 24 February 1955. R. D. Chester resigned as Officer-in-Charge of the Cattle Husbandry Branch on 18 March 1955 to join Stanbroke Pastoral Company, which had several cattle properties in North Queensland. During his eight year term he had seen the Cattle Husbandry Branch expand its influence throughout the State with officers located at Brisbane, Townsville, Miles, Innisfail, Pittsworth, Kingaroy, Gayndah, Oakey, Gympie, Biloela, Brian Pastures, Emerald, Rockhampton, Nambour and Kairi.

Graham Irving Alexander (later to become Director-General), Assistant Veterinary Officer at Rockhampton, joined the Cattle Husbandry staff on 1 May 1955 as Husbandry Officer and moved to Brisbane on 23 June. He was awarded a United States grant to take up advanced studies at the Oregon State University and was successful in obtaining a Ph.D. Donald Norman Sutherland, D.V.O., Townsville, succeeded Chester as Officer-in-Charge, Cattle Husbandry Branch, on 6 October 1955. He was awarded a Veterinary Science Scholarship by the Department in 1946 for the five-year Veterinary Science Course.

Meat inspection was allied to improvement in cattle husbandry and improvement in meat quality and during 1954-55 a Veterinary Officer was appointed especially to supervise meat inspection. Noel Charles Edward Barr was the original appointee but he soon resigned and was succeeded by Alan Andrew Seawright, B.V.Sc., in September 1954. He held a Departmental Scholarship to complete a Veterinary Science Degree and completed also a B.Sc. degree in Chemistry and Biochemistry during the following two years. He resigned in 1959 to join the University of Queensland veterinary staff.

Pig Branch. Frederick Bostock's appointment as Officer-in-Charge of the Pig Branch was confirmed on 29 August 1946 as from 6 August 1945. Keith J. Hutchinson was appointed Assistant Husbandry Officer from 15 March 1951, but resigned on 1 May 1953. On 24 January 1957 George William Osbaldiston, Temporary Assistant Husbandry Officer, was appointed Assistant Husbandry Officer (Pigs).

Poultry Branch. Fitzroy Noel J. Milne, Poultry Husbandry Officer, attended the World's Poultry Congress in Edinburgh during 1954-55 and then visited several northern European countries to examine poultry husbandry practices. With the retirement of Percy Rumball as Officer-in-Charge of the Branch on 31 December 1955, Milne was appointed Senior Poultry Husbandry Officer on 12 January 1956. It was decided early in 1957 that the two small Pig and Poultry Branches should be combined to give the new branch equal status with other branches and they were placed under the Directorship of A. L. Clay, additional to his Assistant Directorship of the Division of Animal Industry, as from 30 May 1957.

Division of Dairying

Daniel James Callaghan, Senior Adviser in Dairying, seconded to the Commonwealth during the War years, resigned from the Department on 30 June 1946. A Dairy Adviser (Machinery) was appointed to help producers with their dairy machinery. The first appointee was Ernest Sutherland on 6 December 1946, and he was succeeded by James Dunford Elrington, Q.D.D., on 17 November 1948. O. St. J. Kent resigned to become Chief Dairy Research Officer and Principal, School of Dairy Technology, Victoria, and on 24 October 1946 Leslie Edwin Nichols, Dairy Technologist Division I, was appointed Acting Assistant Director and Senior Dairy Technologist of the Dairy Research Branch.

When the Dairy Research and Field Branches were elevated to full branch status, Nichols became Director of Research on 27 July 1950 and Robert Alexander Paul, B.Sc.Agr., from the Western Australian Department of Agriculture, was appointed Director of Dairy Field Services. He resigned on 17 June 1954 and was succeeded by Frank Clifford Coleman, Chief Adviser in Dairying, on 19 August 1954, Max Rose Muller becoming Chief Adviser. With the retirement of Ludwig Frederick Andersen, the first Herd Tester, Samuel Ernest Pegg, Q.D.A., took over the Herd Testing Section and was appointed Senior Adviser on 27 March 1947. Two scholarship holders, William David Mitchell, B.Sc., and Terrance A. Morris, B.Sc., who had completed dairying courses at the Massey Agricultural College, New Zealand, took up duty as Assistants to Dairy Technologists on 1 January 1951. New laboratories were built at Hamilton and Geoffrey George Crittall, D.I.C., A.R.A.C.I., was posted there from 12 January 1956 as Analyst. Both Mitchell and Crittall were later to become Director and Assistant Director of Dairying respectively.

L. E. Nichols attended the International Dairy Congress at The Hague during 1952-53 and then visited dairying institutions in Europe and the United States under a Commonwealth Dairy Efficiency Fund Grant. His paper in *Queensland Journal of Agricultural Science* won him the 1952 Silver Medal of the Australian Society of Dairy Technology. E. B. Rice, the Director of Dairying, attended the International Dairy Congress in Rome in September 1956 and then travelled through the United Kingdom, Europe and USA studying dairying matters.

Division of Marketing

On 19 September 1946 Harry Kingsley Lewcock was appointed Acting Assistant Director of Marketing and Senior Marketing Officer. He was succeeded on 8 January 1948 by Charles Herbert Powis Defries, B.Com., B.A., H.D.A., A.F.I.A., Production Statistics Officer. On 26 August 1953 Henry Samuel Hunter, Director of Marketing, was made a member of the State Wheat Board. He went overseas during 1953-54 to study marketing matters and Defries was awarded a Leader Specialist Grant by the United States to study farm management and economics. On his return he initiated an examination of the cost structure of the dairying industry. A small farm economics section was set up during 1945-46. Fritz Burfield Coleman, Standards Officer-in-Charge of the Standards Branch, passed away on November 27 1956 and Alan Alexander Ross, who had been transferred from the Horticulture Branch, was appointed Standards Officer, Division of Marketing, on 7 March 1957. Arthur Christopher Peel was appointed Assistant Standards Officer. The inspection of fruit and vegetables was transferred from the Horticultural Branch to the Standards Branch during 1955-56.

Other staff appointments

The Public Service List published in the *Queensland Government Gazette* on 21 July 1952 gives the full list of staff of the Department of Agriculture and Stock at that time.

Division of Plant Industry, 1945-57

Agriculture Branch

Wheat

The 1945 wheat crop of 8 000 000 bushels was excellent, but the 1946-47 crop was almost a total failure due to extreme drought. Over 80 percent of the 1945 crop came from Queensland-bred varieties. Assistance was again given to the State Wheat Board in the inspection of crops in the field for seed purposes. New Departmental crossbred wheats were field- tested at Kincora, Roma and Biloela, and stem and leaf rust-resistant varieties were found amongst derivatives of Kenya and Hope strains. Varieties bred by the Department filled the first seven places in a census of wheat varieties planted in Queensland in 1947. During 1947-48 a backcross programme for rust resistance replicated nursery field trials for new hybrids and the Pelshenke test for gluten quality of newly bred material was introduced. Backcrossing of the Pusa 4 variety was continued to the fourth generation. By 1950 millers and bakers were becoming concerned at the reduction in flour quality of mottled wheat and the Department initiated trials to determine the cause. Nitrogen deficiency during growth appeared to be a cause.

The 1950-51 crop suffered frosts, which showed that the variety Lawrence had marked resistance to frosting as well as high rust resistance, which enhanced its value for early planting. It was bred by the Department. A new variety Spica was released for general planting.

The 1953-54 crop of 10 million bushels in a season in which no effective rain was received between the first week in May and the last week in August was a landmark in Queensland agriculture. It highlights the role of the Department in advocating water storage in fallows and the use of better varieties. A yield of 55 bushels per acre was achieved from 180 acres of May-planted Spica at Bongeen in the Central Downs.

During the 1955-56 season plant breeders succeeded in incorporating within one variety (Puora) three different factors for resistance to stem rust, leaf rust and mildew.

Oats

The oat crop in Queensland is essentially used for grazing by dairy cows in milk or for finishing beef cattle for marketing. The main experiments with oats involved selection of varieties for early, mid-season and late planting to give a succession of grazing periods. Some cross breeding between the varieties Victoria, Richland, Fulghum and Klein was done and excellent results were obtained. Freedom from crown rust as well as grazing response was sought. Victoria blight made its first appearance in Queensland during 1952-53 and plant breeders were able to provide a disease-resistant variety BVH-4709 (Bovah) to overcome this problem and the appearance of a new strain of crown rust.

Barley

Little attention was paid to new barley varieties before the 1953-54 season because Queensland barley was usually too high in protein for malting. It was grown as a minor
grazing and feed-grain crop. During 1953-4 small samples of malting varieties such as Prior, Malhoorthy, Research, Chevalier and Proctor were obtained by the Department to test these pure strains. In 1955 there was an upsurge in barley production using the malting varieties Prior and Chevalier on the Darling Downs. There was a demand from local maltsters and for export. However, maltsters preferred a high bushel weight and lower protein, thus suggesting that wheat should be grown on the more fertile soils and barley on the less fertile soils.

Maize

Maize selection work continued during 1945-57 with an increase in the use of the Kairi Regional Experiment Station's Durum strain on the Atherton Tableland. Rotation with lucerne or lucerne/rhodes grass for five years, followed by maize, reduced disease-affected maize ears. A rotation with cowpea as a green manure crop was also worthwhile.

There was increasing use of hybrid maize strains developed in Queensland, and the use of open-pollinated varieties in southern Queensland ceased in the 1951-52 season. Yields of over 100 bushels per acre were recorded in the Beaudesert district, with hybrid crops under irrigation in 1952-53. The hybrid maize work was mainly conducted at the Queensland Agricultural High School and College, Lawes (Gatton).

During 1954-55 the Department conducted State-wide trials with hybrid and openpollinated varieties from Australian sources. In all districts other than the Atherton Tableland the "Q" hybrids from the College proved better than all open-pollinated varieties; the Grafton (GH) hybrids also did well, but the DS and NEH hybrids from the New England district of New South Wales performed well only on the Southern Darling Downs. No hybrid had proved superior to the best local open-pollinated variety on the Atherton Tableland.

During 1956-57 the characteristic of male sterility was introduced into maize breeding, enabling hybrids to be produced commercially without the need for detasselling. Graindrying equipment was also introduced for hybrid seed production and results suggested that bulk grain drying would be well worthwhile.

Sorghum

Grain sorghum was fast replacing maize as a summer crop in the under 30 mm rainfall country of Queensland, as it could be grown and harvested with wheat machinery and could be considered along with wheat as an alternative crop according to the incidence of rain during variable rainfall incidence. The Department took early steps to provide for pure seed production to rid the grain sorghum crop of unwanted hybrids, especially those between grain and forage sorghums. An extensive breeding programme was conducted by Dr Gordon Miles at the Biloela Regional Experiment Station and work was undertaken at Kingaroy by Arthur Kerr. During 1947-48 the variety Early Kalo was prominent in the Callide Valley. In 1950 the variety Alpha, also bred by Dr Miles, was released for cultivation and proved to be an outstanding variety. During 1950-51 some 300 bushels of seed of this variety were distributed throughout the major sorghum districts of the State and in 1951-52 it was the major variety grown. Capricorn, another locally bred variety, also

did well. Midge resistance was sought in breeding work and Nunaba, a resistant variety from West Africa, was introduced during 1954-55.

Spacing and rate-of-planting trials with grain sorghum were carried out to determine the best system for the various districts. The introduction of seed head dusting of sorghum with one per cent DDT was a breakthrough in sorghum midge control. The dust was applied at the inception of flowering.

Sweet or fodder sorghums were not neglected and breeding and selection work was conducted in various areas of the State, mainly for varieties of high-yielding capacity suitable for ensilage and for finishing bullocks. Sudan grass breeding resulted in the release of a low prussic acid variety: Roma Sudan grass. Introduction of Sweet Sudan grass from America showed it to be favoured by stock over the Roma variety and a later introduction from USA, Tift, outyielded both and had better resistance to leaf blight and other leaf diseases. The ratooning capacity of grain sorghum was made much use of in central Queensland for a second grain crop, or more usefully, for finishing beef cattle or maintaining milk production in dairy cattle during the autumn and frost-free winters. The variety Alpha was outstanding in this regard. During 1956-57 six acres of the sweet sorghum varieties Sugar Drip and Italian were planted by the Department for the production of certified seed for the requirements of fodder conservation on western grazing properties.

Root crops

English potatoes. Fertiliser, variety and spacing trials were carried out in the Burdekin, Lockyer and Fassifern Valleys and elsewhere during 1946-57. Nitrogen was found to be limiting on the alluvial soils of the Lockyer and Fassifern Valley, with isolated areas deficient in potash. The response from nitrogen was depressed by the application of phosphorus. Potash helped to reduce wilt disease. A hormone preparation, "Tuberone", dusted on seed potatoes at planting gave a significant yield increase at Gatton. Potatoes following a period under lucerne in the Lockyer Valley gave no response to nitrogen, but a potato crop following a bare fallow gave a better yield than one following an annual leguminous green manure crop ploughed in. Non-leguminous green manure crops depressed the yield of the following potato crop. Tests with Lockyer-grown seed potatoes for use as seed in the Burdekin showed that using seed potatoes grown in Tasmania and Victoria was the more rewarding practice.

Variety trials over the decade indicated that Sebago was the leading variety, with ability to yield well, freedom from scab, good shape, and availability of seed. Virus-free seed was sought.

Sweet potatoes. Propagation plots of nineteen of the better table varieties were established in the Rockhampton, Mackay and Atherton districts. At the Bureau of Tropical Agriculture the New Jersey variety yielded 25 tons per acre. The varieties White Maltese, Porto Rico and Abundance proved to be the best overall performers. In 1950 a variety Australian Canner was obtained from Hawkesbury Agricultural College for testing.

Fibre crops

Cotton. Cotton-breeding work with the aim of jassid resistance and improved lint percentage was continued at the Biloela Regional Research Station using the varieties Miller, Lone Star, New Mexico Acala, Triumph and Rowden. Jassid resistant strains developed by Marriott from the Miller variety were available for distribution from 1946. Experiments with supplementary irrigation to provide ample moisture at critical growth stages proved the value of this practice. A pre-planting irrigation of three inches per acre applied at the rate of slightly over an inch per hour and two further similar applications at critical stages equally, altogether nine inches of applied water, plus the 20.10 inches of rainfall, yielded an average seed cotton crop of 1898 lb compared with an average of 813 lb under rainfall alone.

Cotton planted in the first and second years after ploughing in a rhodes grass pasture of three years outyielded continuous cotton by at least 130 lb of seed cotton per acre. Weedicides and special cultivation techniques were tried to control black pigweed (*Trianthema portulacastrum*) in cotton and sorghum crops. During 1956-57 it was found that chloro IPC and C.D.E.C. (Vegadex) applied as pre-emergent sprays considerably reduced the black pigweed population.

Experiments with defoliation of cotton prior to harvest were also studied and success was achieved with Aero Defoliant from the United States of America. By 1957 sodium monochloracetate and amino-triazole were shown to be effective. A mechanical cotton picker manufactured by the International Harvester Company of America was purchased conjointly by the Commonwealth Department of Commerce and Agriculture, the Queensland Cotton Marketing Board and the Queensland Government in 1948. Trials in 1949 showed that varieties such as New Mexico Acala with an open habit of growth were more adapted to mechanical harvesting than varieties such as Triumph and Miller.

Under the stimulus of a higher guaranteed minimum price for seed cotton an increased area was planted in the 1950-51 season, almost doubling the area of the previous year. Breeding work was continued with the introduction of the new varieties Acala 1517, Coker 100 and Empire. The average net realisation for seed cotton was 21.389d per lb compared with the guaranteed minimum price of $9\frac{1}{2}$ d per lb for seasons 1950-55. The prospect of mechanical harvesting under contract also stimulated production.

In the Burdekin area March planting proved best, using the variety Coker 100 under irrigation. April plantings gave 15% less yield and August plantings were a failure in 1953-54.

Cotton growing was extended during 1955-56 to the Darling Downs, where 2000 acres were planted and two growers purchased their own cotton-picking machines. For such large-scale cultivation, a rotation of cotton for two years, followed by sorghum, then cowpeas, and then a cereal in the final year of the four-year rotation before returning to cotton was suggested by the Department.

Leguminous crops

Peanuts. During 1945-46 over 25 000 acres were sown to peanuts in the Kingaroy area. This constituted a record for this crop. The Peanut Board anticipated doubling this acreage

for the 1946-47 season and decided to duplicate the existing storage facilities. Departmental officers were concerned that this over-emphasis on peanuts would result in loss of fertility and aggravation of soil-erosion problems. Good crops were also recorded on the Atherton Tableland and in Central districts. Selection work was undertaken within the Red Spanish and Virginia Bunch varieties. Seed treatment and leaf spot control experiments were conducted in association with the Science Branch and direct harvesting in the field was being studied. By 1954 mechanisation had increased with the crop being dug and sun-dried in windows and harvested by pick-up threshers. Fertiliser experiments were conducted on the "forest" and "scrub" soils in the Burnett. No responses were obtained to potash and the various forms of phosphorus in the 1949-50 season.

Soybeans. Much was expected of the soybean crop following the visit of C. J. McKeon, Director of Agriculture, to the United States of America to study the crop. During the 1945-46 season propagation plots of 128 and 114 varieties and strains were tested at Kingaroy and Moggill respectively, and some selections were made. Smaller propagation plots were established on the Darling Downs, and at Rockhampton, Atherton, Mareeba, Mackay and Bundaberg. Yields of up to 20 bushels per acre were recorded but the crop was not encouraged commercially until an assured market was available. An offer of 30s bushel was made locally during the 1950-51 season and there was a demand for seed of the four varieties the Department had shown to yield best - Clemson non-shatter, Tokio, Nanda and Rose non-pop. Yields of 1500-1750 lb per acre had been obtained from this group. Problems with hare damage and low yields with poor adaptation to climatic conditions led to stagnation of the crop potential up to 1957 and beyond till more adaptable varieties were bred by Dr Byth of the University of Queensland from the 1960s.

Navy beans. Following wartime demands and increasing expertise, satisfactory crops of beans were harvested with bean cutters during 1945-46 at Kingaroy and Warwick. Queensland production at this time was only fifty per cent of Australian requirements. Yields of up to 33 bushels per acre were achieved.

Oilseed crops

Linseed. Some attention was given to linseed as a crop during the late 1940s. In 1945 ten varieties were tried and those with susceptibility to rust were eliminated. By 1950 some 11 000 acres were grown. After several years trials the variety Walsh became the most popular. Corn earworm damage was controlled by insecticides. During 1950, pasmo disease (*Sphaerella linorum*) made its appearance.

Trials with planting times showed May planting to be better than late June. Planting rates were reduced from 100 lb to 20 lb of pure seed per acre. Variability within varieties led to seed-selection work, with a pedigree selection programme initiated at Westbrook in 1949 and at Hermitage Regional Experiment Station in 1950. Fertiliser trials at Bongeen on the Darling Downs yielded a response to sulphate of ammonia and superphosphate.

Introduced varieties from Uruguay yielded at least 40% above the return from Walsh and seed increase of these was under way in 1953. However, a drop of 30% in the price received during 1952 led to several growers switching to more wheat. A guaranteed price of \pounds 70 per ton for 1953 led to a resurgence and some 18 000 acres were sown, and 100 000 acres in 1956.

Sunflowers. Seed obtained from the Queensland-British Food Corporation was tested during 1945-46 against the Sunrise variety. The varieties Jupiter and Polestar, both dwarfs, outyielded Sunrise by 50% and a seed increase programme was undertaken. At Ayr during 1944-45 Jupiter yielded 1688 lb per acre with an oil content of 34.9%. Yields were lowered by either increasing the plant spacing beyond 15 inches or leaving the rows unthinned.

Safflower. Exploratory plots of safflower were established in collaboration with CSIRO during 1954-55. Successful crops were harvested at Hermitage, Biloela and Ayr during 1955-56, yielding up to 1546 lb per acre. The variety Horowitz performed best and seed increases were arranged on the Darling Downs during 1956-57.

Tropical crops

At the Bureau of Tropical Agriculture (later the South Johnstone Experiment Station) several tropical crops were under study.

Rice. Varieties of both swamp and upland varieties from India, Sri Lanka (Ceylon), USA and New Guinea were established and yields varied from 12 to 47 bushels per acre during 1946-47. A New Guinea variety, Mekco, was the best. A trial of 12 varieties with three replications was sown on swamp land at Tully, with little initial success and studies of sowing rate, weed control and time of planting were needed to improve performance.

Upland varieties selected for seed increase during the next few years included Tribulation, Early Niro, Mekco, Prelude and Speculation. The upland variety Prelude planted in December 1952 and harvested May 1953 yielded up to 26 cwt of paddy per acre from plots receiving 194 lb of sulphate of ammonia and 293 lb superphosphate per acre under raingrown conditions. The 1953-54 crop failed and it was decided that commercial rice growing under upland conditions would not be feasible in this area so further trials were abandoned.

Tea. A small tea plantation covering one quarter of an acre was established before World War II. A two-row hedge of tea was established during 1946-47 to examine the possibility of harvest by hedge clipper. During 1947-48 all tea plants were allowed to seed and over 250 lb of seed and 2000 plants were forwarded to the Papua-New Guinea Department of Agriculture for post-war rehabilitation. In August 1948 a harvesting experiment was conducted to ascertain costs of production. The tea manufactured was surprisingly good, leading to a forecast by the Acting Director of Agriculture, D. O. Atherton, that "if mechanical methods can be adapted to harvest tea and to reduce production costs to economic levels, tea growing may have a future in North Queensland". Hand harvesting in 1950 under Queensland labour conditions produced tea at a cost of 3s 11d per lb. Additional areas were established on higher elevations at East Palmerston and on the Atherton Tableland. In 1951 harvesting then costing 7s per lb and in 1952 the costs were 5s 8d for mechanical against 12s 2d for hand-harvested tea.

In early 1952 hedgerow plantings together with shade trees and ground cover were established. The shade trees used were *Albizia moluccana* and *Gliricidia maculata* with ground cover of *Desmodium triflorum* and *D. heterophyllum*. By 1957 the new garden was

ready to test any new mechanical harvester. The 1956-57 yield was 3400 lb of tea per acre-three times the yield from the original garden. Production had been increased by fertilising with 50 lb ammonium sulphate, 15 lb phosphoric acid as superphosphate and 10 lb potash as muriate per acre twice a year.

Miscellaneous tropical crops

Observation plots of derris (for rotenone), balsa, rami and jute (for fibre) were also established at the Bureau of Tropical Agriculture but no commercial ventures emanated from these plots.

Sugar

During the early postwar years attention was given to the deterioration of sugarcane soils which had been continuously cultivated over a large number of years. Organic materials high in sugar, such as molasses and sorghum, which would encourage fungal mycelia to improve soil structure, were studied along with the decomposition of legume residues, molasses and bagasse. It was also shown that the calcium status of the soil was more important than pH after years of cropping. Trash conservation with and without green manuring had no effect on yields on the red soil at Bundaberg, as it maintained its natural good physical condition irrespective of management. Thus the application of adequate fertiliser was all that was needed to promote growth.

In the entomology field, McDougall had shown drainage was very effective in reducing wireworm damage. Buzacott worked on rind hardness of varieties as a factor in borer control and tested many of the newer post-war insecticides against white grubs. In this connection he carried out most of the earlier tests in the benzene hexachloride in 1945 which was to prove so spectacular in grub control. In 1947 Buzacott was appointed Senior Plant Breeder and transferred his activities to sugar cane genetics and G. Wilson took over from him as Entomologist in 1948. It was shown that gamma benzene hexachloride (BHC) was able to persist for some years at a sufficiently high rate of concentration to kill grubs. 150 lb of 10 per cent dust per acre applied in the drills after the young plant had germinated ensured the protection of the crop over the normal cycle of three crops. In 1950 it was estimated that the savings effected by the 1949 application of BHC had amounted to many times the money expended on all sugarcane entomological investigations in Queensland since their inception in 1911. The borer pest was almost eliminated by field sanitation and pre-harvest burning. Following the success of BHC with grub control it was found that it was also effective against wireworm damage applied at 10 lb per acre in fertiliser.

The Rt. Hon. the Prime Minister (R. G. Menzies) visited Meringa Sugar Experiment Station April 1957 on the occasion of the Annual Conference of the Queensland Cane Growers Association at Cairns. It provided a suitable opportunity for a presentation by the Cane Growers Council to the Board of Sugar Experiment Stations. The bronze plaque handed over by the Chairman of the Council, Mr B. Foley, marked the appreciation of the Cane Growers of Queensland for the cane-grub control work of the Board's Entomologists. The plaque was received by A. F. Bell, Deputy Chairman of the Sugar Experiment Stations Board. Menzies paid tribute to the conscientious endeavours of the scientists who were largely responsible for the progress of our agricultural industries. The inscription on the plaque reads: "This plaque was presented by the Queensland Cane Growers Council in recognition of the major service performed by the Bureau of Sugar Experiment Stations to the cane growers of Queensland in initiating and carrying to fruition the research which led to the successful control of the cane-grub, the industry's worst pest."

McDougall studied the ecology of the two pest rats and their control, and baiting with packeted thallium sulphate whole wheat mixture at 1:300, or with yellow phosphorus on bread, was adopted as standard practice.

In the pathological field, research in pineapple disease showed that dipping of setts in a mercurial compound exercised complete control.

Ratoon stunting disease occupied the Pathologists Hughes and Steindl in the early 1950s.

A Committee on Seedling Raising consisting of A. F. Bell, C. G. Hughes and the Officers-in-Charge of the three experiment stations developed a solution of a mixture of 0.01 percent sulphur dioxide and 0.01 percent phosphoric acid which would preserve male and female varieties for crossing under close observation. Crossing lanterns of cotton voile measuring 3 ft \times 3 ft \times 6 ft were used. It was found that storage of fuzz from one season to another could be attained by drying the fuzz and packing it in airtight tins containing a small amount of calcium chloride and storing it at a temperature below 40°F. The stored fuzz could be sown during the summer and the resulting seedlings put out in the field by early winter. Seedlings were then compared with one another and a standard variety. Commercial varieties liberated as "Q" seedlings were successful.

In 1945 E. R. Behne, Mill Technologist, visited Cuba, USA and Hawaii. He resigned in 1948. J. L. Clayton succeeded him and also visited Hawaii. Further appointments included C. B. Venton in 1946, L. R. Brain and B. G. Adkins in 1947, A. D. Doolan, K. Yore and A. G. Claire. Improvements in sugar boiling and fugalling resulted as wartime equipment was replaced with new machinery.

In 1951 the control of the Bureau passed from the Queensland Government to the Sugar Experiment Stations Board.

Pastures

Postwar activities at the Bureau of Tropical Agriculture at South Johnstone consisted largely of grazing trials with mixtures of grasses and legumes and legumes alone. Palatability trials included the legumes Stylo, Calopo, Puero, Hetero and *Dolichos hosei*. The grass/legume mixtures were: *Panicum maximum* var *coloratum* with Centro; Molasses grass with Calopo; Guinea grass with Stylo; Molasses grass with Puero; and Guinea grass with Puero.

By 1948 the reaction to composition and palatability of these mixtures showed that different mixtures should be more suitable and the length of grazing periods should be adjusted to species. Molasses grass was grazed heavily, allowing Calopo to take over. Centro was too vigorous for the purple-top Guinea.

Over the period of 251 days from 18 September 1950 to 28 May 1951 bullocks made an average daily gain of 1.3 lb per head with rotational grazing at an annual carrying capacity of a beast to 1³/₄ acres. Puero was the most palatable legume. Stylo was palatable after stock became used to it. Calopo was the least palatable. By the time that grazing was into the seventh year, Departmental officers were able to recommend mixtures of Guinea grass and Centro for new settlements being opened in the Innisfail area in 1953 and Para grass and Centro for moister areas. The stocking rate for 1953 was one beast to 1¹/₄ acres; it would be increased to one beast per acre for 1954. Until 1954 a set stocking rate was maintained but a put-and-take system was adopted from the 1954-55 year. During 1955-56 this grazing trial was concluded. The final summing up was that common Guinea grass, purple-top Guinea grass and Para grass, together with the legume Centro, were the best pasture species. Grazing for 3-4 days every five weeks was satisfactory. Steers two years old made liveweight gains of up to 500 lb a year on such pastures.

Late in 1947 forty acres of virgin rainforest were felled and burnt at Utchee Creek. The area was divided into 10 paddocks, each comprising four acres, and each paddock was sown to a grass/legume mixture for a continuous grazing experiment. By 1956 the average carrying capacity (Stylo did not persist) had been 1 beast to 2.5 acres for Molasses grass, 1 to 1.33 acres for Para grass and Centro, 1 to 1 acre for Guinea grass and Centro, 1 to 1.33 for a pure Guinea grass stand and 1 to 2 acres for the Molasses grass and Centro mixture. The trial confirmed that Guinea grass, Para grass and Centro form the best pastures and that the growth of Centro with a grass appreciably increased carrying capacity.

Observations showed that Stylo will replace Blady grass where the land is ungrazed and protected from fires in the wet tropics. During 1956-57 a new area of Guinea grass/Centro mixture was established at Utchee Creek to compare continuous grazing with rotational grazing.

Pasture research elsewhere throughout the State gained impetus and the Department made a bid to encourage producers to recognise grass as an important crop requiring careful husbandry.

The Department was involved in the work on pastures at the Bureau of Investigation Irrigation Research Station at Gatton where pasture mixtures were under study and one hundred winter-growing species were listed. It also acquired during 1946-47 the property at Ayr owned by the Federal Government and used during the war for vegetable production. This property was allotted irrigated pasture studies in conjunction with CSIR officers. Pasture plots were established at Hermitage, and at the request of suppliers to the Maleny butter factory, the Agrostologist and officers of the Plant Nutrition Section combined to investigate deteriorating pastures. Row planting of *Paspalum scrobiculatum*, popularised by Paltridge of CSIR, Gatton, Green Panic and Blue Panic was tried at Biloela and Kairi Stations during 1948-49 with inter-row cultivation with the aim of introducing a legume inter-row later.

Exploratory pasture plots on farms were located at Atherton, East Palmerston, Mackay, Rockhampton, Bundaberg, Gayndah, Kingaroy, Gympie and the South Coast, and demonstration plots were established at State Schools as part of School Project Club work. Pasture persistence trials, fertiliser needs, renovation, contour furrowing and weed control all

received attention. Native pasture studies were undertaken by S. L. Everist of the Botany Branch.

From 1951 the Agrostologists had shown that Green Panic (*Panicum maximum* var. *trichoglume*) and Buffel grass (*Cenchrus ciliaris*) were more drought-resistant than Rhodes grass in the 20-30 inch rainfall belt and Buffel grass had been introduced successfully into the 15-20 inch country, especially in areas in the Central West where Gidyea (*Acacia cambagei*) scrub had been bulldozed and burnt.

Attention was also being given to improving the Wallum country in subcoastal Queensland by adequate fertiliser application and the establishment of improved pasture species. The Plant Nutrition Section collaborated with the Agrostologists in this work. A small area near Brisbane and a large area at Coolum were acquired for this work in 1951-52.

A working agreement was struck between the Australian Wheat Board, CSIRO and the Department to investigate improved pastures for beef production and the Board provided funds during 1951-52 to purchase "Brian Pastures", a property at Gayndah for the purpose. This property was to be administered mainly by the Department. By 1955 the Station was ready for research under the "Brian Pastures" Technical Committee.

Light plantings and row planting of lucerne in combination with *Phalaris tuberosa* (Toowoomba Canary grass) and Brome grasses showed these species to be suitable for the upland black soils at Hermitage on the Downs.

Successful seed harvesting of Green Panic crops at Biloela with adapted wheat harvesting machinery was instituted during 1951-52. Freshly harvested seed gave only 9% germination, but the seed matured in storage and after six months had yielded 65% viable seed.

This after-ripening was an important finding with this and other species, and adjustments to minimum germination percentage for seed sales were made by the Standards Branch.

Rearrangement of responsibilities at Ayr during 1951-52 gave the Department charge of grazing experiments and CSIRO the work of evaluating new species, pasture combinations and water requirements. Daily weight gains by bullocks on different mixtures were: Para grass and Clitoria ternatea, 1.52 lb; Guinea grass and Stylo, 1.46 lb; Guinea grass and Centro, 1.41 lb; Para grass and Centro, 1.28 lb; and Rhodes grass and Stylo, 1.15 lb. Liveweight increase was rapid between September and December but slow from January to March because of high humidity. Eight bullocks to 5 acres were carried during 1952-53, except for three weeks in February. The conservation of bush hay (mainly Mitchell and Flinders grass) in the Mitchell grass downs areas of central and north-west Queensland was encouraged by Departmental officers during 1952-53, following the serious 1951 drought. Harvesting problems with tussock grasses and low yield per acre were experienced and the ultimate feeding value had to be assessed. The nutritive value of the main species at various stages of growth was assessed at Toorak Field Station during 1955. The Australian Dairy Board assisted financially in maintaining increased pasture trials and numerous fertiliser experiments were conducted to establish responses on varying soils and with different species to assess economic levels of application. Pasture protein levels resulting from fertiliser applications were also determined by the Departmental Chemists.

By 1954 sales of pasture seeds by seedsmen had reached three times those of the 1952-53 year and supplies could not keep up with demand. During 1953-54 there were 160 Departmental trials and 80 pasture demonstration plots extending from near Cape York to the New South Wales border, mainly in dairying areas, with valuable advisory and financial assistance through the Dairy Pasture Improvement Committee. A State Pasture Improvement Committee was set up, with representatives of CSIRO, the University and the Department, to avoid overlapping of investigations. In 1954-55 the Royal National Association introduced annual pasture improvement competitions and Departmental officers acted as seasonal assessors; the Senior Agrostologist, S. Marriott, was on the panel of judges.

At the FAO Conference on Livestock Production under Tropical Conditions, held in Brisbane in August 1955, Marriott presented information on recent advances in tropical pasture studies.

With the increasing interest in pastures during 1950, Agriculture Branch officers gave more man hours to pastures than to any other crop. The demand for pasture seeds could not be met and seed was costly. The Department was concerned that the farmer should understand the importance of strains within a species, that seed quality should be protected by legislation, and that mechanical seed harvesting should be fully explored and introduced to reduce the cost of seed.

The first turnoff of steers from a grazing trial at "Brian Pastures", Gayndah, during 1955-56 showed that the net liveweight gain per acre from the improved pasture was 117 lb per head, compared with 37 lb from native pasture. The improved pasture was grazed at the rate of one beast to 4 acres under a system of 8 weeks spelling and 2 weeks grazing, while the native pastures were stocked at one beast to 8 acres. During the period 1955-57 the figures were 282 lb and 69 lb respectively. During 1956-57 "Biloela" Buffel grass seed was released from the Biloela Regional Research Station under the Seed Certification Scheme to enable five commercial growers to plant a total area of 115 acres. The seed was originally introduced by CSIRO, identified as CPI6934 and selected locally as Type D Buffel grass. In the same year S. Marriott and G. Lee attended the Seventh International Grassland Congress in New Zealand.

The dry 1956-57 summer and autumn triggered a great interest in irrigated pastures in the Burnett, Callide, Brisbane and Fassifern Valleys using underground water, led by excellent results from the Bureau of Investigation Irrigation Research Station at Gatton.

The clearing of Gidyea and Brigalow areas by pulling and burning and subsequent aerial seeding of Rhodes, Buffel and Green Panic grasses in the fresh ashes developed dramatically and some 70 000 acres were sown from the air during 1956-57 with advice from Departmental officers.

Horticulture Branch

Transport

Experiments in refrigerated transport conducted in 1946 in conjunction with the Railway Department and the COD showed that CMIF refrigerated trucks with greater ice-carrying

capacity and better heat transfer would successfully carry fruit and vegetables from Brisbane to north Queensland and Mt Isa. Cool storage facilities were provided by COD at Charleville, Longreach and Blackall. In conjunction with CSIRO, tests showed that a four-wheeled ABCF railway wagon of approximate tare of 5 tons was also suitable for such transport. If non-refrigerated consignments were pre-cooled before loading a marked improvement in condition was noted on landing at the destination. The introduction of cardboard cartons reduced costs and they proved suitable for transport of soft fruits, grapes and tomatoes.

During 1955-56 fan equipment imported by the Department from the Presco Company of California was installed in an insulated railway wagon by the Queensland Railways Department. The unit was designed to cool loads during transit and to obviate the need to pre-cool consignments. Temperatures within the wagon varied by only 0.2°F. In January 1957 a consignment of peaches and plums loaded direct from the packing sheds at Glen Aplin into the Presco wagon arrived in Cairns in excellent condition, while similar fruit transported in a louvred wagon was completely wasted on arrival.

Pineapples

Investigational work which was commenced at Maroochy Experiment Station included fertiliser mixtures and supply of superior material to growers. It was found that a 10:6:10 mixture of fertilisers was the best. The supply of selected planting material involved the planting of five acres of selected planting material each year for five years from 1945.

It was found that where tops and pineapple refuse near the packing shed were destroyed and the shed was sprayed with formalin, wastage was practically eliminated. Storage experiments for canning pineapples showed that storage at 45-50°F for three weeks had no deleterious effect on quality.

Acetylene gas and hormone sprays were introduced to induce flowering in pineapples during 1947, and in 1948 alpha-napthalene-acetic acid was introduced to induce flowering, delay maturity and increase fruit dimensions. A standard pack for pineapples to increase attractiveness was worked out between the COD and the Science and Horticulture Branches. Weed control using sodium pentachlorphenate (PCP) was effective during the summer months. During 1950-51 it was found that stripping base leaves from suckers before planting gave a marked improvement in growth. Spraying a 1% solution of borax on to the spring crop considerably reduced black heart in the following winter harvest. Trials showed cannery waste could be processed into a useful fibre board. Calcium citrate was recovered and used in reconstituted syrup.

During 1952-53 the COD pineapple farm at Beerwah took over the distribution of selected planting material based on the progeny of selected plants from the Maroochy Experiment Station. Some material was also distributed from the Ayr Regional Experiment Station. Some copper deficiency was found in Maryborough soils and spraying with copper sulphate solution corrected the deficiency.

Experiments in frost control with fans and oil burners were instituted at the Beerwah farm in conjunction with COD and the CSIRO Section of Meteorological Physics. During 1953-54 the use of alpha-napthalene-acetic acid (ANA) sprayed at 100-150 ppm to the developing fruit eight weeks before the anticipated time of harvesting increased yield by 20%. The use of green manure crops of poona pea in summer and New Zealand blue lupin in winter in the 18-month inter-cycle period increased yields by 25%. Chemical analyses of pineapples showed that excessive nitrogen fertiliser reduced sugar and acid content, phosphoric acid increased juice acidity and potash increased sugar and acid, thus improving palatability.

The use of tar to stabilise waterways to control erosion in pineapple fields had proved useful during 1956-57 and studies of tar formulation were set in train.

Bananas

Banana yields were declining in the 1950s due to loss of fertility and trials with pigeon pea and cow peas as green manure showed some improvement in yield. Hormone weedicides were introduced to control weeds. The Mons Marie variety was replacing Cavendish and Lady Finger. Injection of plants with 2,4-D effectively killed old plants. It was found that the size of the plant was proportional to yield. Experiments with quick-frozen bananas for export were instituted.

Individual growth studies of bananas at Maroochy showed the necessity to use plant material which contains adequate food reserves for the needs of the young plant, and the application of adequate fertiliser within three months of planting and thereafter to the young offshoots.

Prompt ripening after harvest was essential as 6 hours at 90°F, 9 hours at 80°C and 12 hours at 80°F reduced the life of ripened fruit by 20%. In summer-grown fruit, losses in ripening reach 5%.

During 1952-53 hessian covers for bunches were hard to obtain and plastic covers of Welvic film proved suitable. Red covers increased fruit weight, while black covers hastened ripening. Experiments with waxing fruit were undertaken. By dipping banana bunches in a water-based emulsion containing micro-crystalline and paraffin wax, weight losses during ripening were reduced by 50%, skin blemishes were controlled and eating life was extended. The use of arsenical weed control was replaced by PCP as used for weed control in pineapples.

Bunchy top in bananas continued to cause trouble and inspectors had to watch carefully any outbreaks and apply control measures.

Citrus

The main activity of the Department concerning citrus fruit was the budwood scheme, which supplied selected budwood and seed required for propagation to nurserymen. The budwood had to be carefully selected to eliminate the psorosis virus, brown spot and stem splitting. Some 150 lb of seed and 50 000 to 100 000 buds were distributed annually.

Maturity standards for citrus were altered to include palatability and much research was done by the Science Branch to determine palatability. The acidity level at which fruit first becomes palatable varies from 8 to 39 and the corresponding sugar level from 7 to 13, making it difficult to prescribe a standard. It was found, however, that the time fruit first

becomes palatable is fairly constant for any district from year to year and dates were published relating to this finding; for example, for Gayndah, Washington Navel oranges are ready from the middle to the end of March, Ellendale mandarins at the end of May and Late Valencia oranges at the end of June.

Considerable research was undertaken to determine suitable stocks for the various citrus varieties. An experimental orchard was established at Lawes (Gatton College) to provide seedling mandarin trees free from viruses.

Considerable research was undertaken to determine suitable stock-scion relationships in citrus. The "trifoliata" stock, so successful in southern Australia, was being tried in Queensland. To accommodate this investigation, more land was required than that available at the Maroochy Station and a nursery was established at Newtown near Maryborough for the purpose. A mandarin hybrid project was also established at the Irrigation Research Station at Gatton (Lawes).

Fumigation of citrus trees with ethylene dibromide to control fruit fly was successful and opened up better prospects for marketing citrus in southern States.

Papaws

Papaw varieties bred by the Department were tested at Yeppoon, Yarwun, Brookfield and Sunnybank to compare the Bettina Improved Petersen and other varieties. Mulching was shown to improve but also delay production. Bisexual strains such as Guinea Gold were being tested for canning at the Koongal cannery at Rockhampton.

Trials with regard to time of picking papaws and storage by quick freezing were undertaken. Immersion freezing in a very cold solution of invert sugar was better than freezing by air blast. Recovery of papain was too small to be of local commercial value.

Deciduous fruit

Experiments at Stanthorpe were mainly concerned with nutrition and the beneficial effect of the trace elements zinc, boron and copper, and the use of hormone sprays to prevent preharvest dropping. Apple rootstocks Merton 778, Merton 793 and Merton 789, released by CSIRO through the Deciduous Fruit Sectional Group of COD, were proving better than the usual Northern Spy material.

Storage trials with Granny Smith and Delicious apples showed that Granny Smith apples picked from the end of March to the beginning of April and Delicious apples picked from the last week in February to the first week in March could be kept in an atmosphere of 10% oxygen and 2% carbon dioxide at 34°F until the end of October.

Trichlorphenoxy propionic acid (2,4,5-TP) was shown to be effective in controlling pre-harvest drop in apples. Control of superficial scald was obtained by dipping the fruit in a solution of diphenylamine (DPA).

Grapes

A small area at Severnlea was leased during 1946-47 to investigate grape problems, especially planting distances and phylloxera-resistant stocks. Resistant stocks were imported from other States and quarantined at the Maroochy Station before transfer to Stanthorpe. Long pruning was shown to be better with Waltham Cross and Purple Cornichon and short pruning for the Muscat-Hamburg variety. Richter 99 and 420A were the most promising stocks at Stanthorpe, and Richter 99 and R du Lot the best at Redlands Experiment Station. Magnesium deficiency at Stanthorpe was corrected by dolomite application to the soil, while zinc deficiency was corrected by swabbing pruning cuts in winter with a zinc sulphate solution of 2 lb zinc sulphate per gallon of water.

Strawberries

The Phenomenal variety in general use in Queensland had become very variable, and yellow edge or crinkle virus disease was becoming serious. The Department therefore established a strawberry runner scheme involving approved growers of planting material under the supervision of the Horticulture and Science Branches during 1949-50. Clonal selection of plants was instituted by the Department in 1951.

Research was undertaken on processing methods to retain flavour and texture in quick-frozen strawberries after thawing. Firm ripe berries frozen in a cold sugar solution gave the best results, but the Phenomenal variety was not entirely satisfactory for processing. Drying to 35 percent of the original weight prior to freezing with the addition of a small amount of pectin improved canning. Fertiliser trials at Redland Experiment Station showed that 10 cwt per acre of a 5:14:5 mixture before planting and 1-2 cwt per acre of quick-acting 5:13:5:5 mixture at monthly intervals was a satisfactory treatment. Mulching of strawberries increased yields and 2,4-D ester controlled weeds in strawberry crops.

Passionfruit

During the 1950s the passionfruit industry was rather small due to the ravages of the diseases fusarium wilt, woodiness and brown spot. During 1949-50 a plant-improvement programme was instituted at Redlands Experiment Station using species other than *Passsiflora edulis*. The Pathology Section showed that *P. edulis* var. *flavicarpa* and *P. coerulea* could be used as rootstocks for the commercial *P. edulis* as they were resistant to *Fusarium*.

Avocados

The avocado industry was gradually becoming important in the late 1940s and early 1950s. Growers, with Departmental help, were producing Fuerte and Nabal. The main problems were those of propagation, soil type and maturity at harvest. Maturity standards for fats and oils were studied by the Department. Fruit of Fuerte was being marketed with 7% oil, whereas 19% oil was found to be the most palatable level. Requirements were laid down by the Avocado Advisory Committee and sixteen formulations containing avocado as the main constituent were kept in a frozen condition for twelve months and emerged in good condition.

Mexican stock was being used for grafting. In 1957 a range of introduced varieties was under test at Redlands Experiment Station to extend the availability of fruit beyond April to September. The varieties Ryan, Hass and Sharwill appeared promising.

Miscellaneous fruit, vegetables and nuts

Departmental advice covered a number of other fruit crops such as mangoes, figs, custard apples and the Queensland nut, and the many vegetables, especially tomatoes and beans (both including breeding programmes).

Ginger

Interest in ginger growing at Buderim was being revived but the absence of suitable seed prevented plantings on an extensive scale in 1955. Experiments with time of planting at Maroochy Experiment Station showed August planting to be better than October. Curing experiments showed that cooking time could be reduced and that continuous evaporation gave a much higher yield and better texture than the normal re-syruping method. Flavour was improved by allowing slight fermentation to proceed during the syruping process and by using honey or raw sugar instead of refined sugar. Hot water at high pressure replaced peeling by hand, and sodium benzoate proved better than sodium bisulphate for storing ginger prior to processing. These Departmental findings considerably improved the final product.

Entomology

Testing of new insecticides, particularly DDT, occupied a good deal of the activities of the entomological staff. They proved promising against the larger horned citrus bug, bronze orange bug, banana thrips, tomato and cotton jassids, corn earworm on cotton, tobacco leaf miner, cabbage moth and beanfly. 0.1% of DDT dust controlled codling moth but encouraged red mite and woolly aphid, by destroying their parasites. DDT was also effective against potato tuber moth and DDT-impregnated bags gave protection against moth attack on bagged tubers. Benzene hexachloride was effective against grain insects but it was recommended that grain so treated not be fed to poultry or dairy cows as it could be detected in eggs and milk. In 1953-54 the major tobacco pest was the budworm (*Heliothis armigera*). It was found that endrin was more effective than dieldrin in general pest control, with DD or EDB effective against nematodes. During 1954-55 DDT was proved to be a suitable substitute for arsenic in the control of light brown apple moth. 92.6% sound fruit was obtained at Toowoomba by DDT spraying for fruit fly, compared with 29% from untreated trees. A key for identification of the larvae of the common Queensland fruit fly was published to assist quarantine officers and research workers.

A State-wide survey of plant nematodes was undertaken and several new species were recorded by R. Colbran.

During 1955-56 an inter-Departmental Committee studied the problems associated with the infestations of the European house borer (*Hylotrapes bajulus*); A. R. Brimblecombe was the Departmental member. The European red mite (*Metatetranychus ulmi*) was recorded for the first time in Queensland at Stanthorpe during 1956-57 and a survey of mite species and the effect of organophosphates in their control was undertaken. It was

found that arsenic residues on apples could be reduced by stopping spraying in early November at Stanthorpe. It was better, however, to use other available treatments.

The strawberry nematode (*Meloidogyne hapla*) was found to be widespread in Queensland and suitable control measures were devised.

Plant pathology

Papaw dieback was recorded throughout the decade, usually after heavy summer rains, and yellow crinkle was also serious in this period. Exhaustive chemical and microbial tests were carried out with dieback and a virus was suspected as the cause. During 1951-52 up to 80% losses from dieback were recorded, being more severe in young trees in their first and second year of bearing. Selection of seeds from trees showing some resistance in a trial at Aspley were sown at the Redlands Experiment Station for study of dieback.

During 1954-55 a spectacular disease occurred in ginger plantations on the north coast planted with "Chinese" material. A soft rot occurred in the rhizomes and a species of *Fusarium* fungus was shown to be the cause.

Charcoal rot and sorghum head smut gave trouble in certain grain sorghum crops and two new diseases to Australia were recorded during 1953-54, one caused by *Gloecercospora sorghi* attacking plainsman and Caprock grain sorghums, and the other by *Ramulispora sorghi* attacking grain and sweet sorghums, Sudan grass and *Sorghum almum*. Fusarium wilt of the passion vine was successfully contained by grafting the common passionfruit *P*. *edulis* on to *P. flavicarpa* stock.

During 1953-54 full time work on soil microbiology was allotted to an officer of the Plant Pathology Section. His work was mainly connected with the selection and propagation of effective *Rhizobium* strains for inoculation of pasture legume seeds.

In addition to the above work, numerous calls were made on the Pathology Section in connection with various well-known plant diseases. Newly developed fungicides were tested for effectiveness.

General Branch

Soil conservation

During 1945-46 a Commonwealth Standing Committee on Soil Conservation was established and the Department was represented on it. The Soil Conservation Officer of the Bureau of Investigation, A. Frank Skinner, was made available to the Department during 1946-47 to survey the eastern Darling Downs to select areas for soil conservation demonstration with the help of Departmental field officers. An Acting Soil Conservationist, Jasper E. Ladewig, was appointed in March 1947 and took part in the latter survey. Provision was made for soil conservation work on Hermitage and Kairi Regional Research Stations. A Soil Conservation Section, under Ladewig, was established within the Division of Plant Industry and a number of farm demonstration projects were set up with the threefold object of training staff, demonstrating the soundness of the recommended measures and obtaining additional information. Six officers received basic training. Field days and lectures were well attended. The use of absorption banks, contour banks and grassed waterways, and stubble mulching were instituted, and farm plans were prepared for twenty farms during 1948-49 and issued to the owners as blueprints for the implementation of conservation farming. The vegetation of waterways on the Darling Downs received close attention to determine satisfactory species with which to hold the black soils. Water disposal methods were discussed with local authorities and the Irrigation and Water Supply Commission.

A good deal of research work was done at the Kairi and Hermitage Regional Experiment Stations and on the Maroochy Horticultural Research Station. Contour working of the deep red soils of the Atherton Tableland was successful in controlling erosion. A Group Planning Scheme was introduced during 1955-56 to develop community leadership and treatment of adjacent farms. A grid reference system was introduced in the Darling Downs and South Burnett, each grid encompassing 5000 acres.

A Bermuda sprig planter was used to grass waterways with Kikuyu grass sprigs. This grass had proved the most useful for the Darling Downs, but African star grass also performed well.

Science Branch

Botany Section

In December 1945 the Government Botanist, C. T. White, returned to Departmental duty after an absence of almost six months, during which he was engaged on a forestry resources survey in the British Solomon Islands on behalf of the High Commissioner of the Western Pacific. The Assistant Botanist was seconded for a period of several months in early 1946 to participate in an agricultural and pastoral survey of certain sections of the Northern Territory being carried out by CSIR on behalf of the North Australia Development Commission. During 1949-50 a Botanist accompanied a CSIRO soil survey team to the western side of the Burdekin Valley to identify plants in the field in relation to soil associations.

During 1947-48 the Government Botanist was appointed a member of the Noxious Plants Consultant Subcommittee of the Co-ordinating Board constituted under The Stock Routes and Rural Land Protection Acts, 1944 to 1946.

During 1950-51 botanists cooperated with CSIRO in a Drug Plant Survey, which included a three-week survey in the Mossman, Innisfail, Atherton and Evelyn Tableland regions of north Queensland. Many overseas and interstate botanists came to the Herbarium during 1950-57 to do special work on particular groups of plants.

A gift of 1400 duplicate specimens of Arnhem Land plants came from R. L. Specht during 1952-53, hundreds of specimens from CSIRO, Canberra, and 100 pasture grasses and legumes from New Caledonia.

S. L. Everist (Botanist) was one of the Australian delegates to the Sixth International Grasslands Congress in Pennsylvania in August 1952 and took part in a tour of the midwest of USA. He also attended the Annual Meeting of the American Institute of Biological Sciences at Cornell University, then spent three weeks in Great Britain, where he visited the Royal Botanical Gardens at Kew, the British Museum of Natural History and

the Royal Botanical Gardens at Edinburgh, and then went to Holland, where he visited the Rijks Herbarium at Leyden. In December 1952, at the request of the South Pacific Commission, he visited New Caledonia and Fiji to advise in grassland problems.

In August 1954 Everist (now Government Botanist, from 1 July 1954) attended the first Australian Weed Conference at Roseworthy, South Australia, where the whole subject of weed control was discussed.

Identification of plant material for overseas botanists, interstate collections, Departmental branches and other State organisations, especially the Forestry Subdepartment and University and College and State Schools, and individual farmers, occupied a good deal of time.

Weed control

The declaration of noxious weeds throughout the State and the publication of relevant notes about each were undertaken by the Botany Section. New editions during 1945-50 were St Barnaby's Thistle (*Centaurea solstitialis*), troublesome on the Downs and in the Burnett areas in 1945-46; Devil's Fig (*Solanum torvum*) in north Queensland in 1946-47. giant sensitive plant (*Mimosa invisa*), a problem in north Queensland cane fields in 1947-48; Burr Ragweed (*Franseria* sp.), Crofton Weed (*Eupatorium adenophorum*), Hemlock (*Conium maculatum*) and Annual Ragweed (*Ambrosia* sp.) during 1949-50. Two other possible problem weeds, (*Synedrella viailis*) and Golden Rod (*Solidago canadensis*) needed attention.

A Weeds Section, staffed by a Senior Weeds Officer, H. E. Young, D.Sc.Agr., and an Assistant, was set up during 1948-49 to deal with the control of common weeds. Crofton Weed in the Numinbah Valley was the first to receive attention. In 1949-50 experiments with weed control with the new 2,4-D and 2,4,5-T; M.C.P.A.; D.D.T. and common kerosene were undertaken successfully in the Numinbah Valley against Crofton Weed with 0.4 percent emulsion of 2,4,5-T; against *Eucalyptus* species at Wolvi with 2,4,5-T solutions in kerosene; against wild tobacco at Beechmont by swabbing severed butts with kerosene alone; against several weeds at Moggill including Heliotropium amplexicaule, which could be killed with a 0.4 percent of 2,4-D and 2,4,5-T ester emulsion. At Kerry, south of Beaudesert, Ambrosia tenuifolia could be killed with a high volume spray of 0.1 percent sodium 2,4-D. During 1950-1 it was found that Groundsel (Baccharis halimifolia) could be killed using 2,4-D at high volume. New serious weeds included Clock Weed (Gaura parviflora) on the Downs and in the Burnett, Artichoke Thistle (Cynara cardunculus) on the Downs and Teucrium integrifolium and Polymeria longifolia in the Peak Downs area. Young resigned on 10 June 1949. The initial trials with the aerial spraying of brigalow (Acacia harpophylla) with a 2,4-D/2,4,5-T mixture were made during 1950-51. Most of the trees treated with 2-3 lb per acre had died or appeared to be dead after the initial spraying on "Cypress Downs", Yuleba. During 1952-53 different formulations were tried at Brigalow, and during 1953-54 in the Tara-Condamine and Wandoan-Taroom areas with brigalow at various stages of growth and at various seasonal periods. By June 1955 the Botanist was able to report that oil-based emulsions were superior to water-based ones, and that November spraying gave the best results. Spraying young suckers at eight weeks of age, using 1 lb per acre of 2,4,5-T sprayed from the ground or from the air, was effective. By June 1956 the Botanist reported: "It appears likely that burning, combined with aerial spraying of 2,4,5-T at low rates, will prove a useful technique for clearing brigalow, provided both the burn and the spraying are properly timed." On 30 June 1957 he wrote: "The net result, after a single spraying (of young suckers), is that the area of dense suckers, difficult to control by other means, has been converted to useful grazing land".

Fodder trees

During 1946-47 a list of suitable fodder trees for special study was drawn up for the Fodder Conservation Committee of the Department and samples from the Maranoa district were analysed by the Agricultural Chemist. Special attention was paid to Mulga (Acacia aneura), the principal fodder tree of south-west Queensland. Four growth forms-low, whipstick, umbrella and tall mulga-were identified, the umbrella mulga being the most useful. It was shown that cutting, burning or pushing (the usual practice with bulldozers) destroys trees but lopping above the lowest branches does not. Stocking with sheep prevents the establishment of young mulga forests; mulga regenerates well from seed, provided seed trees are present and moisture, temperature and light are suitable. Publications on fodder trees were prepared, including detailed research on yield of leaf, reaction to grazing and regeneration and nutritive value. Machinery for lopping mulga was investigated. A bulletin, "Mulga (A. aneura F. Muell ex Benth) in Queensland" was published in 1949, reprinted from Queensland Journal of Agricultural Science, Volume 6, pp. 87-139. The collective information, "Use of Fodder Trees and Shrubs" written by S. L. Everist, appeared as the Queensland Department of Primary Industries Division of Plant Industry Advisory Leaflet 1024 in 1969.

Poisonous Plants

The identification of plants, investigation of toxic properties, and symptoms produced in various livestock occupied a considerable amount of time during 1945-57. Feeding tests in conjunction with the Division of Animal Industry were carried out to verify suspected poisonous plants. Some forty-six plants were suspected during this period. Georgina River disease, which had baffled botanists and pastoralists since 1895 and was common over 4000 square miles, was causing trouble and after field inspections it was thought *Eremophila latrobei* was the cause. However, although toxic it was found to be rarely eaten in the field. It was not until 1955 that A. T. Bell and his associates found that the seeds and pods of Georgina Gidyea (*Acacia georginae*) were the cause of the disease, the poisonous principle being fluoracetate, as proved by Oelrichs and McEwan in 1961.

In June 1949 Birdsville disease of horses, after many years of investigation, was proved to be caused by a low-growing legume (*Indigofera linnaei*, previously called *I. enneaphylla*) following two visits by Departmental staff to the Windorah-Betoota area and a subsequent visit to Alice Springs in January 1950. The cause was confirmed by subsequent feeding tests. During 1955-56 the shrub *Morinda reticulata* was shown to cause "changed hoof disease" of horses in Cape York Peninsula when they ate young Morinda regrowth after burning.

Agricultural Chemistry Branch

The Chemistry Laboratory was subdivided into four sections in 1945: general analytical, biochemistry, toxicology and plant nutrition. The general analytical section tested medicines, antihelminths, insecticides etc. to see if they conformed with prescribed standards, carried out regular examination of dipping mixtures, fodder analyses etc. and joined in inter-Department investigations such as in fluorosis. All waters submitted for

analysis were tested for fluorides and so a quick cover of the widespread extent of fluorosis was discovered. An Inter-Departmental Fluoride in Waters Committee was set up, with the Departments of Public Lands, Health, Home Affairs, and representatives of Agriculture and Stock.

The General Analytical Section handled the examination of derris root for rotenone content, tobacco leaf for smoking qualities, variability in DDT cattle dips (especially by using hard waters or adding DDT to dips already containing arsenic), analyses of oil content in fruit wrapping papers, oil in linseed and sunflower varieties, use of BHC, digestibility of grain sorghum "stubble", BHC "taint" in treated grain, lime and phosphate uptake from grasses and fodders, protein content of Mitchell and Flinders Grass at various stages of growth, "slipped tendon" of poultry due to low manganese content in poultry food, analyses of dolomitic limestone, a survey of wheat quality in Queensland, (which showed that nitrogen added at flowering stage reduced mottling), arsenic residue in apples, standardisation of chemical and physical tests for cereal grains, analyses of grain for wheat crop competitions, development of analytical methods for new veterinary medicines and pest destroyers by new analytical aids of chromatography and spectrophotometry.

Biochemistry

Fluorosis in Merino sheep was studied in depth. Finding alternative sources of stock water was advised early in the investigation while mapping of the affected sources was set in train. Standardisation of analytical techniques was needed to compare the results with those in other countries. It was shown that reduction of fluorides in water to innocuous levels for stock was quite impracticable on a large scale, that addition of counteractants held little prospect, that alteration of plane of nutrition did not improve condition, so management of fluorided waters was the best corrective. A level as low as five parts per million seriously affected the teeth and bones of sheep. Fluorided water has no adverse affect for human consumption and does not affect wool. Protection of sheep from highly fluorided waters immediately after birth was the best method of management. Waters near the bore head were lower in fluorides than those in the bore drains far removed from the source of supply, and water caught in excavated tanks was free of fluoride. These facts enabled a system of management to be worked out. The basic findings were published by J. M. Harvey (later Director-General) in 1952 and 1955:

Harvey, J. M. (1952), "Chronic Endemic Fluorosis of Merino Sheep in Queensland" (*Queensland Journal of Agricultural Science*, Vol. 9, pp. 47-141)

Harvey, J. M. (1955), "Further Studies of Fluorosis in Merino Sheep" (*Queensland Journal of Agricultural Science*, Vol. 10, pp. 109-124)

Copper deficiency in sheep and cattle was found to be widespread, causing enzootic haematuria, with low levels of copper in soils, pasture, plants and all organs. "Steely" wool indicated copper deficiency in sheep. Nitrate poisoning was investigated. It was found that heavy tick infestation withdraws significant amounts of lime and phosphorus from the host's body. Administration of copper and phosphorus posed difficulty but with fertilisation of pastures or application in drinking water and direct administration intramuscularly of copper compounds there was some improvement. Investigations of

avitaminosis in rams and in calves showed the need to administer Vitamin A to these animals and Vitamin B2 (riboflavin) to chickens.

Toxicology

Nitrate poisoning of pigs when natural water high in nitrates was used to mix pig food was recorded during 1946-47. Deaths from careless use of arsenic were common and graziers were warned to dispose of containers and protect dip effluents to reduce this problem. Sorghum poisoning due to high HCN content of the forage ingested was common and the production of low HCN Sudan grass was achieved by plant breeders. Lead poisoning by stock gaining access to paint was also common, the linseed oil in paints being the attraction. Contaminated drums used to store molasses were also a source of poisoning. Thallium in rat baits was found to be the cause of a pig's death during 1952-53.

Plant nutrition

C. R. von Stieglitz took over the duties of Officer-in-Charge of the Plant Nutrition Section in September 1945 after attending a winter school of soil science in Adelaide, visiting irrigation areas in southern Australia and observing erosion control at Dookie Agricultural College.

A large number of soil samples were analysed for data from soil reconnaissance surveys made by the Bureau of Investigation of Land and Water Resources and from War Service Land Settlement Areas surveyed by soil officers of the Department. Soil samples were also analysed for the Sub-Department of Forestry and for individual farmers. Field officers of the Agriculture and Horticulture Branches were asked to report on the field aspects of such problems. A soil survey of the Lockyer Valley was undertaken by W. J. Cartmill and H. L. Wood, the results being published in a Bureau of Investigation *Technical Bulletin*. The quality of water for irrigation was requested by various individuals and Departments during the serious 1946 drought and a "figure of merit" was calculated to indicate such quality.

The needles of the trees *Pinus taeda* and *P. carribea* were analysed and the analyses showed that there was a close relationship between the uptake of aluminium and phosphorus.

Changes in soil structure following irrigation and soil erosion indicated a useful line of research and a fertiliser trial was conducted on pastures at Springbrook during 1947-48 to determine if clovers could be introduced. During 1948-49 detailed soil surveys of the Hermitage and Maroochy Experiment Stations were made and a larger survey of the Passchendale forest plantation area to determine the relationship between soil type and vegetation was carried out. Further Lands Department requests for selection of land for War Service Land Settlement were met. Fertiliser trials to correct mottling in wheat and molybdenum tests for bean nutrition (which showed that molybdenum application was beneficial) were laid down. At Springbrook phosphorus response in pastures was obtained only when dolomite was present.

During 1950-51 reconnaissance soil surveys were completed and reports compiled for 8000 acres in the Landers Creek area in the Burdekin and for areas in the Neumga, Mooloolah, Burdekin, Balcomba, Foleyvale, Banana and Wandoo districts.

Boron deficiency in vegetable crops and magnesium deficiency in cotton were diagnosed. Fertiliser trials were conducted on forest species at Beerwah, Beerburrum, Passchendale, Yarraman and Benarkin using copper, zinc, boron and molybdenum. Molasses added to seedling nurseries improved growth by improving soil structure.

During 1951-52 a detailed survey of the Millaroo Section of the Burdekin Scheme was completed to enable the Irrigation and Water Supply Commission to proceed with farm planning. Surveys were also made at Moura, Cooyar, Inglewood, "Brian Pastures" (Gayndah), and Clare. Wallum land at the "Blunder" near Brisbane and at Coolum was obtained for experimental purposes.

Soil analyses showed that in certain areas surface soils were very low in phosphorus but contained high amounts at depth, indicating that only initial phosphorus at establishment would be needed. Several red soils were very high in manganese and very acid. A reference library of coloured photographic transparencies depicting foliar symptoms of soil deficiencies was being built up. With the heavy demand for soil surveys in 1952-53 and their associated analytical work a laboratory was set up at Ayr and another was being set up at Atherton to undertake soil analyses. A detailed survey was made of the Inglewood Tobacco Research Station and of Canoe Creek, Ingham. The Coolum Research Station was established and fodder trees, horticultural crops and pastures were established; a small area of land in wallum country at Archerfield was acquired from the Brisbane City Council to act as a guide to the Coolum experiments. Soil surveys during 1953-54 were conducted in the Rocky Creek area, Mareeba (5000 acres), Granite Creek (10 900 acres), Parada Station (600 acres), Animal Husbandry Farm, Rocklea (350 acres) and 400 acres of the Field Station at Coolum. Pasture trials and fertiliser trials with pineapples were initiated in the wallum. In the nutrient area chlorine toxicity in tobacco, salt damage to grapes, arsenic toxicity, manganese toxicity in beans, and boron and molybdenum deficiencies were studied.

The effect on tobacco of chlorides in soils and waters was shown to be very important in tobacco quality in studies during 1954-55. During 1955-56 linseed grown on high-phosphate soils on the Darling Downs was shown to be suffering from zinc deficiency, and up to 100 lb of boron per acre were taken up by beetroot. Multiple tops on beetroot were found to be a varietal characteristic and not caused by boron deficiency.

Standards Branch

The Agricultural Standards Act of 1952, proclaimed on 24 July 1952, consolidated the legislation relating to the control of seeds, fertilisers, growth-regulating materials, lime, stock foods, veterinary medicines and pest destroyers and provided for control of quality of marking preparations and testing reagents. This Act, including its new regulations, was administered by the Standards Branch, as before.

On 7 March 1957, Alan Alexander Ross was appointed Standards Officer following the death of F. B. Coleman.

Division of Animal Industry

Veterinary Services Branch

This branch attained this title in the 1950-51 year after being previously listed as Field Veterinary Services and Acts Administration from 1947 to 1948.

Cattle tick and tick fever control with dipping in 0.50 percent DDT was effective during 1946-47. Serious losses were incurred in marginal areas during 1945-55 owing to clean cattle coming into contact with ticks. Babesiosis, with some anaplasmosis, was the main problem. Preventive inoculation when accomplished gave protection. During 1955-56 anaplasmosis was a limiting factor in introducing bulls to one north Queensland herd. Aureomycin administered intravenously gave some indication of being useful in control of this disease. Trials with BHC, toxaphene, organic phosphate, dieldrin and parathion were made by the Department. Many dips still were charged with arsenic but cleansing dips were charged successfully with DDT.

By 1947 it was conceded that the buffalo fly had permanently infested the districts of Leichhardt, Port Curtis and northwards and the districts of Maranoa, Darling Downs, Wide Bay, Burnett and Moreton were clean. Control was based on spraying railway trucks at north Bundaberg, mobile sprays for road cattle and charging dips with 0.5% DDT. During 1950-51 the fly spread rapidly down the Channel Country from the Northern Territory to Charleville and from the Dawson River to Roma, Miles and Chinchilla. DDT spraying was hastily introduced to stop the spread from infested to clean areas. It was expected that the fly would not persist in inland areas after the very wet 1950 year. By June 1952 it had reached Rockhampton and Emerald and spraying equipment was moved 150 miles south to Rosedale and Monto. In the 1952 summer it reached Bundaberg and treatment plants were moved to this point. It also reached Longreach-Barcaldine. By June 1955 the fly had reached Maryborough and Pialba, Wandoan, Injune and Monto. It made a major advance southwards to Chinchilla by June 1956, necessitating the employment of extra staff and equipment in the way of mobile and rail sprays. The fly was to move further south.

Brucellosis was a common disease, especially in dairy cattle. In 1945-46 some 21 000 agglutination tests involved 126 herds, showing 53 herds free, 56 involved eradication by the test and slaughter method. In 1946-47 Strain 19 vaccination of calves was introduced and soon completely replaced the agglutination test. Vaccination was carried out by Departmental officers and private veterinarians.

Tuberculosis testing of dairy herds supplying raw milk to the city of Brisbane showed an initial incidence of 13%, but the second test after destroying the known reactors revealed only 4.65%. During 1945-46 a start was made on testing herds supplying raw milk to major towns from Coolangatta to Caboolture and the Darling Downs, the Downs Co-operative Dairy Association employing its own private veterinary practitioner. In March 1948 the Brisbane Milk Supply district was divided into 14 areas and contracts were let to private veterinarians to handle these districts. During 1948-49 Ipswich and Warwick were zoned for testing, a charge was introduced by the Department for shows, and the Tuberculosis Free Herd Scheme publicised disease-free stud herds in the *Queensland Agricultural Journal*.

Testing for disease control purposes was still free. A single intradermal test using synthetic medium tuberculin prepared by the Commonwealth Serum Laboratories was being used. Testing was extended when private veterinary surgeons became available to Rockhampton and Kingaroy during 1950-51; Oakey, Dalby, Gympie (2), Bundaberg, Townsville and Atherton during 1951-52; to Allora, Clifton, Pittsworth, Booval and Boonah, Nambour, Maryborough, Mackay, Home Hill, Ayr, Ingham and Tully during 1952-53; to Gatton, Cooroy, Maleny, Esk, Wondai and Monto during 1953-54; and to Beaudesert, Malanda, Ravenshoe, Millaa Millaa, Laidley, Lowood, Killarney and Nanango in 1954-55. Many of the herds were cream suppliers and these were included in the scheme. By June 1957 fortyfour Approved Veterinary Surgeons were assisting Departmental officers in the Tuberculin Testing Scheme. During 1950-51 tuberculosis control in stud beef cattle herds in north Queensland was commenced and in June 1945 sixteen stud herds were under test, and some forty herds overall. A relatively high incidence of tuberculosis had been recorded in cattle at slaughtervards and meatworks in north Queensland. During the 1954 season a survey of 282 herds was undertaken in cooperation with the Commonwealth Department of Commerce and Agriculture. Eight herds recorded an incidence in excess of 10%, 15 of 5-10%, 29 of 3-5%, and 42 of 2-3%; 94 herds recorded 1-2%, and an equal number recorded under 1%. Affected dairy cows were slaughtered under supervision, mainly at the Goodna meatworks.

Pleuro pneumonia contagiosa continued to plague North Queensland areas and mobs of cattle travelling to areas in south-east Queensland. Preventive inoculation was still a condition for the issue of permits for store cattle travelling from or through a suspected area. Quarantine and destruction of acute cases were imposed. In dairying areas carriers were detected by a complement - fixation test and destroyed. From 1952 all cattle moving from the Northern Territory were required to be inoculated before entry, if possible, by a Stock Inspector. Records of lesions at meatworks were obtained and the cattle were traced back to the stations. Lesions were present in 1% to 5.5% of cattle from affected areas. Two experienced Field Officers were appointed under a grant from the Commonwealth Extension Services Fund to follow up the finding of lesions and liaise with Stock Inspectors. Each of the Extension Officers was equipped with a portable crus. A comprehensive series of coloured slides of various lesions was supplied to meatworks.

During 1956-57 some 355 properties were visited by extension officers. The Technical Advisory Committee on Animal Diseases was set up during 1956-57, made up of one extension officer, one from research, one from biometrics and one from the Divisional Administration.

Animal Health Stations (later the Research Branch, Division of Animal Industry)

Cysticercus bovis cysts in the heart of an aged cow in the Kingaroy-Gympie area was the first case of its presence in cattle in Queensland, though the adult tapeworm (*Taenia saginata*) had been recorded from children. The ictero haemoglobin of calves producing "redwater in calves" was definitely proven to be caused by a *Leptospira* and was subsequently called leptospirosis. The milk production from affected cows drop markedly. Leptospirosis was also found in sows which farrowed a high proportion of stillborn piglets.

Plant poisoning was studied in conjunction with the Botany and Biochemical Branches, the confirmatory feeding tests being conducted at the Animal Health Stations. Wallum disease

("wamps") in cattle on the north coast was found to be due to *Xanthorrhoea hastile*. Ataxia in horses was found to be due to consumption of *Gomphrena celosioides* and in cattle to *Macrozamia* spp.; Georgina River disease to *Eremophila latrobei*; Birdsville disease to *Indigofera enneaphylla*; ironwood poisoning to *Erythrophleum chlorostachys*; "Change hoof" disease to selenium poisoning from consuming *Morinda reticulata* (in Cape York Peninsula). Copper deficiency in wool was detected during 1945-46 from large areas of north-west Queensland, exhibited as "steely" wool. Numerous trials were instituted to correct this with the addition of copper sulphate to drinking water, top-dressing of pastures through licks etc. More recently injection of copper glycinate has been successful with sheep on large areas, whilst addition of copper sulphate in drinking water in concrete troughs and by top-dressing pastures corrects the problem with cattle and sheep in intensive areas.

Numerous other diseases of cattle, sheep, pigs, horses, fowls, dogs and goats were handled by the Research Branch.

Drought feeding trials with bush hay harvested from the blue-grass downs of the Central Highlands containing 4.6% crude protein and 34% crude fibre proved that closely confined cattle having free access to water, good bush hay and a lick could survive six months' drought. Bone flour/salt (2:1) was also found insufficient to raise the low phosphate status of dairy cows in coastal Queensland.

Meat research. During 1953-54 a highly specific anti-serum for detecting minute quantities of horse meat was prepared. However, it failed with meat heated at a temperature higher than 80 C for longer than 10 minutes. Further experiments were contemplated.

Dr John Legg, Director of Research, retired in February 1957 after years of outstanding research and administration. L. G. Newton, Chief Pathologist, submitted the 1956-57 annual report of the Research Branch.

Sheep and Wool Branch

The April-September period in 1946 was one of severe drought and sheep losses in some districts were as high as 25%, while many districts suffered losses of 10%. During 1946-47 Sheep and Wool officers concentrated mainly on extension work. A staff school of three weeks was held at the Animal Health Station. Five documentary films of the Commonwealth Wool Board dealing with production problems of woolgrowers were shown in 29 towns in the pastoral districts during August and September 1946 and included drought feeding, hydatids, control of worms, control of blow fly strike and brand damage to wool. Field days on the control of worm parasites were held at Emerald, Clermont, Jericho, Barcaldine, Roma, St George, Goondiwindi and Karara. Twenty-five demonstrations of the Mules operation to prevent blow-fly strike were held and the control of the body louse (*Bovicola ovis*) was demonstrated. Animal husbandry production methods dealt with included sheep classing and ram selection, sheep breeding, fat lamb production, drought management, and preventive medicine.

A climatological survey of Queensland was continued. Feeding trials with the suspected poisonous plants weir vine and wild mulberry confirmed their toxicity.

Following negotiations in 1947 the Sheep and Wool Branch was granted research money from the Wool Research Trust Fund of the Commonwealth to investigate summer sterility of rams and Queensland's climatology. A symposium was held in Sydney, dealing with sheep and wool matters, and was attended by workers in CSIRO, State Departments and New Zealand. It was found that 30% of the Merino rams in north-west Queensland suffered from infertility due to diseased conditions of their genital organs (metastatic caseous lymphadenitis abscesses in the epididymi). A method was evolved in conjunction with the Agricultural Chemists to maintain a concentration of about 10 mgm of copper per gallon in drinking water to overcome copper deficiency in sheep.

In 1947-48 a long wool ram subsidy scheme was introduced to help purchase British Breed and Corriedale rams, and field days on fat lamb production were organised. A study survey was undertaken and showed that three-quarters of all the rams sold were bred in Queensland. Field officers' advice on drought feeding led to a 50 per cent reduction in drought feeding costs. By 1950 sheep and wool advisory officers were located in Warwick, Dalby, Roma, St George, Charleville, Emerald, Blackall, Barcaldine, Longreach, Winton, Hughenden and Julia Creek.

During 1950-51 a Wool Biology Laboratory was established within the Branch and facilities were made available for the accurate measurement of the diameters of the fibres in wool samples, for the determination of the lengths of the various wool fibres in a staple and for the computation of clean scoured yield of greasy wool. Facilities were also available for establishing the degree of hairiness in wool and for determining the proportion of the follicles which produce wool fibres and those which produce kemp fibres.

Evidence was presented to the Royal Commission on Pastoral Land Settlement which recommended studies on land productivity under sheep husbandry compared with other enterprises; more intensive use of better lands; special attention to preservation of the ewe flock; adequate transport facilities; maintenance of high standards in sheep studs; and quality rams for distribution; prevention of soil erosion; adequate water; and subdivision.

Cobalt deficiency was discovered in central western Queensland during 1950-51 and to offset this, plus known copper deficiency, one milligram of cobalt and 5 milligrams of copper per day were recommended for administration to each sheep.

With the big floods of 1950 aerial dropping of fodder to marooned sheep was implemented. A study of low reproductive rates of sheep in the tropics showed some seminal degradation in rams and losses of newborn lambs during the first four days of life. Finance from the Wool Research Trust Fund for three years helped the former project. To study reproductive rates of sheep in the tropics the Toorak Homestead Block of 36 850 acres, located at 21°S at Julia Creek, was acquired in early 1951. A school for sheep and wool extension workers, arranged by the Agricultural Research Liaison Section of CSIRO was held in Brisbane in September 1951; it dealt with fundamental research, suggested future research projects, practical problems posed by field officers and information now available to the industry. Action was immediately taken to disseminate the latest information to graziers in an understandable form.

During 1951-52, following the severe drought of 1951, the Sheep and Wool Branch gave serious consideration to the problem of feeding sheep during a drought. It was found to be cheaper and preferable to cut scrub where it was available on the property or move sheep to agistment rather than hand-feed. The next best move would be to grow fodder on the property where possible and store it for drought. Where drought extended beyond 120 days it was cheaper to move sheep to the fodder than transport fodder to the sheep (a hindsight finding). A good deal of research was done on drought frequency by George Moule, Director of Sheep Husbandry, and Selwyn Everist, a Government Botanist, with help from Miss Elizabeth Baynes and Sylvia Cossins, paid from the Wool Research Trust Fund.

A detailed study of the growth of primary and secondary follicles in the skin of the sheep showed that "doggy" wool was produced under nutritional stress from lack of protein.

Research showed that more than one-third of the lambs born north of Longreach each year died before marking (castration and tail removal). Low birth rate, poor mothering ability of ewes, faulty udders, attacks by predators-pigs, foxes and crows-and extremes of heat and cold were important factors in these losses. In early 1953 Moule spent four months studying the co-operative agricultural extension service in the United States of America and on his return established the Sheep and Wool Branch as an extension medium in the State. He stressed the need for leadership amongst the local people and the need to influence their attitude so they could decide upon appropriate lines of action. This could be achieved by:

- i. ensuring that rural people took part in forming extension policy and programmes;
- ii. the greater use of the agricultural press for the dissemination of extension information; and
- iii. the better presentation of extension information.

By 1953 stud sheep breeders were making sound use of the fleece testing in the Wool Biology Laboratory, samples from the mid-side of the sheep being tested and comments and advice being forwarded to the breeders to help in sheep selection.

During 1953-54 emphasis was placed on extension methods with all field officers of the Sheep and Wool Branch, several officers of other branches and from the Victorian Department of Agriculture attending; each member was personally involved in presenting his ideas for discussion.

During 1952-53 the Sheep Branch launched a campaign financed by the Commonwealth Extension Services Grant to conserve fodder. Bush hay was conserved at Toorak Field Station and private properties. Feeding tests showed that sheep would eat 2 lb of bush hay per day per head but that it was insufficient to meet nutritional requirements, and meatmeal, lime and vitamin A had to be added to make the ration complete. Graziers were encouraged by the success of two local graziers during 1953 to conserve silage, and well-attended field days were held by P. J. Skerman, Senior Lecturer in Agriculture, University of Queensland, who was researching fodder conservation as silage in conjunction with G. R. Moule at "Dundee", Richmond, "Terrick Terrick", Blackall, and "Gowrie", Charleville. Problems were capital cost of machinery, need for adequate soil moisture and predators such as grasshoppers, rats and birds.

Feeding trials showed that 2 lb of sorghum silage plus 1 oz of meatmeal per day was adequate to maintain a sheep, the cost being estimated at £67 per 1000 sheep per month. A ration of bush hay, maize grain and meatmeal cost £90 per 1000 head per month. Sheep left to graze natural pasture maintained their weight better than those fed bush hay plus supplements, as they foraged successfully and grazed selectively.

During 1954-55 four in-residence schools for woolgrowers were held, one at "Terrick", Blackall, for twenty-one staff of Australian Estates properties; one at "Tambo" Station, Tambo, for Queensland Stud masters; one at "Eurella", Mitchell; and the fourth at "Barcaldine Downs". The latter two were financed from Wool Funds.

In 1905 the average cut of wool per head from sheep was about 6 lb; by 1955 it had reached 8½ lb. At the stud masters school at Tambo, 31 men were tested in classing sheep and none approached the success obtained on the basis of clean fleece weight or on total value of the fleece. By introducing fleece measurement as an aid to selection by visual appraisal the rate of genetic improvement could be trebled.

During 1956 a severe blowfly strike was anticipated, but by the use of jetting with the new insecticides aldrin and dieldrin and by dedicated extension work the strike was forestalled. A combination of the Mules operation, tail strip operation, crutching and jetting was shown to be the most economical way of preventing fly strike.

During 1956 shearing cradles were introduced into the industry. A nucleus flock was built up at Toorak Field Station to study lambing performance. Older ewes gave higher birth weights and the ram had a significant effect on the birth weight of lambs. George Moule resigned as Director of Sheep Husbandry on 13 June 1957 and was succeeded by Alan T. Bell. On the occasion of Moule's retirement the Under-Secretary stated, "The resignation of Dr George R. Moule, Director of Sheep Husbandry and also Extension Co-ordinator, caused a serious loss. His energy and enthusiasm has built up an efficient service for our most important primary industry, as well as laying the foundation for our extension training and co-ordinating service." (*Rep. Dep. Agric. Stk.*, 1956-57, p. 11) Moule's contributions to the *Queensland Agricultural Journal* were:

"Red Worm Disease of Horses", Vol. 57m pp. 53-54.

"Milk Fever and Pregnancy Sickness (Pregnancy Toxaemia) of Ewes", Vol. 58, pp. 224-247.

"The Supplementary Feeding of Sheep in the Central West", Vol. 58, pp. 53-54.

"Fluorine Poisoning of Live Stock", Vol. 58, pp. 54-55.

"Performing of Mules Operation", Vol. 60, pp. 312-315.

"Faults Observed in Performance of the Mules Operation", Vol. 60, pp. 372-375.

"Organising for the Mules Operation", Vol. 61, pp. 89-92.

"Correct Methods of Lamb Marking", Vol. 61, pp. 159-162.

"Tetanus, Arthritis and Fly Strike in Marked Lambs", Vol. 61, pp. 275-279.

"Fluorosis of Sheep in Queensland", Vol. 61, pp. 352-356.

"Swelled Head of Sheep", Vol. 62, pp. 15-16, 90-91, 238-240.

"Copper Deficiency of Sheep in Queensland", Vol. 63, pp. 87-91.

"Infectious Labial Dermatitis (Scabby Mouth) of Sheep", Vol. 64, pp. 29-35.

- "Sheath Rot (Posthitis) of Sheep", Vol. 65, pp. 149-150.
- "Hand Feeding of Stud Sheep", Vol. 65, pp. 245-264.
- "Milk Fever (Hypocalcaemia) and Pregnancy Toxaemia of Ewes", Vol. 65, pp. 332-337.
- "Case for Mules Operation", Vol. 66, pp. 93-101.
- "Cheesy Gland or Caseous Lymphadenitis of Sheep", Vol. 66, pp. 165-166.
- "Itch Mite of Sheep", Vol. 66, pp. 161-164.
- "Pink Eye or Blight of Sheep", Vol. 66, pp. 167-168.
- "Leg Itch of Sheep in Queensland", Vol. 66, pp. 227-231.
- "Fertility and Infertility of Sheep", Vol. 66, pp. 274-286, 353-368.
- "Copper Deficiency of Sheep in Queensland", Vol. 67, pp. 157-164.
- "The Tail-strip Operation", Vol. 67, pp. 227-229.
- "Lumpy Wool of Sheep", Vol. 67, pp. 272-273.
- "Fat Lamb Production in Queensland", Vol. 67, pp. 359-365.
- "Fat Lamb Production in Queensland", Vol. 68, pp. 30-48.
- "Hand Feeding Sheep in Drought Time", Vol. 68, pp. 234-238, 296-306, 345-352.
- "Mastitis in Ewes", Vol. 69, pp. 158-159.
- "Wool and Its Structure", Vol. 70, pp. 94-100.
- "Wool and Its Physical Properties", Vol. 70, pp. 157-164.
- "Wool and Its Growth", Vol. 70, pp. 226-234.
- "Wool and Its Uses", Vol. 70, pp. 282-284.
- "Wool and Its Manufacture", Vol. 71, pp. 41-49.
- "Wool and World Trade", Vol. 71, pp. 164-168.
- "Observations on the Management of Sheep Properties on the Central
- Highlands 1. Sheep Grazing on Summer Crops, Vol. 71, pp. 228-230.
- "Cobalt Deficiency of Sheep in Queensland", Vol. 71, pp. 277-280.
- "Footrot and Foot Abscess of Sheep", Vol. 72, pp. 38-41.
- "The Aerial Transport of Feed for Flood-bound Sheep", Vol. 72, pp. 101-115.
- "The Sheep Blowfly Problem in Queensland":
- 1. Blowflies and Their Breeding Habits, Vol. 72, pp. 169-173.
- 2. Blowflies in Relation to Their Environment, Vol. 72, pp. 173-175.
- 3. The Attractiveness of Sheep to Blowflies, Vol. 72, pp. 281-284.
- 4. Seasonal Conditions in Relation to Blowfly Strike, Vol. 72, pp. 284-287. "Vital Statistics and the Queensland Sheep Industry":
- Part 1. Vol. 74, pp. 224-241.
- Part 2. Vol. 74, pp. 288-308.
- Part 3. Vol. 74, pp. 343-363.
- "Beating Sheep Blowflies", Vol. 77, pp. 296-300.
- "Still More Wool":
- Part 1. Introductory, Vol. 78, pp. 95-102.
- Part 2. The Factors Which Contribute to Heavy Wool Cuts, Vol. 78, pp. 179-181.

Part 3. How Many Sheep Can You Cull? Vol. 78, pp. 221-225.

Part 4. What Will You Gain from Classing? Vol. 78, pp. 274-279.

Part 5. How Can You Measure Progress? Vol. 78, pp. 369-371.

Part 6. Incorporating Fleece Measurement in Flock Improvement Progress, Vol. 79, pp. 55-59.

"Fluorosis of Merino Sheep in Queensland" (with Jim Harvey):

Part 1. How the Disease Is Caused, Vol. 79, pp. 291-298.

Part 2. Studies on Transmission, Water Treatment and Amelioration, Vol. 79, pp. 357-359.

Part 3. The Management of Flocks to Overcome Fluorosis, Vol. 80, pp. 113-115.

"The Case for Mules Operation", Vol. 80, pp. 233-240.

"The Supplementary Feeding of Sheep in Queensland":

Part 1. Introductory, Vol. 80, pp. 279-286.

Part 2. What Does the Sheep Do with the Feed It Eats? Vol. 80, pp. 327-230.

Part 3. How Does the Amount of Feed Influence Wool Growth in Young Sheep? Vol. 81, pp. 21-28.

Part 4. How Does the Plane of Nutrition Affect Adult Sheep? Vol. 81, pp. 119-123.

Part 5. Supplementary Feeding in Practice, Vol. 81, pp. 163-166.

Part 6. How to Feed a Supplement, Vol. 81, pp. 291-294.

"Fleece Measurement for Queensland Stud Masters":

Part 1. What Can Be Achieved by Selection? Vol. 81, pp. 351-355.

Part 2. What Are the Gains from Selection? Vol. 82, pp. 27-29.

Part 3. Fleece Measurement in Practice, Vol. 82, pp. 103-108.

Part 4. Using the Results of Fleece Measurement, Vol. 82, pp. 235-240.

Part 5. Fleece Measurement as an Aid in Breeding Plans Based on Mass Selection, Vol. 82, pp. 275-279.

"Lambing Losses", Vol. 82, pp. 345-354, 399-401.

"A New Approach to Blowfly Strike", Vol. 82, pp. 519-526.

"How Should We Manage Our Ram Flocks?", Vol. 82, pp. 655-661.

"The Occurrence and Control of Worm Parasites of Sheep in Queensland", Vol. 82, pp. 693-698; Vol. 83, pp. 41-46, 83-90, 143-146.

"How Should We Manage Our Ewe Flocks?", Vol. 83, pp. 213-282.

"Is Feeding Weaner Sheep Good Business?", Vol. 83, pp. 395-400.

"A Study in Flock Management", Vol. 83, pp. 461-468.

In addition to these articles, Moule published numerous technical articles in the Australian Veterinary Journal and Queensland Journal of Agricultural Science.

Cattle Husbandry Branch

This branch published its first annual report on 30 June 1949. It was written by R. D. Chester, Officer-in-Charge, appointed 9 October 1947. The initial aim was to give an efficient extension service in animal nutrition, breeding and management. Short-term research projects were conducted to give the basis for extension. Improving dairy

production through better feeding was the initial project, liaising with the Herd Recording Section of the Division of Dairying.

In October 1949 some 23 Jersey cows were purchased and placed on the Kairi Regional Research Station to form an experimental herd, to demonstrate the use of good bulls for upgrading a herd. Young bulls were used to prove their potential early. They were sold to farmers after getting a few calves from them with the option of repurchasing if they proved especially good sires.

Dr M. C. Franklin, Principal Research Officer of CSIRO organised a five-day school in animal nutrition for field officers of the Department. Urea feeding trials for dairy cows were instituted. Under a Commonwealth Dairy Grant, demonstration farms were selected to guide nutrition, breeding and management. The feeding of dairy calves through metal and rubber teats was investigated. Cooperation with Dairy Division Field Officers was arranged. During 1949-50 an Inter-Divisional Committee incorporating the Divisions of Plant Industry, Animal Industry and Dairying was set up to supervise the conduct of demonstration farms.

Preliminary results with artificial insemination using imported semen were disappointing, but during 1950-51 trichomoniasis in a metropolitan dairy herd was eliminated by this practice.

Chester resigned as Officer-in-Charge of the Branch on 18 March 1955 and J. Gregory Young, appointed Senior Adviser on 17 February, took charge until Donald N. Sutherland was appointed Director of Cattle Husbandry on 6 October 1955. Young then took over advisory services in the dairying industry and Graham I. Alexander became Senior Adviser in cattle husbandry in the beef industry.

A survey of infertility in dairy cows showed that 43% of cows in nine herds failed to come into oestrus within 100 days of calving and 14.5% within 300 days. The problem appeared to be due to inadequate nutrition.

A bull-proving project was instituted during September 1955 and January 1956 in the Nambour-Maleny-Kenilworth area using four young Jersey bulls as donors for artificial insemination. The number of first inseminations carried out was 1275, with a non-return rate of 62%. Comparing results with problems revealed by the infertility survey showed that artificial insemination would be of great value to the dairying industry. During 1956-57 G.I. Alexander was granted fifteen months' leave of absence to take up a graduate assistantship in the Department of Animal Husbandry of the Oregon State College, USA. He was to study genetics and physiology under Professor Bogart; this would be useful to the Department for beef studies on his return.

The growth rates of beef cattle under natural grazing conditions were investigated using fixed weighbridges on properties and portable weighbridges. Growth rate was found to follow a similar seasonal pattern throughout Queensland with liveweight losses for about four months during the April-September period with varying pasture species. The overall liveweight increase per head per year ranged from 270 to 300 lb. Cattle could not reach prime condition for slaughter until they were four years old or over. At the Bureau of Tropical Agriculture improved pastures over a number of years had given a liveweight gain

of 500 lb per head/per year stocked at a beast to 1½ acres. Trials in the north Queensland hinterland showed British breed cattle reached a liveweight of 550 lb at 18 months of age, while Brahman cross cattle under the same conditions were about 100 lb heavier. By transferring such cattle at the end of the wet season to improved coastal pastures, marketable chiller-type cattle could be turned off at 2½ years of age. At the Ayr Regional Experiment Station tropical pastures under irrigation gave gains of 1.26 lb per head per day throughout the whole year at a stocking rate in excess of one beast per acre. At "Brian Pastures", Gayndah, cattle on improved pastures gained 450 lb per head per year, stocked at the rate of one beast to 4 acres, compared with a gain of 300 lb per head stocked at one beast to 8 acres. Selection of replacement heifers for breeding at "Brian Pastures" was done on the basis of birth weight, weaning weight, yearling weight and a score for confirmation at weaning and as yearlings.

In the dairying industry the poor performance of Queensland cows compared with animals from New South Wales and Victoria was demonstrated by collating comparable figures. They highlighted the need for use of proven bulls and herd recording, adequate winter nutrition and infertility studies in cows. An Interstate Technical Committee on Infertility was set up and Breeding Record Sheets were distributed to farmers. These showed that about 75% of surveyed cows came into oestrus by the 70th day after calving, with longer periods for cows calving from July to December. Ten per cent of cows had a calving interval in excess of fifteen months and 15% has an interval between 13 and 15 months. With 7-8 months lactation, this left a long non-profit period in the lifetime of the cows. Conception rates at first service were a low 50% under conditions of natural service, whereas 64% was achieved by artificial insemination. Abortion terminated 8% of pregnancies.

During 1956-57 an AIS herd was established at Biloela Regional Research Station, initially to compare production from irrigated pastures with that from rain-grown pastures. At Kairi the Jersey herd was integrated with a maize-pasture rotation.

Frozen semen for the Jersey herd at Kairi was air-freighted to Cairns from the Animal Husbandry Research Farm at Rocklea.

Pig Branch

At the end of the war, T. Abell returned to the Department and was stationed at Atherton as District Adviser, B. R. Martin resigned and N. B. Poulsen and R. A. R. Aldridge were appointed Cadets. The Pig Meats Acquisition Plan of the Federal Department of Commerce terminated on 31 December 1949 so the price of pig meat was no longer controlled. Pig Branch officers were asked to select breeding stock for breeders in Queensland, other States, New Guinea and the Pacific Islands. Half-yearly inspections of Government piggeries were arranged and help with Rural Training Schools was given.

The correspondence course in pig raising initiated in 1932 was continued until 1948-49 with good enrolments from 75 up to 200 students. During 1948-49 it was mutually agreed that the course should be handed over to the control of the Department of Public Instruction, with periodical checks of the content by officers of the Pig Branch. During 1947-48 carcass competitions based on the English (Hammond) System of appraisal were introduced at shows and the Australian Meat Board sponsored a competition at the Royal National Show to

demonstrate ideal carcasses. The Board ceased this competition in 1957, believing it had served its purpose. Modifications of the Hammond System were worked out by Pig Branch officers, measuring shoulder fat, loin fat and body length. Overfat pigs had been a problem, the excessively fat being sold as lard at 8d per lb compared with bacon at 1s 3d per lb. Bacon carcasses were to be from pigs sired by a purebred boar and of a dressed weight between 120 and 180 lb. For the purpose of experimentation with rations and local extension work, a Tamworth stud was established at Kairi Regional Experiment Station during 1948-49, a Berkshire Stud at Hermitage during 1953-54, and a Large White Stud at Biloela during 1954-55. These piggeries conducted extensive feeding trials with local materials. Pig Branch officers were stationed at Brisbane, Toowoomba, Murgon and Atherton in 1948; one was placed at Warwick during 1951-52 and Biloela, as Hermitage and Biloela piggeries were established and maintained. On 15 May 1951 Keith J. Hutchinson, a graduate, was appointed Assistant Husbandry Officer (Pigs) and commenced feeding experiments. At Kairi the mineral status of rations with pasture and grain was investigated, and to prevent overfatness in pigs, lucerne chaff and later peanut meal were added to the ration at a liveweight of 100-135 lb at the rate of 5%; 10% at 135-160 lb and 15% up to 200 lb reduced growth rate and this gave a satisfactory carcass. While solubles showed no advantage over meat meal to provide the Animal Protection Factor (APF) and antibiotics were useful only in special cases, molasses was found suitable to replace up to one-third of the usual maize ration, but more fibre was needed to prevent scouring and pigs drank more water. Hutchinson resigned on 1 May 1953 to go to South Australia but feeding tests continued. At Hermitage, trials with grain sorghum gave a conversion rate of 3.56 and hogging down ripe crops was shown to be too wasteful, but at Atherton hogging down damaged maize was successful. The introduction of grazing crops and pastures into pig husbandry to reduce excess fat and cheapen pig raising was successfully introduced during 1953-54, with trials and demonstration at Kairi using arrowroot, sugar cane, glycine, elephant grass, peanuts, sweet sorghum, mung and phasey beans and sweet potatoes. Local demonstrations were given on farms at Mt Beppo, Kilcoy, Laidley and Fernvale.

The introduction, at Kairi, of deep litter for raising pigs was successful, the manurial value being assessed at 23s per pig. Demonstrations of this method were conducted at Ormiston, Cryna (Beaudesert) and Riverview. Early weaning of pigs on a special ration at 10 days was shown to be possible but early weaning at one month of age gave better results. The system demanded more attention.

New piggery equipment, such as circular farrowing pens and automatic waterers, was introduced by the Department, with concrete moulds for the latter lent to producers. A Pig Testing Station was under construction at Rocklea in 1957. The Pig and Poultry Branches were merged to full Branch status with A. L. Clay as Director on 30 May 1957 and a Pig and Poultry Technical Advisory Committee set up.

Poultry Branch

During 1945-46 an officer of the Poultry Branch was stationed at Cairns and another at Rockhampton under The Poultry Industry Act of 1946, and licences were issued to chick sexers. First class licences required a candidate to determine the sex of 200 chickens within 35 minutes with an accuracy of 95%, with an error of less than 6%. Stickfast flea (*Echinophaga gallinacae*) spread in the Normanby poultry district in September 1945 and

several properties were quarantined. A 0.5 to 2.0% DDT dip in which birds were immersed killed all fleas and afforded protection for 2-3 weeks at 0.5% to 19 weeks at 2% strength. Nutrition experiments were conducted at the Kairi Regional Research Station on 3 August 1948 with five different rations ranging from 30% to 70% maize and 1% to 7% lucerne meal plus vitamins A and D, synthethic riboflavin and manganese sulphate. Feeding trials with capons and cockerels utilising 65% meat meal and 15% crude protein gave the best production.

A Poultry Advisory Board was appointed during 1950-51, made up of seven representatives of egg marketing boards and one from a poultry organisation. A levy was imposed on egg marketing boards to finance the services of the Poultry Branch.

Feeding tests with grain treated with benzene hexachloride (BHC) on poultry were conducted in association with graders of dairy produce. A taint was imparted to the flesh and eggs of poultry and it was advised that BHC-treated grain should not be used to feed poultry. Feeding rations containing up to 70% maize grain were satisfactory for feeding for egg production.

By 1954 officers of the Poultry Branch were located at Atherton, Townsville, Rockhampton, Bundaberg, Caboolture, Ipswich, Toowoomba and Brisbane. Extension advice required consisted of nutrition, management and disease control. Demonstrations were conducted under the Commonwealth Extension Service Grant.

Research into feeding antibiotics (procaine penicillin) showed that weight increase occurred only with chicks reared in premises previously used for rearing chickens and where the protein percentage of the ration was up to 21%. A Poultry Section was added to the Rocklea Animal Husbandry Research Farm during 1953-54.

Trials with increasing grain sorghum in a wheat ration showed that grain sorghum could be safely used in rations up to 60% by weight. Feeding tests showed that vitamin A supplement was necessary when green feed of poor quality was fed.

F. N. J. Milne, Husbandry Officer, attended the Tenth World's Poultry Congress in Edinburgh in August 1954 and then visited research and production centres in Scotland, England, Denmark and Holland. Half of the funds were provided from the Commonwealth Extension Services Grant and half from the Poultry Industry Fund. Hens subjected to artificial lighting during late autumn and winter laid more eggs at a time when prices were high and this system was more profitable, though annual production was the same as that of the non-lit group. Laying cages were introduced during 1955-56 to select hens for breeding. Crossbreeding experiments using artificial insemination showed that Australorp and White Leghorn crosses gave the greatest number of eggs and also the highest average weight.

By 1956 there was a considerable production of 8 to 9-week-old cockerels (broilers).

Milne became Senior Husbandry Officer of the Poultry Branch on 12 January 1956. A. L. Clay became Director of the combined Pig and Poultry Branches on 30 May 1957.

Division of Dairying

Following the reorganisation of the Department, effective from 1 July 1945, the State was divided into six districts. A senior officer was placed in charge of each district, with other officers working under his supervision. Emphasis was to be given to advisory and extension services rather than routine inspection and dairy factories would be focal points from which officers would work. Efforts would be aimed at improving the quality of dairy produce and the Dairy Research and Field Branches would work closely to provide technical assistance to the industry.

Emphasis was placed on the mechanical and sanitary care of dairy farm machinery and field days were held in co-operation with branches of the Queensland Dairymen's Association. Vacuum gauges were used to check machine performance and steam sterilisers were introduced for sterilising machines.

Weed taints

Weed taints in dairy produce attracted the attention of the CSIR and work on methods of eliminating weed flavours in butter commenced. Field officers of the Department cooperated in the project. A field survey indicated that about twenty weeds caused some tainting but the main offenders were Slender Celery (*Apium leptophyllum*), Lesser swine cress or bitter cress (*Coronopus didymus*), Mustard weed or Pepper cress (*Lepidium hyssopifolium*). Hexham scent (*Melilotus indica*), Stinking Roger (*Tagetes minuta*) and wild turnips (*Rapistrum rugosum, Brassica* and *Sisymbrium* spp.). Modification of factory techniques such as pasteurising temperature investigations was carried out at the Hamilton and Toowoomba laboratories.

Commonwealth Dairy Efficiency Grant

The Commonwealth Government in 1945-46 agreed to bear one-third of the cost of approved herd-testing schemes. During 1947-48 the Commonwealth Government allocated an annual sum of £60 000 for the next five years to conduct an efficiency campaign amongst dairymen to translate the "know-how" of the scientist into everyday farm practice. The Department's plans embraced pasture improvement demonstrations, education on better feeding of livestock, measures for disease prevention and control, herd recording and culling and uplift of quality. (Bell, A. F., *Ann Rep. Dep. Agric. Stk.*, 1947-48, p. 6) The Dairy Efficiency Grant was approved for a further period of five years from 1 July 1953 by the Commonwealth Government. During 1955-6 the Hamilton Laboratory was transferred to the Butter Marketing Board's new premises and the Butter Improvement Scheme was extended. The new laboratory was opened during 1956-57.

Dairy Research Branch

The programme of work in this branch included research on milk quality including a microscopic survey of farm milk. This survey yielded 200 strains of bacteria, thus providing an important background to milk quality. Raw milk supplies to Brisbane were constantly tested by depot testers under the control and direction of the Dairy Research

Branch, the methylene blue and fat tests being the main ones employed. Pasteurised milk was also examined daily for the Brisbane milk supply in cooperation with the Milk Board, which made a grant of £2000 towards the cost of the services rendered by the laboratory and field staff. A survey of seasonal variation in milk within the Brisbane district showed a conspicuous decline in milk solids during the late winter and spring months. After several feeding tests it was found that feeding long rather than chaffed roughage improved the milk yield, butterfat content and average test. After several years' testing it was found that milk supplied from herds fed on a lucerne-green panic pasture was superior in compositional quality to the milk from those fed sorghum and Sudan grass and Paspalum and Rhodes grass. This pasture mixture also arrested the seasonal decline in milk composition and raised the solids percentage in the milk. The daily feeding of 5 oz of sterilised bone meal with a trace of potassium sulphate raised the fat and solids-not-fat percentage slightly, increased overall milk yield and extended the lactation period of the experimentally fed group of cows.

The effect on milk quality of the penicillin used to control mastitis in dairy cows was investigated.

Butter Improvement Service

This was continued with the help of a grant of ± 1000 from the Butter Marketing Board. In 1939-40 the average composition of Queensland butter was water 14.9%, salt 1%, curd 0.8% and fat 83.3%. After seven years under the Butter Improvement Scheme the composition was water 15.5%, salt 1.3%, curd 0.8%, and fat 82.4%, making the farmers $\pm 30\ 000$ a year better off. Microscopic examination revealed that the size of the moisture globules in butter was largely responsible for rapid bacterial development and quality decline in butter. Experiments with the "New Way" process of making butter were conducted at the Commonwealth level during 1946-47 to treat sweet cream. While Dr Senn's machine from Switzerland was installed at the Caboolture factory to treat sour cream - the usual Queensland raw material-"mottling" of butter was found to be eliminated by working the butter more to moisture droplets less than 10 microns in diameter. Incompletely dissolved salt crystals caused the condition. Overneutralisation of cream led to poor-quality butter and research showed that from 0.08 to 0.1 per cent acidity of cream at churning gave satisfactory butter. A pH range of 6.8 to 7.2 was chosen as the standard.

Metallic corrosion in cold water storage tanks and cream equipment increasing the iron and copper content of butter had an important effect on flavour. It caused metallic taint; copper caused a tallowy flavour. In view of decreasing timber supplies, CSIRO tested several timber species for substitution for the usual New Zealand White Pine and found seven satisfactory sources for butter boxes. Experiments were conducted in cooperation with CSIRO and the Forestry Sub-Department to protect wooden churns from decay and contamination of butter. Several chemical treatments and an experiment with a steel churn were commenced, continuing beyond 1957.

Cheese improvement

Complaints of cheese mite infestation of cheeses sent to the United Kingdom during 1946-47 led to experiments to control this pest. Scientists working in conjunction with the
Entomologists found that dichlorethyl ether applied as an atomised spray at a dosage rate of 1 lb per 1000 cubic feet of curing room space ensured a complete kill of all stages of the life cycle. Reconstitution of milk for the production of non-fat leaking cheese was successfully accomplished. A homogenised cheese developed in Queensland for use in tropical areas was the result. A good deal of research was undertaken to control bacteriophage in cheese starter cultures and the production of phage-free cultures. Ultraviolet light was shown to reduce phage virulence. The use of photomicrography to record permanently the morphology of the different strains of starter cultures at various temperatures helped to detect readily any divergence from normal. The introduction of freeze-drying lactic cultures provided for easy transport, storage of cultures and emergency supply to factories affected by starter failure. Research was instituted to determine the effect of residual penicillin used in mastitis control in factory milk supplies to check if this was the cause of delayed acid production by starters. Eventually during 1951-52 phage-resistant starter cultures were developed by holding an unclotted culture in the factory till it clotted and subculturing from this. The problems of putrefactive-blown processed cheese and white spot in processed cheese were solved by identifying the organisms responsible and reducing the pH in the former case and raw cheese used in processing in the latter case.

Rapid cheesemaking methods eliminating cheddaring, and retaining the curd in the grain stage reduced cheesemaking time by two hours. Other problems solved were mechanical openness in cheese, and gassiness in cheese. It was also found that cheese yield is affected by the forage consumed, a lucerne-green panic pasture increasing casein content of milk by 0.03%.

Experiments with waxing and storage of waxed cheese were successful.

Dairy Field Services

During 1948-49 a Dairy Research Branch was created within the Division of Dairying with Leslie Edwin Nichols, Senior Dairy Technologist, in charge. In mid 1950 a Field Services Branch was created and a Director was appointed to each branch. On 27 July 1950 Nichols became Director of Research and on 31 August 1950 Robert Alexander Paul from Western Australia was appointed Director of the Field Services Branch. Paul resigned on 2 July 1954 and was succeeded as Director by Frank Clifford Coleman on 19 August 1954.

The Field Services Branch dealt with production statistics, herd recording and administering the Dairy Industry Efficiency Grant for the development of demonstration farms and the conduct of field days on them, dairy farm and other competitions, operation of a Mobile Film Unit, cheese milk-cooling demonstrations and subsidised interstate transport of sires.

During 1950-51 fifty-three farms were selected in dairying areas as demonstration farms and farm survey data were collected each month for use in field day lectures. In conjunction with other Departmental Branches water supply, cleansers, construction of bails, charcoal coolers and equipment details were noted and also crop and pasture details and general nutrition problems. In the same year 104 entries were received in the Dairy Farm Competitions, 80 entries for the Dairy Equipment Competition. One hundred and twenty screenings were made to a total audience of 11 500 dairy farmers in all dairying districts except the Atherton Tableland. Twelve farmers availed themselves of the subsidised interstate transport provisions for dairy sires.

In the Herd Recording field a list of superior "Families" was compiled in a Register of Merit for both bulls and cows. For entry into the Intermediate Section it was necessary for a cow to produce from 1050 to 1100 lb butterfat in three successive lactations depending on age at first calving. For entry into the Lifetime register at least 2240 lb of butterfat had to be produced in not more than eight lactations and for the Elite register at least 3000 lb in not more than ten lactations. To gain entry into the Sires Register, a sire had to have sufficient daughters entered in the various Registers.

During 1952-53 several field surveys were made with respect to:

- (a) effect of month of calving on production,
- (b) effect of length of lactation on production, and
- (c) production according to test.

The first survey showed that there were definite advantages to be gained by calving cows in the third quarter of the year in Queensland. The second survey, during 1948-52, showed 30% of the cows milked for a period of 270 days for an average production of 180 lb of butterfat, and 20% milked for less than six months for an average production of 63 lb butterfat, leaving a great deal of room for improvement. The third survey showed a close correlation between the butterfat content and the yield of butterfat. A survey of herd wastage showed the main causes of wastage in order of importance were low production, age, sterility and udder troubles. During 1954-55 herd tests, the official lactation period was extended to 300 days as in other States.

A considerable amount of the Branch officers' time was taken up with the administration of the Dairy Produce Acts, examination of factory accounts, statistics of manufacture, payouts and grading of butter and cheese, control of transport of dairy produce, general advisory correspondence, radio talks and articles for the *Queensland Agricultural Journal*. A survey during 1953-54 showed that 16 546, or 80.6% of, dairy farmers were using milking machines, the average number of units per machine being 3.3.

Faults with vacuum pumps, dirty and corroded relief valves, leaks in plant, incorrect pulsator rates, faulty teat-cup assembly and perished rubberware found in the survey led the Department to conduct a Dairy Officers' Refresher Course in May 1954 to help farmers check the performance of their milking machines. Extension work was intensified and senior Dairy Officers were equipped with cameras to record practices, animals, equipment, pastures, fodder conservation etc. to include in articles, film evenings, handbooks etc. Strip grazing, herringbone bails and continuous herd recording were emphasised. During 1955-56 a goat production recording scheme was initiated. Dairy farmer discussion groups were fostered during 1956-57 and three Dairy Extension Advisory Committees were set up to further Departmental-Industry organisation liaison. Extension services were set up at Oakey, Gympie and Malanda. A survey of length between calvings of dairy cows during 1956-57 showed the most common period was 11 to 12 months. Production was adversely affected if the period was shorter but it was not improved by a longer period.

Division of Marketing

This Division handled Commodity Boards, Standards and Co-operative Associations.

Marketing Branch

This Branch was responsible, among other things, for the administration of the following Acts:

The Primary Producers Organisation and Marketing Acts, 1926 to 1941 The Wheat Pool Acts, 1920 to 1929 The Fruit Marketing Organisation Acts, 1923 to 1945 The Primary Producers Co-operative Associations Acts, 1923 to 1934 The Dairy Products Stabilisation Acts, 1933 to 1936 The Second-hand Fruit Cases Act of 1940.

The producer-controlled marketing boards, with the Director of Marketing as a member ex officio, operated under The Primary Producers Organisation and Marketing Acts, 1926 to 1941. The Council of Agriculture comprised the Minister for Agriculture and Stock, the Director of Marketing and representatives elected by the several commodity boards, including the COD and the Queensland Cane Growers Council. The Council of Agriculture met annually, with an Executive Committee of six including the Director of Marketing convenning between these annual meetings. During 1945-46 the costs of production in the dairying industry were surveyed for the Council by the Dairying Industry Production Costs Committee, used by the Prices Commissioner in advising the Commonwealth Government regarding subsidies. During 1945-46 a Dairyman's State Council of nine representatives of the nine districts was elected, which, like the Cane Growers Council, had no powers of marketing but looked after the general interests of its industry. It held its first meeting in August 1947.

Reviews of the Commodity Boards' activities were published in the annual report of the Department of Agriculture and Stock.

In 1948 a change was made by C. H. P. Defries, Assistant Director of Marketing, in the absence of H. S. Hunter, the Director, on extended leave: he published the report required under the Marketing Acts reviewing the Marketing Boards as a separate document, and the activities of the Division in the Departmental Report. This system was continued. Marketing Boards were constituted for potatoes on 1 January 1948, tobacco on 22 July 1948, the Central Queensland Egg Marketing Board commenced operations on 1 April 1947, an Onion Board and a Navy Bean Marketing Board were constituted. Triennial elections for growers' representatives on these marketing boards were conducted by officers of the Marketing Branch.

General comments on the dairying industry, the egg and poultry industry, the grain and allied industries, the tobacco industry, minor crops, fruit and vegetable growing, the potato industry and others were made in the Annual Reports of the Director of Marketing, indicating special activities, provisions, subsidies, auctions, etc. Some of these are mentioned under notes on the specific crops.

During 1951-52 a Committee comprising representatives of the Department of Agriculture and Stock, the Treasury Department, the Railway Department, the Co-ordinator-General of Public Works and the State Wheat Board was set up to examine the bulk handling of wheat in Queensland. Expert subcommittees were formed to report on finance, distribution of facilities, transport and the production and consumption of wheat in this State. The Division of Marketing was represented on the main committee and each of the subcommittees. Bulk handling facilities were subsequently established at Pinkenba and throughout the wheat areas.

Crop Forecasting Service

In the 1891-92 annual report of the Department (p. 24), Peter McLean, Under-Secretary, wrote:

It was thought that Clerks of the Divisional Boards, from their local knowledge, would have been in a position to give an approximate estimate of the area to be placed under different crops within their Divisions, and a circular letter was forwarded to each asking their cooperation. While some freely offered, the majority for various reasons didn't. It will be necessary to fall back upon the original idea, mainly:

- 1. To divide the agricultural districts into areas or sub-districts.
- 2. Have a correspondent in each district who would once a quarter forward all information available to the Department.
- 3. To publish a quarterly bulletin containing the information attained, and thus enable the farmers to regulate their operations.

Apparently this idea was not implemented, for W. Deacon in 1902 wrote a request entitled "The necessity for a statistical Branch in connection with the Department of Agriculture" (QAJ, Vol. 11, July 1902, pp. 35-36): "When we get our crops grown and go into the market with them, as a rule we know nothing of their value. We are in the hands of `rings' and speculators. These men use their knowledge to buy crops that they know they can make a good profit on when it comes to re-selling them".

In 1924 the Department tried to get a reliable forecast of the acreage cultivated to cotton which would be picked during the 1923-24 season. A special card was issued to 9281 growers asking the acreage each grower expected to harvest and whether the prospects were good, fair or poor. Some 6499 growers replied, 30% had not done so. It was assumed that a 25% increase in area was thus missed, bringing the expected crop to 62 000 acres. (*QAJ*, Vol. 21, April 1924, pp. 335)

The task of establishing, operating, and, as circumstances permitted, expanding a system of crop reporting and forecasting was made the responsibility of the Marketing Division in 1946, and was placed under the immediate supervision of the Assistant Director of Marketing, C. H. Defries. The first report on the south Queensland autumn potato crop was issued on 18 April 1947. From time to time other industries were included and by June 1954 the system included potatoes, wheat, maize, grain sorghum, barley, peanuts, tobacco and poultry. The information in these reports and the forecasts of production were based on data supplied by 700 selected honorary crop correspondents-farmers actively cooperating with the Branch in reporting on progress of crops in their localities, Departmental officers

established personal relations with the farmers, visiting them and acquainting themselves with local conditions. The officers also maintained close connections with farmers, leaders and people concerned with the marketing of these commodities. The crop correspondents were appointed largely on the recommendations of field officers of the Division of Plant Industry or of Marketing Boards, while poultry correspondents were selected in a stratified random selection principle. Honorary correspondents received no remuneration but were provided with pre-paid envelopes and were placed on the distribution list for the reports and forecasts in respect of the crops on which they reported, plus information on economic and marketing matters.

Analyses of the ratio between forecast and actual yields were made. In the wheat-growing areas correspondents tended to overestimate yields.

In addition to crop forecasts, a report on production trends was published in the middle of each month incorporating information from the Divisions of Animal Industry, Plant Industry and Dairying, the Commonwealth Meteorological Bureau, the Bureau of Sugar Experiment Stations, marketing boards and cold storage firms and summaries from the Marketing Branch. Analyses were also made of wholesale prices of fruit and vegetables to discover existing trends and seasonal practices and these were issued as supplements to the monthly "Production Trends". Price series covered by 1954 included pineapples, lucerne, oranges, tomatoes, beans, peas, bananas and apples. The "Crop Reports and Forecasts", "Production Trend Reports" and "Price Supplements" were widely distributed to the press and radio stations, farming and commercial interests, government organisations and other institutions interested in rural industry and agricultural economics. 21 549 copies were distributed in 1954.

EXPANDING RESEARCH, PASTURE IMPROVEMENT AND BRIGALOW DEVELOPMENT, **1957-63**

The Department under Otto Madsen, 1957-63

Following the defeat of the Labour Government in August 1957 by the Liberal/Country Party, Otto Ottosen Madsen became Minister for Agriculture and Stock to follow the Hon. H. H. Collins.

Madsen was born on 8 December 1904 in Warwick to Mads and Christine Madsen, who were both born in Denmark. He was educated at the Tannymorel State School and the Warwick Technical College and High School. He was employed by the Tannymorel Coal Mining Co. during 1924-25 and then took up dairy farming at Tannymorel, Killarney and Yangan. He became a Director of the Queensland Co-operative Cold Stores Federation, president of the Queensland Dairymen's Organisation and a member of the Eastern Downs District Council, Deputy State President and Queensland Representative of the Australian Dairy Farmers' Federation, Director of the Killarney Co-operative Dairy Association, a Member of the Australian Dairy Produce Board, a Member of the National Farmers' Union and a Councillor of the Glengallan Shire. The `Otto Madsen Bridge' over the Condamine River at Warwick was named after him.

Madsen was MLA for Warwick in the Country Party from 3 May 1947 to his death on 3 August 1963, Minister for Agriculture and Stock from 12 August 1957 to 9 June 1960, and Minister for Agriculture and Forestry and for Public Lands and Irrigation from 9 June 1960 to 13 June 1963.

The Legislative Acts of the Madsen Ministry

1. *The Wheat Industry Stabilisation Act and Another Act Amendment Act of 1967* (6 Elizabethae II. No. 26, *Qd. Govt. Gaz.*, No. 130, 10 December 1957) was assented to on 3 December 1957, to be incorporated in The Wheat Industry Stabilisation Acts, 1954 to 1957.

The purpose of this Act was to assist growers over a very difficult period in their industry caused by two successive seasons of low production. Queensland had to import wheat, as did some other States. The Act made provision for spreading freight costs over all wheat marketed for consumption in Queensland during the period of twelve months commencing 1 December 1957. The Act also gave Queensland wheat growers a drought premium of 1/- per bushel on all wheat delivered to the State Wheat Board from the 1957 harvest. The Act authorised the State Wheat Board to purchase from the Australian Wheat Board and to sell the wheat so purchased.

2. *The Sugar Experiment Stations Acts Amendment Act of 1957* (6 Elizabethae II. No. 31, *Qd. Govt. Gaz.*, No. 147, 23 December 1957) was assented to on 17 December 1957, to be incorporated in The Sugar Experiment Stations Acts, 1900 to 1957.

This Act was introduced to cope with the giant sensitive plant, a new pest to the sugar industry. It extended the function of Cane Pest and Disease Control Boards from animal, bird and insect pests to plant pests.

The Act also dealt with representation on Cane Pests and Disease Control Boards. A member must be a cane grower at all times during his term of office.

The Act also defined means of apportioning assets where boundaries were amended, and if a Board was wound up, assets were to be returned to the Sugar Experiment Stations Board to be used for purposes under the Sugar Experiment Stations Acts.

3. *The Dairy Products Stabilisation Acts Amendment Act of 1957* (6 Elizabethae II. No. 32, *Qd. Govt. Gaz.*, No. 148, 23 December 1957) was assented to on 17 December 1957, to be incorporated in The Dairy Products Stabilisation Acts, 1933 to 1957.

This Act defined "cheese" as the product when removed from the hoops, moulds or forms. Thereafter it was deemed for the purposes of the Act to be cheese held in stock by the manufacturer until he sold or otherwise disposed of it. Another amendment gave the Queensland Dairy Products Stabilisation Board exclusive power to prosecute for breaches of the Act-save, of course for any offences whereof its members or staff may be guilty.

4. *The Slaughtering Act Amendment Act of 1958* (7 Elizabethae II. No. 18, *Qd. Govt. Gaz.*, No. 29, 14 May 1958) was assented to on 7 May 1958, to be incorporated in The Slaughtering Acts, 1951 to 1958.

This Act clearly demarcated between butchers and small goods shops and at the same time enabled provision to be made for the retail marketing of meat in accordance with public requirement.

The amending Act emphasised that the Slaughtering Act would continue to apply to the preparation for sale of meat and meat products retailed by small goods shops, even though the Act ceased to apply when the preparation was completed.

Inspectorial powers under the Slaughtering Act were strengthened by enabling an inspector to call a member of the Police Force or any expert or competent person to his aid. The inspector could require the name and address of a person relating to a breach of the Act.

Regulations under the Act were extended regarding transport of meat, accommodation for inspectors at slaughterhouses and prescribing fees. A list of diseases in stock or meat set forth in Schedule I of the Act was extended to include the diseases sparganosis (a parasitic muscular disease in pigs) and melioidosis (a bacterial disease in pigs, sheep and goats). 5. *The Stock Acts Amendment Act of 1958* (7 Elizabethae II. No. 19, *Qd. Govt. Gaz.*, No. 30, 14 May 1958) was assented to on 7 May 1958, to be incorporated in The Stock Acts, 1915 to 1958.

The primary object of this Act was to make provision for payment of compensation for cattle condemned for tuberculosis upon their destruction and not upon their replacement as was previously required.

The Act also provided for stock owners outside the ambit of compulsory testing to enter into a voluntary agreement with the Minister for Agriculture and Stock for the testing of their cattle. They would be entitled to similar compensation but testing would be on a completely voluntary basis. Provision was also made for Departmental officers to take possession of and to destroy reactor cattle in cases where the owner refused to destroy them.

The Act also made provision for the establishment and control of artificial insemination of stock. An Advisory Committee would be set up to advise the Minister, with the majority of members representing the livestock industries.

In the interest of disease control it became necessary to regulate the practice of artificial insemination by setting up the same controls in this State as operated throughout the Commonwealth.

The Act also amended some current practices, such as ability to vary a permit to travel stock in the case of disease outbreaks. The Act also made provision to cancel a permit where circumstances required this action.

- 6. *The Foot and Mouth Diseases, Expenses and Compensation Fund Act of 1958* (7 Elizabethae II. No. 53, *Qd. Govt. Gaz.*, No. 125, 17 December 1958) was assented to on 11 December 1958. It was agreed between the Commonwealth and the several States of Australia that, upon the outbreak of foot and mouth disease in any part of the Commonwealth, the parties to the agreement not directly concerned would render financial assistance to the State or States wherein the outbreak had occurred to ensure that prompt and efficient measures were adopted to control and eradicate the dread disease. Powers to deal with the disease were to be found in The Stock Acts, 1915 to 1959. This Act set up a Fund in the Treasury regarding compensation for destruction of animals and the valuation thereof. The Act provided for the winding up of the Fund when the outbreak had been brought under control.
- 7. *The Wheat Industry Stabilisation Act of 1958* (7 Elizabethae II. No. 63, *Qd. Govt. Gaz.*, No. 148, 31 December 1958) was assented to on 16 December 1958. This Act formed part of complementary Commonwealth-State legislation to continue the stabilisation plan for a further five-year period commencing with the 1958-59 season and it was in all essentials similar to the 1954-58 plan. The main features were:
 - (1) The plan would operate for five years; it commenced with the 1958-59 wheat crop and would end with the marketing of the 1962-63 crop.

- (2) The Commonwealth would guarantee a return of 14s 6d per bushel to growers on up to 100 000 000 bushels of wheat exported from the crop in the first year of the plan.
- (3) The Australian Wheat Board would be maintained as the sole constituted authority for the marketing of wheat within Australia and for the marketing of wheat and flour for export from Australia for the period of the plan.
- (4) For the purposes of establishing a stabilisation fund, a tax would be collected on wheat exported which would be the equivalent to the excess of the returns from export sales over the guaranteed return. However, the maximum rate of export tax would be 1s 6d per bushel. The levying and collection of the tax was authorised by the Commonwealth Wheat Export Charge Act 1958.
- (5) The home consumption base price for 1958-59, the first year of the plan, was established as 14s 6d per bushel, bulk basis f.o.r. ports. There was provision in the plan for annual adjustments in the following years.
- (6) Provision was made for a loading on the price of all wheat sold for consumption in Australia to the extent necessary to cover the cost of transporting wheat required by Tasmania from the mainland to Tasmania in each season of the plan.
- (7) A premium would be paid from export realisation on wheat grown in Western Australia and exported from that State, in recognition of the natural freight advantage enjoyed by Western Australia owing to proximity to the principal overseas markets for wheat. The premium would be 3d per bushel.

The Australian Wheat Board would still market Queensland wheat. The Queensland Wheat Board would remain and act as agent and retain its classification system with premiums above f.a.q. price for Queensland wheat sold to flour millers.

- 8. *The Abattoirs Acts Amendment Act of 1958* (7 Elizabethae II. No. 69, *Qd. Govt. Gaz.*, No. 154, 31 December 1958) was to be incorporated in The Abattoirs Acts, 1930 to 1958. The principal object of this Act was to empower the Governor-in-Council to permit local abattoirs, as well as killing for local consumption, to kill meat for consumption both within and outside their areas, so enlarging the scope in relation to purchase, treatment, and sale of by-product raw materials. The name was therefore changed from "local abattoirs" to "district abattoirs" and from "local boards" to "district boards". With the enlarged unit the Act provided for the appointment of more than one member to the abattoir board in addition to local authority members.
- 9. *The Margarine Act of 1958* (7 Elizabethae II. No. 75, *Qd. Govt. Gaz.*, No. 11, 5 January 1959) was assented to on 19 December 1958.

This Act consolidated and amended the law relating to the manufacture and sale of margarine and repealed The Margarine Acts, 1910 to 1950. Any margarine that contained animal fats representing not less than 90 per cent by weight of the total quantity of fat or oil in such margarine was defined as cooking margarine and any margarine that was not cooking margarine was defined as table margarine.

Persons engaged in the manufacture of margarine must be licensed. Licences were of three kinds: (a) table margarine (b) cooking margarine and (c) agents' licence. Every

licensee had to register the marks or brands used by him on margarine and different brands had to be used for table and cooking margarine.

The Act limited the manufacture of table margarine to the total quantity of 4230 tons being manufactured at the passing of the Act and any future modification would be made by Parliament. Licensees would be given a quota. Table margarine could only be sold in 1 lb or $\frac{1}{2}$ lb pats in cube form, labelled on four sides "Table Margarine", with weight etc. Cooking margarine could be sold in 1 lb or 2 lb pat form printed on four sides "Cooking Margarine-For Cooking Purposes Only", with weight etc. For sale to cakemakers, pastry cooks, etc., packs of at least 14 lb suitably labelled were allowed.

The Act prohibited the use of butter in margarine and required a small amount of arrowroot or starch to be added. It provided for officers to administer the Act.

10. *The Filled Milk Act of 1958* (7 Elizabethae II. No. 76, *Qd. Govt. Gaz.*, No. 12, 5 January 1959) was assented to on 19 December 1958.

The object of this Act was to prohibit the manufacture and sale of filled milk, defined as "any liquid or powder containing the non-fat solids of milk with which has been incorporated or to which has been added any fat other than butterfat or cocoa butter". The Act was not intended to apply to genuine invalid and baby foods and provision was made in the Act for advice to be given by an appointed expert advisory committee of three representatives of the Departments of Agriculture and Stock and Health and Home Affairs and the Queensland Governing Body of the British Medical Association.

11. *The Fruit and Vegetables Acts Amendment Act of 1959* (8 Elizabethae II. No. 9, *Qd. Govt. Gaz.*, No. 110, 13 April 1959) was assented to on 6 April 1959, to be incorporated in The Fruit and Vegetables Acts, 1947 to 1959.

This Act provided for inspectors to be appointed under the Act without being previously appointed inspectors under the Diseases in Plants Act. Provision was made for the appointment of temporary inspectors and for withdrawal of authority.

The Act also required a retailer to display a sample of every line of fruit or vegetables he had for sale. It required any person reconsigning a package for resale by wholesale to relabel such package accordingly under his own name and not that of the grower.

The Act also provided for the use of printed paper cloth labels on packages of fruit and vegetables. It also provided for the identity of the packer of fruit or vegetables to be shown by the brand on the outside of the package and gave the power of seizure for resorting.

The Act also gave power to members of the Police Force to act where Departmental inspectors were not available.

12. *The Stock Acts Amendment Act of 1959* (8 Elizabethae II. No. 12, *Qd. Govt. Gaz.*, No. 114, 15 April 1959) was assented to on 9 April 1959, to be incorporated in The Stock Acts, 1915 to 1959.

This Act directed stock returns in relation to the Brisbane Petty Sessions District to be made direct to the Department, leaving such returns in relation to all other petty sessions districts to be made to the respective clerks thereof.

The Act allowed the Minister to pay mileage claims to approved veterinary surgeons from the Stock Diseases Compensation Fund. Responsibility for correct waybills for travelling stock was placed on the drover, and omitted the owner from the provisions. The drover was also given responsibility to give notice before entry on to a holding, except for the riding horses. The Act gave an inspector the right to enter a holding with a vehicle and any plant and equipment. An inspector was given the right to identify cattle tested for tuberculosis by eartag or other approved method. Duly qualified veterinary surgeons were excluded from the requirement of holding an artificial inseminator's certificate.

The Dairy Produce Acts Amendment Act of 1959 (8 Elizabethae II. No. 13, Qd. Govt. Gaz., No. 115, 15 April 1959) was assented to on 9 April 1959, to be incorporated in The Dairy Produce Acts, 1920 to 1959.

The main purposes of this Act were to enable the Minister to delegate his powers, to provide for 28 days' notice to be given by any supplier who diverted his milk or cream supply from one factory to another, to repeal some wartime legislation, to proclaim milk areas for supply to cheese factories, to control the installation of separators in factories and to provide for the consent of the Minister instead of the Govenor-in-Council for the installation or utilisation of plant, machinery or equipment in butter and cheese factories. Factories wishing to manufacture casein needed to separate to obtain skim milk for casein production and use the cream for butter manufacture or table cream. Under this Act separators could be installed only with the approval of the Minister.

14. *The Poultry Industry Acts Amendment Act of 1959* (8 Elizabethae II. No. 20, *Qd. Govt. Gaz.*, No. 122, 16 April 1959) was assented to on 10 April 1959, to be incorporated in The Poultry Industry Acts, 1946 to 1959.

Under the 1950 amendment to The Poultry Industry Act of 1946, a Poultry Industry Fund had been established from a Government Grant and a levy through Egg Marketing Boards and licensing fees. This money was now insufficient. Under this Act the amount of the Government grant was increased to ten thousand pounds, plus an additional sum equal to the annual contribution levied on the industry through Egg Marketing Boards up to a limit of ten thousand pounds.

In 1956 a State Poultry Improvement Plan was introduced and the Act provided for two classes of accreditation-the breeding establishment and the hatchery. This Act provided for a third class - the Hatchery Supply Farm. The Act also provided for the inspection of poultry carcasses in shops or wherever they were sold.

The Act covered compensation for poultry condemned as unfit for human consumption at poultry slaughterhouses; slaughtering returns were required from slaughterhouses.

15. *The Sugar Experiment Stations Acts Amendment Act of 1959* (8 Elizabethae II. No. 65) was assented to on 22 December 1959, to be incorporated in The Sugar Experiment Stations Acts, 1900 to 1959.

This Act declared that sugar cane received at a mill which was not paid for because of a deficiency of sugar should not be levied for funding of the disease and pest boards. It also stipulated that levies be paid on cane grown by the mill owner.

It also decreed that no sugar cane could be removed, planted, transplanted or delivered from a quarantine area without the permission of the Minister. The requirement for the Cane Pest and Disease Control Board to publish an annual statement of accounts was replaced by a notice in the newspaper that such could be inspected at the office of the Secretary, for up to six months.

16. *The Dairy Cattle Improvement Act Repeal Act of 1959* (8 Elizabethae II. No. 66) was assented to on 22 December 1959.

The object of the Dairy Cattle Improvement Act which was passed in 1952 was to improve the standard of Queensland's dairy herds. Its main method of achieving this objective was provision for licensing of dairy bulls. The provision was always opposed by dairy farmers and has never been implemented. The repealed Act also made provisions for the raising of certain moneys to improve dairy herds. However, these funds could be more conveniently raised from the same source under the Dairy Produce Act. This Act repealed the Dairy Cattle Improvement Act, and the Dairy Cattle Improvement Fund was closed.

17. *The City of Brisbane Market Act of 1960* (9 Elizabethae II. No. 4) was assented to on 15 March 1960.

This Act allowed the establishment of a public market in the area of the City of Brisbane. The population had grown and there was need for a larger market. In August 1958 a Markets Investigation Committee was set up with the Co-ordinator-General of Public Works, J. A. Holt, as Chairman. Guided by the results of an investigation conducted in 1958 by the Marketing Division of the Department of Agriculture and Stock it recommended a site of 122 acres at Sherwood Road.

The Act constituted a Brisbane Market Trust to establish and maintain a public market in the area of the City of Brisbane for the sale and storage of fruit and vegetables. The Trust would be composed of six voting members with the Director-General of the Department of Agriculture and Stock or his nominee as an ex officio member. There would be a Government appointee as Chairman, one representative of the Brisbane City Council, two representatives of the fruit and vegetable growers, and two representatives of the wholesalers of fruit and vegetables.

The Act prohibited the wholesaling of fruit and vegetables elsewhere in the area of the City of Brisbane except where exemption was granted by the Trust. The Trust would be a

non-profit organisation. A report of the operations of the Trust was required each year to be submitted to the Minister. The Trust did not represent the Crown for any purpose.

The Act made provision for the construction by the Co-ordinator-General of Public Works of buildings, sidings, roads and market approaches on behalf of the Trust.

18. *The Milk Supply Act Amendment Act of 1961* (10 Elizabethae II. No. 19) was assented to on 4 April 1960 to be incorporated in The Milk Supply Acts, 1952 to 1961.

This Act provided that one of the producers' representatives on the Board should be designated the "wholesalers' representative", representing the producers and wholesalers carrying on business outside the Brisbane Milk District.

The Act enabled the Brisbane Milk Board to take steps to increase consumption of milk by promotion in collaboration with producer organisations, and to establish a sales promotion fund financed by assessments not exceeding one farthing per gallon on milk supplied for use in the Brisbane district or in other agreed areas. An Advisory Committee would be set up.

Authority for fixing milk and cream prices was transferred from the Commissioner of Prices to the Brisbane Milk Board in the Brisbane Milk District and to the Chairman of outside Boards in regard to quality, cost of production etc. The decision must be approved by the Minister and published in the Government Gazette.

19. *The City of Brisbane Market Act Amendment Act of 1961* (9 Elizabethae II. No. 23) was assented to on 14 November 1960, to be incorporated in The City of Brisbane Acts, 1924 to 1960. This Act provided for a "Banana Ripener" who sold on his own account. The ex officio member was given full voting rights.

The Act fixed 31 December 1959 as the date for determining space allocation in the new markets. It also allowed "stock droppers" who purchased wholesale fruit and vegetables to sell wholesale to retailers and deliver to them. It fixed the maximum term of lease of space as 21 years except where the lessee provided his own buildings.

20. *The Stock Acts Amendment Act of 1960* (9 Elizabethae II. No. 42) was assented to on 16 December 1960, to be incorporated in The Stock Acts, 1915 to 1960.

This Act increased the maximum rate of assessment upon livestock for the Stock Fund from $\pounds 2$ to $\pounds 5$ per 100 or part thereof for cattle and horses, and from 10s per 100 or part thereof to 25s per 100 or 3d per head for sheep and pigs.

Police were given powers as Inspectors under the Stock Act, waybills were to be kept for six months after delivery, stock were to be tested or treated for the detection or prevention of disease prior to introduction into the State. Health certificates were to be presented at the time of introduction.

21. *The Swine Compensation Act of 1962* (11 Elizabethae II. No. 2) was assented to on 22 March 1962.

Swine fever had broken out in Australia in 1903-06, 1927-28 and 1942-43. The outbreaks were controlled by strict quarantine and slaughter of all pigs on affected properties. Veterinarians believed the source of infection was uncooked pig meat imported from overseas.

This Act provided for a Swine Compensation Fund for the payment to owners of pigs slaughtered to control the disease. The Fund would be financed by moneys to be raised by the imposition of a swine sales stamp duty imposed on the sale of pigs, supplemented on a loan basis from Consolidated Revenue. The rate of stamp duty would initially be one half-penny per £1 of the sale price. The amount of compensation would be determined by agreement with the owner or by an impartial authority appointed by the Minister.

22. *The Primary Producers' Co-operative Associations Act Amendment Act of 1962* (11 Elizabethae II. No. 13) was assented to on 26 November 1962, to be incorporated in The Primary Producers' Co-operative Associations Acts, 1923 to 1962.

This Act enabled a Primary Producers Co-operative Association to tighten up its rules to guard against an easy take-over of its business. It enabled its members to vote by postal ballot on such decisions.

23. *The Primary Producers' Organisation and Marketing Acts Amendment Act of 1962* (11 Elizabethae II. No. 15) was assented to on 3 December 1962, to be incorporated in The Primary Producers' Organisation and Marketing Acts, 1926 to 1962.

This Act protected the long service leave rights and other leave entitlements of employees of marketing organisations which amalgamated. The Act dealt with travelling allowances to members of the Council of Agriculture, levies in the sugar industry by the Queensland Cane Growers Council, allowing cane growers to petition for a poll before a levy is imposed and including a minimum number for petitioners.

24. *The City of Brisbane Market Acts Amendment Act of 1962* (11 Elizabethae II. No. 21) was assented to on 3 April 1962, to be incorporated in The City of Brisbane Markets Acts, 1960 to 1962.

This Act provided accommodation for produce merchants selling the heavier vegetables such as potatoes, onions and pumpkins, and also for the "country order" trader.

The Act also provided for services to carry on business in the markets such as a bank, cafe, post office, service station, wholesale grocery, butcher, hairdresser, chemist, boot repairer, newsagency, hardware, wearing apparel, chain store, etc.

The Brisbane Market Trust was authorised to invest temporary surpluses in its fund in Commonwealth or Queensland Government Securities, in interest-bearing deposits in a bank, or in the short-term money market.

25. *The Regulation of Sugar Cane Prices Act of 1962* (11 Elizabethae II. No. 45) was assented to on 28 December 1962. The Regulation of Sugar Cane Prices Acts, 1915 to 1954 were repealed. This Act consolidated previous Acts.

This Act made clear that the Central Sugar Cane Prices Board had power to re-zone land. Millowners were authorised to enter land of a cane grower to define boundaries of his assignment. The Act also provided that all local board awards as first made should have equal status and where the Central Board acted to make an award in place of a local board, such award should be deemed to be the award of the local board.

Appeals against farm peaks were limited to 21 days after publication. Other matters regarding contempt, breaches, etc., were dealt with.

26. *The Dairy Produce Acts Amendment Act of 1963* (11 Elizabethae II. No. 37) was assented to on 16 December 1963, to be incorporated in The Dairy Produce Acts, 1920 to 1963.

Goat's milk was brought under the control of the Act. A registration certificate of a factory had to show the type of use of milk. Minimum standards for all products of milk and cream were prescribed. The Governor-in-Council had to give consent for the erection of a butter or cheese factory and the Minister had to approve installations.

27. *The Agricultural Standards Act Amendment Act of 1963* (12 Elizabethae II. No. 40) was assented to on 18 December 1963, to be incorporated in The Agricultural Standards Acts, 1952 to 1963.

This Act protected users of a fertiliser by requiring that it be registered before being put on the market in Queensland. The registration authority was an Agricultural Requirements Board constituted by special officers of the Department of Primary Industries. The Act added a botanist to the Board membership. The Act also required registration of products for cleansing eggs. It also required small seed packages for home gardeners to carry a date after which the seed would cease to be viable.

Staff changes under Madsen

In his annual report for 1957-58 Dr Summerville, the newly appointed Under-Secretary, referring to the staff situation, wrote:

The pattern of staff changes that has been evident for years past was repeated in 1957-58. Foreseeable losses such as age retirements and normal staff turnover have been met mainly from within the Department, but resignations of specially qualified and experienced officers beyond the normal expectancy continued to cause concern. The gaps left by such losses are not easily filled, as specialisation is involved, and fully experienced replacements are not readily available. Thus, while graduate staff recruitments may in terms of numbers counterbalance the loss of scientific officers, such recruitment cannot cancel the loss of experience and special

qualifications. Further, the training of new men throws an added burden of supervisory duties on to the remaining senior personnel.

On the extension side there is an insistent need to provide capable men for the advisory services and the policy of recruiting diplomates of agricultural colleges for training or extension and technical duties has been continued with considerable success.

Higher salaries and better prospects of advancement appear to be the main attractions for professional officers leaving the Department. One of the difficulties in retaining professional staff of intermediate grade in some fields has been that the organisational structure did not provide sufficiently good prospects of advancement to higher grades. This position is being corrected as opportunity offers... Scholarship holders who completed their courses at the end of the 1957 academic year and took up positions in the Department numbered two in Plant Industry and four in Animal Industry. Six cadets graduated in Science.

University Scholarships for the 1958 academic year were awarded as follows:

Agricultural Science 6 (including one financed by the Queensland Dairymen's Association); Veterinary Science 7 (including two financed from the Wool Fund); Science 5 (including one financed from the Commonwealth Extension Services Grant) and Economics 2..."

Death of A. F. Bell

The most serious and tragic loss of staff was the sudden death from a heart attack in his office chair at 4.00 p.m. on 14 May 1958 of Arthur F. Bell, Under-Secretary, who had joined the Department as a Cadet in 1916, rising to Director of the Bureau of Sugar Experiment Stations in 1947 and to Under-Secretary in July 1947. The following tribute was paid to him in the *Queensland Agricultural Journal*.

Tributes of the highest order have been paid, since his death last month, to the outstanding service given to agriculture by Mr. A. F. Bell, who had for 11 years carried out so successfully the important duties of Under Secretary for Agriculture and Stock.

Many of these acknowledgments referred to Mr. Bell's reputation as a brilliant scientist and administrator, which was recognised not only in Queensland and throughout Australia, but in many overseas countries as well.

The former Under Secretary was held in the highest respect by all his officers and staff, and his overall ability was recognised as a paramount factor in the acknowledged success of more recent departmental work.

Mr. Bell was born at Laidley, in the Lockyer Valley, in November, 1899. He received his primary education at the local State School, where he won a scholarship to the Ipswich Grammar School in 1913. He entered the Public Service in 1916 as a cadet in the chemical laboratory of the Department of Agriculture and Stock. In 1917 he enlisted in the First AIF. After his return he rejoined the laboratory staff and started a part-time course at the Queensland University.

After graduating as Bachelor of Science in 1924, he was awarded the sugar research travelling scholarship. He was overseas for four years, attending the Universities of California and London.

On his return to Australia in 1928, Mr. Bell was appointed pathologist to the Bureau of Sugar Experiment Stations, and later became Director. During that period of his career he was responsible for notable work in the control of sugar pests and diseases. In 1947 he was appointed Under Secretary.

Mr. Bell's advice was often sought by governments and he held a large number of important posts that included: Chairman of the Brisbane Milk Board; Deputy Chairman of the Sugar Experiment Stations Board; member of the State Development Works Advisory Committee; Deputy Chairman of the Bureau of Investigation of Land and Water Resources; member of the

Queensland Bureau of Industry; Chairman of the United Nations Food and Agriculture Organisation State Committee; member of the Faculty of Veterinary Science in the Queensland University; member of the Commonwealth Scientific and Industrial Research Organisation Council, and Chairman of the C.S.I.R.O. State Committee. He was a member of the Pastoral Land Settlement Royal Commission in 1950; a member of the Committee that inquired into the Queensland-British Food Corporation; and of the Commonwealth Committee of Inquiry into the sugar industry.

Major overseas visits made by Mr. Bell in recent years were: To New Zealand in 1948-49 to investigate the New Zealand system of abattoirs; to England in 1951-52 to attend the conference of the British Commonwealth Sugar Agreement; to Rome in 1955-56 as a member of the Australian Delegation to the 8th Session of the F.A.O. Conference.

In 1954 M. Bell became the first Queensland to be awarded Australia's highest honour in agricultural science-the Australian Medal of Agricultural Science. In 1956 he was awarded the Farrer Memorial Medal in recognition of his distinguished service to agriculture. (*QAJ*, Vol. 84, June 1958, p. 319)

The Australian Institute of Agricultural Science Queensland Branch established the A. F. Bell Memorial Medal awarded annually to the best research project in agricultural science submitted by an undergraduate in the Faculty of Agriculture of Queensland University.

Appointment of W. A. Thompson Summerville as Director-General and Under-Secretary

Dr W. A. T. Summerville, Assistant Under-Secretary (Technical), succeeded Bell as Under-Secretary on 26 June 1958.

Born on 6 February 1904, Summerville joined the Department on 7 March 1922 as Learner in Entomology and served the Department continuously for 42 years. He rose through the positions of Entomologist, Senior Plant Physiologist, Director of Horticulture, Director of the Division of Plant Industry and Assistant Under-Secretary (Technical) to Under-Secretary and Director-General. He left for London on 4 February 1964 as Agent-General for Queensland. The title of Under-Secretary was changed to Director-General and Under-Secretary during 1958-59.

Summerville's early work in entomology consisted of studying mealy bugs attacking paspalum roots in the Cooroy district. He was in charge of the Nambour field station for several years during which time he investigated citrus pests-the spiny orange bug at Gayndah and Rockhampton, the bronze orange bug on the Blackall Range and the citrus root bark channeller at Mapleton. His work on the biology of scale insect pests of citrus published in the *Queensland Agricultural Journal* in 1934 continues to be a standard text. On the control side he introduced oil sprays instead of the cumbersome and dangerous cyanide fumigation. (Passlow, T., "In Retrospect : Entomology and Plants", *Changing Patterns in Entomology*, 1974, pp. 11-17)

Summerville had graduated from the Queensland University with the degree of Bachelor of Science by part-time study. In 1944 the University's highest degree-that of Doctor of Science-was conferred upon him for his research work on the physiology of the banana plant.

Following World War II he concentrated on research work on pastures, wheat and tobacco. He made two extensive overseas visits, to the United Kingdom, USA and Canada, and to

European and Middle Eastern countries. He was a member of the Bureau of Investigation of Land and Water Resources from 1958, a member of the Senate of the University of Queensland and of numerous boards and committees connected with furthering agricultural development. He was President of the Australian Institute of Agricultural Science in 1957.

In 1963 he was made an Honorary Doctor of Laws by Queensland University. He was appointed Agent-General in London and departed for England on 4 February 1964, taking farewell gifts from the staff of the Department which he had served for so long. He was knighted in 1968 and completed his term as Agent-General in 1970. He died in Brisbane on 20 December 1980. (See Chapter 9 also.)

Other staff changes

After the death of Bell, Dr W. A. T. Summerville was appointed Under-Secretary on 26 June 1958 and Robert Veitch, who had retired from the position of Assistant Under-Secretary (Technical) in December 1956, returned on a part-time basis to assist in the inevitably difficult situation caused by the unexpected and untimely loss of Bell. W. Webster, Director of the Division of Animal Industry, was appointed Assistant Under-Secretary (Technical); H. Barnes became Assistant Under-Secretary on 3 September 1959; and C. L. Harris became Special Administration Officer on 15 June 1960. A. L. Clay was appointed Director of the Division of Animal Industry on 10 July 1958, with C. R. Mulhearn as Assistant Director. W. G. Wells was appointed Director of the Division of Plant Industry on 15 May 1958. He retired on 31 December 1958, to be followed by W. J. S. Sloan, Director of Agriculture, on 1 January 1959; Dr L. G. Miles became Director of Agriculture and S. Marriott became Assistant Director from 8 January 1959. W. J. Cartmill succeeded W. G. Wells as Director of Regional Experiment Stations on 13 December 1956, and J. E. Ladewig became Chief Soil Conservationist.

On 11 July 1957 L. G. Newton, Chief Pathologist, was made Director of Pathology at the Animal Research Institute, Yeerongpilly. On 23 April 1957 J. W. Ryley, Chief Husbandry Officer, ARI, was made Director of the new Husbandry Research Branch at ARI. W. T. K. Hall became Chief Veterinary Pathologist on 6 October 1960. On 1 August 1957 A. T. Bell became Director of Sheep Husbandry. On 21 August 1958 A. A. Seawright was appointed Divisional Veterinary Officer (Slaughtering).

In the Division of Dairying, the Director of Field Services, F. C. Coleman, retired on 30 June 1961 and was succeeded by V. R. Smythe on 1 July 1961.

In the Chemistry Branch W. J. Cartmill was made Director of the Agricultural Chemistry Laboratory Branch on 3 August 1961. The Director of Regional Experiment Stations position was abolished and the redesignated position, Senior Agronomist (Research Stations), was taken over by G. H. Allen. W. R. Winks became Assistant Director of the Agricultural Chemistry Laboratory. The Plant Nutrition Section came under F. C. Chippendale, the General Analytical Section came under Chemist W. R. Winks, and the Cereals Section under W. T. Kelso.

In the Horticulture Branch Dr S. A. Trout, on the opening of the "Sandy Trout" Laboratory at Hamilton, became Director and Biochemist of the Food Preservation Research Branch on 4 August 1960.

J. H. Smith became Director of Horticulture on 13 April 1961, with R. C. Cannon becoming Assistant Director on 29 June 1961. K. M. Ward became Chief Horticulturist (Vegetable Crops) at the Redlands Experiment Station on the same date, supervising research and extension services. The Maroochy Pineapple Plant Physiology Laboratory was established at Nambour, with Dr R. F. Black as Chief Plant Pathologist, appointed on 30 January 1962. The Development Planning Branch was created in June 1962, with D. N. Sutherland, Director of Cattle Husbandry, as Acting Director.

On 25 July 1957 C. W. Winders, Officer-in-Charge, Information Services (also Editor), was designated Officer-in-Charge of Information Services. E. T. Hockings was appointed Editor of Publications on 26 September 1957. Winders then took over the interest in Extension Services, with J. R. Wolfe appointed Extension Training Research Officer on 4 December 1958, Training Officer G. A. P. Hunt (10 August 1961), the Extension Survey Officer A. V. Robinson and Extension Methods Officer N. L. Wilson (24 January 1963) and then P. B. Allan (1 April 1963) on his staff in addition to an Agricultural Journalist (A. E. Fisher on 25 February 1954), Science Abstractor and Photographer.

In the Science Branch, J. H. Simmonds, Government Plant Pathologist since March 1923, stepped down on 20 July 1961; B. L. Oxenham took his place on 28 September.

A Wheat Research Institute was established in Toowoomba and T. McKnight, appointed Chief Plant Pathologist on 13 September 1962, went to Toowoomba as Officer-in-Charge. W. A. McDougall, appointed Government Entomologist on 17 February 1949, continued in this position and A. R. Brimblecombe was appointed Deputy Government Entomologist on 30 May 1962. S. L. Everist continued as Government Botanist, and Dr S. T. Blake was appointed Research Botanist on 1 September 1959.

H. S. Hunter retired as Director of Marketing on 30 June 1963 and A. A. Ross, Assistant Director since 3 March 1960, became Director on 1 July 1962, with D. P. Lapidge as Assistant Director. An Economics Research Branch was created in 1958, with C. H. P. Defries appointed Director of Economic Services. He resigned owing to ill health and E. O. Burns was appointed Director on 1 July 1962. A. C. Peel followed A. A. Ross as Standards Officer on 23 June 1960, with A. Hegarty as Assistant Standards Officer from 11 May 1961.

Patrick B. McGovern was appointed Senior Biometrician in the Biometry Branch on 13 February 1958.

Overseas visits by staff

Special leave of absence was granted to several officers to enable them to undertake University and other studies overseas.

J. R. M. Wolfe (Extension Methods Section) completed a course in extension education leading to the degree of Master of Science at Cornell University. He was assisted financially from the Commonwealth Extension Services Grant.

R. C. Menary (Horticulture Branch) obtained a Rotary Fellowship at the University of California, where he did work in plant physiology for a Master of Science Degree from September 1956.

A. W. S. May (Entomology Section) left in June 1957 to visit Hawaii and mainland States of the United States of America in connection with fruit fly investigations. His visit was sponsored by the Australian Agricultural Council.

R. C. Colbran (Entomology Section) secured a Rockefeller Foundation Fellowship at the University of California to undertake a year's study in entomology.

B. J. Crack (Chemical Laboratory) was awarded a King George VI Memorial Fellowship tenable in soil chemistry at the University of California, returning in November 1959.

C. H. P. Defries, Assistant Director of Marketing, visited the United States of America. On his return a new branch, Economics Research, was created in April 1958, with Defries as Director.

Dr B. R. Champ of the Entomology Section obtained a Ph.D. from Cambridge University after two and half years' study leave to study insecticides.

W. J. S. Sloan (Director of Agriculture) visited the United States of America under a Rockefeller Travel Grant from 20 June till 20 December 1957.

J. M. Harvey (Biochemist) undertook a study tour in USA, the United Kingdom and part of Europe during 1959 to work in the field of biochemistry, concentrating on modern techniques in the study of animal nutrition.

C. R. Mulhearn proceeded overseas at the request of the Commonwealth authorities to take part in a conference on tick problems, and also visited institutions investigating animal diseases during his 1958-59 visit.

L. G. Newton visited Japan during this year to check with Japanese authorities on suspected infections of equine infectious anaemia. He also visited the Philippines to assist the trade in cattle from Queensland, with emphasis on pleuro pneumonia testing.

K. M. Grant also made a quick visit to the Philippines in connection with the transport of stock being exported to that country.

V. R. Smythe carried out an assignment for FAO to investigate aspects of dairy technology in Thailand and the Philippines.

S. E. Pegg (Herd Testing) paid a short visit to New Zealand to study herd recording.

J. L. Clayton of the Central Sugar Cane Prices Board and W. A. T. Summerville attended the International Sugar Cane Technologists Conference in Hawaii in May 1959.

T. J. Beckmann (Senior Chemist) visited France, the United Kingdom and USA returning in September 1960.

R. W. Downes (Plant Breeder) and J. G. Morris (Husbandry Officer) undertook Ph.D. studies in USA under Graduate Assistantships, returning with degrees from the Universities of Cornell and Utah.

D. S. Teakle (Plant Pathologist) studied for his Ph.D. degree at the University of California, Berkeley, under an Assistantship and a Fulbright Travel Grant.

T. A. Morris (Dairy Technologist) visited Europe to investigate cheese manufacturing processes in various countries during 1959-60.

D. H. Brice (Dairy Officer) was granted special leave to undertake duty at Ben Cat Dairy Farm, Vietnam, under the Colombo Plan, and W. A. Thomas, also under the Colombo Plan, helped train laboratory technicians in bacteriology in Sarawak.

S. Marriott (Assistant Director of Agriculture) and L. R. Humphreys (Chief Agrostologist) attended the Eighth International Grasslands Conference in the United Kingdom, visiting USA and Africa respectively on their return journey.

J. G. Young (Senior Cattle Husbandry Officer) spent several weeks during 1960-61 in New Zealand studying dairy husbandry practices. F. N. J. Milne (Senior Poultry Husbandry Officer) also visited New Zealand to investigate the marketing of poultry products after completing an assignment for the New Zealand Poultry Board.

T. McKnight (Senior Plant Pathologist) left in March 1961 on study visits to North America and Europe in connection with wheat problems. Special leave was granted to D. I. Sillar (Agrostologist) for a private study tour overseas during 1960-61.

During 1961-62 W. J. Cartmill (Director, Agricultural Chemical Laboratory Branch) left on a tour of USA and the Continent to examine agricultural chemical methods and soil science matters.

Dr S. A. Trout (Director, Food Preservation Research Branch) also visited these countries in connection with food preservation problems.

A. C. Peel (Standards Officer) was official Australian delegate to the International Seed Testing Conference at Lisbon, Portugal and continued his tour to other parts of Europe and USA.

M. D. McGavin (Senior Histopathologist, ARI, Yeerongpilly) secured an Assistantship tenable for 2 2 years at Michigan State University.

C. W. Winders (Officer-in-Charge of Information Services) visited USA, Britain and Holland in May 1963 to examine new developments in agricultural extension.

A. Winterton (Agronomist) also left in May to examine the tobacco industries in Japan, Canada, and the United States.

J. H. Smith (Director of Horticulture) made an overseas visit to study horticultural problems.

W. Pont (Research Plant Pathologist) attended a World Tobacco Conference in Southern Rhodesia and visited other African countries on plant disease problems during 1962-63.

F. Chippendale and A. S. Greasley attended the International Soil Science Conference in New Zealand.

Dr L. L. Callow (Senior Protozoologist) studied tick problems at Rice University, Texas.

In August 1962 R. McD. Beames was granted 22 years' study leave to accept a Fellowship at McGill University, Quebec, returning with a Ph.D.

L. E. Donaldson (Husbandry Officer) was granted a Fellowship by the Australian Cattle and Beef Research Committee and obtained his Ph.D. from Cornell University, Ithaca, New York.

A. J. Croker (Senior Markets Inspector) served six months in Britain and on the Continent on behalf of the Commonwealth Government, examining the condition of Australian apples and pears on arrival.

This record of the seven-year Madsen-Summerville administration constitutes the most productive period in the Department's history with regard to up-to-date information from overseas.

The Department was to lose several of these scientists to other institutions such as CSIRO and the universities, where their expertise was used in further research and teaching for the benefit of the wider Australia. However, most of these officers returned to give the Department a significant lift in its administration, research and extension services.

Highlights of the Madsen-Summerville administration

During O. O. Madsen's term as Minister for Agriculture and Stock tremendous development took place in his Department and in the development of Queensland land industries. Here are some of the highlights of the period.

Laboratories and equipment

Pig Testing Station at Rocklea

In August 1958 the newly erected Pig Progeny Testing Station on the Department's Animal Research Farm at Sherwood Road, Rocklea, was opened. It was fitted with an air-

conditioning unit to ensure that all pigs were tested under equal conditions. After preliminary trials to ensure the efficient working of the unit, the station was made available for testing of stud stock on 31 March 1959.

Poultry Section buildings at Rocklea

Well designed buildings for poultry research including random sampling testing, management and nutritional studies were made available at the Animal Husbandry Research Farm during 1957-58 to assist in the Queensland Poultry Improvement Plan.

Glasshouse, Redlands Research Station

The Vegetable Sectional Group and the Other Fruits Sectional Group Committees of the COD during 1957-58 financed the provision of a 16 000 ft^2 glasshouse at the Redlands Station to be used for work on plant improvement projects.

Food Preservation Research Laboratory, Hamilton

This laboratory, built to provide efficient facilities for research in the physical and chemical changes taking place in stored foodstuffs and on other aspects of food preservation, was occupied in May 1960. The laboratory was equipped to be operated by four sections-Physiology, Food Technology, Microbiology and Chemistry.

Swan's Lagoon Cattle Field Station in the Burdekin River Basin

Thirty-one square miles (about 80 km^2) of open forest country was acquired in 1959 and developed from funds supplied by the Australian Cattle and Beef Research Fund, with advice regarding layout and equipment from local graziers. A herd of 300 Shorthorn heifers and bulls was selected from northern properties as a foundation for the initial research into reproductive behaviour and performance.

Research laboratories at Mareeba

A laboratory erected and equipped specially for tobacco work was in operation on the Parada Tobacco Research Station near Mareeba during 1961-62 and a new laboratory was erected at Mareeba to analyse soil and plant samples from pastures and other crops, which samples previously had been sent to Brisbane for processing. A laboratory unit of the Agricultural Chemical Laboratory Branch was made available in the new courthouse building in Mareeba in 1962.

Wheat Research Institute, Toowoomba

The Commonwealth Wheat Tax Act of 1957 and the Wheat Research Act of the same year improved finance for research. The Wheat Research Act set up a Wheat Industry Research Council and State Wheat Industry Research Committees with growers having the majority representation. Dr W. A. T. Summerville represented the Department on both committees. A Wheat Research Institute, controlled by the Research Committee and financed by a Wheat Research Levy of one farthing per bushel plus a Government loan, was opened in Toowoomba on 1 September 1962. T. McKnight (Officer-in-Charge) and G. Purss, both

Plant Pathologists, J. K. Leslie (Agrostologist) and M. Whitehouse (Chemist), all Departmental officers, comprised the first staff. Professor L. J. H. Teakle was initial Chairman of the Wheat Research Committee.

Divisional Research Centre, Indooroopilly

With the acquisition of land off Meiers Road, Indooroopilly, a start was made in 1962 to develop a research complex to relieve the pressure on the William Street building. An entomology building and agricultural seed store were built in 1962; a virology glasshouse laboratory and a plant quarantine house, financed jointly by the State and Commonwealth Governments, followed in 1963.

Office-laboratory, glasshouse for pineapple research, Nambour

An office-laboratory was erected at the Maroochy Horticultural Research Station and occupied during 1961-62, and a glasshouse was added by the end of 1962. A Chief Plant Physiologist and two other Plant Physiologists were appointed to the Research Station staff.

Artificial Insemination Centre, Wacol, and plans for a Tick Fever Research Station

The Artificial Insemination Centre at Wacol was ready for occupation, in part, towards the end of 1962 and semen was available from early 1963. In addition, there were eight AI distribution centres in Queensland by June 1963, with four others in an advanced stage of planning. Also, 112 acres of land were acquired adjacent to this AI centre and yards and spray equipment made ready for the subsequent establishment of a Tick Fever Research Station.

Granite Belt Horticultural Research Station

The CSIRO Field Station at Applethorpe and its staff were transferred to the Department of Agriculture and Stock during 1962-63 and renamed the Granite Belt Horticultural Research Station to integrate research programmes formerly carried out by State and Commonwealth bodies and to liaise more closely with the industry.

Strathpine farm to study leptospirosis

A farm at Strathpine was acquired to study the spread of leptospirosis among cattle under field conditions.

Demonstration and experimental cotton plot at St George

The Department, the Irrigation and Water Supply Commission and the Cotton Marketing Board established a 48 acre demonstration plot in the new St George irrigation area during 1958-59, as a guide to new settlers.

Departmental organisation

Formation of Biochemical and Animal Husbandry Research Branches

On 12 January 1956 the Biochemical and Toxicology Sections of the Agricultural Chemists Laboratory were combined to form the Biochemistry Branch within the Division of Animal Industry, with headquarters at the Animal Research Institute at Yeerongpilly.

The Animal Husbandry Research Section was raised to branch status during 1957-58, with headquarters at the Animal Research Institute and with facilities at the Animal Husbandry Research Farm at Rocklea. Initially, it was engaged with drought feeding investigations with cattle and sheep and also with copper and phosphorus deficiencies.

Formation of the Economics Research Branch

An Economics Research Branch, with C. H. P. Defries as Director of Economic Services, was set up in 1958 within the Division of Marketing. Economists from this branch were then stationed at country centres as part of a Departmental team. Two university scholarships in Economics were granted during 1957-58, the holders to join the staff on graduation.

Establishment of a Regional Experiment Stations Board

Before 1960 the Regional Experiment Stations were administered by the Division of Plant Industry, but, with the increasing work in animal husbandry and dairying being initiated, an Experiment Stations Board was set up during 1960-61. It consisted of the Directors of the Divisions of Animal Industry, Dairying and Plant Industry, under the Chairmanship of the Deputy Director-General. A Research Stations Section was set up under the Research Stations Board and Station Committees made up of both research and extension staff in the regional offices were formed to determine plans for work to be submitted to the Board for consideration.

Establishment of a Slaughtering Section, Veterinary Services Branch

Because of the increased work in connection with abattoirs throughout Queensland, during 1960-61 a Slaughtering Section, under a Chief Inspector of Slaughterhouses, was established within the Veterinary Services Branch.

Establishment of a Soil Conservation Branch and a Development Planning Branch

A separate Soil Conservation Branch was set up in 1961 and soil conservation work was separated from the Agriculture Branch. In 1962 a Development Planning Branch was formed under the Administrative Division to assist initially in the Brigalow Development Scheme.

Beef Cattle Husbandry Research Committee

An interdepartmental Beef Cattle Husbandry Research Committee, consisting of the Director of the Cattle Husbandry Branch, the Biochemist and the Director of Husbandry Research, was set up during 1962-63 to define the nature of problems of the beef cattle industry requiring research.

Extension highlights

During 1957-58 a plan for the herringbone type of dairy building was prepared by the Architectural Branch of the Public Works Department in consultation with Divisional dairy officers. Copies were printed for distribution to dairy farmers to provide more convenient and speedy milking machine operation. (See "Field Services Branch".)

A Farmers Festival was organised on a farm just outside Toowoomba in 1962-63. Some 10 000 farmers attended and the media were well represented. Besides static displays, machinery was seen in action. The opportunity was taken by Departmental extension officers to set up displays and information booths to bring first-hand up-to-date advice to the public concerning agricultural problems.

Commonwealth Dairy Industry Extension Grant

This was renewed for a further five years from 1 July 1958.

International agreements

A new International Sugar Agreement, which would apply for five years, was negotiated at a Conference held in October 1958. Australia's export quota was increased from almost 632 000 tons to approximately 650 000 tons. Bulk loading facilities for sugar were completed at Mackay, Lucinda and Bundaberg by 1958, at Townsville in 1959 and Mourilyan in 1960.

A new International Wheat Agreement came into operation on 1 August 1959, covering the crops from the years 1959-60 to 1961-62 inclusive.

Prices arrangements

The Commonwealth Government renewed its legislation for guaranteed prices for butter and cheese consumed in Australia plus exports up to 20 per cent of domestic consumption for five years from 1 July 1957. The Cotton Bounty Act Cotton Guarantee of 14d per lb of seed cotton was extended to the end of 1963 to assist expansion of the industry.

Creation of the Australian Wool Board

Late in 1962 the Commonwealth Government passed the Wool Industry Bill to create the Australian Wool Board to control the Australian Wool Bureau, the Wool Research

Committee and the Australian Wool Testing Authority, and to set up a Marketing Committee.

Jubilee of the Animal Research Institute (Stock Experiment Station), Yeerongpilly

On 2 December 1959 the Hon. G. F. R. Nicklin, M.M., Premier of Queensland, unveiled a plaque erected at the Animal Research Institute to commemorate the fiftieth anniversary of the establishment of the Stock Experiment Station there. An Open Day was organised and dairy farmers, graziers and media representatives heard an address by the Hon. O. O. Madsen, Minister for Agriculture and Stock, and then examined the buildings and research work of the Institute.

Creation of a new Bos taurus-Bos indicus dairy breed

A start was made at the Ayr Regional Experiment Station during 1959-60 to develop a milking strain of cattle for the tropics by crossing the Sahiwal breed from India and Pakistan with European breeds of dairy cattle. The Sahiwal animals were supplied by CSIRO. The project was eventually to produce the Australian Friesian Sahiwal (AFS) breed in the early 1980s. New dairy buildings for the project were erected during 1960-61 at the Ayr station.

The overall emphasis in the Department during the period 1957-63

Pasture improvement

The outstanding achievement during this period was the tremendous expansion in the area sown to improved pastures in Queensland on the recommendations of the agrostologists. During 1959-60 alone, some 420 pasture trials were in progress, scattered over most of the State from Cape York Peninsula and the Gulf to the southern border. Finance for this work was received from the Wool Research Committee, the Wheat Research Committee, the Australian Dairy Produce Board and Shell (Chemical) Pty Ltd. Field days on the farms which won the Royal National Association's Pasture Competitions were held on D. F. L. Skerman's property at Kaimkillenbun, a property at Mt Tamborine, "Vinetree Downs" at Blackall and J. L. Fletcher's property at Emu Vale near Warwick.

Measuring animal production

A new procedure for gauging the capacity of an animal to transmit its desirable qualities to its offspring, that of measuring this capacity, was introduced into the Animal Industry Division during this period. It included production performance recording by measuring rate of gain in beef cattle, bull proving by measuring dairy production of a bull's daughters in the dairying industry, fleece measurement by determining clean scoured fleece weight in sheep, pig testing by measuring the economy of food conversion, speed of growth, improved uniformity of carcass quality in pigs and random sample testing of poultry flocks from 1957-58.

The Brigalow Scheme in central Queensland 1962-78

On 4 September 1958 a Royal Commission on Progressive Land Settlement in Queensland was appointed by the Hon. Frank Nicklin, M.L.A., Premier of Queensland. William Labatt Payne, O.B.E., Barrister-at-Law and President of the Land Court, was Commissioner. Payne asked Dr P. J. Skerman, Senior Lecturer in Agriculture, University of Queensland (who had been reared on a brigalow-prickly pear property in the Dalby district) to prepare an article entitled "The Brigalow Country as an Asset to the State", which appeared as Appendix III to the Commission Report published in 1959. Payne recommended that the State should seek Commonwealth assistance for the development of the remaining brigalow lands. The State approached the Commonwealth, and the Commonwealth Bureau of Agricultural Economics investigated the economic justification for development. An agreement was signed in December 1962 whereby the Commonwealth would provide \$14.5 million as a repayable loan for development of areas 1 and 2; this was subsequently extended to \$23 million for the whole of the area available until 1975, repayable by 1995. The agreement with the Commonwealth provided for acquisition and re-subdivision covering a total of 11.2 million acres on the basis that:

- i. existing leaseholders be offered new leases in respect of part of their existing holding on conditions requiring reasonable development without provision of financial assistance under the Scheme;
- ii. at least one-quarter of the new blocks be sold at auction with appropriate development conditions without provision of financial assistance under the Scheme. These sale blocks were to be less than 10 000 acres (4000 ha);
- iii. all other blocks be allotted under selection methods; and
- iv. adequate roads be provided.

The State administered the Scheme through the Land Administration Commission with technical advice from the Department of Agriculture and Stock's Development Planning Branch, which had a very responsible task in classifying the land. Re-subdivision was based on an estimated potential carrying capacity of the blocks of 800-1000 head of cattle. By 1976 the land had been subdivided into a total of 360 bases comprising 170 ballot blocks made up of 132 purchase leases and 38 grazing selections, 77 auction blocks sold as Auction Purchase Freehold (payment over 10 years at 5% interest), and 113 retention areas (12 agricultural selections, 44 grazing selections, 25 pastoral leases, 1 stud holding, 30 grazing homestead freeholding leases and 1 special lease).

The upset prices for the auction leases was \$3.2 per acre but realised \$7.44 in areas 1 and 2, and in area 3 upset prices averaged \$1.60 but realised \$4.52. Applicants for ballots were selected on experience and ready access to \$24 000 for areas 1 and 2, and \$36 000 for area 3. (Land Administration Commission, Department of Lands, *The Brigalow Scheme in Central Queensland 1962-1978*, 15 pp.)

Division of Plant Industry

Agriculture Branch

Wheat

The 1957 wheat crop was seriously affected by drought and any crop which reached maturity was sown on planting rains in June-July and thereafter drew on soil moisture conserved from December 1956. However, the winning entry in the Royal Agricultural Society's field wheat competition yielded 47 bushels of grain per acre of 14.1% protein. It was grown in rotation with lucerne and on well-prepared fallowed land. Problems with wild-oats infestation and zinc deficiency were met. Urea application at planting gave significant yield increases at Pampas, while applications at the short-blade and flowering stage increased protein percentage in the grain.

In 1958 the wheat crop championship went for the first time to a crop of Spica grown on virgin brigalow land with a yield of 47 bushels per acre with a protein content of 16%. An eight year rotation cycle, comparing the effects a grass/legume pasture crop of one, two, three or four years' duration on the yield and quality of succeeding wheat crops, was laid down in 1957. After three years' pasture (mainly lucerne) the soil nitrate nitrogen was four times that of the continuous wheat plots. Two new rust-resistant wheats-Kenora and Hopps-were released by Departmental plant breeders for the 1959-60 season, following the appearance of new strains of stem rust. A new race of rust appeared in the 1960-61 season and a new variety, Gala, was released to combat it, along with Mengavi from Sydney University.

Bulk handling of wheat on farms increased substantially and the Wheat Board's new bulk terminal at Pinkenba handled all bulk wheat exports from the 1959-60 crop. The plant breeders at the Hermitage Research Station were faced with four important races of stem rust: 21-2, 21-4, 21-5 and 34-3.

Between them, the 21-4, 21-5 and 34-3 races could attack all the current commercial wheat varieties in Queensland. Thus breeding for rust resistance was a continuing challenge.

Depth-of-sowing trials on the heavy soil plains at Bongeen showed no yield differences from 1- to 4-inch depths. This finding was important in relation to the use of pre-emergent weedicides and also for dry planting decisions.

Spraying a one per cent zinc sulphate solution at the rate of 10 gallons per acre gave a yield response in four of the five main soil types on the Downs, with wheat, linseed and maize crops; it was shown that zinc deficiency was in fact the main cause of the "long fallow problem" in growing linseed after fallows of twelve months or longer.

Barley

Variety trials during the 1960s showed that no barley variety was better than the currently used Prior. Nitrogenous fertiliser up to 12 cwt of urea per acre increased yields at Pampas and Warwick, but heavier applications impaired the malting quality of the grain.

Oats

Oats has been a major winter grazing crop on the Darling Downs and in coastal districts but crown rust seriously affects yields. Plant breeders at Hermitage screened 84 introduced varieties during 1958-59; they found Benton and Saia resistant to the disease, and Camellia, Floriland and Saia also valuable early oat varieties, while Landhafer and Santa Fe were rust-resistant, late-maturing oats. Comparison of oats, wheat, barley, rye, phalaris and the rye grasses as winter forage showed oats to outyield each of the others in green material per acre.

Maize

During the 1956-57 season the new Q23 hybrid maize based on male-sterile lines substituted well for the old Q23 produced in the field by detasselling the "female" rows, thus obviating the necessity for expensive and laborious detasselling. By 1958-59 Queensland hybrids were available for all districts except the Darling Downs, where D5 hybrids from the New England Tableland were still used, and the Atherton Tableland, where a hybrid that would withstand cob rots in the maize monoculture system still had to be computerised. During 1961-62 a Grafton bred hybrid, GH128, had been grown on over 50 per cent of the annual Tableland acreage, but it had a rather heavy husk cover, making it liable to heavy weevil infestation. At the Gatton Research Station during 1961-62 a yield under irrigation of 123.2 bushels per acre was recorded with a plant population of 16 000 plants per acre, fertilised with 188 lb N to the acre. As population increased, the ears per plant and weight of grains per ear decreased.

Tropical rust was prevalent on the Atherton Tableland during 1961-62 and the plant breeder at the Kairi Research Station introduced African strains of maize into the breeding work. During 1962-63 an early-September-planted maize crop of Q692 fertilised with 2 cwt of urea per acre and irrigated yielded 143.1 bushels per acre.

Sorghum and Sudan grass

Sorghum stubble proved its value for grazing during the 1956 drought, but with the absence of killing frosts sorghum midge caused some damage to the crop. The variety Alpha, bred by Dr L. G. Miles at Biloela, was outstanding in yield, especially in central Queensland. Male-sterile lines of grain sorghum were introduced during 1957-58 to be included in the breeding programme. In Sudan grass, the Sweet Sudan grass developed by the Department had been readily accepted because of its leafiness, better succulence and palatability, less waste in grazing and lowered risk of introduction of Johnson grass, due to the highly distinctive seed coloration of the Sweet Sudan.

During 1958-59 MCPA proved successful for weed control in grain sorghum crops when sprayed at a height of 3 inches. Grain storage in 500 bushel steel silos on the farm was proved successful. The first replicated field trials of hybrid grain sorghums and the first "apprentice" sorghum crossing plots were grown. The hybrids gave consistently higher yields than the standard varieties of Alpha and Early Kalo. In the 1960-61 year the Texas hybrids (4) gave an average yield of 73.1 bushels compared with 53.8 bushels from Alpha. During 1962-63 the first hybrid grain sorghum seed was made available commercially to farmers in Queensland, including Texas 610, Brolga and Texas 630.

Hybrid forage sorghums were also being produced from plant breeding programmes at Hermitage and Biloela Research Stations.

Cotton

A 50 acre cotton demonstration crop in the St George irrigation area showed that the crop would be well suited to this district, that early preparation and October planting should be adopted, that nitrogen fertilisers should be used on irrigated crops, and that studies in planting rates and varieties suitable for mechanical harvesting should be carried out. During 1960-61 some fifteen cotton varieties were tested under different climatic conditions, with Dixie King, Paymaster, D. & P.L. Smoothleaf and Acala 1517 B.R. promising. The effect of climate and cultural methods on lint character was also studied. Time-of-planting trials indicated that planting is risky when the mean screen temperature is less than 60 F, i.e. normally earlier than mid-October. At Biloela an optimum level of fertiliser was shown to be 94 lb of nitrogen per acre. Trials with cotton defoliants prior to harvest showed promise. Diquat at 2 lb per acre and "De-fol-ate" at 10 lb per acre gave excellent leaf drop. The weeds, barnyard millet (*Echinochloa crusgalli*) and black pigweed (*Trianthema portulacastrum*), in cotton were shown to be controlled by diuron. In timing-of-irrigation experiments, highest yields were obtained when 80% of the available moisture was used from the top two feet of soil.

Tobacco

A Tobacco Laboratory was established at Northgate in Brisbane to study the chemical composition of leaf from the Department's field trials. Tobacco grading schools were held at the Inglewood Tobacco Experiment Station at Whetstone and in the Yelarbon Hall in April 1957; they were presided over by V. J. Wagner, Senior Agronomist. Some 200 south-Queensland tobacco growers attended. Tobacco manufacturers were represented by H. Chaffey (Field Superintendent of the British Australian Tobacco Company), who explained the details of grading based on the position of the leaf on the plant. (*QAJ*, Vol. 83, pp. 296)

The qualifying percentages for rebate of import duty for 1959-60 were fixed at 22% for cigarettes and $23\frac{1}{2}\%$ for cut tobacco.

During 1959-60 facilities at the Parada and Inglewood Tobacco Experiment Stations were augmented and the Tobacco Industry Trust Account funds prepared for more intensive research. The first water was available from Tinaroo Dam. A State Tobacco Officers' Conference in May 1960 set out lines for research. Blue mould-resistant varieties were field tested with promising results. Studies on the effect of chlorine on leaf quality were made at Inglewood and it was shown that when methyl bromide is used in seedbed sterilisation the bromine content of seedling plants reaches high levels. Tobacco seed for sale to growers was now packaged under vacuum in plastic pouches immediately following surface sterilisation and retained its viability better in storage.

During 1961-62 CSIRO-bred blue mould-resistant varieties did well, particularly the Sol variety. A chloride survey of the irrigation waters of the Macintyre Brook water supply showed that two small creeks contributed largely to the chloride content. Studies with desuckering were carried out in 1962-63, and the Ca-Mg-P interactions were investigated. A rotation trial showed that a three-year crop of Rhodes grass was the best soil pre-treatment for tobacco.

Peanuts

The practice of sun-drying peanuts in windrows after digging and subsequently using a pick-up thresher was expanding in the Burnett area, but special drying units were needed on the Atherton Tableland and the factors involved in artificial drying were being studied.

A large crop in 1960 with serious marketing problems forced the Peanut Marketing Board to restrict production by establishing two pools for both the Red Spanish and Virginia Bunch varieties. The No. 1 pool quotas were 7000 tons for Red Spanish and 15 000 tons for the Virginia Bunch variety. The chemical 2,4-D at 8 oz acid equivalent per acre was effective as a pre-emergence weedicide for Red Spanish peanuts, but half this concentration is all that the Virginia Bunch variety will tolerate.

Soybeans

More interest was shown in soybean production during 1961-62, when new varieties from Central Africa introduced by CSIRO were tried in north Queensland. At Walkamin Research Station the later-maturing varieties outyielded the early-maturing ones, with Aroyelles yielding 1656 lb per acre. At Millaroo the Batavian Yellow variety yielded 34 bushels per acre. Row spacing in 14 inch rows easily outyielded the crop sown in 42 inch rows. Strains bred by the Department yielded well in 1962-63, with a new strain of inoculum from CSIRO being successful at Hermitage Research Station.

Weed control and weedicides

Weed control became more effective, with the introduction of new weedicides and Departmental officers were kept busy monitoring these chemicals both as weedicides and for crop tolerance.

Weeds in onions were first controlled by DNOC, but later trials found CMU used as a wettable powder at 1-1¹/₂ lb per acre was more satisfactory.

Weeds in maize could be controlled by using 2,4-D at 1 lb acid equivalent per acre as a pre-emergence spray, and up to 1 lb per acre as a post-emergence spray when the crop was 18 inches high.

Peanut weeds could be suppressed by spraying ¹/₄ lb a.e. per acre of 2,4-D or MCPA at ¹/₄ lb/ac on a two months' crop. Virginia Bunch peanuts were more susceptible than Red Spanish to injury.

Grain sorghum could be sprayed at a height of 3 inches with 2,4-D at $\frac{1}{4}$ lb a.e. per acre or with MCPA at $\frac{1}{4}$ lb per acre at three months.

Guava bushes could be killed by a 2 ¹/₂% solution of 2,4,5-T as a basal spray.

Linseed could be sprayed with MCPA or 2,4-D at up to 1 lb a.e. per acre as a preemergence spray. In linseed, wheat or barley "Avadex" as a pre-emergence spray at 1 lb per acre gave almost complete control of a wild oats stand consisting of 85% *Avena ludoviciana* and 15% *A. fatua*. "Carbyne" at 6 ozs a.e./acre was successful as a post-emergence spray at the 1-12 leaf stage of wheat growth.

For cotton, monuron or diuron at 2 lb per acre controlled *Echinochloa crusgalli* (Barnyard grass) and black pigweed (*Trianthema portulacastrum*) at Biloela. At 6 lb per acre it killed *Urochloa Panicoides* at Hermitage and at 4 lb per acre it controlled morning glory (*Ipomoea purpurea*), bell vine (*I. plebia*) and Barnyard grass (*Echinochloa crusagalli*) in irrigated crops at Forest Hill.

Climbing buckwheat (*Polygonum convolvulus*) was controlled by monuron applied at 1 lb a.e./acre at tillering of wheat.

In the pasture field siratro was highly susceptible to 2,4-D amine as a post-emergence spray at ¹/₂ lb a.e./acre but Stylo was highly resistant. Centro and Calopo were intermediate in their reaction. 2,4-D could be used instead of a second cultivation when planting a Guinea grass/Centro mixture.

Pastures

During the 1950s pasture improvement work dominated the field activities of the Department of Agriculture and Stock. Pasture investigations were featured at all the regional experiment stations as well as at the Bureau of Tropical Agriculture at South Johnstone and Utchee Creek at "Brian Pastures" Pasture Research Station. During 1957-58 one hundred and thirty-three pasture experiment plots were established on properties of farmers and graziers, and thirty-three pasture demonstrations in cooperation with property owners were established under the Commonwealth Extension Services Grant, while the Dairy Field Services Branch handled one hundred and eight pasture demonstrations under the Commonwealth Dairy Industry Extension Grant.

Buffel grass (especially Biloela Buffel grass released by the Department), green panic and lucerne proved very drought-resistant. Buffel grass was successfully established in the Cloncurry district in strips two yards wide and twenty yards apart in native grassland.

Specialists and field officers of the Department held a number of field days, field excursions and special schools on pastures. During 1957-58 two schools, one for dairy farmers and one for cattle raisers, were arranged by the Department at South Johnstone Experiment Station, and a dairy farmers' school was organised at Gympie by Nestles Food Specialists (Aust.) Ltd in cooperation with the Department. The RNA sponsored its fourth pasture improvement competition judged by Departmental officers.

Three hundred new introductions of grasses and legumes were received during 1957-58 and distributed for testing throughout Queensland. A special study of the ecotypes of the native Queensland blue grass (*Dichanthium sericeum*) was initiated. Seed harvesting and clearing machines for Townsvllle Stylo (*Stylosanthes humilis*) were developed and the introduction of this legume into native pastures was extending.

The need for lime and superphosphate in establishing and maintaining pastures in coastal areas was demonstrated. Aerial sowing of pasture seed in pulled and burnt brigalow and gidyea scrub country was shown to be successful.

Grazing trials at "Brian Pastures" showed that a weaner steer to 2½ acres of improved pasture could be sustained during a drought year, a performance superior to that of native pastures.

Irrigated pastures of red canary grass (*Phalaris arundinacea*), white clover, prairie grass (*Bromus catharticus*), lucerne and other species proved the value of such green feed during the winter months.

An Agrostology Section was created within the Agriculture Branch during 1959-60 to cope with increasing interest in pastures. New legumes- *Leucaena glauca, Macroptilium atropurpureum, Neonotonia wightii, Centrosema pubescens, Desmodium uncinatum* and *D. intortum, Lablab purpureus* and *Vigna* spp were added to *Stylosanthes humilis* and *S. guianensis* for testing with several grasses, including new strains of buffel grass (*Cenchrus ciliaris*). Lucerne (*Medicago sativa*) remained the outstanding legume for black soils.

Marked responses of legume pastures to lime and superphosphate were recorded in several coastal areas. Mixed grass/legume pastures gave outstanding liveweight gains in grazing animals and provided useful hay. At `Brian Pastures', over the five-year period 1955-60, total liveweight gains per acre from three pastures based on lucerne and native pasture were as follows:

Green Panic and lucerne	472 lb
Buffel and lucerne	469 lb
Rhodes and lucerne	399 lb
Native pastures	178 lb

Such published figures led to a keen demand for pasture seed and 40 tons of Centro seed were imported during 1960-61. Mechanical harvesting of scrobic had been successful near Bundaberg and large quantities of buffel grass were hand-picked or mechanically harvested.

Regional testing of the browse legume *Leucaena glauca* was continued along the eastern seaboard and at "Brian Pastures". *Panicum coloratum* var. *Makarkariensis* and the "Bombatse" type from Rhodesia showed promise on the heavy black soil of the Downs and the Burnett and Mary Valleys. Pangola grass (*Digitaria pentzii* var. *sericca*) had proved productive in damper areas. Two new cultivars of *Sorghum almum*-Nunbank and Crooble-proved almost the equal of Sweet Sudan grass. The establishment of lucerne into native pasture by first burning, then chisel ploughing, autumn sowing of inoculated seed and covering lightly with soil was successful during the three years 1958-60. At South Johnstone Experiment Station during 1960-61 Guinea and para grass pastures with centro as the associate legume produced 730 lb liveweight gain per acre, *Brachiaria decumbens* without a legume 500 lb, at Utchee Creek Guinea grass and Centro produced 750 lb liveweight gain per acre, Guinea and Puero 433 lb, Green Panic and glycine 442 lb and para grass and Puero only 252 lb. Trials proved that stocking rates could be increased to 0.7 acres per beast. Tinaroo

glycine proved the most useful legume associate to Guinea grass, green Panic and molasses grasses on the Atherton Tableland. Three thousand pounds of Tinaroo glycine seed were harvested at the Kairi Research Station and distributed to seventeen farmers. Cutting Mitchell grass hay at various growth stages at Toorak Field Station during 1954-61 reduced the original basal cover from 3% to 0.5%. Silage with a high protein content of 13-15% was made at Kairi Research Station by fine-chopping the material and adding molasses. Fertiliser trials with pastures in various districts showed the general need for phosphorus, nitrogen and molybdenum as trace elements.

Temperate grasses and clovers were produced under irrigation at Biloela and Parada and in the Lockyer. Intervals of four weeks between grazings generally produced maximum pasture yields in summer with a longer non-grazing interval in winter. During 1962-63 several new legumes such as *Desmodium intortum*, *Dolichos axillaris*, *D. biflorus*, the Rongai strain of *Lablab purpureus* and the grass *Brachiaria ruziziensis* showed promise. A Lotononis/Pangola grass pasture at the Coolum Research Station produced a 1.6 lb per head daily weight gain in cattle grazing the mixture, or 1 lb/acre/day for seven months of the year.

Establishment of Buffel grass within the "drip ring" of large poplar box (*Eucalyptus populneum*) trees in western Queensland was excellent and it was found that the soil in these situations had a much higher phosphorus content than that in the inter-tree areas.

The Walkamin Experiment Station was established during 1960-61 within the Mareeba-Dimbulah irrigation area about 10 miles south of Mareeba. It was to be used to investigate the usage under irrigation of certain types of soil that were considered to be unsuitable for tobacco production. By June 1961 approximately 12 acres were laid out for border irrigation of pastures and 20 acres for crop production under irrigation. A series of temperate pastures was planted in April 1961 and gave a good response to the application of 6 cwt per acre of superphosphate and another group of tropical pasture species sown with 2 cwt of superphosphate per acre was established.

Soil conservation

During 1957-58 requests from 1270 farmers for help with soil conservation, added to the 1668 farmers already helped, indicated that farmers were being convinced that soil conservation was absolutely necessary to continuous assured production. The 1956 drought was broken by severe thunderstorms, causing widespread erosion. The Department provided free plans for conservation works and marked out sites for contour banks, waterways and other structures necessary to bring surplus run-off water under control. Protective earthworks were installed on 50 000 acres of cultivated land, of which 25 000 acres were completed during 1956-58, compared with 31 000 acres during the previous eight years.

Burning of crop residues was discouraged and Departmental officers promoted stubblemulching and cover cropping. Strip-cropping to alternate winter and summer crops was encouraged where such a system would fit. Trials to find suitable pasture species for agronomic soil conservation were made and Kikuyu and African Star grass were found suitable on the Downs and the Burnett for stabilising waterways.

Departmental officers, in consultation with Local Authorities and farmers, developed a system of group planning to deal with units of 5000 acres of land with integrated problems.

Each 5000 acre grid required eight man-days of Departmental planning. During 1957-58 some 120 000 acres over twenty-one catchment areas were being group-planned. Three voluntary soil conservation groups of farmers to assist extension officers were formed in that year. Broadcasts, press articles, *QAJ* articles, show society displays and lectures, and conducted tours by extension officers helped to stimulate farmer interest and action.

Interest grew, and in 1958-59 two local Authorities established Soil Conservation Sub-Committees; field planning for 18 000 acres in the Rocky Creek catchment near Pittsworth was completed; and planning commenced on the Missens Flat catchment. During 1959-60 sixteen Soil Conservation extension officers travelled 93 449 miles to provide 3356 farmers with advice and assistance. Spraying the black soil surface of waterways, after planting, with asphalt emulsion at the rate of one gallon per square yard hastened the establishment of Kikuyu grass in waterways through increased temperature and conservation of soil mixture.

Infiltration studies with the black earths of the Darling Downs showed rapid infiltration of rainfall of from 2 to 4 inches in the first hour up to field capacity and then rapidly falls to two points or less per hour within 3-5 hours, after which run-off was rapid.

A Soil Conservation Branch was formed within the Division of Plant Industry in 1961 and staff were appointed to two new areas, Wandoan and Jandowae. The area treated with contour cultivation trebled the next year. Level interception banks on land of less than 3% slope in areas receiving less than 30 inches annual rainfall were effective in the Wandoan and Emerald areas.

Planning of 200 000 acres at Maclagan and 180 000 in the Mt Tyson area was completed during 1961-62. Flood tolerance tests were made on standard Downs crops. Wheat at seedling stage was unaffected by flooding for 2-3 days, but was killed entirely after 8 days. In later growth stages survival was 30% after 14 days.

During 1962-63 the soil conservation staff was increased by 22%; new centres were opened at Roma, Mareeba, Millmerran, Wondai and Yarraman, to make a total of twenty-eight soil conservation extension officers. Earthworks were installed on 1200 acres of tobacco land on forty farms at Mareeba. A plough planter for establishing Kikuyu grass cuttings was developed by a Departmental officer. Soil conservation plans were prepared for 10 000 acres of irrigated tobacco land in the Mareeba-Dimbulah area. The Toowoomba drafting office was developed as the main drafting centre for soil conservation works throughout the State.

In a joint venture with the Water Research Foundation and the Irrigation and Water Supply Commissions, a catchment instrumentation programme was set up with a weir harvesting the 600 acre Galligan's Gully black soil catchment near Pittsworth and another handling a 250 acre red soil catchment near Kingaroy.

A joint salinity survey in the Linthorpe area was conducted by the Agricultural Branch and the Agricultural Chemical Laboratories during 1962-63.

Quarterly regional conferences of soil conservation staff were instituted.
Tea

Tea hedges were planted at the South Johnstone Experiment Station during 1952, 1953 and 1954. The oldest were harvested in 1956-57 with the Tarpen Clipper, yielding 3400 lb per acre in that year, 2600 lb of cured tea in 1957-58, and 2241 lb in 1958-59. The hedges were pruned during April-May 1959.

Horticulture Branch

The three main activities of the Horticulture Branch were research on problems of field production and preservation and storage of horticultural crops; extension activities covering both production and distribution; and regulatory services, which embraced both State and Commonwealth legislation. On the extension side, the formation of a Farm Advisory Committee of growers in the Mary Valley paved the way for more communication between Department and farmers.

Apples

A satisfactory trade with the United Kingdom in apples was established, with a record consignment of 27 000 cases sent from Queensland in February-March 1958. There was a profitable market for Australian apples arriving in the United Kingdom before the end of April. Hormone treatment of Granny Smith apples with 2,4,5 TP was found to advance maturity, thus enabling the fruit to be picked earlier for the overseas market; it was also a successful thinning agent. Chemical thinning of Granny Smith and Delicious Apples with 10 ppm ANA (alpha napthalene acetic acid) at full blossom was successful and for Jonathans a 15 ppm treatment was needed.

A survey of apple stocks during 1961-62 showed that orchards established before 1940 were established on Northern Spy stock but preference was for the more vigorous Merton 778 for all major varieties on replant land and for Jonathan on virgin land. Merton 793 and Northern Spy were suitable for Granny Smith and Delicious on virgin land. Trials with MM (Malling Merton) stocks were initiated at the Granite Belt Horticultural Research Station. Soil management studies showed that straw mulch improved soil moisture. Gibberellic acid was found to improve "staggy" trees of Granny Smith apples.

Bananas

Variability of planting material had prevented accurate trials with bananas. It was found that planting "bits" from plants of the same variety and age gave more uniform stands, and during 1958-59 clones from selected plants of Cavendish, Mons Marie and Lady Finger bananas were built up for experimental purposes. Row spacings of 9 ft \times 6 ft outyielded the 9 ft \times 9 ft system. It was found that yellow leaf of bananas in north Queensland was due to a temporary shortage of available potassium during the February-April period.

Adequate potassium at planting overcame the problems. A spray to control leaf spot in north Queensland was developed by Departmental officers. Trials with weedicides to replace sodium arsenite as a control for weeds in bananas were initiated during 1961-62. Paraquat and amitrol showed promise. Some cold-resistant Cavendish strains were discovered in trials at the Maroochy Station.

Pineapples

Land management studies to develop a system of planting to control soil erosion resulted in the building of equipment to study surface run-off and soil losses at the Maroochy Experiment Station. Gradients of 2-4% were used with inter-row drains, one to every third row, and the main drains were stabilised with coal tar. Soil drainage with mole drains or agricultural pipes had been proved successful. An intercyle 18-month green manure crop of annual legume, perennial legume or a grass to fit in the normal planting season prevented serious yield decline.

Long-term selection of clones for sugar content, per cent citric acid equivalent, slip and sucker production and yield were undertaken from 1958, and by 1960 fourteen selections were planted in field trials.

Fertiliser trials showed that potash applications in the past had been too low and nitrogen too high and a new formulation of 10:2:10 was devised. Applications of potash to the soil before planting increased yield and reduced the amount required compared with basal leaf application every six months. Urea sprays to the foliage were better than sulphate of ammonia base leaf applications as they did not acidify the soil but had to be applied more often. By planting 19 000 plants per acre instead of the usual 14 000, yields were increased by 30%. Weed control with PCP emergence spray gave good weed control and was generally used. Monuron and diuron were effective but dearer.

Flower induction with hormones helped spread the harvest by varying the planting times. Fruit maturity might be delayed up to 10 days by treating with ANA at 100 ppm 8 weeks in advance of maturity, this resulted in an increase in fruit weight of 20% in a summer crop and 12% in a winter crop. Plant size and fruit weight were studied. The planting materials-tops, slips and suckers-were compared. Suckers produced more advanced fruit than slips, while slips produced more advanced fruit than tops. (Cannon, R. C., *QAJ*, October 1960, pp. 635-642)

During 1961-62 a new fertiliser schedule involving a pre-planting 0:4:37 mixture at 1000 lb/acre followed by 10% urea sprays applied at 8 week periods during the cropping cycle was introduced on the heavier soils with additional nitrogen on the lighter soils.

Papaws

Papaw breeding work continued at the Maroochy, Redlands and Kamerunga Experiment Stations, and Hybrid No. 5, derived from crossing Bettina 100 A and Petersen 170, was available for 1959 plantings in southern Queensland. Selections from Yarwun, Sunnybank and Brookfield material were purified for five generations. Canneries took 39% of the winter crop from central Queensland in 1959 to produce tropical fruit salad of mainly pineapple and papaw. Spacing of 8 ft \times 2 ft and thinning to 8 ft \times 4 ft for irrigated papaws gave highest yields at Redlands. Direct sowing of seed into the field or into pots improved field performance. Lopping the young plant at 3 ft produced a strong-branched tree in which each arm carried a crop of fruit.

Citrus

A late-maturing Washington Navel type was selected at Gayndah. Double cincturing of Navel oranges just before flowering every two or three years helped to retain the crop on the tree. Stock-scion trials sponsored by the Citrus Advisory Committe were initiated. The possibility of using ammonia gas to control mould growth during colouring of oranges was investigated. Experiments showed that Emperor mandarins had a storage of three weeks at atmospheric temperature and six weeks at 45 F, while Ellendale figures were 4 and 8 weeks.

Tangors (orange and mandarin hybrids) were promising at Gatton Experiment Station during 1958-59. In coastal areas citronelle stocks were found to be best for Washington Navals and sweet orange for Joppa and Valencia late. Night watering in Gayndah reduced chlorine uptake by citrus. It was found sweet orange seed for planting should be damp dried, packaged in a polythene container and stored at low temperatures. 8 hydroxyquinane sulphate was a suitable mould preventive. Stock-scion trials sought resistance to Phytophthora root and burrowing nematodes. By agreement with nurserymen all budwood for citrus was supplied by or through the Horticulture Branch at Gayndah.

Avocados

The marketing of fruit from seedling avocados affected returns from recognised varieties. Tests showed that a seed cavity not exceeding 20% by volume and an oil content of not less than 10% would be suitable marketing requirements. Restricting of interstate loading of Fuerte until after 30 April recommended by avocado growers eliminated wastes due to immature fruit. Publicity to popularise avocados in southern markets was succeeding. Stockscion trials at Redlands over five years had provided good-quality fruit. Fruit could now be obtained using different varieties to give continuous supply over nine months of the year from April to December. Fuerte, Anaheim, Sharwill, Nabal, Zutano and Edranol provided early fruit; Rincon mid-season and Hass (late season) were popular. Graft wood was supplied to nurserymen. Suitable minimum oil standards for marketing were of 10% for Anaheim, 12% for Nabal, 15% for Ryan, Hass and Sharwill and Fuerte. A physiological disorder, "ringneck", occurred for the first time in Queensland. Seeds were planted in soil enclosed in tarred paper tubes about $10 \text{ in} \times 4$ in. Cleft grafting was practised, and young grafted, trees were available from Redlands in less than twelve months. Fruit volume was influenced by soil moisture. Scion wood of the variety Duke was introduced from Mexico. Fruit maturity time was determined by the size of the crop on the tree and the water regime during the later stages of fruit development.

Macadamia nuts

Macadamia stock-scion trials were conducted at the Maroochy Experiment Station. Rancidity of the kernels in storage was being investigated. During 1959-60 only 130 acres were in bearing for a yield of 30 tons. The processing plant was at Murwillumbah. During 1960-61 the best of the available types were named and described in the *Queensland Agricultural Journal*. Both rough-shelled and smooth-shelled strains were kept at Maroochy and demand for scion wood by nurserymen was expanding. Successful propagation had been achieved by 1963 by using a suitable potting medium, grafting during the winter months, careful matching of stock and scion and meticulous after-care of the graft.

The Macadamia integrifolia strains were easier to graft than the M. tetraphylla strains.

Custard apples

Stock-scion studies were initiated at Redlands to attempt to solve the problems of erratic cropping. The standard commercial Pink Mammoth variety was tried on seven stocks. Two varieties from India were under study. Zinc deficiency appeared at Redlands during 1962-63.

Grapes

At Severnlea the grape varieties Muscat, Waltham Cross and Purple Cornichon were grown on eight Phylloxera-resistant stocks. Muscat grown on its own roots performed best but Rupestris du Lop, Richter 99 and 18804 showed promise for Waltham Cross and Purple Cornichon. At Redlands it was shown that 3306 stock is best for Muscatel Hamburg and R99 for Black Hamburg.

Passionfruit

Following spectacular results at the Redlands Experiment Station the passionfruit industry was revived and nurserymen during 1957-58 were grafting *Passiflora edulis*, the passionfruit scion onto *P. flavicarpa* stock. This stock gives almost complete immunity to Fusarium wilt. Acidity and pulp colour were important in fresh fruit marketing, but flavour was the overriding factor in canning. Flavour was readily destroyed by heat and rapid cooking methods were being designed. *Fusarium*-resistant vines with a *P. edulis forma flavicarpa* stock and a *P. edulis* scion were widely accepted by the industry. Variations in time of cropping had an influence on the occurrence of the virus disease woodiness. Passionfruit which fell from the vine was sweeter than that hand-picked. There was a variation in maturing date of the above hybrids, some fruit maturing in summer, some in winter and some of intermediate maturity.

Strawberries

Time-of-planting trials indicated that March planting of runners produced the highest yields. Harvesting peaked in September. Tanbark mulches gave undesirable residual effects but aluminium-coated polythene mulches were successful. The Phenomenal variety was excellent for the fresh fruit market but not for processing. Packing the strawberries in pectin gel overcame shrinkage and weeping associated with sugar and syrup packs. Yields were improved with superphosphate in both basal and side dressings and nitrogen in side dressings. Breeding work was commenced during 1960-61 at Redlands with crosses between Majestic, Marion Belle and Phenomenal varieties. Runners for commercial plantings were produced by selected growers under the Department's Strawberry Runner Approval Scheme.

Mangoes

Too many immature fruit were reaching the market and studies showed they were fit for market shortly after they reach maximum size. A total solids content of 15% for Kensington and 11% for Common mangoes was adopted as a standard for maturity. Experiments in quick-freezing mangoes were successful and a plant was erected at

Gladstone during 1959-60 to develop an export trade to southern States. New varieties were imported from USA for trial.

Figs

Glace figs for the Christmas trade have to be stored for along period if the figs are processed shortly after harvesting. Experiments showed that fresh figs can be kept in a solution of sulphur dioxide of 0.25% concentration for eight months and then processed satisfactorily.

Ginger

Experiments showed that at the time of flowering the proportion of stringless ginger in the rhizome was almost 50% and decreased at a known rate after flowering. Processors could now control their rhizome intake on this basis. Sunburn was a problem and spacing at 9 inches in rows 2 feet apart reduced this problem. Sawdust mulching was more effective than mulching with plastic.

Tomatoes

Extensive breeding work at Redlands was aimed at producing varieties resistant to leaf shrivelling virus and adaptation to cool growing conditions. Trials at the Ayr Regional Station established Q3 Lady Cunningham and Bowen Red as suitable varieties for the dry tropics. Responses of tomatoes at Stanthorpe and Redlands to superphosphate were recorded. Direct seeding into the field instead of transplanting seedlings gave earlier harvests. An F1 hybrid derived from Q2 and Salads Special at Redlands promised to become an important type for the winter crop at Redlands. Superphosphate banded one inch below the seed promoted early rapid growth after germination.

A cross between Urban and Ace varieties produced a satisfactory *Fusarium* wilt-resistant plant for the Bundaberg area. A 6 cwt/acre dressing of 5:16:5 basal fertiliser was recommended for the red soils at Redlands. Tissue analyses of plants grown at various degrees of compaction indicated that uptake of calcium, potassium and sodium increases with soil density, and phosphorus decreases.

Beans

During 1957-58 two new bean varieties bred at Redlands Experiment Station for rust resistance, yield and pod quality-named Redlands Belle and Redlands Beauty-were released. During 1960-61 Redlands Greenleaf, resistant to rust and angular leaf spot, was released. After several years of breeding work three stringless beans bred at Redlands were released for grower appraisal. The bulk of the bean seed was grown in the Burdekin district. Culinary bean selections were made in the Burdekin and six varieties were released during 1959-60; they were Black Eye, Coralli, Mandaloni, Borlotti, Saluggia and Rossini.

A wide range of Navy bean selections derived from Actopan \times Senelac crosses were available for field appraisal in Kingaroy during 1962-63, all with rust resistance, but selection was continuing to improve other characteristics.

Other vegetable crops

Trials with varieties and fertilisers were undertaken with cruciferous crops, root crops and salad crops.

Food Preservation Laboratory

This was completed in May 1960 and a Food Preservation Branch was created on 4 August 1960 with four sections-Physiology, Food Technology, Microbiology and Chemistry. The building was officially opened by the Premier on 5 July 1961. Physiological investigations commenced with attempts to increase the storage life of Granny Smith apples by treating them for superficial scald with exoyquin and storing in an atmosphere of 16% oxygen and 5% carbon dioxide. Bitter pit could be controlled by two sprayings with calcium chloride or calcium nitrate at 10 lb/100 gallons 14 days apart, the last 7 days before harvest.

Delicious apples picked in early March and held in an atmosphere of 5% oxygen plus 2.5% carbon dioxide stored well.

Stanthorpe pears were best stored at 30°F and could be kept for eight weeks.

Waxing of oranges improved appearance and reduced weight loss. Late season Naval oranges could be stored for 12 weeks at 45°F and Valencia for 10 weeks at 40 to 45°F. Changes in soluble pectin affected the storage life of plums and peaches. Electrical conductivity measurements could differentiate between healthy pineapple fruit and those affected by "black heart". Papaws could be coloured in winter by exposure to kerosene burners at a temperature of 85°F. Wax emulsion dips of 2% paraffin for winter fruit and 6% for summer fruit improved the keeping quality and appearance of bananas.

Food technology studies showed that esters gave pineapples their characteristic flavour and summer fruit had three times the ester value of winter fruit. Three methyl esters, four ethyl esters, one amyl ester, diacetyl and four alcohols were identified by gas chromatography. Evaluation of clonal fruit on the basis of ester value was studied. It was found that flavours could be removed and fractionated before passing through the main evaporation of juices and kept for adding to the final concentrate.

Juice was usually extracted from the first press of pineapple skins, cores and trimings. Studies were conducted in making vinegar from this material. Aerating the juice inoculated with Acetobacteraceti strain 990 for 10 hours to give a high yeast population and then allowing the fermentation to proceed aerobically for another 40 hours produced excellent vinegar. A Working Group on Pineapple Quality was established in Queensland during 1961-62 on the recommendation of the Standing Committee on Agriculture.

An Optimum maturometer Index for picking peas for freezing was worked out for Queensland varieties and an experimental pea viner was obtained to provide accurate samples. Peas planted in June and July at Bundaberg and in the Lockyer Valley gave the best product.

Roasting of macadamia nuts in ovens instead of cooking in coconut oil was compared. *Macadamia integrifolia* nuts had better storage qualities than *M. tetraphylla* nuts.

Over thirty stringless mango selections were tested for suitability for quick-freezing as mango slices.

Departmental officers assisted the Buderim Ginger Growers Co-operative Association producing dried, syruped and crystallised ginger in the determination of the best harvesting time and in the final storage of the product. Storage of ginger in the whole dried form was better than in the ground form.

Tests showed that papaws could be picked for canning a little earlier and artificially ripened to prevent mould wastage common in ripe papaws.

Initial storage at 32°F followed by storage at 45°F gave the best results for Santa Rosa plums. Waltham Cross grapes could be stored at 32°F for two months with or without sulphur dioxide fumigation and Purple Cornichon for four months. Trials were made during 1961-62 with making fig banana paste and banana puree, processing cashew nuts and the accelerated freeze-drying of foods.

A concentration of 500 ppm gaseous ammonia effectively suppressed green mould in citrus in the degreening chamber. Potassium metabisulphite controlled mould in grapes stored in sealed polyethlene bags for 6 weeks at 30°F.

Santa Rosa plums could be ripened artificially to good eating quality by gassing the fruit for 1 to 3 days with 1000 ppm ethylene at 70°F. Storage at 30°F enabled Burbank plums to be kept for 3 weeks Mariposa for 4 weeks. Brown rot of Alberta and Golden Queen peaches could be controlled by dipping for 3 minutes at 130°F or 7 minutes at 120°F in water. Dips in N6 benyladenine allowed brussels sprouts, cabbages and celery to retain their original green colour after 9 days' storage at 70°F.

Food technology. The installation of the Luwa turbulent thin film evaporator allowed pineapple juice to be concentrated to 20% of its original volume and a pilot scale batch of fully flavoured frozen concentrated pineapple juice was produced.

Science Branch

Botany Section

Brigalow. A field survey of all methods which had been used to control brigalow (*Acacia harpophylla*) was begun by R. W. Johnson during 1957-58 and the field work was completed during 1960-61. A draft report was issued during 1961-62 detailing methods used in control, a critical assessment of the problems involved, and lines for further research. A printed bulletin entitled "Ecology and Control of Brigalow in Queensland" was published in 1964 and provided Johnson with his Master of Science Degree from Queensland University. Seasonal conditions markedly influenced the effectiveness of all methods of brigalow control-ringbarking, pulling and aerial spraying-the best results being obtained in the wettest seasons. Clearing with bulldozers and chains needed follow-up work and in the Goondiwindi area stocking with 1-2 sheep per acre on pulled virgin scrub or 5 sheep per acre on pulled sucker country in well-fenced and watered areas when the

sucker regrowth was just appearing was effective. In cattle country, burning some 9 to 12 months after pulling, sowing the ashes with Rhodes grass and keeping the area protected from stock until seeding was an effective control if overstocking, injudicious burning or drought did not occur. Aerial spraying of dense brigalow with 2,4,5-T at 4 gallons per acre (1 lb acid equivalent) in January gave reasonably good control. Low volume ground misting with 1 lb of 2,4,5-T per acre gave good control of brigalow suckers.

Mulga. Drought conditions in south-west Queensland during 1956 made it necessary for many graziers to cut mulga to feed their sheep. S. L. Everist, Government Botanist, visited the region in October-November to inspect areas cut during the 1944-45 drought and to study methods being used to cut down trees. It was found that types of mulga will grow again if managed correctly. Trees that had been pushed or pulled over with machinery were mostly dead but had been replaced by seedlings germinated in 1947. Where fires had been severe during 1950-51 the trees were dead. In most districts ample reserves of mulga existed. An article was written in the *Queensland Agricultural Journal* in conjunction with officers of the Division of Animal Husbandry in 1957 and issued separately as an advisory leaflet dealing also with palatability and fodder value.

Pushing over dense stands of mulga when soil moisture was high led to improved carrying capacity from grass and herbage protected by the fallen trees as well as regrowth from limbs of the pulled but not uprooted trees.

Feathertop wiregrass. It was found that feathertop wiregrass (*Aristida latifolia*) invaded Mitchell grass pastures in wet years and under light stocking and was more prevalent under sheep grazing than under horses and cattle.

Weeds. Two weeds new to the State during 1957-58 included hook thistle (*Carduus nutans*) on the Darling Downs and *Tephrosia tinctoria* from Ingham and Millaa Millaa, both coming in Centro seed. In 1958-59 St John's Wort (*Hypericum perforatum var. angustifolium*) from southern Australia was found at Pechey. Pampas Lily of the Valley (*Salpichroa rhomboidea*) from Victoria was found at Ipswich, snake cotton (*Froelichia floridana*) from USA occurred in central Queensland in imported Buffel grass seed, and torpedo grass (*Panicum repens*) from USA was found in the Brisbane suburbs. During 1960-61 yellow hawkweed (*Tolpis barbata*) from southern Australia was found at Yungaburra from packing material from New Guinea. Horned African cucumber (*Cucumis metulifera*) was found in sugar cane in the Mulgrave area.

Poisonous plants. Ellangowan poison bush (*Myoporum deserti*) was responsible for cattle deaths at Charleville and Miles. Linseed (*Linseed usitatissimum*) flowers and fruit caused the death of eleven dairy cows near Toowoomba due to prussic acid. Fuchsia bush (*Eremophila maculata*) killed cattle at Clermont. *Morinda reticulata*, which contains selenium, caused foot abnormalities in horses at Cooktown. Caustic vine (*Sarcostemma australe*) killed sheep at Winton. Black pigweed (*Trianthema portulacastrum*) killed sheep at Jambin from oxalate poisoning. Weir vine (*Ipomoea calobra*) killed sheep at Roma. Purple Angel's trumpet (*Datura metel*) and candle nut (*Aleurites moluccana*) seriously poisoned young children; young Noogoora burr (*Xanthium pungens*) and crown beard or wild sunflower (*Verbesina encelioides*) caused stock losses. Heart leaf poison bush

(*Gastrolobium parviflorum* and *Macrozamia* spp) caused deaths in stock in 1961-62 and sunflower daisy (*Wedelia asperrima*) killed 1000 sheep in the Richmond district in the north-west, and the next year boggabri (*Amaranthus mitchellii*) killed further sheep in the same district through oxalate and nitrate poisoning.

Weed control. Several serious weeds were examined for the Stock Routes Co-ordinating Board. Harrisia cactus (Eriocereus martinii) assumed serious proportions at Collinsville in 1958-59, especially in dense brigalow, and it was suggested that clearing the brigalow would help stay its expansion. Nut grass in Mareeba tobacco areas was found to be Cyperus esculentis and not the common weedy nut grass. It had been brought in in gravel from the Walsh River bed. Skeleton weed (Chondrilla juncea) was found at Kingaroy and was eliminated with powdered borates at 2000 lb per acre. Soursob (Oxalis pes-caprae) was found at Landsborough and Pittsworth and it was suggested to the Co-ordinating Board that it be declared noxious. Prickly acacia (Acacia arabica nilotica) was expanding at Winton. Johnson grass (Sorghum halepense) was found in new areas. Three sprayings of dalapon at 5 lb per acre at weekly intervals effected some control. Examination of wild oats populations in wheat on the Darling Downs showed that more than three-quarters were grey-hulled Avena ludoviciana and the remainder brown-hulled A. fatua. Damage to the seed by mechanical harvesting improved germination. "Aradex" was found to be an effective pre-emergence spray. "Di-allate" and "Carbyne" were effective post-emergence sprays. Grader grass or Habana oat grass (Themeda quadrivalvis) became serious in cane land in the Mackay-Proserpine area during 1962 after being naturalised in the area since 1935. It occurred on distributed ground and could be killed by two applications of dalapon at an interval of two weeks. Thickhead (Crassocephalum crepidioides), which first appeared in Brisbane in 1955, and Annual Ragweed (Ambrosia artemisifolia), which causes severe hay fever in North America, spread rapidly in the Moreton area and the Co-ordinating Board was asked to keep a close watch on them.

Entomology Section

During 1959-60 two entomologists returned from overseas study to concentrate on fruit fly and nematode control respectively. Two more field stations were established in north Queensland, one to cover tropical entomology and one to expand fauna studies. In 1960-61 an entomologist commenced duties at St George, making nine field stations in the State. In 1961-62 he was transferred to Hermitage Regional Experiment Station to conduct fauna studies. Pens for use in wild duck studies were built at the Animal Health Station at Oonoonba and the Department organised an Interstate Fauna Conference in Brisbane from 12 to 15 September 1960. At Long Pocket, Indooroopilly, a new Entomology Research Laboratory was occupied in early June 1962. Officers attended the Fourth Biennial Conference of Commonwealth and State Entomologists at Perth in October 1961 and the Third Meeting of the Australian Water Fowl Advisory Committee at Sydney in January 1962. A new Entomological Field Station was established at Mareeba to expand research in tobacco pests.

Forest insect pests. The European house borer *Hylotrupes bajulus* was found in imported houses and the State Government engaged contractors to fumigate infested houses; they started in January 1958 and completed the work during the year. Periodic checks for infestation were made for the next few years. The bagworm (*Hyalarcta huebneri*) was

active in *Pinus radiata* plantations at Passchendale, and studies on parasitism, population distribution and the relationship between degrees of defoliation and tree growth were undertaken. Damage by the Kauri pine coccid increased in southern Queensland during 1962 and spraying with dimethoate prevented serious damage to new leaf for two to three weeks. The Gum leaf skeletoniser (*Uraba eugens*) stripped several eucalypts over 1000 square miles of south-east Oueensland during 1961-62, rendering the area useless for honey production. Other insect pests of forest trees dealt with included the cedar shoot borer (*Hypsipyla robusta*), the pine bark anobiid (*Ernobis mollis*), the hoop pine jewel beetle (*Prospheres aurantiopictus*), the large auger beetle (*Bostrychopsis jesuita*), the elephant beetle (*Xylotrupes gideon*) and the processionary caterpillar (*Teara contraria*).

Deciduous fruit pests. The major pests-codling moth, light brown apple moth and fruit flywere kept well in check. During 1959-60 the fig leaf hopper (*Austroasca australica*) and fig leaf beetle (*Poneridia semi-pullata*) were active, and fruit sucking moths (*Othreis* spp.) caused 50% losses in apples at Herberton. During 1960-61 field surveys revealed many new insects at Stanthorpe and mite biology studies were commenced. During 1962-63 the woolly aphis parasite (*Eriosoma Zanigerum*) was active and hard to control but vamidothion eventually subdued it. The apple/dimple bug (*Campylomma* sp.) was abundant in local wattle trees at Stanthorpe in 1963 and moved into apple and pear orchards.

Citrus pests. Oil sprays continued to be effective against white wax (*Gascardia destructor*) and California red scale (*Aonidiella aurantii*) and sulphur was effective against Maori mite (*Phyllocoptruta oleiuora*). The citrus gall wasp (*Bruchophagus fellis*) was prevalent in the Nambour district. A citrus leaf roller (*Psorosticha zizyphi*) from South-east Asia was recorded for the first time in Queensland at Gayndah in February 1961. Fruit sucking moths (*Othreis* spp.) continued to defy effective control measures. The fruit spotting bug (*Amblypelta nitida*) caused heavy falls of young oranges in the Brisbane district during 1961-62. During 1962-63 trials showed that sodium metasilicate was effective in killing the white wax scale.

Tropical fruit pests. Following a survey of pests (of bananas in north Queensland during 1958, research on nematodes (five species), rust thrips (*Cheatanaphotrips signipennis*) and scab moth (*Nacoleia octasema*) was intensified. Effective control measures were found and published. Detailed work on the three nematode pests of pineapples in southern Queensland resulted in satisfactory control measures.

Tobacco pests. The leaf miner (*Phthorimaea opercullela*) continued to cause serious losses and screening trials with insecticides showed the pest had not acquired resistance to commercial insecticides. A new insecticide (WL1650) was more effective than others and for pest control thorough spray coverage was essential. Azinphos ethyl proved outstanding against the leaf miner in Mareeba-Dimbulah during 1962-63. Nematode control with methyl bromide and EDB was studied and a recommended control program for tobacco pests published during 1959-60 with estimates of costs. Recommended spray programs properly applied more than doubled yields of saleable leaf at Parada and Millaroo. Other pests included the bud worm (*Heliothis armiger*) and the lopper (*Chrysodeixis argentifera*).

Cotton pests. Research on cotton pests in the Burdekin and Biloela areas was intensified and technical and extension articles on cotton pests were published during 1958-59. Major pests included the rough bollworm (*Earias huegeli*), the pink bollworm (*Pectinophora cutigera*), the vegetable jassid (*Austroasca viridigrisa*), the tobacco budworm (*Heliothis armiger*) and the cotton looper (*Anomis flava*), the latter being well controlled by endrin at **3** lb per acre as a spray. Tests showed that a soil cover of over 2 inches was sufficient to kill over-wintering larvae of the pink bollworm (*Pectinophora scutigera*).

Vegetable pests. A thorough ecological survey of the bean fly (*Ophiomyia phaseoli*) was undertaken during 1959-61. Fruit fly, tomato mite (*Aculops lycopersici*)-controlled by sulphur treatment-and leaf miner (*Phthorimaea opercullela*) were major tomato pests and the newer insecticides were screened to provide control measures. Volunteer plants were a continuous source of infestation.

Field crop pests. The sorghum midge (*Contarinia sorghicola*) was active on the Darling Downs; a screening trial on insecticides was carried out and a technical paper on chemical control was published. Trials to control the potato tuber moth (*Phthorimaea opercullela*) were conducted in the Lockyer valley and lucerne pests, including the leaf roller (*Merophyas divulsana*), the crown borer (*Zygrita diva*), the leafhopper (*Austroasca alfalfae*), the brown wheat mite (*Petrobia latens*) and lucerne looper (*Zermizinga indocilisaria*), were studied.

Stored products pests. Reports on a wide survey of all major grain pests with suggested control measures were prepared and circulated to interested parties. Studies on peanut storage led to the peanut crop being treated with malathion at intake into the Kingaroy silos. Annotated records of all stored products in Queensland were compiled, and lindane and malathion as grain protectants and their residual effects as to toxicity were studied.

Insect resistance. Insect resistance to insecticides became an important research study.

Nematodes (Nematology). Nematodes received intensive study in relation to tobacco, pineapples, bananas and strawberries and several new host records were listed by R. C. Colbran and new species described.

Miscellaneous. Studies on Coccoidea, Agromyzidae, Dacinae (systematics and cytology), Thysanoptera, Aphididae, Acaroidea, Scarabaeoid larvae and *Heliothis* species were continued.

White ants damaged and faulted several miles of plastic-sheathed telephone cable in southeast Queensland.

Mice (*Mus musculus*) and yellow winged locust (*Gastrimargus musicus*) plagues were dealt with.

Funnel ants (*Aphaenogaster pythia*) affecting pastures on the Atherton Tableland received attention.

Beekeeping. The Honey Flora of south-eastern Queensland, compiled by Dr S. T. Blake and C. Rolfe, was made available by the Department as a book during 1958-59. Extension work covered 3005 colonies in 76 apiaries in 22 localities. On 31 March 1959, the end of the beekeeping year, 1319 beekeepers were registered. The 1959 harvest included excellent honey from yellow box (*Eucalyptus melliodora*). Nosema disease was recorded in apiaries at Parkhurst and Goomburra and in queen bees from USA and Italy. European foul brood was recorded at Rockhampton and American foul brood at Marmadua. A mite (*Acarapis woodii*) was found in queen bees from USA, Italy and New Zealand and a sarcophagid larva from Italy. Inspection and quarantine measures were instituted by the Adviser in Apiculture and Entomologists. Giant toads (*Bufo marinus*) congregating near apiaries caused reductions in bee populations.

Flora and fauna conservation. This activity was covered by the Entomology Section. To the end of some 2733 permits and licences had been issued under The Fauna Conservation Act of 1952 and 624 642 kangaroo, wallaroo and wallaby skins were marketed. By the end of the 1959 calendar year, 506 795 kangaroo skins were sold and from 1 January 1960 to 30 June 576 tons of kangaroo meat, processed from an estimated 45 337 carcasses, had been exported. During 1961-62 a broad survey of the kangaroo industry was completed for publication. A koala film was added to the Departmental series entitled "Serving Queensland". During 1962-63 a booklet, *Queensland Fauna Sanctuaries*, was published to satisfy an increasing demand for reliable information on the locations of the many fine mainland sanctuaries declared in this State and as a first step in rationalising wildlife refuges. Following discussions in Canberra, Queensland became a participant in the Australian Bird Banding Scheme during 1962-63. In the same year an area of 10 860 acres of typical wallum country north of Noosa was reserved for fauna and flora conservation purposes under the control of the Department as trustee.

Centred on Townsville and Brisbane, research on wild ducks and other waterfowl was continued and field and enclosure work with marsupials was started in south-western and north Queensland.

Several honorary protectors (fauna) and honorary rangers (flora) were appointed each year and prosecutions made. Open seasons were declared as necessary. During 1962-63 graziers complained of the spread of cattle tick by the red deer (*Cervus elephas*) in the Crows Nest area.

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Plant Pathology Section

During 1962-63 laboratories became available at the new Wheat Research Institute at Toowoomba, and a regional laboratory at Mareeba was ready for tobacco disease research.

Cereal diseases. Crown rot of wheat caused by *Fusarium graminearum* was found to be more prevalent in years of below-average rainfall. Some control was achieved by employing a long fallow followed by sowing one or two resistant varieties such as Lawrence or Gala or by rotating with grain sorghum. The disease was often associated with frost injury.

In 1958 a new physiological race of wheat stem rust appeared to change the wheat variety preference. Heavy losses occurred with Gabo, Charter, Puora, Koda and Seafoam varieties, and only Spica, Lawrence and Festival showed good resistance. During 1959-60 two more new races of rust appeared and Strain 34-3 destroyed the resistance of Gabo. Hopps, Kenora, Lawrence and Festival showed satisfactory resistance. With the appearance of further new physiological races of stem rust in 1961 all current wheat varieties in Queensland became susceptible. During 1962-63 stem rust race 34-Anz-2,4 was widespread. This race oversummers effectively on *Agrophron scabrum* as well as on volunteer wheat. Spraying with Manebnickel sulphate reduced stem and leaf rust incidence during the dry year of 1962-63.

Leaf blast and head blight of Setaria spp. caused by *Piricularia oryzae* was present in epidemic proportions in Dwarf Setaria (Panicum) in 1957-58. Departmental trials showed that Korean millet (*Setaria italica*) and Nunbank Setaria were immune to it. Covered kernel smut of sorghum caused by *Sphacelotheca sorghi* was more common in soils deficient in nitrogen. Seed teatment with organic-mercurial seed dressings controlled this disease and other pre-emergence and seedling rots, especially of the new hybrid sorghums.

Tropical maize rust caused by *Puccinia polysora*, identified by the Commonwealth Mycological Institute, occurred for the first time in Queensland on the Atherton Tableland during 1958-59. During 1961-62 an epiphytotic of tropical rust occurred, with considerable reduction in yields owing to premature defoliation of the crop. Plant breeding to develop resistant varieties was set in train. In the same year *Diplodia* and *Gibberella* stalk rots and *Diplodia* cob rots were also severe. The *Diplodia* in north Queensland was found to be *D. marospora*, differing from *D. zeae* of southern Queensland.

Peanut diseases. Pre-emergence rot caused by *Rhizopus arrhizus* was controlled by mercurial seed dressings and crown rot *Aspergillus niger* by captan, and so a combined dust consisting of two-thirds mercurials and one third captan was recommended as a seed dressing. Stem root due to *Sclerotium rolfsii* was shown to be controlled by pentachloronitro benzene (PCNB). The disease carried over in crop residues, and tillage methods were studied in an effort to reduce it. Peanut wilt was widespread during 1959-60 and was found to be caused by *Verticillium dahliae*, which occurs also in the weeds Stinking Roger (*Tagetes minuta*) and *Anona cristata*. The disease is common on the better soils. Varietal resistance to the disease was studied. Leaf spot caused by *Cercospora arachnidicola* caused leaf drop and it was found that fungicidal dusting, using Dithane, M45, Antracol and maneb dusts, would control the disease.

Tobacco diseases. It was found that an early mild infection of blue mould would condition a plant against later infections. A survey of tobacco crops in north Queensland in 1958 made by the Queensland Tobacco Advisory Committee found that volunteer plants and root suckers carried blue mould prior to the planting of seedbeds. Benzol fumigation of seedbeds every third night was shown to control blue mould, and spraying with 0.5% maneb and 0.25 % zineb controlled leaf and stem mould in the field. During 1963 a race of blue mould (*Peronopora tabacina*) capable of infecting hybrid tobaccos with *Nicotiana bedneyi* resistance caused considerable damage in the Moreton district. Ascochyta leaf spot (*Ascochyta arida*) occurred in the crops in the border area and was controlled by spraying with copper oxychloride.

Ginger diseases. Ginger rhizome rot caused by *Fusarium oxysporum* was controlled by dipping seed pieces in a mercurial dressing at 2 lb in 40 gallons of water for ten minutes.

Stone fruit diseases. Brown rot of stone fruit at Stanthorpe was controlled by spraying weekly over the month before harvest with captan and ending with one spraying immediately prior to picking. A post-harvest hot water dip at 50°C for seven minutes was an added precaution.

Strawberry diseases. Virus studies were made by making petiole grafts onto *Fragaria* vesca in a project to provide virus-free runners to growers by 1963. Grey mould (*Botrytis*

sp.) was controlled by fortnightly spraying with 2 lb of the 50% captan product in 100 gallons of water at fortnightly intervals.

Banana diseases. After many years' study the cause of leaf speckle of bananas in Queensland was found to be *Mycosphaerella musae*, during 1959-60 air blast machines to apply copper oxychloride/white oil/malachite green mixture successfully controlled leaf spot and speckle if both upper and under surfaces of the leaves were treated. Treatments with 0.5% sodium salicylanilide or a hot water dip at 55°C for two minutes considerably reduced black end and anthracnose diseases in post-harvest fruit.

Citrus diseases. A number of different stocks were tested for resistance to root and collar rot caused by *Phytophthora parasitica*. Trifoliata, Morton citrange and Sour orange were shown to be resistant. An imported strain of Cleopatra rootstock was shown to be more resistant than the current Mildura strain. *Alternaria citri* was proved to be the cause of brown spot of Emperor mandarin and *Phytophthora citrophthora* the cause of brown spot of fruit.

Cowpea diseases. Testing varieties for resistance to stem rot (*Phytophthora vignae*) Races 1 and 2 continued and breeding work provided suitable varieties for release in the Burnett and Darling Downs.

Vegetable diseases. Breeding work at Redlands Research Station was aimed at combining in beans resistances of the Redlands Beauty (to rust, anthracnose, common mosaic and halo blight) with those of 121-2-3 (to rust and angular leaf spot). Tomato breeding was aimed at resistance to winter virus disease problems, mosaic and leaf shrivel (potato virus Y), *Alternaria* foliage and fruit spots, Fusarium wilt, target spot and bacterial canker. Cucumber mosaic (watermelon mosaic) infected pumpkin, watermelon, squash and rockmelons in the Lockyer and Brisbane areas. Maneb sprays controlled the disease.

Powdery mildew of French beans caused by *Sphaerotheca fuliginea* was recorded for the first time in Queensland during 1960-61, and another first was the occurrence of cabbage yellows caused by *Fusarium oxysporum* f. *conglutinans*. The All Seasons Cabbage was the only variety to show resistance. A leaf spot and dry rot disease of lettuce caused by *Xanthomonas vitians* was also recorded for the first time in Queensland, along with Verticillium wilt of watermelons caused by *Verticillium dahliae*.

Forestry diseases. *Phytophthora cinnamomi* was found to be associated with a root rot of *Pinus* trees at Beerburrum in 1957 and later at Passchendale and Toolara nurseries. Preplanting fumigation with methyl bromide prevented root rot. *Pythium ultimum* and *P. splendens* were also associated with root rots, and *Rhizoctonia solani* and *Pythium debaryanum* with damping off of seedlings.

Microbiology. The legume inoculation service expanded significantly between 1957 and 1963 with inoculum distribution centres established at Gympie, Warwick, Toowoomba, Cooroy, Kingaroy, Atherton, Beaudesert, Goondiwindi, Monto, Biloela and Murgon. On 30 June 1961 the free distribution of cultures by the Department was discontinued as commercial firms had adequate supplies of efficient cultures. The Department then concentrated on selecting efficient *Rhizobium* strains for tropical legumes to serve as

mother cultures for the University Department of Agriculture Laboratory Service (UDALS), the New South Wales body controlling the standardisation of commercial inoculum in Australia. Selection of strains tolerating high soil temperatures was an important objective. Mineral deficiencies affecting nodulation were uncovered. The Department continued to supply cultures for field experiments and demonstrations.

Plant Pathology publications

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Chemical Laboratory

C. R. von Stieglitz, Agricultural Chemist, was in charge of the Chemical Laboratory until his retirement 30 June 1961. Then the Regional Experiment Stations Branch was reconstituted as a research facilities section controlled by a Research Stations Board, and the Chemical Laboratory was redesignated the Agricultural Chemical Laboratory Branch, with W. J. Cartmill as Director, W. R. Winks as Assistant Director and W. T. Kelso as Chief Chemist. The objective of reorganising the branch was to decentralise its activities. Staff would be trained in the Brisbane laboratory for country laboratories, which would be under the direction of the Agricultural Chemical Laboratory Branch. New laboratories were constructed at Mareeba and for the Cereal Chemistry Section of the Wheat Research Institute at Toowoomba. The laboratory at Millaroo Research Station was to be staffed by a Soils Physicist and a Chemist. The laboratories at the Tobacco Research Station, Parada, and at Atherton would retain their staff. These laboratories and future laboratories at research stations would allow on-the-spot investigation of district problems by a team of scientists and would provide field training for chemists to bring them into direct contact with field problems through cooperation with extension staff. The Chemical Laboratory consisted of a Plant Nutrition Section and a General Analytical Section.

Plant Nutrition Section. This section was heavily involved in soil surveys, mapping and soil analyses in relation to irrigation development. From 1957 to 1961 the Mareeba-Dimbulah irrigation area was surveyed especially for tobacco irrigation, including 4500 acres in the Atherton Creek, 6000 acres in the Right Bank Walsh, and 12 000 acres in the Walkamin-Mareeba areas during 1958-59. Deficiencies of calcium and potassium were found in the main soil type, the Walkamin clay loam. During 1959-60 a further 315 000 acres were surveyed in the East Barron Section and Granite Creek, and in 1960-61 another 15 000 acres of first-class tobacco soil was found, but also about 3000 acres of badly structured soil (the Arriga Complex), which might possibly be suited to irrigated pastures. The suitable tobacco land occurred on slopes and soil conservation methods would be needed to bring it into production.

Reconnaissance soil surveys were made of 486 000 acres in the Dawson Valley and 147 000 acres in the St George area. Mapping was done at the Great Soil Groups level during 1956-57 of the Clohesy-Davies-Creek area near the Mareeba survey, the Upper Herbert River, the Quilpie area, in the Bowen River-Broken River area during 1962, and for a site for a new research station near Moura.

Soil salinity investigations were carried out near Currumbin during 1957-58. A floodgate was installed, sugarmill mud was applied and para, kikuyuand paspalum grasses were established. The soil originally had a pH of 5.3 and chlorides ranging from 0.35 to 0.67%. Mole drainage at 12-14 inches below the surface further improved the soll and reduced the chloride content. The application of gypsum also had a beneficial effect. Salinity studies were extended to the Darling Downs.

Fertiliser trials conducted in conjunction with other branches showed a response to zinc on the Darling Downs by linseed and to urea by wheat, a response to nitrogen and phosphorus together on brigalow soils, and a response to sulphur by tomatoes at Redland Bay.

Chemical analyses of tobacco leaf from the various soils in the tobacco districts occupied a good deal of time, the analyses being done at the Northgate Tobacco Research Laboratory. The chlorine content of leaf varied with the watershed in which it was grown, and leaf composition varied with the fertiliser application made during growth. At Millaroo, leaf from the top half of plants irrigated by furrows in alternate rows and rain-grown crops was significantly lower in chlorides than that irrigated by the normal furrow method or by sprays. Analyses of tobacco seedlings showed that the tobacco plant can absorb bromine up to 1% of its total dry weight when the seedbeds are treated with methyl bromide fumigation before sowing. "Flatleaf" of tobacco was found to be associated with the amounts of chloride and nitrate absorbed by the plant, along with other factors.

Soil physical conditions in relation to irrigation were investigated at laboratories made available in Brisbane and Millaroo from 1962.

The Cereal Chemistry Section monitored wheat quality in relation to rotations, fertilisers, etc. Wheat after lucerne and pasture had a high protein content. At the Wheat Research Institute in Toowoomba correlations between laboratory data and field performance were being worked out.

Pasture research at Coolum Research Station involved extensive plant nutrition data.

Normal analytical determinations for water, dairy products, fertilisers, etc. were carried out in the General Analytical Section.

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Division of Animal Industry - W. Webster, Director

The Division of Animal Industry in 1957-58 comprised seven branches. Four of these were field branches-Veterinary Services, Sheep Husbandry, Cattle Husbandry and Pig and Poultry-and there were three associated research branches-Pathology, Biochemistry and Animal Husbandry. The research branches were located at the Animal Research Institute, Yeerongpilly, and the nearby Animal Husbandry Research Farm at Rocklea, as well as at the Animal Health Station, Oonoonba, Townsville. The three research branches at Yeerongpilly were housed in the one building. A new small animal block and a large well-equipped store were provided during 1957-58 and a large modern autoclave was provided.

Veterinary Services Branch - C. R. Mulhearn, Director

Cattle diseases

Compulsory tuberculin testing of dairy cattle continued with the help of private practitioners and during 1958-59 some 900 000 head of dairy cattle were under regular testing. Departmental veterinary officers undertook the testing of milk supply, herds to towns such as Chinchilla, Miles, St George, Emerald and Clermont which were not covered by the compulsory testing areas as a public health measure. A subsidised mileage system was adopted in some areas to reduce producers' contributions. There was difficulty in obtaining enough veterinary help from private practitioners in the early 1960s. However, the number of reactors to the tuberculin test was declining.

Contagious pleuropneumonia was brought into southern Queensland during 1959-60 in a load of cattle brought by sea from Darwin. This led to the creation of a protected area being declared from Rockhampton south and as far west as Wandoan and Bonshaw. Cattle could only enter this area if they had been depastured in Queensland during the previous three months. A National Pleuropneumonia Fund was established in 1961 by contributions from all the mainland States and additional staff were appointed to concentrate on the eradication of pleuroneumonia. In cooperation with the Commonwealth and State meat inspection services, returns were obtained of the incidence of lesions in all cattle killed at the principal meatworks. Specimens derived from meatworks were tested by cultural and serological methods. Slaughter cattle from properties between the Great Dividing Range and the Expedition Range in central Queensland were blood-sampled at killing works with a view to including this area in the "protected area". Properties on which bovine contagious pleuropneumonia (BCPP) was detected were quarantined, clinical cases were destroyed, and the remainder vaccinated. Quarantine restrictions were not lifted for six months after the last known case. The eradication programme was suspended in October 1961 because of adverse seasonal conditions, but reactivated in April 1962 with fourteen experienced officers including a Divisional Veterinary Officer. Visits were made to 800 properties and 300 000 cattle inoculated under supervision, and the Dawson Valley and the country south of the Charleville railway line between the Maranoa and Warrego Rivers were declared "protected" and pleuro "free" areas respectively. The incidence of active BCPP in the field during 1961 was the lowest recorded in Queensland. No active cases were found in travelling cattle or station cattle on properties. Only two individual cases were recorded at meatworks and one of these originated directly from another State. As at 30 June 1962, only three properties were under quarantine restrictions and two of these were due for release. (See Chapter 9, "The Eradication of Pleuropneumonia.")

Sterility diseases including brucellosis, vibriosis, trichomoniasis and leptospirosis were common. Vaccination with Strain 19 for brucellosis and leptospirosis and sulphadimidine against vibriosis were instituted. Artificial insemination helped to reduce the incidence of these diseases.

External parasites. Cattle ticks were found on properties outside the declared areas in the Toowoomba-Jandowae and South Burnett areas in late 1958 and early 1959, requiring quarantine measures in 97 holdings. By 1962 the chlorinated hydrocarbons had been replaced as dipping fluids by organic phosphorus compounds due to tick resistance to the

former. The organic phosphorus compounds also give protection against the buffalo fly for up to eight days.

Poison plants continued to cause losses. Heavy losses from Gidyea pod poisoning occurred during the 1957-58 dry season. Cattle were also poisoned by weir vine (*Ipomoea calobra*) on the western Downs and treatment with cobalt bullets appeared to protect them from this problem. Yellow wood (*Terminalia oblongata*) continued to poison cattle in the Emerald-Duaringa area.

Diseases of sheep

Pregnancy toxaemia was prevalent on the Darling Downs and glycerine therapy was applied. During 1958-59 an extensive survey of the incidence of *Coxiella burneti* in sheep, cattle and kangaroos was undertaken with the Health and Home Affairs Department.

During 1960-61 ovine brucellosis in rams was prevalent on the Darling Downs and in the Burnett area amongst British breeds; a survey in 1961-62 showed the incidence was less than 2% and eradication would be possible. With the development of crop feeding the fat lamb industry enterotoxaemia was becoming more common where prophylactic measures were not employed.

Diseases of pigs

A survey of pig diseases during 1961 showed that 50% of outbreaks and 70% of losses from infectious disease were due to salmonellosis and pneumonia (including virus pneumonia). Erysipelas and oedema were responsible for 8% and 10% respectively, Glassers disease for 4%, streptococcic septicaemia for 3.5% and tetanus and piglet anaemia for 2%.

With outbreaks of swine fever in New South Wales and Victoria during 1961-62, all pigs and pig meat products were prohibited entry to Queensland.

Diseases of horses

A fatal debilitating disease of horses was recognised on two properties in central Queensland during 1958-59 and confirmed as equine infectious anaemia in the Mackenzie River area in 1959-60. Quarantine was introduced but removed during 1961-62 when no cases were detected during the year. Selenium poisoning from ingestion of *Neptunia amplexicaulis* at Richmond was recorded.

Diseases of poultry

Vaccination against infectious laryngotracheitis effectively kept this disease in check and drugs contained coccidiosis. During 1960-61 streptococcal septicaemia caused by *Streptococcus zooepidemicus*, the first record of this disease in Queensland killed 55% of laying fowls on a Brisbane property.

Quarantine

The Veterinary Services Branch is responsible for quarantine. The surveillance of imported animals and particularly of live animals exported to the Philippines, New Guinea and United States (reptiles) was supplied.

Slaughtering

The setting up of District Abattoirs at Townsville and Ipswich during 1958-59 and subsequently at Toowoomba and Bundaberg by 1960, with other centres preparing for them, helped meat inspection in country areas. A Divisional Veterinary Officer (Slaughtering) was appointed during 1959-60 to head a Slaughtering Section and a Senior Veterinary Officer was appointed to each of the District Abattoir Boards operating. Restrictions on the introduction of meat into the Brisbane area were introduced during 1959-60. A carcass branding system was introduced at the Cannon Hill Abattoir.

All beef carcasses were classified as ox heifer, cow or yearling and marked accordingly, and a "prime" grade was so ribbon marked. This system was introduced into district abattoirs. Retailing of meats was also upgraded and hygiene improved, and pre-wrapped meat cuts became popular.

Brands

Revised copies of the *Horse and Cattle Brands Directory*, complete to the end of 1957, and the *Sheep Brands and Earmarks Directory*, complete to the end of 1958, were placed in the hands of the Government Printer in May 1959 and June 1959 respectively.

Pathology Branch-L. G. Newton, Director

This branch was formed in 1957 when the Research Branch was separated into husbandry and pathology interests. The functions of the branch were four-fold-the performance of laboratory techniques to aid in the diagnosis of disease, research into problems of various research committees involving pathological examination, the immunisation of cattle against tick fevers and the preparation and distribution of vaccines. To facilitate the working of the branch several sections, including diagnostic pathology, histopathology, protozoology, bacteriology, serology and parasitology were set up. The most important function of the branch was examination of specimens for diagnostic purposes. Serological tests were made as an aid to diagnosis, particularly of pleuropneumonia and brucellosis cattle being exported to the Philippines.

Poisonous plants

Feeding tests and post-mortem examinations identified some thirty-one plants that had poisoned stock during the 1957-62 period. Poisoning from the negilgence in using arsenic caused numerous deaths and occasional cases of lead Doisonina were met with.

Pasteurellocis, botulism, melioidosis

Bacterial diseases investigated included Pasteurellocis in cattle, enterotoxaemia in goats, botulism (coast disease), *Salmonella pullorum* in chickens, Streptomyces from lung abscesses, also *Actinobacillus lignieresi* and *Pasteurella multicoda* from lungs and *Bordetia bronchi septica*, the first record in Queensland from a pneumonic lung of a pig. *Serratia marcesans* was isolated from eggs with a pink colour throughout. Melioidosis caused by *Pseudomonas pseudomallei* was diagnosed from several animals, especially pigs and sheep. Infection through muddy water was found to be the main cause. In north Queensland *Pseudomonas pseudomallei* has been isolated from sheep, goats, pigs, cattle and horses from abscesses in various sites of the body including viscera, joints and brain. Serological methods of diagnosis were studied, concentrating on a complement fixation text for sheep and a haemagglutination test for sheep. Mastitis was found to be caused by several organisms - mainly *Streptococcus aureus*, then *Streptococcus agalactiae*, *S. uberis*, *S. bovis* and *S. dysgalactiae*.

Tick fever

Considerable research was undertaken by the Pathology Branch into tick fever of cattle, as well as providing vaccines to the industry. Testing of new chemotherapeutics was one avenue of research and resulted in the changeover from DDT to organic phosphorus acaricides such as "Asuntol" for dipping.

Studies on *Babesia argentina* showed that a steer infected with it could transmit the infection for up to five months as a "bleeder" but subsequent monthly "boosting" was not recommended. The 5 mL dose of blood sometimes did not confer immunity but a 100 mL dose always did. Calves from immunised cows showed marked resistance to *B. argentina* for some six weeks after birth, made possible by antibodies received from their mothers in the colostrum. Attempts to infect laboratory-bred ticks with the vaccine strain of *B. argentina* were unsuccessful so the spread of tick fever by blood vaccine is unlikely. Infection of the cattle tick (*Boophilus microplus*) with *B. argentina* takes place only when ticks are in the adult stage during the febrile period of tick fever.

The seasonal incidence in Queensland of babesiosis due to *B. argentina* was illustrated by recording 13 cases between July and September, 43 cases between October and November, 103 cases between January and March, and 49 cases from April to June.

Studies of vaccines showed that:

- 1. *Babesia* are fragile and may be killed by excessive handling at room temperatures or higher atmospheric temperatures;
- 2. antibodies present in the vaccine at the same time as the parasites may make the parasites ineffective;
- 3. there is a minimum number of parasites required to cause a reaction;
- 4. the time between inoculation and reaction can be varied by varying the number of parasites; and

5. there is no difference in the severity of the reaction between 10 000 and 100 000 000 infected parasites.

Brain smear techniques provide a simple method for detecting carriers of *B. argentina* and cattle have been shown by these techniques to carry *B. argentina* for two years after removal to tick-free country. Deep-frozen *B. bigemina* at -79° in dry ice and an alcohol bath produced infection after 30 days' subsequent storage.

The incidence of tick fever infections during 1962-63 was 194 cases caused by *B. argentina*, 22 cases caused by *B. bigemina*, and 27 cases caused by *Anaplasma marginale*.

Leptospirosis

During 1962-63 the original Skerman property, "Rockangle" at Strathpine, which had been resumed for the future Pine River Dam, was acquired by the Department in the meantime for epidemiological work on leptospirosis, and for breeding cattle to obtain calves and weaners for experimental work. The land was expected to be available for eight to ten years.

Coccidiosis in poultry

Research showed that the coccidostat nicarbazine when fed continuously at a rate of 0.0125% in the ration is very effective in preventing deaths from experimentally induced caecal coccidiosis.

Equine infectious anaemia

During 1958-59 a disease in horses caused by a virus resembling equine infectious anaemia was met with in central Queensland, the first time this disease was suspected in Australia. Serum from infected horses was taken to Japan for testing and the disease was confirmed as equine infectious anaemia. Blood smears sent to USA showed that infectious rhinopneumonitis is also present in this State. A satisfactory procedure for the confirmation of equine infectious anaemia was developed. Siderocytes are frequent in blood smears prepared from white blood cells.

Serological Tests

As an indication of the work performed by the Pathology Branch, the serological tests conducted during 1960-61 are listed.

	Yerongpilly	Oonoonba	Total
Brucellosis - cattle, pigs, sheep	8 555	1 471	10 026
Leptospirosis - cattle, pigs	6 956	1 616	8 572
Contagious pleuropneumonia	4 658	883	5 541
Actinobacillus - sheep	3 852	-	3 852
Vibriosis - cattle	2 456	270	2 726

Staff

Pathology Branch policy was to interchange graduate staff between the Oonoonba and Yeerongpilly laboratories. During 1961-62 W. T. K. Hall and L. Laws returned to Yeerongpilly from a five-year term at Oonoonba and Dr L. Tammemagi and L. Y. Johnson replaced them. D. Griffith (Parasitologist) was transferred to Oonoonba in 1961 but resigned, and Miss M. Lucas, B.V.Sc., was sent to Oonoonba as Bacteriologist. M. D. McGavin, M.V.Sc., Senior Histopathologist, left to undertake two years' postgraduate study at Michigan State University.

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Animal Husbandry Research Branch-J. W. Ryley, Chief Husbandry Officer

In 1954 a Husbandry Section was formed within the Research Branch to concentrate on problems associated with the feeding, breeding and management of livestock. In 1957 the Animal Husbandry Research Branch was formed as a separate entity with headquarters at the Animal Research Institute at Yeerongpilly and the main experimental facilities at the Animal Husbandry Research Farm at Rocklea. The 350 acre farm was subdivided into small paddocks; roads and drainage channels were provided; a building to individually house 40 cattle and eight small yards were built for group feeding experiments; cattle working yards, a weighbridge, a photogrid and a steel dip were provided; and fifty acres of cultivation for crops for use in nutrition experiments were brought into production.

Projects concerning the nutrition of livestock included studies on drought feeding of cattle and sheep, mineral deficiencies of cattle and sheep, and the influence of management on cattle grazing paspalum pasture. Cooperation with the Biochemical Branch and Division of Plant Industry was arranged. The major project in animal breeding was concerned with the collection, processing and distribution of semen for use in bull proving, a bull proving scheme being commenced in 1955.

During 1959-60 twelve small concrete pens were built for feeding experiments.

Artificial Insemination Centre

In April 1960 seventy acres of land on the Mental Hospital Reserve at Goodna were obtained upon which to build an Artificial Insemination Centre.

In February 1961 an officer was appointed to oversee the construction of this centre at Wacol and he visited southern artificial insemination centres to compare notes. The Centre was opened on 17 December 1962; it consisted of a laboratory and administration block, a combined feed and machinery shed and 50 pens for bulls. The Centre was established to supply semen to commercial distribution centres, collaborate with the Cattle Husbandry Branch and Herd Recording Section in proving AIS and Jersey bulls, and undertake research on some aspects of bull fertility in a subtropical environment.

Bull proving projects were operating at Nambour-Maleny and Nanango-Kingaroy during 1957-58, with approximately 47 farmers each with AIS and Jersey cattle respectively cooperating. The non-return to service rate was 59.9% for Jerseys and 45.8% for the AIS. Deep frozen semen was being prepared at Rocklea as an insurance against injury or death of bulls. A Samford unit was established by the Department in 1959 with AIS cattle, and a non-return rate of 72.5% was achieved. A Beaudesert unit commenced on 6 June 1960. Daughters of Jersey bulls under test completed lactations during 1960-61 and three bulls were retained in the service. During 1961-62 the non-return rate at Nambour was 64.7%, at Kingaroy 54.8% with chilled semen, and 70.5% at Samford with deep frozen semen. AIS

bulls do not reach maximum fertility until after 18 months. Friesian, Guernsey and Hereford bulls were added to the suite of breeds available when the new Wacol centre opened.

Semen extended in 20% egg yolk/glycine stored better than that in 50% egg yolk/citrate of 10% glycerol in milk. When the Wacol Artificial Insemination Centre was opened on 17 December 1962 the number of bulls stationed there was: AIS 24, Jersey 28, Friesian 5, Guernsey 2, Ayrshire 2, Hereford 2 and Aberdeen Angus 1.

Drought feeding experiments

Bush hay of 4.6% crude protein maintained maiden heifers of 18-24 months of age for 6 months, and with a supplement of lucerne chaff, meat meal, crushed sorghum or oats they maintained or increased weight. The use of bush hay of 3.1% crude protein on 13-monthold heifers was disastrous, even with some supplementation of 2 oz urea plus 1 lb crushed sorghum per day. It was shown that drought feeding should commence when animals are in good condition and heavy supplementation is necessary with low-quality hay.

Feeding heifers with sorghum silage of a crude protein content 5.2% kept them alive for 28 weeks with an average weight loss of 10 lb per month. Supplementation with urea raised the ration from a survival to a production ration.

Merino sheep survived for 22 weeks on sorghum silage plus 8 g of urea per day. Fifteen- to eighteen-month heifers fed 3 lb crushed grain sorghum per head per day plus 1% ground limestone mixed with the grain remained strong, over 27 weeks losing 10 lb per head per week over the first 9 weeks and 3.3 lb per week over the final 18 weeks. With twice-weekly feeding of the 3 lb crushed grain per day ration, maiden heifers over a 26-week period lost weight to the extent of 98 lb but recovered this weight after 9 weeks on pasture.

Feeding of bagomolasses (70 parts molasses to 30 parts bagasse) up to 5% of a fattening ration was feasible, but the high cost per feed unit of transporting molasses could rule this ration out on economic grounds.

Hereford breeders grazing paspalum pastures and consuming an average of 7.9 lb per head per day of molasses showed no response in body weight or feed intake to molasses. Supplementation of low-quality pasture, however, with a molasses urea mixture fed daily resulted in increased consumption of hay and response in body weight and this system could be useful during winter in parts of Queensland. When feeding urea it was found necessary to pre-mix urea with 1.5 times its weight of water. Low concentrations of urea in a urea-molasses mix result in high and uneconomic consumption, while high concentrations are dangerous.

Drought feeding of pregnant cows with sorghum silage of 4.3% crude protein was insufficient to maintain production. With the addition of 2.5 oz of urea per head per day performance was satisfactory.

Nutrition trials

Pregnant heifers could be maintained with 8 lb sorghum grain per head per day. Experiments with early weaning of beef calves during drought showed that at an average age of 62 days a ration of 50% lucerne chaff and 50% sorghum grain would permit early weaning. Supplementing weaner cattle grazing paspalum pasture with 2 lb per head daily of a mixture of 75% kibbled sorghum grain and 2% linseed meal gave a weight advantage over pasture grazing only of 56 lb per head after 28 weeks' feeding. Later experiments showed rotational grazing to have no advantage over set stocking. Comparisons between wheat grain and sorghum grain for pig feeding showed little difference. A molasses/urea/salt block proved a satisfactory method of supplementing cattle with urea in the field.

Hormone implants increased daily weight gain from 2.2 lb per day to 2.8 lb day. Feedlot studies were conducted during 1961-62. Finishing time decreased and efficiency of feed conversion increased with grain percentage. 60 grams of urea per head per day caused a marked increase in daily feed intake, rate of body weight gain and efficiency of feed conversion.

Grazing trials with irrigated paspalum pastures showed that stocking rate would have to be increased during the early summer growing period or fodder conserved to make full use of the pasture.

Genetics

A genetic analysis was made of the Large White breed of pigs and the behaviour of sheep on three feed regimens.

Studies on carcasses produced by feed lotting showed that there is a linear relationship between the per cent fat in the 9th, 10th and 11th rib cut section and the specific gravity of the carcass; there is a disproportionate increase in yields of commercial cuts of meat during feed lotting, with the main increases in the ribs, sirloin and total fat trimmings, and the fat becomes softer with feed lotting.

In feeding chickens, rations with 10.5% protein yielded poor growth; maximum growth rate was achieved with a 19.5% ration. Feed conversion efficiency increased with protein level and decreased with age of bird, but did not differ between breed type, and heterosis by mating Australorp sires with White Leghorn hens was twice as great as with the reciprocal cross.

Studies of sexual maturity of bulls of the AIS breed gave an average age of 47.2 weeks at a bodyweight of 647 lb, while with Jerseys the average age was 41.8 weeks at a body weight of 462 lb.

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Cattle Husbandry Branch-D. N. Sutherland, Director

The Queensland dairying industry had shown no increase in output per animal for 20 years. The use of irrigated pastures had been shown on Departmental Research Stations and private farms to be the most economical method of improving production under Queensland conditions. In non-irrigable farms, increased production could be achieved with the use of improved pastures, grazing crops and fodder conservation, requiring mechanical equipment on a large scale. This meant larger farms. With increased production, an overall increase in butterfat production would produce a surplus and lower prices, so diversification of production was required.

Beef production increased dramatically after World War II and the United Kingdom market became selective, requiring carcasses less than three years of age and without excessive fat, and a decision was made to pay a premium of 2d per lb for beef of this desired quality.

Producer schools were held by the Branch during 1957-58 at "Canobie", Cloncurry, Townsville and South Johnstone for beef producers, and four on the Atherton Tableland and one each at Gympie, Kingaroy, South Johnstone and Daintree for dairy farmers. They were well attended.

During the years 1952-57 the Branch obtained local data on:

- 1. growth rates of beef cattle in various districts;
- 2. growth rate performance on improved pastures and crops;
- 3. performance of cattle of different breeds in various environments of the State;

- 4. breeding performance, reproductive data, etc. from the "Brian Pastures" herd;
- 5. feeding of cattle on low-quality roughage and the effect and value of supplements to same.

Dairy recording and herd breeding surveys provided valuable information and the artificial insemination units in cooperation with producer units were well supported.

Beef cattle investigations

Drought in 1957 reduced weaner weight gains to 68 lb compared with 257 lb for 1955 and 202 lb for 1956. A crushed grain sorghum supplement of 2 lb per head per day from July to October maintained weaner weight. The broad pattern of normal beef cattle growth rate in the Central Burnett was:

- 1. productive weight gain from mid-November to mid-May;
- 2. weight loss from mid-May to the end of August;
- 3. unproductive weight gain from the end of August to mid-November.

Native pastures are of insufficient quality for weaners and it is economical to feed supplements or improved pastures or crops.

The average birth weight of beef calves over the three years 1954-56 was 71 lb, with males averaging 74 lb and females 68 lb. Heavier cows bore heavier calves; for each 100 lb heavier liveweight of the cow, calves born to them were 22 lb heavier. Birth weight had a significant effect on growth rate.

Chiller carcasses were successfully produced from 14 month yearling steers from Mt Garnett after 13 months on improved pastures at the South Johnstone Bureau of Tropical Agriculture. Similar steers fattened at "Wairuna", Mt Garnett, and on coastal improved pastures from January to May 1957 gave a liveweight figure of 806 lb and 985 lb, respectively.

Milk production of Hereford cows in November 1956 averaged 12.4 lb per day and only 2.9 lb in May 1957. Crossbred Zebu-Hereford cows yielded 9.5 lb per day compared with 5.5 lb from Herefords at the end of 6 months lactation.

Drought feeding trials with bush hay in the Central Highlands showed that cows receiving hay and molasses and urea maintained body weight and the calves gained weight. Hammer milling hay gave no effect. Urea increased hay intake. Liveweight changes in beef cattle at "Brian Pastures", Gayndah, showed that:

- 1. in all years cattle lose weight in the period from mid-May to the end of August;
- 2. following birth, in the period mid-October to mid-December calves on their dams gain 1.5-1.6 lb per day until May. They remain on their dams till August but make poorer gains from May to August;
- 3. weaning in August, these weaners make poorer gains than older male cattle till the following April, e.g., yearlings gained 129 lb more and older cattle gained 178 lb more;
- 4. the overall gains made by cattle from 6 months to 18 months (May-May) are much less than the gains made at later stages, but they are capable of making similar gains more economically if adequately fed.

Repeatability trials with beef cattle breeders of variates gave the following scores:Birth weight of calf0.25 (perfect score is 1.0)Weight of dam in May before calving0.86Weaning age of calf0.13Gain of calf birth to 180 days0.63Gain of calf, weaning to 18 months0.24Yearling weight0.33

The rate of gain from birth to weaning was significantly less for calves of first calf heifers than for adult cows

Dentition studies showed that the average time of eruption of the first pair of incisors in cattle is 24-26 months (70%), and for the second and third pairs variable. The teeth give a good idea of the age of a group but errors in individual ages occur.

Time of calving trials showed that mating between 8 October and 7 December gave lighter birth and 90 day weights, but at age 270 days this group of calves weighed 100 lb heavier than those from matings from 8 January to 9 March and 8 April to 7 June, the latter two having heavier birth and 90 day weights, and the late mating gave the worst overall performance.

Breeding percentages for beef cattle herds in north Queensland averaged 58% from an average calving percentage of 72%. The interval between birth and first calf was 3 years for a breeding cow; the average cow lived for 8-10 years and produced 3 calves during her lifetime.

Vibriosis was found to be enzootic throughout the beef cattle population of north Queensland. The percentage of bulls used was 2-6%. It was recommended that cows be culled if they did not calve at least every second year. Evidence suggested seminal degeneration in British breed bulls during the hot summer months and there was an absence of ovarian activity also during dry summer months.

Subdivision and segregation of classes, especially weaner heifers, was recommended for more supervision of herd management. Most calf losses from birth to weaning were due to predators.

The use of synthetic hormones for stimulating growth in fattening beef cattle was shown to give a response of from 0.2 to 0.40 lb additional liveweight gain per day over 75-120 days.

The occurrence of "cancer-eye" or bovine ocular squamous cell carcinoma in Hereford and Polled Hereford cattle caused the culling of 1-4% of breeders in Queensland herds. Selection for fully pigmented margins of the lids of both eyes appeared a worthwhile practice.

Crop fattening studies were conducted in 1958-59 and for a poor crop in 1959-60. Trials with supplementing weaner and yearling cattle which were grazing native pastures showed that small quantities of lucerne hay or high protein meals appeared the most efficient supplements.

Crop-fattened cattle made an average daily gain of 1.9 lb or 217 lb in 114 days. The increase in chilled carcass weight was 149 lb and the dressing percentage increased by 5.9%.

Cattle railed from Innisfail to Brisbane for slaughter lost 123 lb in liveweight and 34 lb in carcass weight compared with locally killed cattle.

The Cattle Husbandry Branch held schools for producers at Roma and Tinaroo during 1961-62 and provided speakers for a Bankers' Conference.

During 1956-60 several farmers on the Darling Downs were engaging in feed lot fattening. With a mobile weighbridge, Departmental officers accumulated data on yearling Hereford steers. The feed lot ration was 2 parts grain, 1 part lucerne hay by weight.

The initial weight of the steers averaged 609 lb. They gained 242 lb per head liveweight over 98 days or 2.47 lb per day, from an average feed consumption of 7.90 lb per lb liveweight gain. Expansion of this method of finishing depends on the current price of grain and meat. Sugar cane trash was found too fibrous to be of use in this system of feeding.

Dairy cattle investigations

Money made available by the Commonwealth Dairy Industry Extension Grant was used to conduct an infertility survey of the State's dairy cattle.

Findings were that:

- 1. at least 40% of herds had breeding troubles;
- 2. about 25% of the cows had a calving interval of over 13 months, owing mainly to anoestrus;
- 3. the number of services per conception and the conception rate were below desirable standards. Atherton Tableland figures were the lowest. Infectious diseases of reproduction were the main cause of wastage.

The gestation length of the Australian Illawarra Shorthorn breed was published in the *Queensland Agricultural Journal* of January 1958.

The total milk production of the Jersey herd on the Kairi Regional Experiment Station rose from 66 880 lb in 1956 to 110 450 lb in 1957 and 145 622 lb in 1958. Normal lactations showed production rises 20% from the level immediately after calving to a peak at 3-5 weeks following calving, and then a decline of 8-10% per month. Feeding concentrates at Biloela from four months and at Kairi from the seventh month arrested this decline. Feeding concentrates for a period of 6 weeks ("steaming up") before calving and then 2½ lb per gallon of milk produced was tried at Kairi. The concentrate was made up of one part of meat meal to three parts of cracked grain. The average production from the concentrate group was 81 lb more than the control group and the average length of lactation 47 days longer.

During 1960-61 a survey of the resources and production methods on dairy farms was conducted with funds from the industry and Commonwealth Government and administered by the Australian Dairy Produce Board Research Committee. This material was to be the basis for extension work to improve dairy production. The survey showed that the land was

used to only 65% of its potential, that farming plant was inadequate, and that a large expenditure on purchased fodder was entailed.

Vealer production, artificial insemination

Guernsey and Friesian bulls were added to the Jersey and AIS bulls held at Kairi for artificial insemination purposes during 1960-61, and Nestles (Gympie) and co-operatives at Dayboro and Beaudesert commenced operations. The Department maintained a small unit at Samford to train AI technicians. A vealer production trial was carried out on the property of D. F. L. Skerman, "Waverley" at Kaimkillenbun, during 1960-62. A dairy herd of AIS cows producing an average of 236-240 lb butterfat was transferred to vealer production by introducing a Polled shorthorn bull. Second calf and older cows were given two calves to rear, the imported one being sold at 3 months and the natural vealer at 8-11 months . The annual return per cow was a little higher with vealer production and the labour less.

By 1962-63 some 16 983 artificial inseminations were made in the State in 9 months. Preferences were: AIS 7534, Friesian 4010, Jersey 3385, Guernsey 852, Ayrshires 94. Beef breeds: Herefords 796, Angus 312. All of the expansion since 1962 was in cooperative commercial units. Charges of £1.15s. were made for a first service. Five Jersey bulls and one AIS bull had by this time been designated "AI Proven" by the Department. Infertility surveys showed 88% of dairy cows showed vibriosis reactions, 15.6% brucellosis, 13% leptospirosis, 5.6% leptospirosis (*L. hyos*) and 0.2% trichomoniasis. Raising nutritional standards resulted in improved fertility, the disappearance of anoestrus and a lower incidence of retained placenta.

Transfer of staff

During 1962-63 a Regional Planning Branch was formed in the Department and the Director of Cattle Husbandry, D. N. Sutherland, became its Director.

L. E. Donaldson was awarded the Degree of Master of Veterinary Science by the University of Queensland and went to the USA for further studies at Cornell University.

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Biochemical Branch

Poison plants

Analyses of material suspected of being poisonous included high nitrate contents, hydrocyanic acid, oxalates and alkaloids. Selenium poisoning from *Neptunia amplexicaulis* (changed hoof disease) in the Richmond area and from horses eating regrowth of *Morinda reticulata* in Cape York Peninsula were investigated. Studies to find the toxic principle in *Acacia georginae* (Georgina gidyea) showed it to be the fluoracetate ion. *Portulaca aleracea* and *Wedelia asperrima* contained high nitrates.

Mineral deficiencies and toxicities

Statewide surveys of the phosphorus and copper status in 15 Queensland shires showed onethird of the 174 properties were phosphorus deficient and a further one-fifth were marginal. One-ninth of 115 properties were copper deficient, with another 5% marginal. Calcium deficiency was found on one-fifth of the properties examined. Trials at the Animal Husbandry Research Farm showed that sheep maintain adequate copper reserves but adult cattle have very low copper reserves and calves rapidly lose their adequate copper reserves determined at birth. Intravenous injection of copper sulphate into cattle resulted in better weight gains. Spraying copper sulphate on the pasture lifted copper content slightly but heavy spraying at 28-56 lb per acre led to toxicity. Copper deficiency was generally associated with young pasture.

Phosphorus and copper deficiency occurred mainly on coastal country south of Maryborough. Grazing cattle show a high degree of selectivity and for the diet selected the concentration of phosphorus, calcium and protein is usually adequate for at least moderate production. Low production in the milking herd is owing to low feed intake caused by an insufficiency of palatable fodder, and especially to the quality and quantity of feed available to dry cows before calving. Anoestrus in dairy cattle is inversely related to production due to a low plane of nutrition rather than to phosphorus deficiency specifically. Silage experiments showed that paspalum made good silage when molasses was added at 40 lb per ton.

Further studies of selenosis showed that selenium in the diet of sheep causes damage to the wool follicle. The Tambo formation of marine limestones of the lower Cretaceous age occupying some 35 000 square miles of the western Mitchell grass downs contains selenium.

During 1960-62 studies at Townsville showed a growth response in weaner cattle to copper but not to cobalt and a subcutaneous injection of copper glycinate is needed every three months. Treated heifers during the twelve months prior to mating showed improved fertility. In the Rockhampton area there was a seasonal response to cobalt and copper. A three-year study was made of the normal values of the blood constituents and the changes with the seasons and the age of the cattle. Experiments to define the effect of meat, blood and bone protein fed to chickens on production rations containing 18.8% protein showed that levels of blood meal up to 12% in meat and bone meals are not detrimental; the higher the bone content of meat and bone meals, the poorer the growth rate and the higher the feed conversion ratio. A high bone content decreases the energy content of a ration and raises the feed conversion ratio. On the basis of these findings analytical limits were suggested for protein, fat, ash, calcium and phosphorus with the object of defining protein quality in meat and bone meals.

Analyses of samples of earth being constantly licked by cattle showed the presence of appreciable levels of sodium chloride. Analyses of dipping fluids with the change-over from arsenic to organic phosphorus compounds and chlorinated hydrocarbons led to much research to develop analytical methods.

Pesticide levels

The finding of unacceptable pesticide levels in meat in New Zealand led to research in Queensland on residues resulting from the use of acaricides to control both cattle tick and buffalo fly. It was found that cattle dipped in DDT vats carried residues in fat exceeding the 7 ppm tolerance permitted in the USA and legislation was introduced in Queensland prohibiting the use of acaricides based on chlorinated hydrocarbons. Acaricides based on organic phosphorus compounds were found to offer no residue risks. Spraying small amounts of 0.25 pint of 0.3% DDT along the back at monthly intervals for the control of buffalo fly did not result in unacceptable residues.

Grazing studies on paspalum pasture fertilised with 75 lb nitrogen per acre showed that with a high stocking rate the increased pasture production delayed the onset of weight loss in winter but in late summer the greater animal production was from short unfertilised pasture.

Urea toxicity

To obtain the maximum benefit from nitrogen fertilisation either stocking rate must be varied with season or pasture conservation must be practised. Cattle select a diet with about 5% higher protein value than that of the overall pasture. In studying urea toxicity it was shown that the level of blood ammonia is related to the amount of urea administered and levels out 12 to 22 hours after dosing.

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Sheep and Wool Branch-A. T. Bell, Director

The Sheep and Wool Branch had difficulty in maintaining senior staff during the 1957-63 period, being reduced to two graduates during 1961-62 by deaths and resignations.

Its main emphasis was aimed at extension in the sheep-raising districts and research at the Toorak Field Station, backed by measurements from the Wool Biology Laboratory.

Extension

Numerous field days were held throughout the merino sheep areas and with drought, blowfly strikes and resistance to insecticides, field officers were kept busy advising on drought feeding and parasite control. Advice on selection and mating, in conjunction with results from the fleece testing laboratory, helped graziers to improve the quality of their flocks. A school was held in September 1957 for officers of a large pastoral company, organised by the company and attended by its officers and cadets, with Departmental lecturers and demonstrations. An analysis of figures for extension work showed that 73% was devoted to sheep breeding and parasite control and 27% to sheep feeding, marketing and land utilisation.

A school was held for 14 Colombo Plan Senior Fellows from India during June 1959.

The development of resistance in the blowfly to some of the chlorinated hydrocarbons awakened more interest in some basic methods of fly control such as tail length, tail strip and the Mules operation.

Extension media, such as radio broadcasts, *Journal* articles, news articles, film showings, meetings and show exhibits, were used widely and a school for graziers was conducted by branch officers at Toorak Field Station during 1960-61; twenty-one graziers attended.

Toorak Field Station

The Toorak Field Station Technical Committee was appointed and its first meeting was held at the station in June 1961. The committee was made up of sheep owners from the United Graziers Association and Departmental representatives. The Branch was represented at the first meeting of the Technical Subcommittee on Wool Production, a subcommittee of the Animal Production Committee in Brisbane in March 1961.

Lambing percentages

Lambing at Toorak from randomly selected ewes yielded 49%, from ewes selected for high fertility and wool production 55.5%, and from ewes selected for low fertility and wool production 37%. Lambs marked from this group were 30%, 38% and 25% respectively, indicating the difficulty in maintaining flock numbers in Queensland's north-west.

Repeatibility studies

Repeatability studies on sheep to indicate what results from a single year are a perfect guide to those expected in subsequent years were conducted. A figure of 0 indicated that the factor had no relationship to future years, and a figure of 1 indicated a perfect positive relationship. Figures obtained were:

Character measured	Repeatability
Greasy fleece weight	0.67
Yield	0.67
Clean fleece weight	0.66
Staple length	0.57
Crimps per inch	0.71
Fibre diameter	0.49
Variability of fibre diameter	0.43
Birthweight of offspring	0.43

Skin fold score (neck)	0.62
Skin fold score (side)	0.50
Bodyweight	0.80

Correlations were made between wool characters.

Studies on ram semen quality showed variation throughout the year, with poorer quality during the dry spring and early summer, though some rams maintained high semen quality. In this area spring-early summer mating is common.

In general, lambing percentage appeared to increase with age. In a joining and lambing trial 10% of ewes did not come into oestrus, 32% were served but did not conceive, 11% apparently conceived but failed to lamb, and 13% lambed but failed to rear a lamb to marking age. The latter problem appeared to be due to low birth weight and inadequate milk production.

Plain-bodied ewes gave a higher percentage of lambs than wrinkled ewes. Wool growth studies in 1963 showed the greatest growth took place from March to April and the least from October to January.

Fat lamb production

This is practised mainly on the Darling Downs, with joining in November-December to drop the lambs on young winter crops of oats, wheat, rape or turnips. Summer mating, however, coincides with low reproductive ability.

External parasites

The main external parasites of sheep apart from blowflies were body lice (*Damalinia ovis*) and leg itch mite (*Trombicula sarcina*) in black soil areas, and itch mite (*Psorergates ovis*). Lime sulphur treatment was successful against itch mite but discoloured the tip of the wool staple for a few months.

The main internal parasite was the barber's pole worm (*Haemonehus contortus*), which was controlled by anthelmintics.

Mulga feeding

During drought the mulga (*Acacia aneura*) had been used for drought feeding. The Department was interested in conserving enough trees for seed purposes as well as future supplies and advocated selective thinning and lopping. Mulga forage was low in phosphorus (0.15% of the dry matter) and high in lime (1.5%) and after sheep had been on mulga for a few months it was recommended that a phosphate-rich lick be provided.

Poison plants

Since 1954 a "bent leg" condition in lambs and weaners and cardiac incompetence in adult sheep had occurred and were found to be caused by sheep grazing heavy stands of native parsnip (*Trachymene glaucifolia*). This occurs only on mulga country during September-October after good winter rain. Management to keep sheep out of dense areas was suggested.

"Humpy back" of sheep, causing them to lag behind the mob with arched back and discomfort when forced was believed to be due to their eating *Solanum esuriale* but this was not yet confirmed.

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Pig and Poultry Branch - A. L. Clay, Director

Pig Section

Departmental stud pig herds. Departmental stud pig herds were maintained at the three Regional Experiment Stations: Kairi (Tamworth), Biloela (Large White) and Hermitage (Berkshire).

The pig industry was constantly unstable because of the comparative costs of grain and pig meat, the variable supply and quality of protein meals and the problems of satisfactory rations. Extension staff were limited.

Nutrition. Pig nutrition studies occupied a good deal of time. At Kairi trials with the use of molasses, to replace some of the grain in the ration, showed that it could be fed in amounts up to one-third of the total ration but to prevent scouring more fibre such as lucerne was needed. Food conversion per lb liveweight gain was 3.88 for a grain-meal ration, 3.9 for a low molasses ration and 3.87 for a high molasses ration. Trials continued in 1957-58 and showed growth rate to be slow on molasses, meat and bone meal, maize meal and lucerne hay, probably owing to the high volume of food intake lowering the net energy of the ration.

Trials at all stations showed the importance of palatability in pig rations. Protein foods were less palatable than cereals. The order of preference at Biloela was shown to be wheat, sorghum and maize. Trials with protein supplements showed that cottonseed meal could be

fed up to 15 per cent of the ration without adverse effect and locally grown cowpea could be substituted for meat and bone meal up to twenty per cent of the ration. Imported fish meals from South Africa of high biological value gave excellent results but irregular supplies and high prices limited their use. Whale meatmeal, whole meat and bonemeal and dried whale solubles (whale protein meal) gave good results in Departmental trials but irregularity of supply was again a problem. At Hermitage, restricted feeding trials to improve factory grading and to decrease backfat of Berkshires showed that restriction of daily intake to a scale varying from 2 lb of meal per day at 40 lb liveweight and increasing to 4.4 lb at 180 lb liveweight gave excellent feed conversion and eye muscle figures. Low biological value and high ash contents (particularly calcium) were often responsible for poor growth or parakeratosis. In many cases the addition of zinc carbonate or zinc sulphate was recommended.

Hogging down of green oats (irrigated) maize and sorghum was tried on research stations, but the economics of the system were doubtful.

Sow performance records were kept on all the research stations and on cooperating farms where Departmental officers could do the weighings. The Landrace breed of pigs from Denmark gradually became the dominant State breed.

The Pig Testing Station. In August 1958 the newly erected Pig Progeny Testing Station on the Department's Animal Research Farm at Sherwood Road, Rocklea, was brought into operation. A proving trial of the Station was conducted on 60 pigs brought in from the regional experiment stations. Feeding a pint of water with each pound of food fed, or mixing food and water to a consistency of thin porridge, overcame the wastage of food. Air-conditioning ensured the same atmospheric conditions for every pig. The rations consisted of wheat, sorghum, meatmeal, lucerne meal and a mineral mixture fortified with Vitamins A, D and B2. Three rations were used, based on 17%, 15% and 13% crude protein respectively. Any pig being tested received the same treatment. Pigs were fed twice daily and weighed once a week on the same day and at the same time. On 31 March 1959 the Station was made available for testing of stud stock. An advisory committee was appointed to supervise the operation of the station. A 200 lb liveweight figure had been set for delivery to a factory. From initial testing it was shown that there were strains capable of producing good-quality baconers at 200 lb liveweight with full feeding while others matured earlier and were consequently overfat at these weights. During 1962-63 conversion figures for food consumed to produce 1 lb liveweight gain ranged between 2.70 and to 3.09 for 85% of the pigs, with the greater number in the 2.90 to 2.99 lb range. In no case was the standard maximum of 3.5 lb exceeded. Body length improved with the introduction of the Landrace breed and overall backfat depth decreased from 33.32 mm to 32.49 mm during the year. Thickness of eye muscle was disappointing and attention of breeders was drawn to this deficiency.

A modification of the Hammond system of grading carcasses to meet local requirements was made in 1962.

Common diseases met with included leptospirosis, erysipelas, avitaminosis, parakeratosis, virus pneumonia, and photosensitisation. Parasites were dealt with in conjunction with the Veterinary Services Branch. The certified Brucellosis Free Tested Herd Scheme for stud

herds was continued and 139 stud herds were declared by 1961. A society for the development of virus pneumonia-free herds was formed among producers.

Extension work was provided during the period under review, through field days, the press and radio, the *Queensland Agricultural Journal*, practical examinations at the Queensland Agricultural College, supervising young judges competitions, and co-operating with the Education Department in preparing visual aid materials and providing lecturers.

Poultry Section

Poultry Improvement Plan. During 1957-58 nine poultry breeders were cooperating with the Department in the Queensland Poultry Improvement Plan and others were enquiring about joining the scheme. Seven were using genetically sound breeding schemes based on the sire-family system, in which the half-sister progeny test is used to indicate superior families. Two breeders were using laying cages and had individual records, working on a "full-sister" scheme; this was more involved than the "half-sister" scheme, for it required that chickens derived from various matings be pedigreed to both the dam and the sire. These breeders were using artificial insemination. The Poultry Section was active in assisting and funding farmers with the compilation of their records. During 1958-59 thirteen breeders were involved, seven in the Brisbane area, five on the near North Coast and one in the Toowoomba area. Differences of up to 40 eggs per bird over a 41-month test were recorded between the best and the worst families.

This improvement plan over five years interested producers in adopting scientific methods in breeding, but the labour and equipment needed discouraged participation. The overall policy of the plan established in 1956 needed to be reviewed regarding the system of accreditation for breeders meeting the required "standards of excellence".

Random sample testing. This commenced in association with the Poultry Improvement Plan in August 1957. A large intensive shed capable of holding 2000 birds at 18 weeks of age and a third row of laying pens were completed in August 1958, giving accommodation for 15 breeder entries for the 48-week production period of the test.

The average hen-housed production for the 48-week period was 160-85 eggs per bird for 1957-58 and 171-152 for 1958-59. Food efficiency in terms of pounds of feed to produce a dozen eggs was 6.04 lb with a range of from 4.88 to 7.28 lb, indicating the need for improved breeding. The average hen-housed mortality was 12.31%, with a range from 5% to 22.5%. The average age for first egg was 153 days in 1957-58, 143.4 days in 1958-59 and 138 in 1959-60. The age to reach 50% production was 192, 170 and 166 days respectively. The age of sexual maturity had to be watched closely as the volume of small pullet eggs could affect the level of profitability. "Pullet" eggs (under $1\frac{1}{2}$ oz) were valued at less than half "small hen eggs" (over $1\frac{1}{2}$ oz but under 1 $\frac{7}{8}$ oz).

Poultry nutrition. Trials at Kairi showed that protein levels from 14.3 to 17.1%, in a grain protein ration offered free choice gave no difference in egg production. A low-fibre (3.2%) high-grain ration proved more economical than a high-fibre (7.2%) ration. Water consumption with the high-fibre ration was double that of the low-fibre-fed chickens. The

low-fibre high-energy ration also proved superior for egg production, with higher production and lower food consumption.

At Kairi it was found that the all-mash ration, composed of equal parts of maize meal and sorghum meal with the addition of meat and bone meal, salt and vitamin and mineral supplements, was a more efficient method of feeding in terms of production and quantity of feed required to produce a dozen eggs than the free-choice meal and meat and bonemeal ration.

White French millet was found to be a suitable grain for use in poultry rations, but bloodmeal was shown to be unsuitable in chicken rations. Soybean meal was a valuable addition to poultry rations.

Winter lighting. Winter lighting on the Atherton Tableland in the early morning from March to October increased production per bird by 8.3 eggs over the non-lit group.

Egg pigmentation. A trial with a commercial pigmenter (synthetic carotenoid) showed that at 20 grams per 2000 lb of mash improved yolk colour was obtained but the cost was high. Adding 15% of maize meal plus 2.5% lucerne meal, or 2.5% lucerne meal alone produced a yolk colour similar to that of the pigmenter at lower cost.

Debeaking. Debeaking tests showed that debeaking was of value in reducing food wastage up to 12 weeks of age. But it must be done when the birds are 7 or 14 days old, as they suffer a setback when it is done at the day-old stage.

Egg quality extension program. A series of colour transparencies on egg quality was prepared during 1958-59 and these were used at poultry association meetings. A 16 mm colourfilm with sound, to be used as a taking point at producer meetings, was completed on the effect of heat on egg quality.

Forced moulting. It was generally not a payable proposition to keep layers for a second year of production. But with the low price of carcasses compared with those of broilers, forcing moulting by restricting food and water, followed by morning lighting, could improve second-year egg production during periods when egg prices were high.

Day-old-chick production. Production increased yearly from 1957 to 1963 and an interstate and international market developed to New South Wales, New Guinea, Indonesia, Singapore, the Philippines and Borneo. Over three million unsexed chickens were supplied to broiler growers.

Disease control. Testing for "Pullorum-free" classification and "Pullorum-clean" status continued. Leucosis was found in broiler chickens, and cleaning out pens and disinfecting equipment before the next intake helped break the chain of infection.

Division of Dairying-E. B. Rice, Director

Drought effect

Drought conditions during the greater part of 1957-58 led to a loss of £5 000 000 in butter and cheese production, apart from losses of livestock which in some cases were heavy. Butter prices in the United Kingdom were low and dairy industry leaders drafted proposals to stimulate local consumption, including expanding research into industry problems, financed by levies of 1/8d per lb butter and 1/16d per lb cheese supplemented by a subsidy from the Commonwealth Government. The legislation providing for a guaranteed price for butter and cheese consumed within Australia plus exports up to 20% of the local consumption was renewed by the Commonwealth for a further five-year term from 1 July 1957, giving a 2d per lb higher price than the last year.

During 1957-58 some 300 000 dairy cattle were tested for tuberculosis by veterinarians holding testing contracts; of these cattle 0.12% were found to be reactors.

Dary cattle feeding costs, new dairy products

The Economics Research Branch of the Division of Marketing studied dairy cattle feeding costs in the Warwick and Beaudesert districts during 1957-58. The Australian Dairy Farmers Federation made a submission to the Joint Dairy Investigation Committee that a farm cost of 53d per lb commercial butter should be regarded as the cost of production for the purpose of the Commonwealth Government's guaranteed price scheme for 1958-59. Dairy cattle numbers tended to decline to favour other forms of land use and the population at 31 March 1958 was the lowest since 1933. The industry was moving away from its dependence on butter: cultured butter, market milk, varieties of cheese other than cheddar, casein and the utilisation of by-products helped diversify the industry and provide more stability. Twenty-four factories were equipped by 1960 to provide these products. Eight produced dried buttermilk, two plants produce spray-dried powder. Three factories provided unsalted cultured butter for export. Two varieties of cheese-Edam and Goudawere being produced in quantity and with the return of the Division's cheese technologists from overseas more cheese varieties were produced. Pre-packed rindless cheese was being produced by eleven factories for a controlled export programme of the Australian Dairy Produce Board.

Dairy Industry Committee of Enquiry

In 1960 the Commonwealth Government released the report of the Dairy Industry Committee of Enquiry. It defined an economic dairy farm as one on which the yearly production was equivalent to 8000 lb butterfat. Nine thousand Queensland farms were able to produce this amount but 1000 farms did not have this potential; on 5300 mixed farms dairying provided more than one-third of the income; and 1400 farms produced unimportant quantities of dairy produce. The quantity of milk used in Queensland during 1960-61 for purposes other than butter and cheese was estimated at 55 million gallons. The pasteurised and non-pasteurised milk trade represented 21% of total milk production. The cream intake by factories declined as milk consumption rose and the number of

commercial dairy farms declined to 16 000 by 1962. Decreasing productivity of coastal pastures in areas with a high concentration on dairy farms owing to declining fertility and the invasion of poor-quality mat grass (*Axonopus affinis*) were an increasing problem.

Dairy cattle breeding at Ayr, Biloela and Kairi

At the Cattle Field station at Ayr a programme of dairy breed improvement for the tropics was under way, with Sahiwal \times AIS crosses from Biloela, Sahiwal \times Friesian crosses at Kairi and Sahiwal \times Jersey crosses at Ayr.

In 1961 several major exporting countries agreed to regulate the quantities of butter released on the British market and the Australian export quota was fixed at 65 100 tons. The British Government decided to suspend the 15s per cwt preference duty on butter from Commonwealth countries but agreed to protect their interests. Because of the continuing rise in cheese production the Queensland cheese industry voluntarily decided to reduce production by 10%. The first casein factory was opened at Maleny in 1960. A second was opened at Gympie in 1962-63.

Construction of dairy plants in several Asian countries by negotiation with the Australian Dairy Produce Board began in 1960. The plants were to use Australian butter oil and milk powder in the manufacture of reconstituted milk products.

Extension

A major extension function during 1962-63 was the Farmers' Festival at Toowoomba, which attracted 10 000 farmers. The Departmental extension officers, cooperating with Dairy Extension Advisory Committees, concentrated on the more general adoption of better farming practices.

The Division comprised Field Services and Research Branches.

Field Services Branch-F. E. Coleman, Director, 1956-61, and V. R. Smythe, 1962-

The drought year 1957-58 forced the State Government to advance £320 000 in drought relief, and market milk supplies to the City of Brisbane were only maintained by costly hand feeding. Milk shortage at Cairns led to supply by tanker from Caboolture 1000 miles away and long-distance haulage to Charleville and Cunnamulla was required. The winter incentive to milk producers was continued and producers received 3s 7½ d per gallon.

Dairy hygiene field days, farm regrigeration

Ten successful dairy hygiene days were organised by the Eastern Downs Dairy Extension Advisory Committee during 1957-58. The use of old rubberware on milking machines was a cause of poor-quality milk in many cases. A switch to herringbone designs for milking sheds improved working conditions and hygiene, and as electricity extended into country areas electric water heaters were installed. Refrigerator storage of cream on the farm improved the quality of cream delivered to factories. An incentive payment for milk quality was made by factories. One Board of Directors established for milk quality a methylene blue test of four hours or more, and a margin of 1/3d per lb butterfat above the price for unqualified milk. Another Association paid 1d per gallon premium for refrigerated milk. These incentives led to the installation of more refrigerators. A milking-machine testing service was carried out by officers of the Department with airflow meters and vacuum recorders. Only 9% of machines were found to be without faults. Factories informed Departmental dairy officers of any producer of borderline cream and the dairy officers wrote to the producer offering to assist his production.

Fodder conservation

Following 1957 greater interest was shown in fodder conservation and in 1958 the amount of silage stored increased from 15 000 tons to 60 000 tons annually. Silage-making demonstrations by the Department were well attended. Water-harvesting demonstrations were also well attended, as were some twenty farm demonstrations each year.

During 1960-61 a survey was made of the ferment defect in cheese and over 28 000 tests made by field officers were reported to factory managers, resulting in marked improvement in cheese gradings. A cream quality improvement drive lifted the percentage of choice grade from 33.81 to 46.12 over the twelve month period to June 1961.

Milking techniques

A vacuum-operated sediment tester was made available to field officers for testing extraneous matter in milk, and an apparatus developed by a field officer, A. W. J. Murray, was used to study milking techniques. It was found that a period of 30 seconds, preparation must be allowed to permit the complete manifestation of the let-down of milk by the cow, involving washing the udder and teats and massaging.

Many types of new equipment for dairy production and manufacturing were submitted to the Department for testing.

Bulk handling

Bulk handling of farm milk was introduced in the early 1960s, the cost being 3d to 2d to refrigerate one gallon of milk. Tests were also made with the efficiency of farm separation, and new materials such as metals, alloys and plastics in equipment were tested under field conditions. An effective milk flow meter became available in 1962-63.

Herd production recording, milk flow, sire surveys, Register of Merit, Time of calving

Herd production recording was a function of the Field Services Branch. In 1957-58 only 7% of the commercial herds in the State were recorded. Reasons given for this low percentage were the low price received for dairy produce, the uncertainty of the overseas market, the cost of herd recording and adverse seasonal conditions.

Pure Bred Production Recording. From 1 July 1958 herd owners were required to record all females in the herd. Some 120 herds of 10% of the members of the five Herd Book Societies were submitted for testing. The average production for all cows in 1959 was 288 lb of butterfat in 1960, 282 lb in 1961, 268 lb and 273 lb in 1962.

Figures for sire surveys were released during 1959. Of 72 bulls tested, 30 (40.5%) raised production with their daughters, 13.5% maintained production, and 45.9% lowered production, indicating the value of such surveys. During 1961, 4.9% increase production. The Register of Merit required cows qualifying for the "Elite" Section to produce a minimum of 3600 lb of butterfat. By 1962 forty-nine "Elite" cows had been recorded since 1953. The entry into the "Lifetime" register, requiring cows to produce 2240 lb fat over not more than eight lactations, was achieved by 371 cows.

These registers allowed farmers to select bulls on the production records of their dams. A Merit Stud Register was kept for studs having a concentration of merit register cows. In 1962 a total of 43 307 cows from 1120 herds took part in Group Herd Recording for the year ended September. The average yield of 423 gallons of milk and 177 lb of fat was the highest ever recorded. Calves from cows with high production were identified by ear tattoo by herd recorders so as to form a group from which herd replacements could be made.

The effect of month of calving on production from the following lactation showed that in the period 1948 to 1954 the most favourable months were July, August and September, but with more fodder grown and/or conserved in the period 1955 to 1960 the best months were June, July and August. The average yield per breed and per district during 1961-62 showed:

	AIS Cows		Jersey Cows	
	Average milk yield (lb)	Av. fat (lb)	Average milk yield (lb)	Av. fat (lb)
Atherton Tableland	4400	165	3480	161
South Burnett	4550	172	3530	167
South-east Queensland	4345	163	3460	163
Eastern Downs	5210	203	4185	205

During 1961-62 goats from eight herds were tested for milk and fat production. The average yield from thirteen goats which completed lactations was 1478 lb milk and 49 lb fat. In 1957-58 the averages were 1440 lb and 56 lb respectively.

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Dairy Research Branch-L. E. Nichols, Director

During 1957-58 emphasis was placed on investigations of unsalted and salted butter, extraneous matter in cream and butter, thermoduric bacteria in market milk supplies and the improvement of the compositional quality of milk.

A school for cheesemakers was conducted at the Queensland Agricultural College in collaboration with the Department and the Society of Dairy Technology. A nylon cloth of a multifilament weave stretched over stainless steel strainers placed before and immediately after pasteurisation and covering 12-18 sq. feet was found the most suitable filter for removing extraneous matter in cream.

Cultured butter

To improve local butter consumption and produce a butter more acceptable to migrants, starters were used with cream. The best culture consisted of *Streptococcus diacetilactis* cultured in buttermilk. To improve keeping quality 1-1.3% of carbonated salt could be added without detriment and the product was well received overseas.

Iron and copper in butter

Traces of iron (7 ppm) and copper (0.1-0.2 ppm) in butter severely reduced keeping quality. Surveys showed contamination could come from cream pumps, butter wash waters, farm milking machines and butter wrappers. The use of stainless steel equipment and better quality butter wrappers reduced the problem.

Compositional quality of milk

It was found that fat percentage was largely affected by the intake and quality of roughage, and solids non-fat could be increased by raising the level of protein and providing a mineral supplement.

Keeping quality of pasteurised milk

It was found that thermoduric bacteria resisted the pasteurisation temperature and affect keeping quality. The Food and Drug Regulations limited the bacterial count of pasteurised milk to 50 000 organisms per millilitre. Departmental officers devised a test for thermoduric organisms to be done by the factory staff and an immediate improvement in keeping quality resulted.

Moisture content and cheese quality

It was disclosed that the optimum moisture content of cheddar cheese lay within the range of 52.5- 53.0% when expressed as percentage of moisture in the fat-free substance.

Table cream production

The sale of table cream was a valuable local outlet for butterfat. In association with the Health Department processing, chemical and bacteriological standards were determined. A good whipping cream was found to contain 30-40% fat.

Detergents and chemical sterilants

Trials showed that daily use of sodium metasilicate and wetting agent, and a dilute hydrochloric acid solution once weekly, cleansed equipment and kept the bacterial content of milk in cans within satisfactory limits without causing corrosion.

Farm refrigeration

A cheap drop-in refrigeration unit in a farm-built concrete cabinet was devised for cooling milk or cream.

Market milk quality

A very close check was continually kept on the quality of milk supplied to the metropolitan area on behalf of the Brisbane Milk Board, and in country areas served by the regional laboratories at Toowoomba, Murgon and Malanda. Weekly samples were tested for other areas. Milk depots regularly sampled and tested raw milk for methylene blue reduction times and butterfat content.

Cheese starters

Starter cultures, many freeze-dried, were distributed to factories. Bacteriophage-resistant starter cultures were provided where starter failures due to this problem occurred.

Cheese packaging

Information and advice regarding packaging of rindless cheese were given to factories.

Waxing of cheeses

It was found that a simple blend of one part of petroleum jelly with two parts of paraffin wax and three parts of microcrystalline wax heated to 250°F into which cheeses were dipped for five seconds gave good results.

Non-cheddar varieties of cheese

Assistance was given to the development of edam, gouda, blue-veined, taffel, caraway seed, smoked and clove cheeses in loaf sizes.

Weed taint in milk

It was found that removing the herd from pastures infested with *Lepidium* (pepper cress) four hours before the afternoon milking reduced the taint. Extensive research by the Department, the University of Queensland and CSIRO in the removal of weed taints in milk and cream was carried out in the early 1960s. Successful removal of weed tainting substances from butter oil during 1960-61 led to trials to develop a commercial process.

Research laboratory and pilot plant at Hamilton

During 1962-63 the Government approved the establishment of research laboratories and a pilot plant at Hamilton at a cost of £219 000, and foundations were laid. Site and plans for a new dairy research laboratory at Malanda were also finalised. An extension to the laboratory at Murgon was completed by the South Burnett Co-operative Dairy Association and the Government provided fittings, staff and equipment.

At the invitation of CSIRO two officers of the Branch went to Melbourne for training on specialised equipment associated with flavour problems of dairy products. At the request of the Education Department a Chemist was stationed at the Queensland Agricultural College to carry out research work under the Research and Promotion Grant for Dairying.

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Division of Marketing-H. S. Hunter, Director

During 1957-58 two University Scholarships in Economics were awarded to attract future staff.

Stabilisation schemes were given close attention: wheat, the dairy equalisation and stabilisation scheme. The barley, grain sorghum, peanut, egg and wheat boards gave more supervision to the transit and delivery of commodities. Discussions were held on the provision of a field organisation by the Egg Marketing Board to form a closer link between producers and the Board. The onion industry sought an Onion Marketing Board, which was created in March 1959. The Cotton Guarantee of 14d per lb seed cotton under the Cotton Bounty Act was extended to the end of 1963.

The Director represented the Department on the Prices Advisory Board provided for in the 1957 amendment to the Profiteering Prevention Acts. Great progress was achieved during 1957-58 in Seed Certification. Increased home consumption subsidies by the United Kingdom Government in the post-war period led to more self-sufficiency and fewer imports, and with the smaller market, competition for it was very keen. Further marketing problems arose with the US policy of disposing of farm surpluses under Public Law 480, whereby surpluses were paid for in the currency of the importing country.

The Department's Crop Reports and Forecasts, Monthly Reports on Production Trends, the Daily and Weekly Market Reports and Grain Abstracts were well received.

In 1956 the Marketing Branch entered the field of agricultural economics when it was called on to report on possible changes from row crop production (maize) to mixed farming. Branch officers reported that the change would be beneficial after a few years but that income would decline in the short term.

The Pineapple Sectional Group of the COD asked that a study of the economics of pineapple production be made and a report was published early in 1958, stating that many farms were too small for economic operation. A survey of the profitability of irrigating pastures showed that it would be profitable if done on farms of sufficient size and would constitute a drought insurance.

In 1958 a Committee under the Chairmanship of the Co-ordinator-General of Public Works (J. A. Holt), including the Director of Marketing and representatives of the Brisbane City Council growers and agents, recommended that the City markets be relocated at Rocklea and a Market's Trust be formed to establish and maintain a public market.

During 1962-63 the Director of Marketing, H. S. Hunter, retired. He was succeeded by A. A. Ross, with D. P. Lapidge as Assistant Director of Marketing.

Economics Research Branch-C. H. P. Defries, Director to 27 March 1962

The Economics Research Branch was created in April 1958, with C. H. P. Defries as Director. Defries had recently studied farm management in the USA and Canada. The current trend was towards intensification of production and the need for extension workers to have factual information concerning the economics of farm operations. Individual industry problems such as the size of farm, the nature of investment patterns, risk and uncertainty in seasons and markets, together with the economic implications of improved farm practices, were the focal points of interests of the Branch. A wheat industry survey, dairy cattle feeding investigations, budgeting procedures and soil conservation economics were initiated in co-operation with officers of other branches. A series of fifteen lectures on farm management was given to University staff, students and members of the public by the Director during 1958.

In the wheat industry survey a stratified random sample of 166 growers gave personal interviews using a prepared questionnaire. A major part of the report was devoted to an

analysis of the factors that influence profitability on wheat farms. Factors such as area of cultivation, capital investment, income from supplementary pursuits, level of costs and labour force were studied separately. The material collected was confidential between the economic research officer and the farmer. It was obvious from the survey that a good deal of work was needed on the relationship between soil types, farming patterns and costs and returns.

The dairy industry survey was conducted in the Wide Bay and Eastern Darling Downs with the enthusiastic co-operation of the Dairy Extension Advisory Committees. The investigation teams also consulted the field officers of the Divisions of Plant Industry, Animal Industry and Dairying. Fifty farmers cooperated in the Wide Bay area, as did the same number in the Eastern Downs, and discussed fodder cropping, fodder conservation, pasture improvement, irrigation, hand feeding, and herd testing-costs and returns. A close analysis was made of alternative courses of action open to the individual farmer.

A survey of the production of whole milk during the winter months was made, in collaboration with the Cattle Husbandry Branch, in the Beaudesert district. Interim reports were published in early 1963 dealing with case studies of supplementary cropping, and two others dealing with irrigated pasture and rain-grown pasture were in preparation by June 1963.

E. O. Burns succeeded Defries as Director in 1962.

In view of the importance of technical developments taking place in the poultry industry it was decided to undertake a study of management problems on up-to-date poultry farms in the Brisbane area and field work commenced in September 1960. The study was confined to farms involved with egg production with flocks in excess of 1000 birds. The analysis included examination of costs, particularly feed costs, the timing of production and grading of eggs, replacement of flocks, rates of laying and capital structure. Linear programming and optimisation methods were to be applied to the individual farm. It was found that feed costs were almost 80% of the total cash costs in the farms and about three times as great as the average cash surplus, which is the difference between cash receipts and cash payments. "Least-cost" rations were devised for each situation.

A study during 1961-62 of the vealer sideline enterprise at Murgon was completed and published. It involved use of native pasture and took the form of a budgetary analysis of alternative enterprises.

During 1962-63 the Economics Research Branch conducted an economic survey of the riparian holdings on the Dumaresq River as part of the study of the advisability of constructing the Pike Creek Dam. A plan for the development of the Cherbourg Aboriginal Settlement including a dairy herd, a beef cattle herd, fodder conservation and soil conservation was also undertaken.

Active steps were also taken to encourage the use of modern accounting techniques as tools of farm management and Farm Management Accounting Groups were inaugurated on 1 July 1962.

Lectures, radio broadcasts, conducted farm tours and field days were held and a feature page "Profit and Loss" in the *Queensland Agricultural Journal* in 1962-63 consisted of thirty short articles.

Standards Branch-A. A. Ross, Director to 1958-59, A. C. Peel, 1950-60

The duties of seed testing, seed certification, inspection of some 840 sellers of agricultural produce extending to Thargomindah, Wallangarra and Laura, registration of agricultural requirements, checks on imports and export and inspection of fruit and vegetables were undertaken by the Standards Branch. Bulk handling equipment was installed at Mt Tyson during 1957-58 for the harvesting and cleaning of one of the grain sorghum crops for certification. This practice was continued. An article entitled "Facts on Fertilisers" was published in the *Queensland Agricultural Journal*.

During 1958-59 only the Gayndah strain of buffel grass was certified. A quantity of buffel grass seed was harvested but either the germination was too low or the seed was contaminated with too much inert matter to be certified. In the same year the Agricultural Requirements Board, at 21 meetings, reported on the efficacy of 885 preparations-744 pest destroyers and 141 veterinary medicines. Of these, nineteen pest destroyers and two veterinary medicines were refused registration. In November 1958 an interstate conference of technical officers in Melbourne made successful representations to the Australian Agricultural Council to adopt their uniform grade standards for potatoes.

During 1959-60 "dry conditioned seed", dried to a predetermined moisture content and packed in moisture-resistant containers with a view to extending its storage life, was placed on the market. Aluminium foil packaging proved excellent. The administration of The Farm Produce Agents Acts, 1917 to 1952 was placed under the control of the Standards Branch in August 1969. In 1961-62 there were 112 licensed produced agents in Queensland, 71 being in the Brisbane area.

Certified grain sorghum, sweet sorghum, Sweet Sudan grass, hybrid maize and tomato seed were available during 1960-71 and certified Redlands Green Leaf bean, a rust-resistant variety, was introduced during the year. New staff were added during 1961-62 to cope with the expansion in pasture development and the need for new laboratory methods of testing subtropical and tropical pasture seeds.

During 1962-63 all pasture seeds on offer to the Land Administration Board were tested prior to purchase on behalf of the Brigalow Development Scheme. Australia was represented by the Standards Officer, A. C. Peel, at the 1962 International Seed Testing Association Congress in Lisbon, Portugal, and experimental work was thenceforth intensified with regard to grass and legume seed. All seeds imported into Queensland were sampled and examined on behalf of the Commonwealth Plant Quarantine Service.

Clerical and General Division-W. T. Gettons, Assistant Under-Secretary (retired 2 July 1959), and H. Barnes, Special Administration Officer

Staffing

The Clerical and General Division provided the clerks, clerk-typists, accountants, transport officers and miscellaneous workers necessary to a department with a staff of 1235 in 1958-59 and 1652 in 1962-63, with offices throughout the State. It also handled accommodation, transport, housing, extension services, information services, records, accounts, a library and abstracting service, photography section and publications. As at June 1963, of the 1652 staff 313 were clerks, clerk-typists, male assistants and female assistants; 211 were located in Brisbane and 102 at county centres. The appointment of male clerks and clerk-typists to country branches of the Department was aimed at relieving technical officers of many routine clerical duties to enable them to devote more time to their primary duties in the field.

Appointees as male clerks were given preliminary training at head office and then some or all were posted to their home towns with the cooperation of the Public Service Commissioner. Some clerks were selected for cadetships in technical branches of the Department and undertook higher studies to qualify for promotion in the technical areas within which they had taken up duty.

Accommodation

With the Department's rapid expansion, office accommodation was a recurring problem. During 1957-63 new Departmental offices were located in court houses at Bundaberg, Kingaroy, Emerald, Dalby, Gympie, Toogoolawah, Winton, Bowen (the previous office there had been destroyed by a cyclone), Beenleigh, Nambour, Mt Isa, Blackall, Longreach and Mareeba, and in the Lands Office at Wandoan. Other offices were leased at Tapullins Building at Cairns (whole floor), Inglewood, Wowan, Kingaroy, Southport, Wondai and Maleny. The Bureau of Sugar Experiment Stations moved to Gregory Terrace at the end of 1958, leaving more space for Head Office.

Housing

New housing or purchased housing was provided to house Departmental staff at Miles, Ingham, Chinchilla, Winton, Blackall, Clermont, Barcaldine, Kingaroy, Mitchell, Ayr, Goombungee, Charleville, Gympie, Longreach, Mareeba, Jandowae, Millaroo, Murgon, Gatton, Biggenden, Roma and Cooroy.

Laboratories and equipment

During 1961-62 the new entomology laboratory and glasshouse was occupied at Indooroopilly, and a Pineapple Plant Physiology Research Unit and glasshouse at Maroochy Horticultural Research Station; extensions were made to the Horticultural Research Station at Redlands; a new hay shed was provided for the Animal Husbandry Research Station at Rocklea, an Artificial Insemination Centre at Wacol, a Cattle Field Station in the Burdekin and seed stores at Indooroopilly and Hermitage.

Transport

By June 1958 the Department operated 283 vehicles with an additional 303 officers using their private vehicles for official purposes on a mileage basis. By June 1963 the Department had 368 cars and trucks in its fleet, located at 96 centres throughout Queensland. It endeavoured to turn over vehicles which had travelled 40 000 miles.

Accounts

The figures fo the years 1957-58 to 1962-63 are shown below:

	Expenditure	Receipts	Remarks
	(f)	(£)	
1957-58	3 768 662	1 282 382	
1958-59	3 529 913	2 304 269	(includes bulk handling facilities for sugar)
	(Trust funds 2 102 670))	
1959-60	3 449 592	2 183 445	
	(Trust funds 1 834 490))	
1960-61	4 217 700	2 604 025	
	(Trust funds 2 371 922)	1	
	(Salary of Minister 3739)	
1961-62	3 856 725	2 028 153	
	(Trust funds 1 792 392))	
1962-63	4 275 672	2 268 489	
	(Trust funds 2 023 423)		

Extension services

Funds from the Commonwealth Extension Services Grant were again made available for an extension consultant service, the aims of which were:

- i. assisting in the co-ordination of extension;
- ii. training staff in extension methods; and
- iii. serving as consultant to the Department's divisions and branches in programme planning and other extension activities.

In view of the increasing demands made upon the section, an experienced extension officer was seconded from another branch to further training in extension during 1956-57. During 1957-58 J. R. M. Wolfe (of the Extension Methods Section) completed a course in extension education leading to the Degree of Master of Science at Cornell University in USA and returned to the Department in December 1957 after some field work in various State extension services.

A series of conferences was then held to determine the most appropriate and practical form of organisation of Departmental extension services and a plan was adopted. During 1957-58 induction and in-service training of extension officers in extension methods were given to new officers and 58 officers attended the two fifteen-day in-service schools and 64 attended during 1958-59. In addition, 14 Indian sheep and wool officers studying in Australia under the Colombo Plan were given a training course. During 1959-60 training was given to officers in the Veterinary Services, Cattle Husbandry and Poultry Branches. Two twelve day in-service schools were held for 60 Departmental officers and personnel from Fiji and Ceylon. Four Colombo Plan Fellows from Borneo visited the Department to learn of extension methods. A central tape service in a digest form was continued at 17 radio stations, supplied regularly with talks by Departmental officers. An Extension and Training Officer examined the functioning of the Department's tobacco extension service in the Burdekin and made suggestions for improvement. By 19 June 1962 most of the Departmental offices had received in-service extension training and an extension officer, J. R. M. Wolfe, was stationed at Toowoomba; an organised soil conservation group in the Pittsworth district took part in a project.

In 1962-63 a combined farm management and extension supervision school for district supervising officers was arranged. The farm management section dealt with farm budgeting methods, farm accounts and other management matters; the supervision section dealt with duties of supervisors, staff training and assessment, programme planning, interviewing and general aspects of supervision.

Publications

The *Queensland Agricultural Journal*, with some 15 000 subscribers, continued as the main Departmental monthly publication. During 1958-59 *Journal* display racks were placed on the walls of twelve country centres, and a radio feature "Agricultural Digest" gave previews of *Journal* articles and notes to the country press. Many *Journal* articles were reprinted as *Advisory Leaflets*. The provincial press made continued use of the Department's news bulletins, often as the "Farmer's Page". News reports covering current activities of the Department were issued almost every day. *The Honey Flora of Southeastern Queensland* was published.

With the January 1960 issue the *Journal* introduced photographic colour, slightly larger type and material presented in a more readily assimilated form, and new subscriptions increased. During this year the Department's "News Bulletin" became the "Press Release". During 1960-61 a special extension publication, *Tobacco Growing in Queensland*, was released, financed by the Tobacco Industry Trust Account. *The Queensland Journal of Agricultural Science* continued to publish scientific papers. The year 1961-62 saw the publication of new enlarged editions of both Volume I ("Fruit and Vegetables") of the *Queensland Agricultural and Pastoral Handbook*.

Photographic services

Some 18 000 prints of all sizes were made each year from negatives sent in by field officers and covering a wide range of subjects. A steady demand for colour slides of scientific subjects for lecture purposes continued and a central film library was built up of 16 mm movie films of various agricultural interests.

Library and abstracting services

The Central Library continued to build up a comprehensive collection of valuable reference books and *Journals* from all over the world relating to various aspects of the agricultural and pastoral industries and inter-library borrowing was undertaken where necessary. During 1959-60 arrangements were made by the Public Library of Queensland to provide staff for the Central Library. A scientific abstracting service was provided by the Information Branch during 1959-60, the Abstractor perusing all literature accessions and abstracting relevant items. This service was widely used by all branches.

CHANGE OF NAME, STABILITY OF STAFF AND EXPANDED SERVICES, 1963-1972

The Department under Sir John Row, 1963-1972

Sir John Alfred Row, Minister for Primary Industries, 1963-1972

John Alfred Row was born at Hamleigh, Ingham, on 1 January 1905. He was educated at the Trebonne and Toowoomba East State Schools, Toowoomba Preparatory School and Toowoomba Grammar School. He purchased a cane farm at Trebonne, near Ingham, in 1924 and worked the farm personally from 1926 to 1960. He was a member of the Victoria Mill Suppliers' Committee and Executive 1932-60, growers' representative on the local Sugar Cane Prices Board 1948-60, a Director of the Cane Growers' Co-operative Store 1955-60, a member of the Cane Pest and Disease Control Board 1955-60, a life member of the Herbert River Show Association, the founder and a life member of the Rodeo Association, Chairman of the Queensland Council of Agriculture, and past President and trustee of the Ingham Bowling Club. Row was knighted in 1974. He was a member of the North Queensland Club, a Justice of the Peace, a Councillor of the Hinchinbrook Shire 1952-63, and Council representative on the Townsville Regional Electricity Board. He was Country Party M.L.A. for Hinchinbrook from 28 May 1960 to 27 May 1972 (when he retired), and served as Minister for Primary Industries from 14 June 1963 to 20 June 1972.

Legislative Acts Passed during Row's Ministry

1. The Wheat Industry Stabilisation Act of 1963 (Qd. Govt. Gaz, No. 18, 1963) was assented to on 3 December 1963. This Act continued for a further five-year period commencing with 1963-64 wheat season, the joint Commonwealth and all States Scheme for stabilisation of the wheat industry. Queensland's representation on the Wheat Board was now extended from one to two members - i.e., as for other States. The Scheme provided for a guaranteed price for wheat of each season's harvesting, based on the cost of production. Export wheat was limited to 150 million bushels. The cost-of-production figure for the first year was reduced from 15s 5d to 14s 5d. The owner-operators, allowance was increased from £1110.4s. to £1250 per annum. The yield-per-acre figure was raised from 15 2 bus. to 17 bus.

The current home consumption price was 15/11 2 bushel.

Queensland's quality premiums would be protected and all moneys earned by way of quality premiums on the sale of Queensland wheat would be paid to the State Wheat Board for distribution to growers who delivered Q1, Q2 and QB2 wheat. Queensland's

hail insurance and wheat classification schemes would not be disturbed and other marketing legislation protected.

 The Dairy Produce Acts Amendment Act of 1963 (Qd. Govt. Gaz, No. 37, 1963) was assented to on 16 December 1963-to be incorporated in The Dairy Produce Acts, 1920 to 1923.

Goat's milk was brought under the control of the Act. Dairy inspectors were to provide written records and they could obtain police assistance or technical assistance on making inspections. Provision was made for a registration certificate of a factory to show the type, i.e., the use authorised by the registration. Registration fees were increased to £3 per annum in the case of a cold store or factory and £1 in the case of a depot.

Minimum standards were extended to all products of milk or cream. The consent of the Governor-in-Council for the erection or use of a butter or cheese factory and of the Minister for plant installations costing more than £1000 in such a factory was now required for all dairy produce factories, except on the dairy farm.

 The Agricultural Standards Act Amendment Act of 1963 (Qd. Govt. Gaz, No. 40, 1963) was assented to on 18 December 1963 to be incorporated in The Agricultural Standards Acts, 1952 to 1963.

This Act protected users of fertilisers and other preparations marketed to assist agriculturalists by requiring that the fertiliser or other preparation be registered before it was put on the market in Queensland. The registration authority was the Agricultural Requirements Board. This new Act added a Botanist to the membership of the Agricultural Requirements Board. It also now covered preparations for cleansing eggs, and required a date to be placed on small packets of seeds up to a weight of one ounce indicating the date after which the seed would cease to be viable.

- 4. The Fruit Marketing Organisation Acts Amendment Act of 1964 (Qd. Govt. Gaz., No. 16, 1964) was assented to on 6 April 1964, to be incorporated in The Fruit Marketing Organisation Acts, 1923 to 1964. This Act established a Cannery Board to take over the Northgate Cannery from the Committee of Direction of Fruit Marketing. The Act vested the cannery in this Board and imposed upon it the duty of maintaining, managing and operating it. Growers, particularly pineapple growers, made a substantial contribution to the cost of establishing the cannery in 1948. Those growers who made this contribution received certificates of contribution entitling them to interest, a share of cannery profits, and preference in the event of a glut. When the above Act was passed the aggregate value of these certificates was £788 145, of which £663 958 was held by pineapple growers. The Cannery Board would be constituted by seven members as follows:
 - (a) one subscriber member of the Pineapple Sectional Group Committee, who was both a supplier and a member of COD;
 - (b) two subscriber members of the Pineapple Sectional Group Committee, who must also be suppliers;

- (c) one subscriber member of COD other than of the Pineapple Group, who is also a supplier;
- (d) one subscriber member elected by the subscribers;
- (e) the General Manager of COD and
- (f) the Cannery Manager.
- 5. The Fruit Marketing Organisation Acts Amendment Act of 1964 (No. 2) (Qd. Govt. Gaz, No. 52, 1964) was assented to on 10 December 1964, to be incorporated in The Fruit Marketing Organisation Acts, 1923 to 1964.

This Act gave the COD the power to undertake the marketing of "heavy vegetables"; vegetables grown in the Shires of Glengallan, Inglewood, Rosenthal and Stanthorpe and the City of Warwick were placed within the jurisdiction of the Deciduous Sectional Group Committee. Tomatoes came under the Other Fruits Sectional Committee and deciduous fruit grown outside the Granite Belt was handled by the Other Fruits Sectional Group Committee.

- 6. *The Veterinary Surgeon's Acts Amendment Act of 1964* (*Qd. Govt. Gaz.*, No. 64, 1964) was assented to on 23 December 1964, to be incorporated in The Veterinary Surgeon's Acts, 1936 to 1964. This Act restored to the Presidency of the Veterinary Surgeon's Board of Queensland, a qualified veterinary surgeon, such as Professor H. R. Seddon, Dean of the Faculty of Veterinary Science within the University of Queensland and its first President. During World War II the veterinary faculty was closed and Professor Seddon left Queensland. In 1946, with uncertainty regarding the faculty, an amending Act provided for the Under-Secretary of the Department of Agriculture and Stock to be ex officio a member and President of the Board.
- 7. The Soil Conservation Act of 1965 (Qd. Govt. Gaz., No. 4, 1965) was assented to on 8 April 1965. The Soil Conservation Act of 1951 was repealed. In introducing the Bill, the Minister, The Hon. J. A. Row, stated that over 2 300 000 acres of the State's valuable farm lands were affected by soil erosion. The Act constituted the Director-General of Primary Industries as a corporation sole under the name of the Soil Conservation Authority. The Advisory Committee of the 1951 Act was kept in this Act with the addition of representatives of the Land Administration Commission and the Forestry Department. The Soil Conservation Authority could take the initiative in declaring areas of erosion hazard. Project areas could be recommended by the Minister and constituted by the Governor-in-Council. The Soil Conservation Authority prepared a soil conservation scheme for an area and in so doing divided works into categories of general benefit and private benefit work and would provide estimates of cost of the works. He would advertise the proposals and forward copies of the plans to land owners and affected statutory authorities. Objections could be lodged and investigated and alternate proposals submitted. When the scheme was approved a gazetted notification would be made and thereafter the scheme would have the force of law and would be binding upon the Crown, the Authority, and all persons. There was provision for modification if a change in land use occurred.

The Act provided for the constitution of soil conservation districts and the formation of local Trusts to organise and co-ordinate local activities and exercise overall local responsibility.

In 1955 only 1000 farmers were applying soil conservation measures; in 1965 the figure was 3700, and increasing at 500 farmers a year.

A majority of landholders in an area could apply to the Minister for the constitution of a soil conservation district and if more than two-thirds of the landholders indicated in a poll that they wished to establish a soil conservation district the Minister would recommend it to the Governor-in-Council. An owner could obtain permission from the Minister to be excluded from the scheme and the Minister could approve if the applicant's grounds were reasonable. After a district was constituted a Trust consisting of five members-four elected by involved owners and one a Government representative-was set up. Alternatively, a local authority could be appointed a Trust. Trusts would have power to borrow and must submit a budget to the Minister. The Trust could issue erosion correction notices where erosion was being aggravated by an owner. Finance for erosion work could be obtained from the Agricultural Bank. The Trust could resume land which might be needed for a project.

8. The Primary Producers Organisation and Marketing Acts and Another Act Amendment Act of 1965 (Qd. Govt. Gaz, No. 12, 1965) was assented to on 21 April 1965, to be incorporated in The Primary Producers Organisation and Marketing Acts, 1926 to 1965. The Other Act amended was The Peanut Industry Protection and Preservation Acts, 1929 to 1941.

This Act removed the whole of the State other than central Queensland from the control of the Grain Sorghum Marketing Board and enabled a reconstituted Central Queensland Grain Sorghum Marketing Board to operate for the benefit of growers in central Queensland. The Act specified the Dawson-Callide and Central Highlands districts, together with coastal areas to the east and north and Mt Christian and south to the southern boundary of the Calliope Shire.

9. The Meat Industry Act of 1965 (Qd. Govt. Gaz, No. 28, 1965) was assented to on 10 May 1965. In 1964 the Queensland Government appointed a Committee of Inquiry to inquire into matters concerning the livestock and meat industry. Lloyd Harris of the Department of Primary Industries was a member. Based on its recommendations the above new Act consolidated into the one Act with amendments The Slaughtering Acts, 1951 to 1958, The Abattoirs Acts, 1930 to 1955 and the slaughtering provisions of The Poultry Industry Acts, 1948 to 1959. It repealed several old Acts.

The present Act set up a meat inspection account at the Treasury into which all fees should be paid and from which costs of inspection would be met.

Amendments were made to powers of inspectors, the power to make regulations, penalities, and slaughtering of horses and other animals for pet food.

The Act provided for the establishment of a Queensland Meat Industry Authority of six members, an independent chairman appointed by the Government, an officer of the Queensland Department of Primary Industries and four members representative of producers, abattoir boards constituted under the Act, owners of proprietary abattoirs and operators of service works respectively.

A duty of the Authority was to approve private abattoirs for the supply of meat in public and district abattoir areas by licence.

The Queensland Meat Industry Board was renamed the Metropolitan Public Abattoir Board and its activities were confined to the Greater Brisbane Area and the operation of the Cannon Hill Abattoir, public saleyards and public meat markets. The Authority would plan additional public or district abattoirs.

The Act provided for the marking of carcasses. Acquisition of cattle or of meat was removed from the powers.

- 10. *The Tobacco Industry Protection Act of 1965* (*Qd. Govt. Gaz.*, No. 37, 1965) was assented to on 29 October 1965. The Tobacco Industry Protection Act of 1933 was repealed. This Act removed the necessity under the 1933 Act to uproot the old plants within one month of harvest and burn them as now the crop was grown under irrigation as a spring crop and burning was impossible during the wet season and exposed the soil to erosion. The acceptable method now was to shred old plants with a rotary slasher or flail and defer ploughing until after the heavy rain period. The new Act required destruction of volunteer seedlings and seed bed residues, and provided for replanting if necessary, during portion of the gazetted crop-free period. It also provided for the onus for breaches of the Act to be placed on the owner or occupier, depending on the particular circumstances, and for compensation for losses sustained by ordered destruction for quarantine purposes.
- 11. *The Sugar Experiment Stations Act Amendment Act of 1965* (*Qd. Govt. Gaz.*, No. 38, 1965) was assented to on 29 October 1965, to be incorporated in The Sugar Experiment Stations Act, 1900 to 1965. This Act replaced the term "alternate host plant" by "alternative host plant" to enable the control of "mosaic disease" which was present in wild sorghum adjacent to sugar cane land and other instances.

The annual rate of assessment per ton of sugar would now be levied by the Minister instead of the Governor-in-Council. An amendment allowed cane pest and disease control boards to sue for recovery of any debts for materials or services supplied. Another amendment allowed a cane pest and disease control board to establish a superannuation fund.

12. The Brands Acts Amendment Act of 1965 (Qd. Govt. Gaz, No. 39, 1965) was assented to on 29 October 1965, to be incorporated in The Brands Acts, 1915 to 1965. This new Act allowed numerals to be used above the registered brand where cattle were branded on the ribs. The Minister could approve special brands. The size of brands must not be less than 1.3 inches or more than 22 inches, and a horizontal letter in a brand must be permanently joined with another letter, numeral or sign.

More than one earmark only might be registered with the one brand. Brand directories were to be issued every fourth year for cattle and horses and every second year for sheep. Returns for brands and earmarks registered must be made on first January of each year. Powers of inspectors were strengthened.

- 13. Stock Acts Amendment Act of 1965. (Qd. Govt. Gaz, No. 40, 1965) was assented to on 29 October 1965, to be incorporated in The Stock Acts, 1915 to 1965. The main amendments made by this Act were related to:
 - 1. the insertion in the Act of a list of notifiable diseases;
 - 2. the authority of the Minister to enter into agreements with private veterinary surgeons for the carrying out of tuberculin testing of dairy cattle and other veterinary services;
 - 3. the bases upon which assessments could be levied on milk and cream for the financing of the tuberculosis eradication project;
 - 4. the purposes for which moneys could be disbursed from the compensation fund;
 - 5. the seizure and destruction of infected or suspected meat introduced from other States;
 - 6. the remedying of certain defects in law relating to permits and waybills for travelling stock; and
 - 7. the licensing of pet shops.

Provision was made for payments to be made from the compensation fund for the improvement by artificial insemination of dairy cattle of producers who contributed to that fund by means of assessments levied on milk and cream supplied to factories.

Permits were now available for a specified period to cover frequent movements of stock between an owner's own holdings - generally for three or six months. The Governor-in-Council could exempt certain classes of stock from the need for permits to travel, e.g., bobby calves, pigs or poultry.

14. **Poultry Industry Acts Amendment Act of 1965** (*Qd. Govt. Gaz*, No. 54, 1965) was assented to on 16 December 1965, to be incorporated in The Poultry Industry Acts, 1946 to 1965. In introducing this Bill Row said the poultry industry, which in 1959 was estimated to be worth £3 000 000, was now worth £8 000 000 per annum to the State. Random sample tests conducted at the Rocklea Animal Husbandry Research Farm now showed annual production of two dozen eggs per bird more than five years before. Orderly marketing of broilers was done by contract with growers supplying a poultry processor. The present-day broiler could reach 3 lb liveweight in under 10 weeks, compared with the bird of 1959, which took 12 weeks.

This Act provided wider avenues of finance for the Poultry Industry Fund, which financed research. Prior to this Act this fund was financed by a Government grant and by the egg producers by means of precepts upon egg marketing boards. This Act extended to contributions by precepts on licensed poultry slaughtering establishments. A Government subsidy would match the total precepts issued and in addition provide an annual grant of £20 000. The Poultry Advisory Board was reconstituted with seven members: three

Government and four industry representatives. Egg Board representation was two, and one representative was allotted to each of the table poultry and hatchery interests.

The Act recognised naked-eye and optical inspection of the vent in chick sexing and operators could officially use either method and could hold a licence under examination in both methods. Stock supplies must be registered. Turkeys and ducks were now included in stock supplies. The Chief Inspector had powers to accept or cancel registration.

The Act also provided for registration of premises as egg grading and packing floors, and controlled the activities of the manufacturer of egg pulp. The Egg Marketing Board pasteurised before freezing all the egg pulp it manufactured.

- 15. *The Stock (Prevention of Blue Tongue) Act of 1965 (Qd. Govt. Gaz.*, No. 60, 1965) was assented to on 17 December 1965. Catarrhal fever of sheep, commonly called "blue tongue", is a very serious disease from which Australia has been free. It was discovered that cattle semen, smuggled in from Canada, had been used at Mt Crosby near Brisbane. Cattle semen is a carrier of blue tongue. The Mt Crosby area was quarantined, all cattle in the area were destroyed, and an attempt to eradicate sandflies, the carriers of the disease, was instituted. This Act ratified the action taken by the Minister and it provided for compensation for cattle destroyed except those of the smuggler. (See "Surveillance of Exotic Diseases")
- 16. *The Tobacco Industry Stabilisation Act of 1965* (*Qd. Govt. Gaz.*, No. 57, 1965) was assented to on 17 December 1965. This Act complemented Commonwealth legislation with the object of providing a stabilisation plan for the tobacco industry in Australia, agreed to by the Commonwealth and the three States which produced tobacco, namely Queensland, New South Wales and Victoria. Under the Stabilisation Plan the Commonwealth was to ensure the sale, if available, of 26 million lb of Australian-grown tobacco leaf of acceptable grades, during each of the four seasons 1964-65 to 1967-68. The 26 million lb was apportioned among the States as follows:

Queensland	14 000 000 lb
Victoria	9 662 000 lb
New South Wales	2 338 000 lb

The plan was administered by the Australian Tobacco Board, made up of a Commonwealth Chairman, four manufacturers' representatives (one from each State) four growers' representatives and three State Government representatives (one each from Queensland, Victoria and New South Wales).

This new Queensland Act provided for a Tobacco Quota Committee consisting of three grower representatives and a Chairman who was to be a representative of the Department of Primary Industries. This Committee allocated growers' basic quotas attached both to the grower concerned and to the land specified in the allocation. A Tobacco Quota Appeals Tribunal was provided. An adjusted quota could be determined in the case of shortfalls on the one selling floor. Quotas to existing growers were to be based on their best two years' sales during the four years 1960-61 to 1963-64.

- 17. *The Primary Producers' Co-operative Associations Act Amendment Act of 1965 (Qd. Govt. Gaz.*, No. 64, 1965) was assented to on 23 December 1965, to be incorporated in The Primary Producers' Co-operative Associations Acts, 1923 to 1965. This Act was formed to deal with the financial straits of the Gin Gin Sugar Mill, involving 180 sugar growers and their families. It provided for the mill or any other mill to be taken over by other than Primary Producers' organisations. The primary producers' Co-operative Association under this new Act could convert itself to and register as a Company under the Companies Act.
- 18. *The Sugar Board Act of 1966* (*Qd. Govt. Gaz.*, No. 6, 1966) was assented to on 21 October 1966. This Act confirmed and ratified the action of the Government in arranging for the Sugar Board to obtain advances from the Rural Credits Department of the Reserve Bank of Australia of \$19 000 000 to assist the marketing of No. 1 pool sugar from the 1966 season. The first advance to growers would be available at a higher level than otherwise immediately following passage of this legislation. The Queensland Government agreed to guarantee the advances from the Reserve Bank and to enable this guarantee it was necessary to constitute the Sugar Board a corporate body. The State Government within 12 months would give the Sugar Board a repayable grant, the first repayment being due 1970-71, to liquidate its indebtedness, both principal and interest, to the Reserve Bank at the end of the 1966 season.
- 19. *Primary Producers' Organisation and Marketing Acts Amendment Act of 1966 (Qd. Govt. Gaz.*, No. 18, 1966) was assented to on 15 December 1966, to be incorporated in The Primary Producers Organisation and Marketing Acts, 1926 to 1966. This amendment provided that the Governor-in-Council by Order-in-Council could authorise a particular district canegrowers' executive to appoint two or three representatives to the Queensland Canegrowers' Council, otherwise a district executive would have one representative only.
- 20. *The Regulation of Sugar Cane Prices Acts Amendment Act of 1966* (*Qd. Govt. Gaz.*, No. 19, 1966) was assented to on 15 December 1966, to be incorporated in The Regulation of Sugar Cane Prices Acts, 1962 to 1966. This Act provided for arbitration by the Central Sugar Cane Prices Board with respect to cane harvested by chopper harvesters and the time limit for such cane to be delivered to the mill, if agreement was not reached between millers and growers. The Act also provided for the conversion of all monetary references in the Regulation of Sugar Cane Prices Acts to decimal currency.
- 21. *The Agricultural Chemicals Distribution Control Act of 1966* (*Qd. Govt. Gaz.*, No. 27, 1966) was assented to on 21 December 1966. With the introduction after World War II of low-volume spraying from aircraft of high-concentration hormone-type weed killers, it was necessary to prevent damage to neighbouring crops. This Act provided a means for a primary producer to obtain compensation for damage by spraying of his crops or stock by others. Exemptions to parts of the State could be granted. Provision was made for licensing of commercial operators for both aerial and ground spraying. The owner of an aircraft or ground equipment must take out an insurance policy indemnifying him or his servants against liability for loss, damage or injury caused by his operations, the minimum for aerial distributing being \$30 000 per aircraft. Hazardous areas could be declared by Order-in-Council.

22. *The City of Brisbane Markets Acts Amendment Act of 1967 (Qd. Govt. Gaz.*, No. 30, 1967) was assented to on 15 November 1967, to be incorporated in The City of Brisbane Market Acts, 1960 to 1967. This Act gave to "farm produce" trade representation on the Brisbane Market Trust and for that purpose added an additional member to the Trust. "Farm produce" included heavy vegetables such as potatoes, onions and pumpkins, as well as hay, chaff, grains, etc.

The Act also relieved the Co-ordinator-General of Public Works of the responsibility to act as constructing authority for the Trust and transferred this to the Trust itself. The Act also empowered the Trust to sell or otherwise dispose of its 125 acres of land (of which 36 acres were then occupied) up to 26 acres subject to the approval of the Governor-in-Council.

The Act also required the Trust to establish a Debt Redemption Fund for the repayment of Ioans raised by the Trust. The Auditor-General, the Under-Treasurer and the Chairman of the Trust were appointed Trustees of the Fund and were constituted a body corporate with the name of "Trustees of Brisbane" Market Trust Debt Redemption Fund.

- 23. Agricultural Chemicals Distribution Control Act Amendment Act 1968 (Qd. Govt. Gaz., No. 38, 1968) to be incorporated in the Agricultural Chemicals Distribution Control Act 1966-1968. This Act clarified the definition of aerial spraying and insurance policies in line with agreement between States. Each flight must have an insurance cover of a minimum of \$30 000. Damage on the property of the person requesting the spraying would not be covered.
- 24. Wheat Industry Stabilisation Act 1968 (Qd. Govt. Gaz., No. 39, 1968), assented to 11 December 1968. This Act continued the wheat industry stabilisation for a further five years from the 1967-68 crop. This new Scheme differed from earlier schemes since 1948. With increased wheat incomes and rising land values the Commonwealth broke right away from the cost-of-production idea. There was an international grains arrangement which set a floor price for wheat. The Commonwealth decided to guarantee \$1.45 per bushel for the first year on 200 000 000 bushels of export wheat with an annual revision based on a cost index maintained by the Bureau of Agricultural Economics. If costs went up, so would the guaranteed price. The new home consumption price was fixed at \$1.71. The Bureau of Agricultural Economics would exclude land values from its index of costs. The term of operation of the Australian Wheat Board must be appointed the licensed receiver for the Australian Wheat Board in this State. Queensland's hail insurance scheme and wheat classification and premium schemes on high protein wheat were protected.
- 25. Swine Compensation Fund Act Amendment Act 1969 (Qd. Govt. Gaz., No. 5, 1969) was assented to on 27 October 1969, to be incorporated in The Swine Compensation Fund Act, 1962-1969. Swine fever had occurred in Australia in 1903-06, 1927-28, 1942-43 and 1962; the compensation fund was first established in the Act of 1962 in Queensland and the disease was excluded from Queensland by embargoes on the introduction to this State of pigs and pigmeats. The fund had reached \$300 000, which was considered adequate, and so this Act suspended the collection of swine sales stamp

duty and refunded to owners and agents unused and uncancelled swine sales duty stamps from the fund.

- 26. Foot and Mouth Disease Expenses and Compensation Fund Act Amendment Act 1969 (*Qd. Govt. Gaz.*, No. 6, 1969) was assented to on 27 October 1969, to be incorporated in The Foot and Mouth Disease Expenses and Compensation Fund Act 1958-1969. The amendment provided uniformity of control measures throughout Australia. Only property which could not be adequately disinfected would be destroyed in an eradication programme including meat, farm produce, hides, skins and possibly clothing that might have been contaminated or exposed to contamination by the disease.
- 27. Wheat Industry Stabilisation Act Amendment Act 1969 (Qd. Govt. Gaz., No. 9, 1969) was assented to on 19 November 1969, to be incorporated in the Wheat Industry Stabilisation Act 1968-1969. With the severe drought in Queensland, feed wheat had become a major life-saver for starving stock but the price was too high. This amendment Act enabled the Australian Wheat Board to reduce its price. It empowered the Australian Wheat Board to sell fair average quality wheat for purposes other than human consumption at a price not less than the f.o.r. ports equivalent of the guaranteed export price which was about \$1.41 per bushel.

The Act also provided for a reduced price for wheat used for industrial purposes such as starch manufacture. It also provided for offals-bran and pollard-sold for stock. A rebate was given to millers on the quantity actually sold as bran and pollard.

- 28. Co-ordination of Rural Advances and Agricultural Bank Act Amendment Act 1969 (Qd. Govt. Gaz., No. 17, 1969) was assented to on 17 December 1969, to be incorporated in the Co-ordination of Rural Advances and Agricultural Bank Acts 1938-1969. This Act provided for the Corporation of the Agricultural Bank to be constituted by the Minister for Primary Industries rather than the Treasurer, as a consequence of the recent transfer of the Agricultural Bank to the portfolio of the Minister for Primary Industries.
- 29. *Meat Industry Act Amendment Act 1969* (*Qd. Govt. Gaz.*, No. 18, 1969) was assented to on 17 December 1969, to be incorporated in the Meat Industry Acts 1965-1969. The poultry meat industry in Queensland slaughtered 4 900 000 broilers in 1962-63 and 12 900 000 in 1968-69. Dressed poultry carcasses, particularly frozen chickens, were being sold containing unduly high quantities of water as ice. This Amendment Act ensured that the water uptake was kept below a maximum figure of 8% in line with figures in other States. A high penalty of \$2000 was fixed for a breach of the Act and the Court could suspend the offender's slaughterhouse licence for up to six months.
- 30. Wheat Delivery Quotas Act 1970 (Qd. Govt. Gaz., No. 4, 1970) was assented to on 10 April 1970. This Act was designed to introduce a delivery quota system for the wheat growing industry for deliveries to the Wheat Board. In 1958-59 Australian wheat production was 215 000 000 bushels; in 1962-63 it was 301 000 000 bushels; and the 1968-69 crop was 554 000 000 bushels. Most of the crop was yet to be disposed of and had to be disposed of on the export market. The Commonwealth Government, which financed the wheat crop, indicated it could not guarantee the wheat industry unlimited finance. The Australian Wheat Growers Federation submitted a plan to bring down production, which was agreed to by Commonwealth and State Ministers in April 1969. For the 1969-70 period the Australian quota was fixed at 344 000 000 bushels plus an

additional quota of 13 000 000 bushels of prime hard wheat, giving a total of 357 000 000 bushels. Queensland quotas were 25 000 000 bushels plus 6 000 000 bushels of prime hard wheat.

This Queensland Act followed Commonwealth legislation. The Act was in four parts.

Part I - the Act included all wheat harvested up to and including the 1972-73 season, which was the end of the current wheat stabilisation plan.

Part II - Division I set up a wheat delivery quota committee of five members - three to be growers nominated by the State Wheat Board, one nominated by the Queensland Grain Growers Association, one a member of the Queensland Department of Primary Industries acting in an advisory capacity. The Chairman would be a wheatgrower nominated by the Minister on the recommendation of the committee.

Division II set up a tribunal of three members with a barrister-at-law as Chairman (or stipendiary magistrate or a former one), the second member an independent Government nominee and the third a grower nominated from a panel of three nominated by the State Wheat Board.

This was the same principle as the tobacco tribunal.

Division III dealt with the allocation of growers' basic quotas for the 1969-70 season, based generally on average deliveries to the State Wheat Board over the three seasons 1966-67, 1967-68 and 1968-69, less a predetermined percentage. New growers would be considered separately.

Division IV dealt with rights of quota holders.

Division V deals with general provisions, regulations, penalties, etc.

Part III - dealt with the Wheat Industry Stabilisation Act.

Part IV - modified the Wheat Pool Act. It removed the requirement of the State Wheat Board to accept all wheat except quota wheat, but it could accept over-quota wheat.

31. Agricultural Chemicals Distribution Control Act Amendment Act 1970 (Qd. Govt. Gaz, No. 18, 1970) was assented to on 16 April 1970, to be incorporated in the Agricultural Chemicals Distribution Control Act 1966-1970. This Act covered a new section making additional provisions concerning conditions, warranties and exclusion clauses of insurance policies. These would have to be approved by the Standards Officer administering the Act in Queensland. Uniformity in the indemnity provisions of the Acts in all States was essential.

Ground distribution was not involved in the above but the Act provided for the issue of licences of different classes of commercial operators of ground equipment used for the distribution of herbicides. Three different classes of ground operators were identified to include bodies such as local authorities, regional boards, P.M.G., etc.
Responsibility to see the insurance policy was in force and the equipment as stated was moved from the owner to the actual operator in the new Act.

Organisational changes during Row's term

The Department of Agriculture and Stock becomes the Department of Primary Industries

By Proclamation by His Excellency the Governor, Sir Alan James Mansfield, Administrator, on 26 September 1963 the Department of Agriculture and Stock was named the Department of Primary Industries and the Minister, the Hon. J. A. Row, had his portfolio changed from Minister for Agriculture and Forestry to Minister for Primary Industries.

The Department was founded as the Department of Agriculture on 17 June 1887. On 1 July 1904 the Stock Branch, which had been under the control of the Home Secretary, joined the Agriculture group under the one Minister to form the Department of Agriculture and Stock; this name persisted for almost sixty years.

Research stations

In June 1964 W. J. S. Sloan, Acting Director-General of Primary Industries, referred to the newly established Brigalow Research Station at Theodore as "No. 23". He said few people realised that the Department was a major operator of research stations. The Department owned and operated the following research stations.

Northern Queensland: Parada Research Station and Walkamin Research Station (Mareeba-Dimbulah Irrigation Area), Kairi Research Station (Atherton Tableland), Kamerunga Horticultural Research Station (near Cairns), Tropical Agriculture Research Station (South Johnstone), Animal Health Station (Oonoonba, near Townsville), Toorak Sheep Field Research Station (near Julia Creek), Ayr Cattle Field Research Station, Swan's Lagoon Cattle Field Research Station and Millaroo Research Stations in the Burdekin area.

Central Queensland: Biloela Research Station, Theodore Research Station and the Brigalow Research Station (near Theodore).

Southern Queensland: Coolum Research Station (near Yandina), Maroochy Horticultural Research Station (Nambour), Animal Research Institute (Yeerongpilly), Animal Husbandry Research Farm (Rocklea), Redlands Horticultural Research Station (Ormiston), Gatton Research Station, Hermitage Research Station (near Warwick), Granite Belt Horticultural Research Station (Applethorpe) and Inglewood Research Station.

In addition, the Department conducted "Brian Pastures" Research Station (Gayndah) owned by the Australian Wheat Board, and staffed the Queensland Wheat Research Institute at Toowoomba.

Organisational changes within the Department, 1964-72

1964-65

The Division of Development Planning and Soil Conservation was created during 1964-65 to provide a basis for co-ordinated planning of developmental projects in primary industry. Planning had hitherto lacked cohesion in some areas and the new division was to provide a permanent core devoted to one particular purpose. The close association of soil conservation services with development planning highlighted the emphasis to be placed on soil conservation in any land development projects, whether irrigated or dryland. The Soil Conservation Act of 1965 provided the statutory facilities for landholders to undertake joint soil conservation activity, either under Government guidance or through local sponsorship and leadership. The Director-General of Primary Industries was constituted by the Soil Conservation Authority and, as such, was subject to the Minister, responsible for the administration of the new Act. (Sloan, W. J. S., *An. Rep. Dep. Prim. Ind.*, 1964-65, pp. 2-3)

1965-66

Within the Division of Marketing, the Marketing Branch and the Economic Research Branch were renamed the Marketing Services Branch and the Economic Services Branch respectively to designate more accurately the wider functions now being performed by those branches. A Director of Marketing Services, D. R. Lewis, B.Sc. (Econ.), was appointed and the position of Standards Officer, held by A. C. Peel, was raised to that of Director of Agricultural Standards. In view of the expansion of the functions and responsibilities projected as a result of additional Commonwealth funds, the Information Branch was redesignated Information and Extension Training Branch; C. W. Winders was appointed Director, and a Senior Information Officer was appointed.

To avoid confusion following the formation of the Queensland Meat Industry Authority, the title of the Meat Control Branch was changed to Slaughtering and Meat Inspection. The status of the Cattle Husbandry Branch was raised as a result of expansion of staff and responsibilities.

The position of Chief Advisory Officer (Administration) was created with a view to providing a central source of advice to the Director-General on finance and other administrative matters.

A Chief Extension Officer was appointed in the Agriculture Branch to supervise the extension activities of this major branch. (Harvey, J. M., *An. Rep. Dep. Prim. Ind.*, 1965-66, pp. 3-4)

1966-67

The Division of Plant Industry was strengthened by the appointment of a Deputy Divisional Director, S. Marriott, B.Agric.Sc.

The status of the two branches within the Division of Development Planning and Soil Conservation, namely Development Planning Branch and Soil Conservation Branch, was

raised during the year because of the expansion of activities and the higher degree of responsibility being assumed by the officers-in-charge.

Three Assistant Directors were appointed in the Agriculture Branch to assume responsibility for the Agronomy, Agrostology and Extension Sections. The planning and supervision of research within the branch was decentralised, with six regional leaders in agronomy and agrostology nominated to organise regional planning and implementation of research programmes.

An Epidemiology and Statistics Section was formed in the Pathology Branch of the Animal Research Institute as more adequate recording and increased use of diagnostic data, together with application of statistics to specific disease situations, were essential background for disease-control purposes. (Harvey, J. M., *An. Rep. Dep. Prim. Ind.*, 1966-67, p. 2)

1967-68

The previous year's internal organisation was maintained.

1968-69

The major organisational changes made during the year were in the Division of Animal Industry and the Horticulture Branch.

The central administration of the Division of Animal Industry was strengthened by the appointment of two Deputy Divisional Directors. L. G. Newton, formerly Director of Veterinary Services, became Deputy Director responsible for regulatory and other field activities. J. W. Ryley, formerly in charge of the Animal Research Institute, assumed responsibility for the Division's research work.

The functions of the Department in horticulture were reviewed and the Food Preservation Research Laboratory Branch was absorbed into the Horticulture Branch. R. C. Cannon was confirmed as Director of Horticulture with increased status. Three Assistant Directors were appointed - J. W. Berrill (Extension), H. M. Groszmann (Research) and R. E. Leverington (Food Preservation).

Following a reallocation of Ministerial responsibilities by the Premier in May, control of the Agricultural Bank and the Fish Board were transferred to the Minister of Primary Industries. The Fisheries Branch of the Department of Harbours and Marine was also transferred to the Department of Primary Industries. (Harvey, J. M., *An. Rep. Dep. Prim. Ind.*, 1968-69, p. 5)

1969-70, a major reconstruction

A major reconstruction of the Division of Dairying was made during 1969-70 to strengthen and integrate Departmental extension and research services to the farming and manufacturing segments of the dairying industry.

A Dairy Cattle Husbandry Branch, with J. G. Young as Director, was added to the Field Services and Dairy Research Branches which had constituted the Division since its inception in 1945. The new branch was concerned with dairy cattle nutrition, breeding and management, facets previously handled by the Cattle Husbandry Branch of the Division of Animal Industry. That Division retained beef cattle husbandry responsibilities in a Beef Cattle Husbandry Branch, with B. A. Woolcock as Director.

To facilitate the co-ordination of the herd recording and dairy cattle artificial breeding services of the Department, the Artificial Insemination Centre at Wacol, formerly within the Division of Animal Industry, and the Herd Recording Section of the Field Services Branch were transferred to the Dairy Cattle Husbandry Branch.

The Field Services Branch was to be more strongly orientated to extension projects on dairy cattle husbandry.

A Deputy Director (Dr G. I. Alexander) was appointed to the Division on its expansion.

Extension of the responsibilities of the Division of Soil Conservation and Development Planning, established in 1965, led to a change of name for the Division to Division of Land Utilisation. This acknowledged the importance of examining in depth the Land Utilization projects in developed areas as well as performing the established functions of investigating, reporting and co-ordinating development requirements in State development projects and providing research, extension and technical facilities for soil conservation.

Reorganisation of the component branches of the Division was undertaken. Livestock Resources Development and Agricultural Resources Development sections were established in the Development Planning Branch, and Research and Field Services Sections were established in the Soil Conservation Branch.

The Pig Testing Unit previously operated by the Pig Section was transferred to Husbandry Research Branch, thus bringing all the facilities at the Rocklea Animal Husbandry Farm under single control.

In view of the widening activities of Information and Extension Training Branch in training and servicing extension officers, an Assistant Director (J. L. Groom) was appointed. (Harvey, J. M., *An. Rep. Dep. Prim. Ind.*, 1969-70, p. 4)

1970-71

The establishment of a Fauna Conservation Branch was finalised; it took over the responsibilities in fauna conservation which had for many years been exercised by the Entomology Section.

Three long-established Sections of the Division of Plant Industry-Botany, Entomology and Plant Pathology-were raised to branch status, and the status of the Fisheries Branch was increased by the creation of the position of Director.

Some changes were made in the organisation of Herd Recording and Artificial Insemination to improve these services.

In the Division of Animal Industry the Pig and Poultry Branch, which had always previously operated as two independent Sections, was re-established under the control of a Director. (Harvey, J. M., *An. Rep. Dep. Prim. Ind.*, 1970-71)

1971-72, extension reorganisation

The proposals for reorganisation of the Department's extension services submitted during 1970-71 received the approval of the Public Service Board and steps were taken to set up an Extension Services Board and an Extension Services Section with a cadre of Regional Extension Leaders. (See "New Directions in Extension".)

Top-level staff changes during Row's Ministry

Summerville appointed Agent-General for Queensland in London. In October 1963, W. A. T. Summerville, Director-General and Under Secretary in the Department, was named Agent-General for Queensland. In preparation for his new office he moved out of the Department and on 24 October 1963 William Webster, Deputy Director-General, was appointed to act as Director-General and Under-Secretary during Summerville's absence. Dr Summerville left Queensland to take up his London appointment on 4 February 1964. More than 100 members of the staff gathered in the Legislative Council Chamber at Parliament House for the presentation of farewell gifts on 29 January. The Minister for Primary Industries (the Hon. J. A. Row) presented Dr Summerville with a camera and other photographic equipment on behalf of the whole staff, both head office and country. The president of the Department's Sports and Social Club (R. V. Riley) presented him with a tray and crystal glasses on behalf of the Club.

The Chairman W. Webster, who said although the staff were sad at Dr Summerville's departure, they were happy that in his new job he would be able to do much for Queensland and Australia.

In a tribute to Dr. Summerville, W. J. Sloan in his Annual Report for 1963-64 (p. 9) said:

The scientific achievement of W. A. T. Summerville as an officer of this Department is recorded in a variety of scientific Journals. This report is an appropriate place to put on permanent record a note of his administrative services.

After he stepped out of the field of research in 1945 into technical administration, Dr Summerville rose quickly through a succession of directorships to become Assistant Under-Secretary (Technical) in 1957.

He assumed the responsibilities of Permanent Head in 1958 at a time when the Department was experiencing the difficulties associated with an accelerated intake of staff and intensification of Head Office and field activities. At the same time, the outside commitments of the Permanent Head were increasing considerably as Commonwealth Government Departments, primary

industry organisations and the Department became jointly involved in the planning and financing of research and extension.

On the home front, Dr Summerville had the training and experience to enable him to take the administrative problems of a rapidly growing Department in his stride. In his official association with outside bodies he was able to state the Department's case in a convincing fashion and to stand up for its rights when necessary.

Dr Summerville was knighted in 1968. (See also Chapter 8.)

Webster appointed Director-General. On 19 December 1963 William Webster, B.V.Sc., H.D.A., was appointed Director-General and Under-Secretary, with William James Stuart Sloan M.Sc.Agr., Director of the Division of Plant Industry, as Deputy Director-General.

Webster goes to the Queensland Meat Industry Board. On 25 June 1964 W. Webster was seconded as General Manager of the Public Abattoir and Chairman of the Queensland Meat Industry Board; and W. J. S. Sloan was appointed Acting Director-General and Under-Secretary from that date, with D. N. Sutherland as Acting Deputy Director-General. On 14 January 1965 Webster was officially appointed General Manager of the Public Abattoir and a Member and Chairman of the Queensland Meat Industry Board from 25 January 1965 to 30 June 1969. Sutherland was Acting Deputy Director-General from 25 June 1964 till he resigned on 30th October 1964 to become Director of the Commonwealth Department of National Planning in Canberra.

Sloan becomes Director-General and Under-Secretary. On 11 March 1965 William James Stuart Sloan, who had been Acting Director-General since Webster's departure, was appointed Director-General and Under-Secretary. James Meiklejohn Harvey, D.Sc., F.R.A.C.I., Biochemist, Division of Animal Industry, became Deputy Director-General.

Sloan died suddenly on 12 October 1965, after only sixteen months in the Director-General's chair. He had had a long and successful career with the Department, and will be remembered for many aspects of his work; prominent among these was the part he played in the introduction of hybrid grain sorghum to Queensland.

Born at Atherton in 1912, Sloan was educated at the Brisbane Grammar School and graduated as a Bachelor of Science in Agriculture from the University of Queensland. He was later awarded a Master's degree. He joined the Department as an entomologist in 1934 and worked for some time in the Central Districts.

He became Agronomist in the Bureau of Sugar Experiment Stations in 1945, and Senior Agronomist in the Department's Agriculture Branch in 1947. He progressed through the positions of Director of Agriculture and Director of the Division of Plant Industry to be appointed Deputy Director-General in 1964.

During his service with the Department, Sloan made two overseas visits. In 1955 he was a delegate to the FAO International Seminar on Education in Health and Nutrition held in the Philippines. In 1957, he spent seven months investigating agricultural practices in the USA under a Rockefeller Travel Grant. It was during this visit that he acquired hybrid grain

sorghum parent material which he brought back to Queensland, and from which the present Queensland hybrid grain sorghums were developed.

In paying a tribute to his devotion to duty, the Minister for Primary Industries, J. A. Row, M.L.A., said Sloan had done a tremendous amount of work for the Department and had given much time to planning for the improvement of Departmental services to primary industries. His impact on the discussions of the Standing Committee on Agriculture of the Australian Agricultural Council had been striking. He had a particularly progressive outlook on the Department's responsibilities and it was most unfortunate that he had not been spared to carry his ideas through to fruition. His death had meant a great loss to the Department and to the primary industries of Queensland.

Harvey becomes Director-General. Following Sloan's untimely death, James Meiklejohn Harvey was made Acting Director-General and Under-Secretary on 13 October 1965. He was appointed Director-General and Under-Secretary on 2 December 1965, with Alan Alexander Ross, M.Sc.Agr., Q.D.A., Director of Marketing, as Deputy Director-General.

These changes caused a number of sequential appointments.

Overseas study

The Department took every opportunity to improve its research and extension services by facilitating overseas visits for study purposes. Many of the visits were supported by Commonwealth Government and industry funds. Some officers obtained travel and study grants from various other sources, and some accepted teaching/research assistantships at overseas universities. In a few cases the Department bore the whole cost of a study tour.

Overseas visits made during Row's term as Minister and under Directors-General W. A. T. Summerville, W. Webster, W. J. S. Sloan and J. M. Harvey are listed below.

1963-64

S. T. Blake (Research Botanist) went to the United Kingdom as Australian Botanical Liaison Officer at the Royal Botanical Gardens, Kew.

D. B. Copeman (Veterinary Officer) went to USA to study under a Rotary Foundation Fellowship.

K. M. Grant (Assistant Director of Veterinary Services) went to Canada to attend a school on exotic diseases.

T. McEwan (Chemist) went to Canada for postgraduate study in the chemistry of natural products.

R. F. Moore (Research Plant Breeder) went to USA to study hybrid sorghum breeding.

L. E. Nichols (Director of Research, Division of Dairying) went to New Zealand to attend a meeting of the International Dairy Federation and examine research work.

E. B. Rice (Director of Dairying) went to New Zealand to attend a meeting of the International Dairy Federation and to examine dairy matters.

P. G. Tow (Agronomist) went to the Netherlands to undertake research work in plant physiology.

1964-65

J. W. Ryley (Director of Husbandry Research) spent three months at the end of 1964 studying animal production in Europe and USA.

F. N. J. Milne (Senior Poultry Husbandry Officer) spent three months in Canada and USA studying the intensive poultry industry.

J. K. Leslie (Agrostologist) visited North and South America, the United Kingdom, Europe, Israel and India in a six-month tour to study pasture and crop nutrition and to attend the International Grassland Congress in Brazil.

Dr B. Grof (Agrostologist) visited South-east Asia, Ceylon, South Africa and North and South America to study tropical pastures over a six-month period and attend the International Grassland Congress in Brazil.

D. S. Teakle attended the International Botanical Congress in Edinburgh in July 1964 to present a paper, "Fungal Transmission of Plant Viruses".

L. S. Smith (Botanist) visited New Guinea for two weeks in April 1965 to undertake botanical studies of rainforests.

J. R. Blake of the Food Preservation Branch visited New Zealand for two weeks in November 1964 to study the transport of bananas in plastic bags.

Dr J. G. Morris (Director of Husbandry Research at the Animal Research Institute) attended two International Congresses-Grasslands at Helsinki and Animal Production at Edinburgh-and made a study tour of South Africa and USA.

Dr J. P. Ebersohn (Chief Agrostologist) also attended the International Grassland Congress. While overseas he searched for pasture plants in South America and Africa.

V. R. Smythe (Director of Dairy Research) left to attend the World Dairy Congress at Munich and to study developments in dairy products and dairy research in Europe and USA.

J. G. Young (Senior Cattle Husbandry Officer) was seconded to a World Bank team investigating development possibilities in the Sudan Gezira. While overseas, he was given the opportunity by the Department to examine cattle husbandry practices in Israel and Europe.

G. S. Purss (Senior Plant Pathologist) was given assistance to study plant pathology in USA supplementary to a Winston Churchill Fellowship.

R. C. Cannon (Assistant Director of Horticulture) left in June to study horticultural research, extension and production methods in Great Britain, USA, Canada, Philippines, Israel and Ecuador. Most of these visits, as is usual with overseas visits by Departmental officers, were supported by funds provided by the Commonwealth Government and various industries.

B. F. Bradley of the Food Preservation Branch spent a week in USA.

J. C. Dean (Agronomist) spent a month during May-June in USA and Canada, studying the tobacco industry.

1966-67

L. Laws spent January to April 1967 in USA and Canada studying epidemiology.

Dr B. R. Champ (Entomologist) spent six months from October 1966 to May 1967 visiting Hong Kong, India, Europe, the United Kingdom, USA and Fiji.

H. T. Green of the Agricultural Chemistry Laboratory visited the USA, Canada, the United Kingdom and Europe to attend a tobacco conference and visit tobacco establishments.

B. A. Woolcock (District Veterinary Officer) spent two months in the USA, the United Kingdom and Europe, during 1966, studying the diagnosis and control of exotic diseases.

Melda Moffett (Plant Pathologist) visited Portugal in January 1967 to attend an International Conference in Bacteriology, after two years in Boston, USA completing her Master's Degree. U.S.A.

1967-68

H. Christensen, D. C. Clague and R. J. Higgins (Veterinary Surgeons) visited the United Kingdom for two months in December-January 1967-68 to study foot and mouth disease. They actually took part in the control of an outbreak which occurred at that time.

R. J. Elder (Entomologist) visited New Zealand for three weeks in February-March 1968 to investigate insect pests in pastures.

Dr J. M. Harvey (Director-General) spent two months in October-November 1967 visiting USA, Canada, the United Kingdom, Italy and Hong Kong, studying important matters in the agricultural field.

L. Laws visited France and the United Kingdom during July-August 1967 to attend the World Veterinary Congress in Paris and visit local veterinary institutions.

W. V. Mungomery (Research Horticulturist) visited USA for two months during March-May 1968 to investigate citrus growing and some other tropical fruit crops in southern States and attend the first International Citrus Symposium at Riverside, California.

1968-69

Two officers were granted leave up to three years to enable them to undertake advanced studies at overseas institutions: J. J. Davis studied entomology in Louisiana and G. H. Behncken studied transmission of virus diseases in California.

Arrangements were made for several officers to make study tours or attend technical conferences overseas, as follows:

D. K. Ward-tobacco production in Japan, Canada and USA.

S. G. Knott-exotic diseases school in New Zealand.

G. L. Swartz-soil conservation matters, particularly machinery types, in USA.

J. A. Gartner-animal nutrition and reproduction matters in Africa, Europe and USA.

L. L. Callow-study period on blood parasites in London.

N. F. Fox-extension organization and methods in USA, Europe and South Africa.

E. O. Burns-farm management in USA, Canada and Europe.

E. F. Singleton-artificial insemination in Europe, USA and New Zealand.

A. C. Peel and E. T. Prodonoff-International Seed Testing Association Congress in New Zealand.

1969-70

Several Departmental officers undertook overseas study tours or study courses during the year, in most cases with financial support from the Commonwealth Government or other sources.

The Deputy Director-General (A. A. Ross), in company with senior representatives of other State Agriculture Departments and the Commonwealth Department of Primary Industry, examined extension organisation and administration in South Africa, Europe, the United States and Canada.

F. W. Berrill (Assistant Director of Horticulture ([Extension]), attended the 18th International Horticultural Congress in Israel and studied aspects of horticulture in several countries.

T. Passlow (Senior Entomologist) examined research and extension in pest control in summer crops in the USA, Africa and India.

R. R. Staples (Research Plant Breeder) made a pasture plant collection trip in Africa, India, Ceylon and the USA.

C. W. R. McCray (Biochemist) attended the FAO Symposium on Resistance of Agricultural Pests to Pesticides, held in Rome.

O. H. Brooks (Assistant Director of Veterinary Services) attended a special school on exotic diseases in New Zealand.

A. C. E. Todd (Senior Pig Husbandry Officer) toured New Zealand pig-raising areas. W. D. Mitchell (Director of Dairy Field Services) studied mastitis control methods and the problem of insecticide residues in New Zealand.

C. H. Clark (Research Dairy Technologist) studied the operation of herd recording schemes in New Zealand.

G. W. Swartz (Senior Soil Conservationist) examined stubble mulching methods and machinery in the USA.

R. Rees (Plant Pathologist at the Queensland Wheat Research Institute) went to South Africa, Europe and North America to study aspects of wheat rust infection and control.

N. H. Hall (Technical Administration Officer) attended an FAO Seminar in the Philippines on fruit and vegetable marketing.

T. M. Grimes (Veterinary Officer) examined the poultry disease situation in Great Britain.

T. Beckmann (Chief Chemist), while overseas on a private visit, attended a meeting of the Collaborative International Pesticides Analytical Committee, held in Belgium.

G. T. T. Harrison (Chief Inspector of Fisheries) visited Guam at the request of the US authorities for consultation on the planned investigations by a US scientific team into the crown-of-thorns starfish in the American Pacific Area. He also visited Japan.

1970-71

T. Passlow (Senior Entomologist)-research and extension in pest control in USA.

B. L. Oxenham (Director of Agriculture)-integration of research and extension services and potential crop diversification, USA, United Kingdom, South Africa.

M. Bengston (Entomologist)-pest control methods in USA, Canada, United Kingdom, Netherlands, Israel and India.

R. W. Johnson (Botanist)-postgraduate studies in taxonomy techniques in USA.

G. C. Simmons (Chief Bacteriologist)-attendance at International Microbiological Conference (Mexico City) and study tour of USA, United Kingdom, Israel and Malaysia.

F. N. J. Milne (Director, Pig and Poultry Branch)-attendance at World Poultry Science Congress (Madrid) and study tour of United Kingdom, Denmark, Holland and North America, with particular reference to pig husbandry research and extension.

L. Pedley (Senior Botanist)-appointment for twelve months as Australian Botanical Liaison Officer at the Royal Botanical Gardens, Kew, England. He was able to solve many outstanding problems on classification and nomenclature of Queensland plants.

The services of J. K. Teitzel (Agrostologist) were made available to the Government of Thailand to advise on pasture requirements and other matters relevant to the introduction of Droughtmaster cattle from Queensland.

1971-72

F. Chippendale (Director of the Agricultural Chemical Laboratory Branch) visited laboratories and agricultural research institutes in New Zealand, Canada, United States of America, Great Britain and Malaysia and attended the International Congress of Irrigation and Drainage in Bulgaria.

Dr M. Bengston (Senior Entomologist) completed a study tour of North America, the United Kingdom, Europe, Israel and India, in which particular attention was directed to recent advances in stored products entomology.

J. L. Alcorn (Plant Pathologist) attended the International Mycological Congress in the United Kingdom and visited institutions in the United Kingdom, Canada and United States of America. His particular interests were plant disease, herbarium management, fungal taxonomy and retrieval of plant disease records.

Dr G. M. Behncken, Plant Pathologist, after completing his Ph.D. studies at the University of California undertook a short study tour through USA, Canada and Europe, with emphasis on insect-borne plant viruses.

S. L. Everist, Director of the Botany Branch, attended the International Symposium on Useful Wildland Shrubs in Utah, and subsequently visited several research institutions in the western United States of America to observe methods of dealing with the utilisation of native browse plants and unwanted woody plants.

A. L. Clay, Director of the Division of Animal Industry, led the Australian delegation to the World Veterinary Association Congress and made a study tour of the United Kingdom, Eire, Canada, USA and Mexico.

N. H. Hall, Senior Administration Officer, was included in a team to make a study of fruit and vegetable marketing in USA, Canada and the United Kingdom.

G. Short was a member of a team which examined the prospects for banana exports to Japan.

Staff promotion

The activities of the Department continued to expand. When Summerville was Director-General, he introduced the category of "Research" officer to lift the status of selected officers in most of the Branches, e.g., Research Botanist, Research Agronomist, etc. The trend was to continue.

Staff opportunities

In June 1968 J. M. Harvey, Director-General, wrote:

With the extremely wide range of professional and technical positions, the Department can offer its staff excellent opportunity for professional improvement.

Youths recruited as Cadets at Senior public examination level are required to undertake advanced studies leading to certificates, diplomas and degrees. Special provision has been made for a correspondence course for field Cadets.

There is a variety of scholarships available for full-time University attendance in a range of Faculties, including Agricultural Science, Veterinary Science, Science and Economics. Some scholarships are extended to cover an honours year. Some scholarships are also available for the Queensland Agricultural College Associate Course.

Opportunities for full-time post-graduate study both in Australia and overseas arise from time to time. During the past year for instance, a seeds specialist has been doing an extended course at the University of Adelaide, a veterinarian has completed the Diploma in Animal Health course at the Royal Veterinary College in London and an agrostologist has undertaken an Honours course in physiology of pasture seeds at the University of Queensland.

Some officers also undertake extra-mural work leading to doctorates. Each year a number of officers are sent to short courses or on study tours. Overseas study tours for which provision was made during the past year were concerned with cotton breeding in the United States, pasture pests in New Zealand, animal reproduction and artificial insemination in several countries and plant virus disease control.

Interstate study tours covered such subjects as irrigated agriculture, fruit production, plant pathology, food science, radioisotopes in research, veterinary matters, sheep and wool production, turkey growing, agricultural economics, soil conservation and pasture research.

Some officers made their own arrangements for extended periods of study overseas. If the study programme fits the requirements of this Department, study leave is usually granted. In the past year a plant breeder (J. Rose) was granted leave to undertake three years' post-graduate training leading to a Ph.D. Degree at the University of Minnesota.

It is interesting to record the large number of recruits from the Netherlands Agricultural Colleges such as Deventer. Many of these entered the Soil Conservation Branch of the Department.

Overseas aid

In June 1968 J. M. Harvey, Director-General, wrote:

Queensland as an advanced area in agricultural and pastoral research and its application in the sub-tropics and tropics, has much to offer many of the developing countries.

The Department is continually giving assistance to these countries, mainly by providing training facilities for visiting technical officers. This is the most convenient way in which to meet the needs, as it is not practicable for the Department to release officers for long-term

assignments overseas. However, short visits are made overseas from time to time to satisfy specific requests.

Individual visitors study in Departmental laboratories and field centres for periods ranging from a few days to several months. Foreign students who have been attached to the Department during the past year were (interested) in such subjects as artificial insemination techniques, marketing of dairy products, beef cattle management, food preservation, tropical crops, dairy farming, poultry production and pig raising.

The Department is also a major participant in group training courses for Afro-Asian students. Those held during the past year were on grain storage and extension methods. These group courses run for several months and training in considerable depth is provided for about 20 students in each group. The biennial tropical pasture group course, which is conducted mainly in Queensland, is a popular one with overseas students.

During 1968-69, in cooperation with CSIRO and the University of Queensland, the Department organised a conference and study tour on tropical pastures and beef production for thirty delegates sponsored by the South Pacific Commission. It also helped the Department of External Affairs in a training course for twelve African and Asian poultry experts. During 1969-70 an International Training Course in Marketing of Agricultural Products was conducted by the Division of Marketing on behalf of the Department of External Affairs. The course extended over five weeks and was attended by 23 marketing representatives from 15 African and Asian countries.

Departmental officers also participated in an International Training Course in Agricultural Extension attended by 20 African and Asian Extension workers. During 1970-72 International Courses were provided in Seed Improvement and Certification, Subtropical and Tropical Horticulture and Branch Development and Management.

During 1968-69 A. Hegarty (then Deputy Director of the Division of Development Planning and Soil Conservation) visited Kenya to advise the Kenyan authorities on their agricultural planning programme.

Dr B. Grof (Officer-in-Charge, Tropical Agriculture Research Station) visited Malaysia to advise on pasture aspects of the Government's livestock production plan, and during 1969-70 undertook an FAO mission to advise on the setting up of a pasture research institute in India.

Also in 1969-70 W. T. K. Hall (Director of Pathology) visited South Korea to advise on the control of tick fever of cattle.

Reference has already been made to services given to the Thai Government by J. K. Teitzel concerning Droughtmaster cattle.

Officers on loan

In March 1964 Dr S. T. Blake, Research Botanist, left to take up a twelve month position as Australian Liaison Officer at the Royal Botanical Gardens and Herbarium, Kew, England.

During 1963-64 F. C. Sweeney, Agrostologist, was loaned to CSIRO's Division of Land Research and Regional Survey for service as a member of a team surveying portions of the

Fitzroy basin of central Queensland; a little later in the year, L. Pedley, Botanist, was attached to another team surveying the Belyando area. Both loans were for fifteen months.

Highlights of the Row-Harvey Administration

Stability of staff

A glance at the table of senior staff during the years 1963-72 would show that this period was one of the most experienced in terms of tenure in the Department's history and was a most productive one.

Senior staff during the J. A. Row Administration 1963-72

Minister for Agriculture and Forestry - The Hon. J. A. Row, 20.8.63 - 26.9.63 Minister for Primary Industries - 26.9.63 - 20.6.72

(J. A. Row was created a Knight Bachelor on 21 January 1972 after his retirement, to become Sir James Row)

Central Administration and Clerical and General Division

Director-General and Under-Secretary: W. Webster, W. J. S. Sloan, J. M. Harvey
Deputy Director-General: W. J. S. Sloan, D. N. Sutherland; J. M. Harvey, A. A. Ross
Assistant Under-Secretary: H. Barnes, R. V. Riley
Special Administrative Officer (later changed to Chief Advisory Officer (Admin.) in 1966): C. L. Harris
Accountant: E. C. R. Sadler, H. J. Evans
Officer-in-Charge Information Services (later changed to Director Information and Extension Training Branch): C. W. Winders
Assistant Director Information *et al*: J. L. Groom
Executive Officer Research Stations Section: G. H. Allen
Fisheries Branch Chief Inspector of Fisheries (later changed to Director): G. T. Harrison
Manager Agricultural Bank: F. J. Strutton
Director Fauna Conservation Branch Director: G. W. Saunders

Division of Plant Industry

Director of Division: L. G. Miles
Deputy Director: S. Marriott
Agriculture Branch
Director of Agriculture: S. Marriott, B. L. Oxenham
Director of Tropical Agriculture: J. L. Groom
Assistant Director Agriculture (later changed to Asst. Director Agronomy): L. R. Humphreys, V. .J. Wagner
Assistant Director Agrostology: J. P. Ebersohn
Assistant Director Extension: N.F. Fox

Soil Conservation Branch

Director: J. E. Ladewig (see Division of Development Planning and Soil Conservation)

Horticulture Branch

Director Horticulture: J. H. Smith, R. C. Cannon

Assistant Director Extension: F. W. Berrill

Assistant Director Research: H. M. Groszmann

Assistant Director Food Preservation: R. E. Leverington

Science Branch

Government Botanist (later changed to Director): S. L. Everist

Government Entomologist (later changed to Director): W. A. McDougall, A.R. Brimblecome

Deputy Government Entomologist: A. R. Brimblecombe

Government Plant Pathologist (later changed to Director): B. L. Oxenham, G. S. Purss

Agricultural Chemistry Branch

Director: W. J. Cartmill, F. Chippendale

Food Preservation Research Branch (see Horticulture Branch from 1969)

Director: S.A. Trout

Division of Animal Industry

Director: A. L. Clay

Assistant Director (later changed to Deputy Director): C. R. Mulhearn (followed by joint Deputy Directors) L. G. Newton and J. W. Ryley

Animal Research Institute

Director Veterinary Research: J. W. Ryley

Director Veterinary Services: C.R. Mulhearn, L. G. Newton, K. M. Grant

Director Pathology: L. G. Newton, W. T. K. Hall

Director Biochemistry: J.M. Harvey, C. W. R McCray

Branch Directors

Husbandry Research: J. W. Ryley, J. G. Morris, L. Laws

Cattle Husbandry (later changed to Beef Cattle Husbandry): G. I. Alexander, B. A. Woolcock

Slaughtering and Meat Inspection (Chief Inspector later changed to Director-Meat Control): B. Parkinson

Sheep and Wool: A. T. Bell

Section Leaders

Senior Husbandry Officer Pig Section: F. Bostock, A. Todd

Senior Poultry Husbandry Officer (later changed to Chief Poultry Husbandry Officer 11/65) Poultry Section: F. N. J. Milne

Pig and Poultry Branch Director: F. N. J. Milne

Division of Dairying

Director: E. B. Rice Deputy Director: G. I. Alexander Director, Dairy Resarch Branch: L. E. Nichols, V. R. Smythe Director, Field Services Branch: V.R. Smythe, W. D. Mitchell Director, Dairy Cattle Husbandry Branch: J. G. Young, N. C. E. Barr Division of Marketing Director: A. A. Ross, D. P. Lapidge Assistant Director: D. P. Lapidge, E. O. Burns Branches Economics Research, Director of Economic Services: E. O. Burns Standards Branch, Standards Officer (later changed to Director of Agricultural Standards): A.C. Peel Marketing Services Director: D. R. Lewis Division of Development Planning and Soil Conservation (later changed to Division of Land Utilisation) Director: D. N. Sutherland, J. E. Ladewig Assistant Director: A. Hegarty Development Planning Branch Chief Development Planning Officer (later changed to Director): A. Hegarty Livestock Research Development Section: W. F. Y. Mawson Agricultural Research Development Section: S. Pink Soil Conservation Section Director: J. E. Ladewig, J. Rosser Research Section: G. Swartz Field Services Section: H. Pauli

Drought

Drought conditions prevailed in east-central Queensland, the Burnett and parts of the Western Darling Downs in 1964, seriously affecting the beef, dairy and grain sorghum industries. Except in the far north, summer and autumn rainfall over late 1964 and early 1965 was well below average. The Darling Downs had 40% of its average summer-autumn rain; in the far south-west only 5% of the average was received. By the end of March three quarters of the sheep country was suffering drought of an intensity unknown for over half a century. At the beginning of winter, more than half the State was experiencing one of the most severe droughts on record.

In May 1965 an Inter-Departmental Drought Mitigation Committee was set up by the Premier, the Hon. G. F. R. Nicklin. Under the chairmanship of the Department's Director of Cattle Husbandry (Dr G. I. Alexander), the Committee reviewed the incidence and effects of drought on the rural industries from the State's and individual producers' viewpoints as well as technical aspects of mitigation measures and future avenues for promoting mitigation. The Committee recommended the stimulation of fodder production and storage both on-property

and off-property, and financial stimuli by way of tax concessions, loans and freight concessions. The report was considered by a representative group under the chairmanship of the Minister for Primary Industries and subcommittees were set up to define detailed methods of implementing the recommendations; it was decided to prepare a handbook on drought for the use of farmers and graziers. The Australian Agricultural Council sponsored a survey of drought effects and their mitigation over a five-year period. Field interviews in Queensland were carried out by Departmental officers quarterly and the reports were made available as a guide to drought relief measures.

During 1968-69 of the State's 131 shires more than 90 were declared drought-stricken, representing 77% of the area of the State, and 300 000 cattle and two million sheep were moved into New South Wales. Some 7000 store cattle were involved in forced sales to meatworks. Rail and road transport were insufficient to give adequate service. The Department assumed additional responsibilities in extending freight concessions to road transport as well as rail. Drought relief committees with Departmental representation were formed in many centres to advise the General Manager of the Agricultural Bank on the merits of applications for drought relief assistance and the Department was also called in to advise the bank on loans. Restrictions on the movement of slaughter cattle to meatworks within the tick-infested areas were relaxed to enable drought-affected cattle to be slaughtered.

During the 1969-71 drought a wide range of drought relief assistance measures first provided for primary producers in 1965 were reintroduced with the support of the Commonwealth Government. In summary, these consisted of:

(a) rail and road freight concessions on the transport of fodder;

- (b) rail and road freight concessions on the transport of stock to slaughter, to and from agistment, and for restocking;
- (c) carry-on and restocking finance available through the Agricultural Bank;
- (d) other benefits, such as a grant for the payment of half shire rates in certain shires for one year, reduction of Crown rents on sheep properties, waiving of registration and stamp duty fees on drought loan mortgages, remission of interest on succession duties on properties in drought-declared areas, extension of time to pay and funding of areas of Crown rent.

Drought Secretariat

A Drought Secretariat was set up in 1970 within the Department to develop a long-term approach to drought problems and their mitigation and to provide technical support in the implementation of the Government's drought relief strategy. (*An. Rep. Dep. Prim. Ind.*, 1970-71, p. 3)

The Commonwealth-State Consultative Committee on Drought proposed the establishment of a Drought Study Group, which was subsequently confirmed by the Standing Committee on Agriculture with the following terms of reference:

- 1. To undertake a study of drought.
- 2. To collate and assess existing relevant climatic, biological and economic information relating to drought and its management.

- 3. To develop an integrated model suitable for the testing of various combinations of drought strategies in a pilot study area and subsequent development for other regions.
- 4. To highlight specific gaps in the available information and advise on action to provide the needed information.
- 5. To present the results from testing and using the model and assessing the long-term biological and economic implications of various drought management strategies.

The Drought Secretariat represented the Department on the Study Group as Queensland was selected for the location for the pilot study. A workshop on modelling was to be held in Brisbane in July 1972. One of the recommendations of the Drought Mitigation Committee (1966) was that there should be a coordinated approach through commodity marketing boards to off-property storage of drought fodder. The Australian Agricultural Council proposed a National Fodder Reserve. The Commonwealth did not wish to take part in either proposal. (*An. Rep. Dep. Prim. Ind.*, 1971-72, p. 4)

W. F. Y. Mawson was the first officer-in-charge of the Drought Secretariat, with Ian Robinson as his assistant.

Brigalow development

Departmental officers collaborated with the officers of the Lands Department in the operation and expansion of the Fitzroy Basin Brigalow Land Development Scheme. Physical inventories and property development plans were prepared for new settlers in Areas I and II by officers of the Development Planning Branch. Sampling, testing and submission of recommendations concerning the purchase of pasture seeds for the aerial sowing of 101 600 acres in the Brigalow Scheme, and Land Unit mapping of 215 210 acres in selected positions of Area III of the Scheme were completed during 1965-67. The Department's development planning officers assisted with the taking-up of 100 ballot blocks in Areas I, Ia and II; base property plans for the 26 ballot blocks taken up during 1967-68 were prepared, with Iand capability classifications superimposed and suggestions included for location of water points and fence lines. Recommendations for the purchase of 68 000 Ib of Rhodes grass, Green Panic and Buffel grass seed were made to the Land Administration Committee. Similar help was given for settlement of 816 543 acres in Area III.

To provide research backing for the Brigalow Research Scheme, the Brigalow Research Station was established at Theodore. In 1964-65 primary producer representation was invited on an advisory committee for the Research Station.

Because of the relative isolation of the brigalow areas individual Departmental officers (called "contact officers") were assigned groups of settlers to ensure the whole range of technical services was available to the producer. All contact officers met at six-monthly intervals and contact with Head Office was maintained through attendance of development planning officers at the meetings. A land assessment officer and the contact officer participated in the formulation of initial development programmes with the new settler and a representative of the Land Administration Commission. The contact officer was supported by a Technical Advisory Group, located at headquarters. A committee comprising local representatives of the Land Administration Commission, Irrigation and

Water Supply Commission and the Department of Primary Industries coordinated activities where necessary. A three-day school was conducted for new settlers to consider development problems.

Development planning and land use studies

Apart from the activities of officers in this new branch already dealt with under the Brigalow Development Scheme, the Branch during 1965-66 coordinated Departmental surveys and reports on various development projects including the Emerald Irrigation Project, the Kolan-Burnett Irrigation Project, the St George Irrigation Extension, the Bowen-Broken River (Urannah Dam) Irrigation Project, together totalling 140 000 acres of irrigated Iand. Evaluation of irrigation schemes for sugarcane in the Bundaberg-Isis and North Eton (Mackay) area was undertaken during 1967-68 in conjunction with the Irrigation and Water Supply Commission and a technical guide on soils and Iand classification of about 1.6 million acres of the western Darling Downs was prepared for extension officers.

A land classification of the agricultural and pastoral lands in the Bowen and Broken River Valleys in the Collinsville area was made of the nearly 700 000 acres assessed; 150 000 acres were classified as suitable for cash cropping, a further 150 000 acres for fodder cropping, and 250 000 acres for pasture improvement.

A land use survey of the under 15 inch rainfall areas of south-western Queensland was conducted in association with the Bureau of Agricultural Economics, the Department of National Development, CSIRO Rangeland Research and the Land Administration Commission, to determine the principles of management of soils, vegetation and livestock (5 million sheep and 700 000 cattle) with the object of maintaining a desirable economic balance consistent with the preservation of the long-term productivity of the region.

During 1969-70 a land use study was made of the Dumaresq Valley Irrigation Project between Pike Creek and Goondiwindi and of the South Coast area of some 250 000 acres with special reference to the economics of tropical pastures. A climatological study of the northern sheep zone comprising 48.3 million acres was made as a basis for study of pastoral productivity and economic viability. An assessment of cultivable lands in Northern Australia was made. Beef, beef/sheep and sheep properties in north-west Queensland were delineated for the Department of National Development *Atlas of Australian Resources*. A land capability/length of growing season map of Cape York Peninsula was prepared to enable Main Roads requirements to be assessed. Areas likely to be inundated by dams at Wolfdene (Albert River), on the Boyne at Gladstone and at Advancetown on the Nerang River, and the effect on the economics of these developments, were studied by the Development Planning and Economic Services Branches.

The Isis Land Use report on erosion and alternate land use in the sugarcane areas was completed in May 1971, leading to eventual relocation of cane assignments. A study of the Gin Gin area resulted in a similar action. A multi-disciplinary team studied the Condamine-Maranoa (Comber) area to assess its resources and the Gympie dairying/horticulture region to study management factors and profitability.

The Development Planning and Soil Conservation Branches were combined under a Division of Land Utilisation and during 1971-72 the Division took part in the Moreton Regional survey conducted by the Co-ordinator-General's Department and the Commonwealth-State Burdekin Basin study involving water availability and possible future needs or uses for urban, irrigation, power generation, industrial (including minerals) and flood mitigation requirements. The Development Planning Branch had fully justified its creation in 1963 and, combining with the Soil Conservation Branch as the Division of Land Utilisation, set out in earnest to catalogue the State's resources and determine the limitations and suitability for various uses.

Soil conservation

The number of applications for technical assistance from Departmental officers made by farmers wishing to protect their land from erosion was increasing yearly, and at June 1964 there were 35 soil conservation extension offices stationed in 20 districts. Increased topographic mapping by the Survey Department to produce 10 chain to the inch contour maps saved up to 60% of the soil conservation officers' planning time. Plans were finalised during 1963-64 for soil conservation on all the sloping areas of the Mareeba-Dimbulah tobacco irrigation area.

The Soil Conservation Act of 1965 provided the statutory facilities for landholders to undertake joint soil conservation activity either under Government guidance or through local sponsorship and leadership. It provided also for co-operative activity with statutory authorities and for an authoritative approval of plans for soil conservation schemes. Once a plan had been approved its implementation could not be threatened by any unco-operative minority in the area. Financial assistance was available from the Agricultural Bank for such programmes. The Director-General of Primary Industries was constituted the Soil Conservation Authority responsible for the administration of the new Act. Provision was made for the establishment of Soil Conservation Districts to be administered by Soil Conservation Trusts, each of which would be a corporate body like a Shire Council, but by June 1969 no groups had moved to form a district.

During 1969-70 Queensland passed the one-million-acre mark in contour farming. However, Departmental officers estimated that there were still three million acres of existing cultivation involving 15 000 holdings, which had yet to be farmed on the contour, and which would require twice the annual treatment rate to complete within the next two decades.

Requests for assistance remained static from 1967 to 1970. Stubble mulching was the most important single conservation measure urged by the Department. The Council of Agriculture arranged for a joint team comprising a landholder and a technical officer to visit the USA during 1969-70 to examine stubble retention procedures and machinery in that country.

The Wellcamp No. 1 Soil Conservation Project Area was proclaimed in September 1966. Research projects by the Soil Conservation Officers included the testing of kikuyu, African Star, Rhodes and Queensland Blue grasses for waterways; the testing of the erodibility of the Kingaroy red (Krasnozem) soils at Kingaroy; and the testing of moisture accumulation under fallowed black soil at Irongate. In the latter, stubble-retained soil stored 32.8% moisture compared with 28% in stubble-burnt plots.

Water-spreading trials on the Darling Downs showed that wheat, barley and canary seed could tolerate extensive inundation from the late vegetative to the grain yellowing stage but linseed was badly affected.

During 1971-72 a report, "An Erosion Survey of the Upper Nogoa River Catchment" on an area of 6440 square miles was completed; the authors estimated that an average annual loss of 14 million tons of soil took place.

The Agricultural Bank returned to the Department's jurisdiction

The Agricultural Bank was established by The Agricultural Bank Act of 1901, and, under the control of a Board of Trustees, opened its doors in 1902 to primary producers as a lending institution with a long-term advance maximum of £1600. From 1916 to 1920 it was administered by the Corporation of the Commissioner of the Queensland Government Savings Bank. In 1920 it was transferred to the Commonwealth Savings Bank, with rural lending retained under Government control under the name the Advances to Settlers Branch of the State Advances Corporation, with funds provided by the Treasury. In 1923 the Corporation of the Agricultural Bank was created giving a maximum advance of £3400. In 1939 the ordinary functions of the Agricultural Bank were continued under the name the Bureau of Rural Development. Under The Co-ordination of Rural Advances and Agricultural Bank Act Amendment Act of 1943 the administration of the Bank was transferred from the Secretary for Agriculture and Stock to the Treasurer. In 1969 this responsibility was re-transferred to the Minister for Primary Industries under The Coordination of Rural Advances and Agricultural Bank Act Amendment Act 1969.

During 1968-69 total approvals under the various Acts amounted to nearly \$20 million. The Graziers Drought Relief Scheme established in 1965 was finalised in this year. The Scheme approved in March 1968 which provided assistance by non-repayable grant to drought-affected graziers to meet local authority rates was also completed. A new scheme under the Drought Relief to Primary Producers' Acts, implemented in March 1969, provided for assistance to all necessitous primary producers, excluding cane growers, in declared drought areas. A free grant of \$220 for purchase of fodder was also made to eligible stock owners. The Bank also administered the Scheme approved to allow owners of sheep, beef cattle and dairy cattle in declared drought areas to purchase feed wheat on terms. During 1969-70 loans to cane growers and other crop growers were included. In May 1970 assistance by way of a non-repayable grant was approved for all primary producers in specified shires to meet payment for one half of the 1970 local authority rates. The rate of interest on the Bank's normal advances was increased to 61/8% on 3 November and to 71/8% from 1 July 1970, but suspended where the property was drought-stricken. Total loans approved during 1969-70 amounted to \$25 238 900.

The Agricultural Bank Fund was the medium through which Natural Disaster Relief Assistance was made to primary producers where there was no existing legislation to deal specifically with it. An instance was the Field Mice Damage Scheme in the Wandoan area in 1972.

Meat industry changes

The postwar market for meat moved dramatically from the United Kingdom to the United States of America, and millions in State and Commonwealth moneys were earmarked for the development of "beef roads". Early in 1964 the Government appointed a Committee of Inquiry to look at the livestock and meat industry in the light of changing circumstances.

Out of this inquiry came the Bill to consolidate and amend the law relating to the meat industry. The decisions reached were:

- (a) the establishment of a Queensland Meat Industry Authority to advise the Minister for Primary Industries on all matters of public policy in relation to meat and to administer defined policy, including overriding control of Public Abattoir and District Abattoir Boards;
- (b) the renaming of the Queensland Meat Industry Board as the Metropolitan Public Abattoir Board and the restriction of its authority to the Brisbane area;
- (c) the withdrawal of franchises from those abattoirs killing for both export and domestic consumption except in the case of Rockhampton, where special circumstances existed.

These decisions were translated into the Meat Industry Bill and culminated in the proclamation of The Meat Industry Act of 1965, to come into operation on 1 July 1965.

The eradication of pleuropneumonia after 114 years in Queensland

Contagious bovine pleuropneumonia ("pleuro") was the most contagious disease which affected cattle in Queensland. Next to drought and the cattle tick, it was the most important problem of the cattle industry and in the first 15 years of its existence in Australia it caused the loss of 11 million animals with an annual loss of \$4m. (*Rural Research in CSIRO*, No. 14, 1955, p. 2)

After its introduction to Victoria by an infected cow which arrived from England in 1858, pleuro spread rapidly over the Australian mainland and by 1880 it had reached Darwin.

On 10 May 1864 a Select Committee of Parliament chaired by T. de Lacy Moffatt was asked to examine what steps could be taken to suppress and eradicate pleuropneumonia in the northern districts of the colony. The Committee discovered that the disease had been introduced through cattle from neighbouring colonies. It recommended the prohibition of imports of horned cattle from those areas and destruction of beasts with unmistakable signs of disease. It suggested compensation for those whose cattle had been destroyed under Clause two of the Diseased Cattle Act. In each district, associations should be formed for the protection of farmers, with Inspectors' expenses subsidised by the Government. (Borchardt, 1978, p. 12. *Qd. Parl. Papers*, 1864, pp. 1069-1090)

On 28 August 1888 the Government, at the insistence of a number of stock owners, requested two visiting scientists, A. Loir and Dr Germont, to conduct experiments on pleuropneumonia in cattle and to develop a serum against the disease. On 16 November of the same year, a board was appointed to inquire into the origin and development of pleuropneumonia in horned cattle. Its members were E. Palmer (Chairman), J. Thomson and J. Tolston. They

were appointed to assist the scientists in their investigations and to make a full report on their work.

The Board accepted the scientific report of Germont and Loir describing in detail the development of a serum and their information about pleuropneumonia virus. The Board was impressed by the success of the experiments and recommended the establishment of a laboratory for further study and preparation of the serum for sale to stock owners. The Board suggested the publication of a pamphlet informing the public about the disease.

The Board recommended that an honorarium of £1000 be paid to the scientists in recognition of their contribution to the cattle industry. Germont and Loir also held experiments on Pasteur's vaccine for anthrax. (*Qd. Parl. Papers* 1889, Vol. 4, pp. 591-599)

Pleuro thrives only under "big herd" or primitive conditions. It has persisted for many years in only a few areas where the cattle are comparatively uncontrolled, such as parts of northern Australia. The disease is caused by a micro-organism Mycoplasma mycoides which affects the lungs. It is present in the particles of moisture exhaled by affected animals, and transmission takes place when a healthy beast inhales these infective droplets. Close contact between infected and healthy stock is necessary for its spread and conditions are ideal in travelling mobs of cattle in close contact when walking during the day and even closer when on camp overnight. One infected but not necessarily visually infected animal (a "carrier") can cause a pleuro outbreak which spreads with great severity. Destruction of infected animals and quarantine of a mob was a common procedure.

Immunity which lasts for at least a year can be induced in susceptible animals by introducing a small quantity of vaccine into the soft tissue of the tail. This vaccine must contain large numbers of the living pleuropneumonia organism. In the early years the amber fluid from the chest cavity of an infected animal (natural virus) was used and introduced in a woollen thread saturated with the vaccine with a seton needle, leaving the thread in the wound.

Since 1936 a cultured vaccine produced by CSIRO has been used and a syringe has replaced the seton needle. Mr de Burgh Persse of "Tabragalba", Beaudesert, was one of the earliest to inoculate with natural vaccine as early as 1866.

A reliable blood test for detecting carrier animals was developed by CSIRO, also in 1936. However, the size of herds and the large area of holdings in northern Australia made detection of infected animals, as well as effective vaccination, extremely difficult.

Queensland was the first State to be supplied with the artificial vaccine and it was used with marked success in the northern endemic areas under the guidance and encouragement of the Veterinary Services Branch staff of the Department to vaccinate both travelling mobs and herds in which the disease was known to be present. By 1944 an average of a quarter of a million doses per year was being used and a marked decline in infected lungs was recorded by meatworks inspection.

During the Second World War, surveillance was necessarily reduced. An upsurge occurred during 1949-51, and between August 1952 and February 1953 fifty-three outbreaks

occurred in New South Wales and seventy-seven in Victoria, infected by mobs moving southwards from Queensland. The losses of stock, which were severe, caused concerted action which led to the elimination of the disease.

Firstly, the Chief Inspector of Stock in Queensland proposed administrative measures including the declaration legislatively of protected and infected areas as provided for under the Stock Acts, compulsory vaccination of cattle prior to movement from infected to protected areas and vaccination for outbreaks as well as vaccination of surrounding "buffer" properties. At that time, the Department's disease control service was decentralised, with stock inspectors at some seventy strategically located centres throughout the State under control of a Divisional Veterinary Officer in each of five veterinary divisions. Travelling stock were required to be accompanied by a permit issued by an inspector. Thus in 1951 the permit showed that travelling stock, other than those going direct to an abattoir, had been vaccinated as necessary. At the same time carcasses were traced back to the property of origin; vaccination was insisted upon on the property, and movements were restricted as necessary. A Departmental Veterinary Officer was located in north-west Queensland specifically to study the disease.

Secondly, as many outbreaks of disease originated in the Northern Territory and spread with cattle crossing to Queensland, a meeting of the Chief Inspector of Stock for Queensland and the Chief Veterinary Officer of the Northern Territory was held at Camooweal; they agreed that all cattle crossing into Queensland other than those going direct to slaughter would be vaccinated as from the 1952-53 season. Such a "Border Conference" continued each year to discuss stock matters. Thirdly, a Central Australia Protected Area was set up jointly between the Northern Territory and South Australia. The area was closed to northern cattle in 1955 so that store stock could move to southern States without restriction and movements from this area under its new status began in 1957. This move greatly increased the belief that the disease could be eliminated.

Finally at the 1953 Biennial Conference of Commonwealth and State Veterinary Officers a joint investigation aimed at control and eradication was launched. This pleuropneumonia eradication project qualified for assistance from the Commonwealth Extension Services Grant (CESG) and so more staff could be appointed. In 1954 two field officers were appointed under the grant, and each year thereafter until 1966 from two to four men, together with their vehicles and operating expenses, were financed from the grant. Stationed in the more remote areas including Normanton, Boulia and Quilpie, they concentrated on increasing vaccine usage. In 1955-56 the number of doses of vaccine distributed had risen to 600 000. The Stock Acts were amended to compel an owner to vaccinate stock to prevent the spread of disease whether within a declared infected area or not. Surveys during 1955-56 showed that the northern part of Cape York Peninsula, the south-east corner of Queensland and the sheep-raising areas of the State were regarded as free of the disease. Under this heavy vaccination pressure the disease declined: in 1957-58 there were only two outbreaks, and in 1958-59 three. Then in 1960 infected animals arrived by sea from northern Australia and a new outbreak occurred. It was soon quelled and the south-eastern Protected Area was proclaimed. To enter this area, cattle other than those proceeding direct to slaughter were required to be resident in Queensland for three months or to have had a blood test with negative results.

In 1958 the Standing Committee on Agriculture appointed a subcommittee comprising the Chief Veterinary Officers of the Northern Territory, Western Australia and Queensland and the Chief of CSIRO's Division of Animal Health and Production to deal with the disease. From its report in 1960 (the Gill Report) it was agreed the Commonwealth would bear the cost of work in the Northern Territory and the activities of CSIRO in research, while the mainland States collectively would contribute towards capital expenditure and annually for three years towards the general operating costs of the project. This was the beginning of the national eradication campaign. A trust fund was set up in the Queensland Department of Agriculture and Stock, called the "National Pleuropneumonia Fund" and the Chief Veterinary Officers of the remaining States joined the newly named "Subcommittee on the Control and Eradication of Contagious Bovine Pleuropneumonia". Each State was to conduct its own programme. The Commonwealth agreed to continue research into the disease, prepare vaccine and make antigen for diagnostic purposes.

The Queensland authorities decided on the following programme:

- i. vaccinate, where possible under supervision, store cattle moving from or through the endemic areas and fat stock which would be travelling for more than 28 days;
- ii. intensify extension work throughout the endemic areas;
- iii. intensify follow-up work on properties on which meat inspection revealed the disease to be present;
- iv. explore at field level the value of tests to detect carrier animals;
- v. extend the "free areas" northwards along the coast, westwards to the dingo barrier fence and later into the channel country.

Work under the national scheme commenced in 1961. A senior Veterinary Officer and 10 Stock Inspectors were seconded for this purpose and worked under the local Divisional Veterinary Officers. Funds from the scheme provided for vehicles, equipment and working expenses. Portable radios were employed. Each year the field programme commenced in March or April to coincide with cattle movements after the wet season and finished about the end of October. Vaccination was the basis of the campaign and a screening test was developed to identify infected animals allowing up to 100 000 samples to be tested each year without difficulty. In 1964 a specially trained team equipped with a mobile laboratory moved on to properties and tested the animals on the spot. Any reactor cattle were removed. The last outbreak had occurred in 1960. To encourage continuation of vaccination, in March 1965 two additional areas were declared-the Peninsula and North Coast and the Central Queensland Protected Area-giving animals from herds with approved control programmes freedom of movement. Some properties with poor disease-control records were not granted improved status until a more satisfactory vaccination coverage was achieved. The south western Infected Area was tackled first with experienced extension officers located at Thargomindah, Bedourie and Boulia, and in 1967, with the exception of the Boulia Shire, all the south western Infected Area was granted protected status. The Bulloo Shire in 1968 and in 1970 the last remaining area, the Gulf and Carpentaria Infected Area, were granted protected status. At the 1972 meeting, 11 years after commencement of the national campaign, the subcommittee agreed unanimously that the whole of Queensland should be considered pleuropneumonia-free. This was a triumph for the dedicated efforts and cooperation of CSIRO scientists in producing effective vaccines and diagnostic tests, State veterinary supervisors and field staff, and the final cooperation of graziers, and gives hope for success for similar campaigns in the future.

This summary is mainly based on a paper entitled "Historical and administrative aspects of pleuropneumonia eradication in Australia with particular reference to Queensland" submitted by L.G. Newton. This paper was awarded second prize in the A.C.T. Regional Group Essay Competition 1971. It appeared in *Public Administration*, Volume 33, No. 1 March 1974, pp. 43-59.

National scheme for the eradication of tuberculosis and brucellosis

Following the successful eradication of pleuropneumonia, a national project was launched in 1970 to eradicate tuberculosis and brucellosis in cattle. In anticipation four areas in Queensland were declared "protected" during 1969-70. These areas were those where a substantial eradication of tuberculosis in dairy cattle had already been achieved by Departmental action. Testing for tuberculosis was then extended by 1972 into areas contiguous to the protected areas and restriction was placed on importation into USA of beef from animals which had shown signs of tuberculosis infection.

Vaccination of dairy cattle against brucellosis would be carried out as a routine measure over as many herds as possible, but vaccination of beef herds would be restricted for the time being to herds determined to be infected.

Commonwealth Dairy Stabilisation Plan

The fourth five-year Commonwealth Stabilisation Plan came into operation on 1 July 1967. It included the main features of the previous plan, and continued subsidy payments on 40% butterfat products at the rate of \$27 m per annum, with an annual guaranteed average return of 33.3 cents per Ib commercial butter. The Commonwealth Government continued its support on export of processed milk products to the extent of \$800 000 per annum. Assistance was also offered to individual farmers to assist in the economic amalgamation of farms and evacuation of certain farmers from the industry.

In 1970 the Commonwealth Government agreed to provide \$46¼ million as bounty on dairy production for the 1970-71 season only. This included the existing \$27 million bounty on butter and cheese, plus an additional grant of \$19¼ million to be paid as bounty on butter and cheese and skim milk powder, casein and other non-fat products.

Establishment of the Otto Madsen Dairy Research Laboratory at Hamilton

The Department of Primary Industries in 1935 initiated research into dairy problems. Research was then oriented towards the production of milk, the composition of milk, and the quality of dairy products. The demands for a broader spectrum of research activities led eventually to the establishment in 1967 of the Otto Madsen Dairy Research Laboratory at Hamilton. This laboratory provided facilities for bacteriological, chemical, biochemical and technological research into dairy problems. A pilot plant was also available for research into manufacturing problems associated with new dairy products.

Guidance on research

The Director-General, W. J. S. Sloan, wrote in June 1965: "Research projects need to be planned and conducted in such a way as to ensure that priorities are being met and that the end point of practical application of results will not be unduly delayed." Steps were taken to secure producer guidance on research at the local level through advisory committees for the research stations. Advisory committees helped to plan research at the Toorak Sheep Field Research Station in the north-west, Swan's Lagoon Cattle Field Research Station on the Burdekin, and the Granite Belt Horticultural Research Station.

Fish Board and Fisheries Branch of the Department of Harbours and Marine transferred to the Department of Primary Industries

Following a reallocation of Ministerial responsibilities in May 1969, control of the Agricultural Bank and the Fish Board was transferred to the Minister for Primary Industries. The Fisheries Branch of the Department of Harbours and Marine was also transferred to the Department of Primary Industries. The Fisheries Branch was transferred from the Department in August 1969, but was brought within the Department again in February 1970. Matters such as the banana prawn industry, the crown-of-thorns starfish, kerosene taint in mullet, development of oyster banks and contracts for shark netting became the province of the Department. The Fisheries Branch operated a small laboratory at Mourilyan. It co-operated with the CSIRO Division of Fisheries and Oceanography on the East Coast Prawn Research Project, studying the ecology and population dynamics of the king prawn (Penaeusplebejus). Market sampling of mullet was undertaken at Tewantin, the productivity of developed area waters such as the Southport Broadwater area was compared with that of similar untouched regions, and the cause of oyster mortality in the Pumicestone strait and Deception Bay was investigated. Research on the crown-of-thorns starfish was conducted at the Mourilyan Laboratory in conjunction with staff at the James Cook University at Townsville.

Control over prawn trawling in fishing grounds was exerted through regulation, and habitat reserves were established to protect fish breeding and feeding grounds. During 1970-71 six new habitat reserves were declared: Tallebudgera Creek, Tippler's Passage, Currigee, Pimpama, Peel Island and Hinchinbrook.

Creation of the Fauna Conservation Branch

The Department was involved in fauna conservation from 1905 when it took over administration of the Native Birds Protection Act. The Under-Secretary of the day, commenting on lack of public interest in the Act, said: "What is everybody's business is nobody's business, and as the public will take no interest in protecting what is of value to them, it is time that restrictions should be placed upon those who have not the sense or knowledge of discrimination". That official commented further that the Act was "somewhat difficult of administration." A new Fauna Conservation Branch was created within the Central Administration and Clerical and General Division, with the appointment of Dr. Graham W. Saunders, D.Agr.Sc., as Director on 29 July 1971. The branch had a technical staff of 15, comprising the Director, six graduate zoologists, three fauna rangers, and several

experimentalists. Most of the staff continued to engage in research and survey work from the two main fauna research centres - Hermitage Research Station, near Warwick, and Townsville. In its first full year ending 30 June 1972, the Director reported that detailed research work on the grey kangaroo had been completed and published. At Oonoonba, Townsville, field studies were made on 15 species of waterfowl and on brolgas. In Brisbane, native rats were studied. In the Gulf and Peninsula the biology of crocodiles was being studied. Control of kangaroo harvesting was set in train and numerous inspectors provided day-to-day surveillance of the Fauna Conservation Act.

Commercial tea production

After 32 years of experiments in tea growing at the Department's Tropical Agricultural Research Station at South Johnstone, leading to the production of tea of good quality, Dr A. P. Malouf of Nerada established a large tea plantation with fully mechanised harvesting. With promising development in sight the Land Administration Commission and private enterprise arranged for the lease of land in north Queensland for tea production with provision for building a local factory. The Department undertook research on clonal evaluation, weed control and regional assessment in the wet tropics. Tea growing trials were initiated at Millaa Millaa, Topaz and Ingham. Fifteen new clones were supplied during 1969-70 from Tocklai Research Station (Assam), after local quarantine. A teamanufacturing laboratory was equipped with experimental tea equipment with financial assistance from the Department of National Development. Departmental economists estimated that a seedling tea yield of 2000 lb per acre and a price of 40 cents per lb were required to provide a satisfactory return on the large amount of risk capital involved.

Federal Raw Cotton Bounty Act 1963

Under this Act an amount not exceeding \$4 000 000 per annum was made available for bounty payment on all Australian-produced raw cotton of a grade higher than strict good ordinary, at a rate based on 16.125d (13.4375 cents) per Ib of middling white raw cotton for the 1966 crop, compared with 13.174 cents per Ib in 1965.

Transfer of Whinstanes Cotton Ginnery to Cecil Plains

During 1966-67 the Cotton Marketing Board moved its Whinstanes ginnery to Cecil Plains to take advantage of lower freight costs to South Queensland growers and cater for the expansion of cotton growing on the Darling Downs, which had become the largest single cotton growing area. This ginnery handled the record 1967 south Queensland crop.

Dairy Industry Advisory Committee

This Committee, set up in May 1964 to advise the Government on matters relating to farm production in the industry, presented its report in May 1966; the Government accepted two of its recommendations, viz:

- i. the payment of a subsidy to encourage pasture improvement, and
- ii. the provision of farm management advisory teams in the main dairying areas.

1. Dairy Pasture Subsidy Scheme

This scheme was inaugurated in September 1966 and its benefits were made retrospective to May 1966. The scheme was intended to encourage the planting of approved permanent pastures by granting a subsidy on a dollar-for-dollar basis, up to \$14 an acre on such plantings with a limit of 20 acres a year and 100 acres over a 5 year period. The response in the first year involved 2358 farmers applying to plant a total of 43 490 acres, representing one-fifth of the State's dairy farmers. The Scheme was administered under the Minister for Primary Industries and the Director-General of the Department by a Central Committee. This consisted of the Deputy Director, Division of Plant Industry (S. Marriott) as Chairman, the Director of Dairy Field Services (W. D. Mitchell) as Deputy Chairman, the Director of Cattle Husbandry (G. I. Alexander), the Director of Economic Services (E. O. Burns), the Sub-Accountant (H. Evans) and the General Secretary of the Queensland Dairyman's Organisation (B. Whip), with a District Adviser in Agriculture as Executive Officer. Local administration was provided through Co-ordinating Committees of Department officers and a dairy industry representative. A significant statement from the Director-General at the end of the first year was: "the widely publicised interest in the tropical and sub-tropical pasture species has unfortunately tended to over-shadow the major role which lucerne, Green Panic, Rhodes grass, Buffel grass, paspalum, and white clover still have under the Subsidy Scheme in many of Queensland's important dairying districts" (Harvey, J. M., An. Rep. Dep. Prim. Ind., 1966-67 p. 18) By May 1972 the total subsidy approved for payment since the inception of the Scheme was \$3 008 303 covering 19 017 applications, 208 035 acres at an average subsidy per acre of \$11.96.

2. Farm management advisory teams-property economics

The Economic Services Branch was geared to help individual producers to plan their property enterprises and operations on the basis of economics. Decentralisation of these services was extended as staff and funds became available and by June 1967 agricultural economists were stationed at seven country centres-Warwick, Toowoomba, Roma, Gympie, Rockhampton, Townsville and Atherton-as well as Brisbane. These economists were also involved in the operation of Farm Accounting Groups, training other field officers in budgeting and other management techniques, and in providing short courses in farm management economics for groups of farmers.

Dairy farm decline

With difficulty in disposing of butter surpluses and a succession of dry seasons, many farmers ceased dairying and others were assisted in leaving the industry by the Marginal Dairy Farms Scheme. Dairy farms thus became larger and more efficient. From a peak of about 27 000 dairy farms in Queensland in the early 1940s the number had dwindled to 8125 by June 1971.

Tobacco Stabilisation Plan

After several years of poor demand for tobacco leaf in the face of expanding production, discussions between the Commonwealth and State Governments concerned, tobacco growers and manufacturers led in November 1964 to a stabilisation plan. Under this plan,

the Commonwealth Government undertook to ensure that, if available, 26 million lb of Australian leaf of acceptable grades would be bought each year by manufacturers at an average minimum price of not less than 125d per lb on a normal crop fallout. Queensland's share was set at 14 million lb. A Special Tobacco Quota Committee was established to allot farm quotas, generally on the basis of a grower's best two years out of the four seasons ended 1963-64.

Rust-resistant hybrid maize for the Atherton Tableland

Although hybrid maize varieties had been available for planting in southern Queensland from 1928, attempts to breed a variety of hybrid maize which performed better than the locally selected "Atherton Main type" defied the earlier plant breeders. In 1962 a plant breeder, Ian F. Martin, was stationed at Kairi Research Station to commence breeding maize for tropical rust resistance. By 1965 two rust-resistant hybrids had been produced; one, QK37, was released for commercial production during 1966-67, bred from parental material of Australian breeding lines and resistant types obtained from Africa. By 1967 sufficient seed was available to sow 24 000 acres and by 1969 over 95% of the area sown was to hybrids.

Rice as a commercial crop in Queensland

Upland rice was grown in 1899 in north Queensland and produced 14% of Queensland's annual consumption, totalling 1 318 176 lb of cleaned rice with 8 235 564 lb imported. Production steadily declined to zero. In 1953, after fairly extensive Departmental trials in north Queensland at Millaroo Research Station on the Burdekin and farm trials, it was shown that the crop would be successful under irrigation. In 1968 the first commercial crop of 360 tons of rice for delivery to two small mills, organised by G. H. Allen, Executive Officer, Experiment Stations, was harvested. Growers made an arrangement with an experienced southern rice marketing organisation to market the processed rice in north Queensland. The variety Blue Bonnet was shown in trials to be the best variety for the area and a pure seed scheme for this variety was commenced during 1968-69. Some 97 varieties were introduced to the Millaroo Research Station from the International Rice Research Institute for testing. Research also involved determination of optimum fertiliser practice (80 lb nitrogen per acre), weed control, sowing rates and water management. Profitability studies in co-operation with growers were initiated by officers of the Economic Services Branch. During 1970-71 an area of 6000 acres was grown under irrigation in the Burdekin with 4000 acres in the summer crop and 2000 acres as a winter crop. Yields averaged 22 tons of paddy rice per acre.

Surveillance of exotic diseases

In November 1965 it was discovered that cows in the Mount Crosby area close to Brisbane had been inseminated with semen introduced without permission from an artificial breeding centre in Canada. This raised the possibility of blue tongue virus being introduced into Australia. A Commonwealth Veterinary Consultative Committee was called together and drastic slaughter-out action was taken. All ruminants, comprising 723 bovines and 2 goats within an 11-mile radius of the point of use were removed for slaughter and the area was fogged by an Army detachment supervised by scientists of CSIRO and the Queensland Medical Research Institute. Meatworks paid \$25 000 for the stock slaughtered and owners

received additional compensation and stock transport charges totalling \$51 000. Material submitted to South African authorities revealed no evidence of blue tongue, but disastrous consequences to the Australian sheep industry could have resulted if blue tongue virus had spread through it. (See The *Stock Prevention of Blue Tongue* Act of 1965.)

Early in 1966 the Animal Research Institute isolated the virus of Newcastle disease in chickens from flocks at Hemmant and Belmont in the Brisbane area. This disease was believed not to be present in this country and its discovery was viewed with concern throughout Australia. It was subsequently found that the strain of the virus was a weak one and drastic action to eliminate the disease was unwarranted. (Harvey, J. M., *An. Rep. Dep. Prim. Ind.*, 1965-66, pp. 1-2)

Multi-resistant ticks

The problem of some tick resistance to common tickicides had been met with for some time. During 1965-66 a strain of ticks in the Esk area was found to be resistant to all organophosphorus chemicals and a survey showed that these resistant ticks were present on twenty properties in the district. By the following year this "Biarra" strain of resistant tick had spread as far as Beenleigh and Mundubbera. Some \$60 000 was expended during 1966-67 in charging dips in the Biarra-Crows Nest area with new medicaments effective against this strain of tick, Nexagon and Dursban. A special committee was set up by the Australian Agricultural Council to consider tick resistance and a Technical Sub-committee on the Control of Cattle Tick, consisting of the Department of Primary Industries, CSIRO and the New South Wales Department of Agriculture, was set up to watch over quarantine regulations. A Liaison Committee of owners' representatives and Departmental officers was set up in the Brisbane Valley. Later a Joint Committee on Cattle Tick convened by the Minister made recommendations to Cabinet as a basis for future action. In 1965 permits were endorsed for travelling cattle "to be free of visible ticks" and ticky drafts at saleyards were withheld from sale, treated, and either returned to their properties of origin or held for 72 hours before release. In 1966 conditions were tightened to require all cattle in ticky areas to take a treatment within 72 hours prior to movement. By May 1972 five strains of resistant ticks - Mt Alford, Biarra, Mackay, Gracemere and Ridgelands - required special treatment.

New cattle breeds

The first importation of Charolais beef cattle semen from the United Kingdom arrived in Queensland in April 1969 to join the range of new breeds - Sahiwal, Africander, Red Sindhi and the Australian Murray Grey.

New directions in extension

The Far North Queensland Extension Committee, composed of officers of various branches, commenced about 1965 to guide the joint extension work of regional officers but did not attempt complete integration of extension work in the region. At Roma, Denis Purcell, a graduate who had also completed the Queensland University Post-Graduate Diploma in Extension, was given the task of coordinating regional extension work based on the voluntary co-operation of his colleagues. In the Moreton Regional Survey dairy officers selected "unit

farms" representative of a local district, and with the owners provided management recommendations for the dairy farm with the co-operation of the farmer and Departmental officers; field days, farm walks and other extension strategies were incorporated.

During 1971-72 the Public Service Board approved the establishment of an Extension Services Board and an Extension Services Section with a cadre of Regional Extension Leaders, for thirteen agricultural extension regions: Far Northern, Burdekin, Central Coast, Burnett, South Burnett, Near North Coast, East Moreton, West Moreton, Darling Downs, Near South Western, Far South Western, Central West and North Western. Within these regions were 34 districts for which extension programmes were drawn up by district committees, consisting mainly of local extension officers but with some representation of research workers. The guidelines were:

- 1. Teamwork was the keynote, with all extension officers functioning in a district programme.
- 2. Use would be made of all methods of extension to assist farmers to achieve their goals through definition of problems, adjustment to technological change, improvement of technical and managerial efficiency and conservation of production resources.
- 3. Contact with farmers would follow a whole-farm approach, recognising land capability.
- 4. Advice would be given in a farm management context.
- 5. Adoption of programme planning was desirable for effective overall operation of the extension service.
- 6. Direct contact between extension and research services would be maintained.
- 7. Extension services were expected to be dynamic, show sound leadership and promote the wellbeing of rural industries. The Standing Committee on Agriculture appointed a special committee including the Department's Director of Economic Services to prepare guidelines for future development of farm management services throughout the Commonwealth. This committee was mainly concerned with farm recording systems and analysis, farm management techniques generally and farmer education on the business side of farming.

Division of Plant Industry

Agriculture Branch

Wheat

Queensland's wheat acreage exceeded the million mark for the first time in 1964 and a record production of 24 million bushels was recorded; in 1966 it reached 34 million bushels from 1.1m acres, with new areas planted in the western and south-western Downs. A major soil fertility research programme was launched in conjunction with ACF and Shirleys Fertilisers Ltd and the University of Queensland and critical levels for nitrogen

and phosphorus for a wheat crop were found to be revealed by rapid soil tests. In a general screening of Queensland's wheat soils deficiencies of phosphorus, sulphur, molybdenum, zinc, calcium and potassium were found in various areas. Mottling of wheat grain was found to be prevented by adequate nitrogen levels in high-yielding crops. Zinc deficiency common on the black soils could be corrected by drilling in zinc sulphate at 1 cwt per acre or spraying with a 1% spray 2-4 weeks after germination. Inoculation of soil with *Azotobacter chroococcum* gave increased wheat yields.

After ten years' trials it was shown that wheat yields were increased following a pasture (especially lucerne) phase with high-protein grain produced and better suppression of the black oats pest. Yields after zero tillage and stubble mulching were also higher.

Wheat breeding for high quality increased yields and especially affected the changing stem rust position. Root rot and flag smut resistance were a continuing major challenge. The perfect stage of the wheat crown rot fungus was found in Queensland for the first time during 1964-65, as well as rust infections on local grasses such as *Agropyron scabrum* var. *plurinerve*. Mexican dwarf wheats gave high yields under irrigation at Emerald. Yields of crops sown after June-July declined.

Experiments by the physiologist at the Wheat Research Institute in Toowoomba showed that drought hardening of wheat seed by soaking seed for 24 hours and allowing it to dry to its original weight before planting gave an average yield increase of 12.4% over three seasons' trials.

Studies were made by Departmental officers on the optimum time for replacing wheatgrowing machinery.

Barley

Extensive variety trials by the Department showed that several varieties outyielded the existing malting variety Prior. The Barley Marketing Board in 1969-70 accepted Clipper as the new variety to replace Prior within two years. In 1967-68 the Department obtained micromalting equipment donated by the barley industry to initiate malting trials. Excessive use of nitrogen fertiliser led to decline in malting quality. In 1969-70 barley stripe mosaic was discovered for the first time in Queensland in Cape barley (a feed type) at Kingaroy. It was found to be pollen-transmitted and restricted to the Cape variety, but fairly widespread.

Oats

This crop continued to be a major water-grazing crop for dairy cattle and fat cattle in Queensland. During 1968-69 a fungus *Fusarium culmorum* causing severe crown rot was recorded in Queensland for the first time. It is common in southern Australia.

Grain sorghum

This crop continued to expand throughout Queensland and the variety Alpha, bred by Dr L. G. Miles, continued to dominate the open-pollinated varieties. Numerous hybrids were being produced by seed companies and Departmental plant breeders to improve yield and quality. Problems were the soft grain of hybrids making storage difficult, excessive

lodging, susceptibility to the Johnson grass strain of sugarcane mosaic virus and head smut. A hybrid, XQ5161, with good resistance to lodging was released by the Department during 1971. Seed firms introduced a wet slurry dressing to TM TD to replace seed dusting with mercurial dusts to control insect and disease problems. Deep seed planting to 4 ins and the use of press wheels improved germination on cracking clay soils. Atrazine as a post-emergence weedicide applied 7 days after emergence of grain sorghum gave good control of black pigweed (*Trianthema portulacastrum*).

Maize

Mention has been made of the successful breeding and release of a hybrid maize for the Atherton Tableland. Regional variety trials were conducted throughout Queensland. In 1969 studies were initiated on three land use systems for the Atherton Tableland-continuous maize, continuous maize fertilised with 60 lb nitrogen per acre and maize grown in the first and second year after 4 years of Green Panic/glycine pasture. Nitrogen and pasture phases increased yields dramatically.

Cotton

The skip-row (plant 2, skip 2) planting method proved successful with rain grown cotton; the application of 100-150 lb nitrogen per acre increased yields from irrigated crops; irrigation soon after emergence, at boll formation, and especially at flowering proved crucial; and the use of trifluralin was shown to be effective for the control of grasses and broadleaved weeds. An economic survey of cotton production under irrigation on 14 specialist farms on the Darling Downs was undertaken by the Economic Services Branch during 1968-69. Light trapping by officers of the Entomological Branch at the Biloela Research Station extended the knowledge of the seasonal incidence of insects, and the fungicide benomyl gave good control of leaf spot. Cotton breeding to select varieties for the cooler ripening weather on the Darling Downs continued to improve fibre strength and micronaire.

Tobacco

Priority was given in tobacco research to nutrition studies. High chloride content of irrigation waters was a common field problem. Two suitable oils were discovered for sucker control. Supplies of the sucker control agent Penar were imported for farmer use. Breeding work by CSIRO produced several new varieties resistant to mould and black shank and these were tested in the field by Departmental officers. The herbicide Balan (benefin) was released for farmer use for grass control and tillam at 4-6 lb per acre effectively controlled nutgrass.

Foliar diagnosis by 1969-70 gave a good indication of the nutrient status. It was found that the nutrition of the crop could not be varied after topping and that most of the nitrogen uptake occurs early in the growth of the crop. Up to 50% of the nitrate nitrogen can be replaced with ammonia nitrogen, a commercial advantage. Field light trapping as a prediction service was effective in advising farmers of insect populations.

At the request of the Australian Tobacco Board a Departmental agricultural economist carried out an Australia-wide survey into the effect that new loose-leaf selling and bulk-sorting methods would have on the production and marketing costs of tobacco during
1971-72. It was estimated that, after a period of adjustment, the industry could expect an average saving of 6.9 cents per lb of cured leaf by adopting the new system.

Oilseeds

In 1964 linseed production reached a record 34 175 tons from 97 092 acres, but then declined rapidly because of over-production and competition from substitutes in paints and linoleum. By 1967-68 when Departmental research had found nutritional problems were caused mainly by zinc deficiency, it lost favour with growers.

The widening use of safflower oil as an edible oil and also overseas interest in the crop led to the production of a record 30 000 tons of seed in 1966, almost three times the size of the previous largest crop. The crop was handled by the Queensland Graingrowers Association.

This crop also lost favour with the advent of high-oil-content sunflowers from Russia in 1967-68. These varieties averaged 41.4% of oil compared with 29.5% oil in the birdseed variety Polestar. A Departmental plant breeder introduced 105 varieties specially selected by the USDA during 1967-70 and trials were immediately begun. Irrigated sunflowers on the Darling Downs averaged 2948 Ib/acre of seed. Optimum plant populations derived from trials pointed to 40 000 plants/acre for irrigated and 20 000 plants/acre for rain-grown crops, each sown in 14 inch rows.

Peanuts

Agronomic research on peanuts was intensified during 1969-70 and included time of planting and fertilising work on the Atherton Tableland, nutrition and population studies in the South Burnett and a small plant-breeding project at Hermitage Research Station. Marked differences in yield owing to variation in sowing date were achieved in the Atherton Tableland. With the increasing incidence of verticillium wilt it was found that removing the peanut trash after harvest delayed the onset of the disease in the following crop.

Irrigation projects

With the development of the irrigation venture at Emerald, Departmental officers assembled agronomic data on cotton, grain sorghum, wheat, soybean, sunflower and barley growing under irrigation ready for farmers who would occupy new irrigation farms in 1972-73.

Agrostology

Pasture research and extension flourished during the Row-Harvey administration. After selecting species and mixtures, grazing trials using cattle were established throughout the better rainfall areas of the State and economic data accumulated.

On a 40 acre lotononis/pangola grass pasture at Coolum Research Station cattle gained 1.6 lb per head per day or 1 lb per acre per day for seven months of the year. The Rongai strain of *Lablab purpureus* gave good autumn grazing. Optimum growth temperatures were established for the main tropical grazing legumes, with *Stylosanthes guianensis* preferring over 30°C, the majority 25-33°C, and Cooper glycine preferring a cooler 22-27°C.

Pasture establishment on the free-mulching soil of the Darling Downs was hindered by poor germination owing to dry crumbs forming under the surface crust because of light penetration. Use of a press wheel behind the seed chute improved germination. Buffel grass in western Queensland established best within the "drip ring" of large *Eucalyptus populnea* trees, shown to be due mainly to higher phosphorus status of the soil. These trees provide useful shade and are commonly used as camps by sheep and cattle. Phosphorus fertiliser use was shown to be the major factor in successful pasture establishment, but fertiliser trials also showed some deficiencies of copper, molybdenum, zinc and potash. Aerial topdressing of pastures containing Townsville stylo (*Stylosanthes humilis*) was adopted commercially and research on Townsville stylo was concentrated mainly on Swan's Lagoon Research Station in the Burdekin. Without fertiliser it was a poor performer. Numerous tropical grasses and legumes were screened.

Dr J. P. Ebersohn, Chief Agrostologist, visited low-rainfall areas in Peru, Brazil, Ethiopia and Rhodesia and brought back several hundred species which were screened at "Brian Pastures" Research Station at Gayndah and at the new laboratory and nursery at Charleville in 1967. Subsequently Dr B. Grof introduced new *Stylosanthes* from Central America. Buffel grass cultivars proved promising in pulled and burnt gidyea (*Acacia cambagei*) scrub country in central western Queensland and, sown in mulga (*Acacia aneura*) pushed for drought feeding of sheep, it established satisfactorily when sheltered from grazing in its early stages.

In the wet tropics at South Johnstone Research Station grass/legume mixtures gave excellent liveweight gains and *Brachiaria decumbens* fertilised with 175 lb per acre of nitrogen carried nearly two cattle beasts per acre per year. Glycine (*Neonotonia wightii*) cultivars were tested at Kairi for dairy pastures. The "pasture revolution" depended for its success on the availability of sufficient pasture seed of good quality and reasonable price. Research on seed production devolved almost entirely on Departmental officers working on the various research stations dealing with pastures and the seed quality was monitored by the Standards Branch. Pasture seed has always been costly and as well producers often involve heavy costs in land preparation. Hence high quality seed is paramount.

Effective nodulation of the many leguminous species selected for use in improved pastures and at research stations is also essential. Legume bacteriologists in the laboratories of the Department and in co-operation with CSIRO continuously selected and tested new strains to improve field nodulations. Irrigated pasture trials involving lucerne and other temperate species were undertaken at the Irrigation Research Station at Gatton College. Under a 5 acre rotational grazing system using lucerne, 2.4 yearling steer equivalents per acre were carried, producing 806 lb per acre weight gain (450 lb carcass gain). Lucerne cultivars Hunter River and Siro Peruvian outyielded other summer legumes under irrigation at Emerald.

An economic assessment of Townsville stylo pastures in north Queensland showed that an integrated breeding and fattening enterprise with male cattle was preferable. Breeders on Townsville stylo pastures would need to improve on breeding percentages by 20%.

Horticulture Branch

Deciduous fruit

Research in stock-scion relationship in apples showed that Merton stocks and some Malling Merton stocks were producing better yields and T7 was proving better than the established *Pyrus calleryana* stock for pears. The variety improvement goals at the Granite Belt Horticultural Research Station at Stanthorpe were for early-maturing red dessert apples, early and mid-season yellow-fleshed peaches and nectarines, and plums maturing before and after the Wilson plum variety. Improved budwood of peaches and nectarines was introduced from USA in 1970. Screening for resistance to spider mite *(Tetranychus urticae)* in apples was initiated.

Nutritional studies in fruit trees showed that phosphorus deficiency was common in virgin land. Measles in stone fruit was finally proved to be due to boron deficiency accentuated by high manganese and low calcium. With the shortage of irrigation water in the Granite Belt, trials were undertaken to determine the critical levels of water stress in trees to assist in timing of irrigation. A technique involving paraffin infiltration of leaves was developed as a simple field test. Under-tree and trickle irrigation systems were developed to economise on water. Some waters had a high total-solids content rather than high chloride and these waters caused leaf scorch when used for irrigation. Mechanical weed control on the shallow soils damaged the roots but chemical control with Terbacil and Simazine proved satisfactory.

Nematode control was obtained using methyl bromide-chloropicrin mix. Pre-harvest fruit drop was reduced by spraying with 2,4,5-TP and thinning of the fruit crop by application of NAA (naphtha-acetic acid) and carbaryl. Gibberellic acid treatment improved staggy trees. Virus-free material of the Gravenstein apple was developed to control "flat limb" disease. Post-harvest scald was found to be controlled by using diphenylamine (DPA) and bitter pit was reduced by early detection and treatment with DPA at 2000 ppm and calcium chloride at 1000 ppm. Warming apples to 70°F after 4 weeks' storage reduced soggy breakdown. "Hen and chicken" disease of grapes at Stanthorpe was controlled by gibberellin sprays at a strength of 10 ppm when 80% of the flower caps had fallen. In coastal crops a potassium sulphate spray at cap-fall improved berry quality. Cold storage of grapes packed in sealed polythene bags with sulphur dioxide as a fungicide proved successful. From 1968 interest was growing in the development of a local wine industry at Stanthorpe and wine varieties were introduced under quarantine to the Research Station for testing during 1969-70.

Pineapples

A survey showed the production pattern on certain forms in a district is representative of the whole. Fruit development studies showed maximum total solids in the fruit occur 155 days after flowers appear in the hearts of plants. So given uniform planting material and effective flower induction, block harvesting for canneries was feasible and this practice developed. ANA and BOH proved effective inductants at the Maroochy Station, although BOH went out of production during 1971-72, and a second spray of ANA two to three weeks after the first improved flowering.

Clones were selected at the Maroochy Research Station and cannery suitability was selected from a range of 3n clones and narrowed down to Clones 30 and 14 after eighteen years of selection. A clone named Queensland Cayenne was selected and multiplied from 1969-70 at the Beerwah Pineapple Industry Farm to be released during 1974-75.

A balanced fertiliser schedule was formulated from nutrient uptake studies. At Beerwah dolomite at 1 ton per acre increased fruit weight by 6% due to the magnesium content. It was shown that the pineapple plant made better use of ammonium nitrogen than nitrate nitrogen. Urea sprays could be increased in concentration from 2 2% to 10% and the overall nitrogen application could be increased from 50 lb to 100 lb as a result of nutrient trials. Weed control was effected with PCP, which was superseded by diuron. Green couch and crowfoot grass were shown to be diuron-resistant but by combining diuron with bromasil they could be destroyed.

Ethrel sprays improved fruit colour and produced uniformity for canning. Top rot (*Phytophthora cinnamomi*) could be controlled with difolitan and dexon, and mulching with black polythene improved yields. Three watering regimes were studied where irrigation was available. The mechanisation of the industry using boom sprays and fruit harvesters led to some modifications of recommendations.

Studies on harvesting showed that translucency was a good indication of ripeness.

Bananas

Departmental research to determine the best banana varieties continued during 1963-72. Clonal selections were made within the Cavendish and Mons Marie varieties. A variety 2390 introduced from Jamaica and a local M2 (Mons Marie selection) showed resistance to Panama disease to which the Lady Finger variety is susceptible. Dwarf Mons Marie and Queensland Cavendish were released as new varieties for north Queensland.

The disease "banana yellows" was found to be caused by potassium deficiency.

Tully clay loam with a high K content of 0.5 m.e. per cent gave no response, but red brown loams around Innisfail with a K content of 0.1 m.e. per cent needed high K. Too much K led to magnesium deficiency. Side dressings of fertiliser gave no response if applied later than six months after planting. Green banana storage life was increased by 0.9 day for every degree Fahrenheit drop in temperature between 70°F and 55°F, depending on fruit maturity. Benomyl at 200 ppm and thiobendazole at 400 ppm as post-harvest dips controlled black end or crown rot of fruit. Removal of the "bell" from the fruit bunch increased the size of the fruit. DD and EDB reduced nematode effect. Leaf diseases reduced the green life of the fruit. The flower thrip (*Thrips florum*) was found to cause Corky scab in south-east Queensland and bronzing was caused by the banana mite (*Phyllocoptruta musae*) and rusty speckle by a species of *Brevipalpus*.

The Economic Services Branch conducted a survey of key management practices amongst growers and prepared a report indicating means of improving the industry. A feasibility study on exporting bananas to Japan was also undertaken in the early 1970s.

Papaws

Papaw selection work continued. Uniform Sunnybank lines were selected and 57 were released, and at Maroochy selection within a local farmer's lines led to the release of Richters Gold by 1973. Propagation of papaws by cuttings was initiated to provide uniformity. Corrosion of cans of papaws due to the oxidative action of nitrates in the fruit became a problem. The reserves of nitrogen in the plant accumulate as nitrates in the fruit. Attempts to reduce nitrates involved adjustment of nitrogen fertilisation to soil fertility, eliminating nitrogen fertilisation after flowering and using a urea foliage spray during harvest. The mechanism of nitrate accumulation was studied at the Sandy Trout Food Preservation Laboratory and selection of strains of low nitrate accumulation was set in train. Propagation of papaws by cuttings was investigated.

Farm records of Yarwun growers were studied for management information.

Citrus

Stock-scion trials with citrus had been carried out for 11 years. Rough lemon stock proved best for all lemons and the Villa Franca lemon gave the highest yield at Gatton. Troyer citrange was best for oranges and emperor mandarin for mandarins. Emperor mandarin stock takes up less chlorine from soil than other stock and less sodium than sweet orange. The Glen Retreat mandarin gave poor performance on *Trifoliata* stock, especially where salinity problems were likely. In nutrition trials it was found that tissue analysis recommendations for nitrogen, phosphorus and potash as used in California applied here except for the need for more nitrogen on sandy soils. The winter application of nitrogen per tree, applied between May and August, is sufficient for navel oranges. Control of the citrus leaf miner (*Phyllocnistis citrella*), prevalent in north Queensland and spreading southwards, was achieved by spraying with diazinon and azinphos-ethyl each at 0.05% active constitutent. Methidathion and omethoate should replace oil sprays to control red scale (*Aonidiella auranti*) on Glen Retreat mandarin and other sensitive varieties.

It was found that the solids/acid ratio is a better guide to citrus palatability than the acid level. The trickle system of "degreening" citrus as used in Florida was introduced and adopted in Queensland. Ethylene is continuously trickled into the room to maintain a concentration of 5-20 ppm at temperature of 27.5° C (95° F) and a relative humidity of 90%. A post-harvest dip with thiabendazole at 1000 ppm gave protection from green mould up to 6 weeks and a copper spray at $\frac{1}{2}$ - $\frac{3}{4}$ petal fall controlled black spot. A tight-fill citrus-packing system was adopted.

Ginger

The Australian market in 1965-66 required 2200 tons of ginger and the expected crop was 2240 tons; hence research was concentrated on manufacturing with a view to exporting the product. Optimum sucrose/reducing sugar ratios in syrup needed to be maintained. Guidelines for quality were drawn up. It was found that ginger should be syruped over a 9-day period to obtain the maximum drained weight and sugar absorption and the best appearance. In a study of flavour components the distinctive flavour of Queensland ginger was found to be owing to the presence of 8.27% of geranial and neral in the volatile oil component. Ginger also retained its texture and gave a much higher recovery in salt brines

than in metabisulphite solutions. Pathologists found that bacterial wilt caused by *Pseudomonas solanacerum* had a wide host range amongst weeds and other plants and posed a serious threat to the industry. However, good control of rhizome rot was effected with thiabendazole and benlate, which could replace organo-mercurials.

Strawberries

Nucleus plots of heat-treated virus-tested plants were multiplied in isolation on three farms at Nanango and later at Boonah and Neusavale. The Strawberry Runner Approval Scheme, which operated in collaboration with COD, made available some 250 000 virus-free runners for planting in 1967 using Phenomenal and Majestic varieties; Redlands Crimson was released for the 1969 planting.

Heat therapy was found to eliminate mottle virus but not other types. It was found that the storage life of strawberries could be increased by treatment with ethylene oxide for 24 hours, so improving trade with the South. Trials on the Granite Belt showed good production with the imported Red Gauntlet variety from USA. The south-east Queensland crop ripened from June to October and the Granite Belt crop from October to March, thus spreading the availability of fruit in Queensland. Pre-cooling and packing in ice also extended the range of markets.

It was found that benomyl was better than captan for controlling grey mould and powdery mildew. Strawberry dwarf crimp was found to be caused by the bud nematode (*Aphelenchoides besseyi*), the first record in Queensland.

Passionfruit

There was a smaller demand for passionfruit during 1966-67 owing to a decline in crop area and disease in the common purple variety. A breeding programme producing hybrids between *Passiflora edulis* and *P. flavicarpa* at Redlands Research Station produced hybrids with higher yields than the purple variety, but were as yet unfixed and canners did not favour them. Quality of the juice from hybrids was assessed by the Food Preservation Laboratory. Demand was increasing for the inclusion of passionfruit in drinks from 1970 and the breeding programme was intensified. *Phytophthora nicotianae* var. *parasitica* caused extensive damage to the north coast crop in the wet 1971-72 season.

Avocados

An analysis of costs and returns from avocados in south-eastern Queensland was undertaken by Departmental officers and prospects for high returns encouraged additional plantings, raising the number of trees from 10 000 in 1960 to 43 000 in 1970. Root rot caused by *Phytophthora cinnamomi* caused extensive losses in the wet years 1970-72.

Tomatoes

Tomato breeding for Queensland conditions continued during 1963-72, and success was achieved with the imported varieties Floradel and Indian River in southern Queensland and Walter in the Bowen area. Tomato nutrition studies showed the benefit of luxury applications of phosphorus in early growth. Blossom end rot was found to be owing to

calcium deficiency. Selection for suitable varieties for processing for juice and for whole tomatoes was undertaken.

An economic survey of the tomato industry was undertaken during 1970-71.

Beans

The year 1963-64 saw a significant change from stringed to stringless beans for the best trade and the varieties Redlands Pioneer and Redlands Autumn crop were released. Salinity was a problem in areas of the Lockyer Valley. Steps were taken to ensure quarantine against disease entrance to the Burdekin and Mareeba areas.

Other vegetables

Most vegetable crops received some attention from Departmental officers. "Baby" carrots became a new vegetable for the Lockyer Valley during 1971-72. Several weedicides were compared for the onion crop.

Ornamentals

With the expanding market for ornamentals a horticulturist was appointed to the Redlands Research Station during 1971-72 and began assessing the extent and the problems of the industry.

Packaging

Packaging problems causing damage to fruit and vegetables in transit and storage was also a new research project during 1971-72.

Food Preservation Laboratory

This laboratory was heavily involved in studying the physiology of growth of fruit and vegetables and especially ripening processes in bananas and tomatoes, both of which could be ripened earlier with ethylene treatment. Studies were made of concentrating pineapple juice, making vinegar from pineapple skins, suitability of beetroot varieties for canning, preventing loss of colour in leafy vegetables, and control of mould in grape packages by the use of polythene liners.

A process for the production of pan-dried egg albumen suitable for use as a crown seal adhesive was investigated at the Sandy Trout Food Preservation Research Laboratory. The Laboratory also assisted the Egg Marketing Board in developing a technique for preparing an export-quality salted egg yolk containing 12% added salt for use in mayonnaise and related products.

Botany Branch

The Botany Branch continued its study of taxonomy and during 1963-64 published papers on species of *Acacia* and *Micraria* and revised the *Carpobrotus* spp. The genera *Melaleuca* and *Plectranthus* were studied in detail and the classification of variants of *Solanum* *nigrum* was sorted out. Identification of the large Archbold Collection made in Cape York in 1948 was continued. Native collections were made during a good season in the Stanthorpe-Wallangarra area. In association with the Captain Cook bicentenary during 1970 a senior botanist spent two weeks with botanists from the British Museum of Natural History and the James Cook University at Townsville collecting plants in the vicinity of the Endeavour River and Bustard Bay, which had been surveyed by Banks and Solander of Captain Cook's crew in 1770. Similar plants were found but many *Melaleuca* had been removed for housing development.

Ecological studies included a floristic survey of a state forest on Fraser Island, a similar survey of 1400 square miles of the Simpson Desert National Park and of a wildflower reserve in the wallum country of the Gold Coast during 1966-67. Weeds and woody plant surveys were made to identify the extent of invasion of galvanised burr in south-west Queensland and northern New South Wales for the Australian Weeds Committee, Argyrodendron in the Imbil area, Salvinia in the Burnett and prickly acacia around Longreach, Barcaldine and Bowen. In the latter district prickly acacia is valuable as a browse plant carrying a beast to 3 acres, but tends to form thickets.

Control of brigalow suckers could be achieved by spraying with 2,4,5-T, with better success with two sprayings on the one day. Burning of sprayed areas 11 months after spraying almost doubled the kill. In central Queensland 1/4-1 lb acid equivalent per acre of spray was needed, while in southern Queensland 1 lb a.e./ acre was satisfactory. Two sprayings of 2,4,5-T in diesel distillate at intervals of 10-12 months in warm weather were more effective.

An Inter-Departmental Committee for the Control of Woody Plants decided that priority in control tests should be given to budda or false sandalwood (*Eremophila mitchelli*), which infested some 40 million acres in Queensland. Other problem trees were Dawson gum (*Eucalpytus cambageana*) and yellow wood (*Terminalia oblongata*) in central Queensland and limebush (*Eremocitrus glauca*) in the Goondiwindi area. The latter was subsequently reduced by arable cropping.

Botany Branch officers were also called in to assist in revegetating damaged beach dunes, and conducted a survey of vegetation on stabilised dunes, to ascertain likely stabilising plants.

Surveillance of newly found weeds was an important task. During 1971-72 Botanists identified ten named species not recorded as growing wild in Queensland. Two serious weeds not previously recorded in Australia were found and steps taken for their early eradication.

During 1971-72 the Director of the Botany Branch, S. L. Everist, was one of four Australian botanists nominated to the Executive authorised to produce a new *Flora of Australia*.

Service branches

The service branches-Chemical Laboratory, Entomology and Plant Pathology-as always were called upon by other branches to assist in most of their projects requiring laboratory investigations involving routine research techniques, identifications and specific research techniques to elucidate critical areas of production, handling and storage.

Fauna

The Department has had the administration of fauna regulations since its establishment, having taken over The Native Birds Protection Act of 1877, The Marsupials Destruction Act of 1877, The Native Animals Protection Act of 1906 and subsequent Acts and Amendments thereto. Interest in wildlife studies was revised in the late 1950s, with studies on kangaroos implemented at the Department's wildlife research centre at Warwick, aimed at reconciliation between the grazing pressures of kangaroos on pastures, the commercial harvesting and use of these animals and the conservation of this unique form of wildlife. The habits of the main species were studied in detail and criteria for determining the effects of drought and harvesting were developed. Restrictions on harvesting were imposed, limiting the harvest to 1968 figures.

A second wildlife centre at Townsville was concerned largely with the balance between conservation and utilisation of game birds such as wild ducks. Migration, breeding and feeding habits were studied in detail. H. J. Lavery was the recipient of a Churchill Fellowship to visit wildlife and zoological centres overseas. He subsequently prepared an authoritative list of birds of north Queensland for use by scientists and naturalists. Crocodile populations were studied and brolgas were studied from 1969 as damage to Burdekin grain crops was involved.

On 29 July 1971 the status of the fauna subsection was raised to that of a branch, with Dr G. W. Saunders as Director, with a staff of fifteen.

Division of Animal Industry-Livestock research and extension

Beef cattle

Observations were made in northern, central and southern Queensland into breeding performance in beef cattle. These ranged from pregnancy diagnosis following the seasonal mating period to detailed observations at regular intervals throughout the year in which the effect and interaction of age, lactation status, time of calving, fluctuations in weight and condition and bull fertility on pregnancy rate, calving interval and weaner percentage were noted. The conception rate of dry cows was higher than that of lactating animals and cows that gained most weight during the mating period had the highest conception rate. Mortalities were highest during the final three months of pregnancy, coinciding with nutritional stress.

Trials were made at Swan's Lagoon Research Station to synchronise oestrus by hormones to achieve insemination over a short period.

In the Burdekin a two-paddock rotation system as a means of tick control, strategic dipping and a pasture management system to build up the Townsville stylo component were instituted. Fertilised Townsville stylo gave better results than that grown on unfertilised areas. At the Ayr Cattle Field Research Station trials with crops and pastures in rotation were initiated. Digestibility and protein content of Zulu sorghum declined after the 60-day stage of growth and cattle performance also declined.

Molasses/urea supplementation was proved effective in survival feeding and for weaner supplementation, and dispensing through drum lick feeders was readily adopted by the industry. Molasses alone gave no liveweight increase. Compensatory gain occurred in the non-urea group but the urea/molasses groups still held the advantage. Survival during drought depends on the body reserves at the commencement of the drought and steers of high initial body weight survived longer.

Trials with intensive beef production at the Husbandry Research Farm showed sodium to be necessary when feeding sorghum grain which should be finely ground. Approximately 11 lb of a high grain ration were required per pound of liveweight carcass gain and this system of production was not economic where the ratio of feed to carcass process was wider than 1:11. Supplementary feeding of breeders with 5 lb of grain daily for six weeks before and after calving gave less weight loss after calving and subsequent higher pregnancy weights. At "Brian Pastures" and the Brigalow Research Station early mating from October to December induced higher fertility and heavier weaning weights of calves than those from cows mated January to June.

Artificial insemination for beef herds was initiated by performance testing of beef bulls at the Animal Husbandry Research Farms, the best bulls were then transferred to the Wacol AI Centre.

Losses from recorded pregnancy to weaning in central Queensland averaged 8% per annum. This was a continuing problem in the Queensland beef industry and the reasons for it were sought.

Feed lots were being established at strategic centres. At Jimbour on the Darling Downs, steers fed high-moisture grain had a 5% better daily weight gain than the dry-grain group and a slightly lower dry-matter intake and better feed-conversion ratio. Addition of molasses to the dry grain ration was shown to be uneconomic. Trials with beef cattle which were grazing nitrogen-fertilised pangola grass were done at Coolum Research Station. The problem of dystocia was investigated. It was shown that the pasture should not be stocked till the weather warmed in September. At the Brigalow Research Station a stocking rate of a beast to five acres on Biloela Buffel and Rhodes grass gave the best all-round performance.

Pests and diseases

The cattle tick lines were modified from time to time to facilitate cattle movements, especially on the fringes of the Darling Downs. Research with vaccines continued, including transport and administration in syringes. Anticoagulants, in vitro culture of *Babesia*, drugs to reduce tick fever and tick resistance to insecticides (mentioned earlier) were studied. Botulism was common in cattle north of Alpha and from Miriam Vale to Gladstone and Mackay, and vaccination with bivalent toxoid was recommended. Infertility from brucellosis, vibriosis and leptospirosis continued to occupy much of the time of

veterinary staff in dairying districts. St George's disease of cattle, prevalent in the Maranoa district, was found to be caused by eating *Pimelea trichostachya*, the toxic principle of which is simplexin. Extension officers were in heavy demand for advice on nutrition aspects, especially drought feeding and also on breeding herd management.

An economic survey of beef properties in the Miriam Vale and Kolan shires was undertaken during 1971-72 to assess management systems in different-sized properties.

Sheep

Studies of the nucleus Merino flock at Toorak Sheep Field Research Station established in 1957 continued. Some 20-45% of lambs born were lost before marking, indicating the great difficulty in maintaining flock size in Queensland's north-west. Plain bodied ewes gave the highest marking percentage. Joining all the rams with ewes at the one time gave better lambing than "staggered" joining. Wool growth studies showed maximum growth during the fresh pasture growth in late summer and autumn with a marked decline in winter and spring. At the instance of the Animal Production Committee of the Standing Committee on Agriculture a survey of the vital statistics of breeding flocks was begun in 1964-65. Long-term studies of the management of mulga scrub and Mitchell grass pastures and cropping in the north-west were initiated also in that year. It was found that carotene levels in mulga feeding were adequate for sheep. In selenium studies in the north-west, geochemical studies showed that selenium excess was confined to the Toolebuc Member of the Wilgunya Formation or to water courses draining this Member.

During 1969-70 a comprehensive report on the organisation of the wool industry was published by the Marketing Services Branch. In 1970-71a farm management accounting service was provided by the Economic Services Branch to small groups of sheep raisers centred at Muttaburra, Dirranbandi and Karar. High temperatures in the north-west reduced sheep fertility but it was found possible to select rams in which both rectal and scrotal temperatures remained at low levels. Seminal degeneration in the ram was associated with a high degree of fertilisation failure.

Chemical defleecing trials were conducted and wide animal-to-animal variation was recorded. Trials to test the economic use of sheep rugs supplied by CSIRO were started in the Barcaldine area during 1971-72.

Pigs

New shed designs developed by Departmental officers were readily accepted by the industry. The Department analysed various carcass measurements to arrive at a system that would give a better indication of the meat content, and to help, an Intrascope was imported from Denmark in 1966-67. Pig nutrition experiments with sorghum grain, wheat and barley supplemented with soybean, safflower or cottonseed meals or artificial supplements were conducted. A computer programme was developed to arrive at the least-costly rations. Tuberculosis-type lesions caused by Battey strain, serotype VI mycobacteria were discovered on inspection at Toowoomba in several pig carcasses from Crows Nest to Wallumbilla. During 1969-70, after discussion with the Australian Pig Society, the

progeny test was phased out at the Rocklea Pig Testing Station and replaced by a performance test based on measurements of growth rate, feed conversion and carcass characteristics using an echo-sounder.

Departmental officers assisted in establishing pig recording systems on farms and emphasis was placed on rations giving the greatest economic returns. The Economic Services Branch studied size efficiency relationships in pig production and the Marketing Services Branch in 1969-70 published a study of the pig industry structure in Queensland. The publication showed it to be a highly competitive industry.

Poultry

By June 1964 over 70% of broilers were produced by growers on contract to a processing firm. The total number of chickens hatched in Queensland in 1963 was 11 416 989 of which 8 123 127 were supplied to broiler growers by registered hatcheries, most of these being synthetic meat breeds. A survey of range conditions met with on farms was conducted for the Egg Quality Committee; this involved 10% of the farms in four of the five Egg Board districts. The survey showed that it would be difficult to improve egg quality, but egg-holding facilities with cooling devices located on farms would be a significant improvement. Washing and oiling improved the internal quality of eggs stored for a long term. Internal quality declines with age and accelerates under high temperatures. Layer and broiler random sample tests were conducted. The autumn test in 1965 for broilers gave an average body weight of 3.4 lb at a conversion rate of 2.50 and the summer test figures were 3.1 lb at a conversion rate of 2.34.

Studies showed that partial debeaking of chickens at 5 days old was best for broiler chickens. Mortality increased at high cage density and egg production decreased. Trials with various meals and their likely toxic effects were studied and egg yolk pigmenters compared. Mineral nutrition and egg shell quality and egg production were also investigated. Pesticide residues in eggs were examined by the Biochemical Branch. A survey of broiler farm practices and a survey of lighting practices in the Toowoomba area were conducted by the Poultry Section in 1969. A Poultry Farm Management Scheme was carried out by the Economic Services Branch in 1969, and also a study for the Egg Marketing Board of the optimum time to replace laying flocks.

Division of Dairying

Development of a process to remove weed taint from butter oil was a major achievement of dairy researchers during 1963-64 and farm aspects of weed control were studied. A flavoured milk concentrate was developed and new varieties of cheeses were introduced through Departmental research. Milking machine base metals were studied and stainless steel was encouraged for more general dairy use. Tanker collection of bulk milk was introduced and electricity costs were studied by field officers and temperature changes during transport of dairy produce were monitored. Herd production recording was promoted as the best means of herd improvement and the artificial insemination programme was expanded. An important service was the training of technicians for commercial AI co-operatives.

An economic assessment of dairy farms assisted under the Farm Water Supplies Act was carried out for the Irrigation and Water Supply Commission. The economics of various farm practices in the Wide Bay area were investigated and a report was published. Assistance with waste disposal at factories was a feature of technological services for casein and butter factories.

Product research included studies on the spreadability of butter, continuous butter making at the Malanda factory; non-cheddar soft cheeses such as Quark, Queso Blanco and Ricotta; flavoured milk drinks; use of microbial instead of an animal rennet in cheesemaking; bacteriological standards for cheese for the Japanese market; solids non-fat levels in milk; a catalase test for quality in milk and the production of UHT pasteurisation of milk funded by the Australian Dairy Produce Board; yoghurt manufacture; penicillin residues in milk; surface components of the milk fat globules; a Paracurd continuous cheesemaking machine; the relation of Pseudomonas to market milk spoilage; the keeping quality of table cream; the effect of tropical legumes on milk tainting and product quality; food drying; Australian standards for dairy products and concentration by freezing.

Apart from the administration of the Dairy Subsidy Scheme, herd recording, bull proving and AI, the Field Services Branch was involved in the crossbreeding programme to develop a tropical dairy cattle breed, a whole farm development programme and comprehensive extension activities.

Marketing Division

The Marketing Branch was actively engaged in several research projects in the 1963-67 period. Research projects included the Wide Bay Dairy Study, the Eastern Downs Dairy Study, a Study of Fertiliser Use on the Atherton Tableland, a Beef/Sheep Study, Poultry Management, a Survey of the Granite Belt Deciduous Fruit Industry and the Peanut Industry in the Burnett, a Small Crops and Poultry Study, a Survey of the Broiler Industry, the Market Milk Situation, the Cotton Board Vegetable Oil Seeds, Markets Available in Central and North Queensland, Income/Cost of Agencies in the Rocklea Markets, Outlets for Rice in North Queensland, and Crops for Irrigation on the St George and Lockyer Irrigation areas.

Members were involved in a Conference on Industry Productivity organised by the Australian Institute of Management, took part in a Trade Mission to Fiji, attended a Sheep and Wool Conference at Leura, and gave market information to the North Australia Development Authority. The Branch Clerk acted as Assistant to the Secretary of the Sugar Committee of Inquiry.

On the accounting side members took part in the Commonwealth Joint Committee on Farm Management Accounting, formed Farm Management Advisory Groups, joined the Queensland Grain Growers Association Farm Economics Sub-committee and committees on Accounting Standards. The Branch was also involved in Farm Management Training, elections for the various Boards and transfer of the Northgate Cannery from the COD to a Cannery Board during 1963-64.

The Standards Branch expanded from its Brisbane base and inspectors were stationed at Toowoomba and Rockhampton to deal with local problems. With the increasing interest in tropical pastures the Standards Branch was represented on the Tropical and Subtropical Working Group established by the International Seed Testing Association.

The Marketing Branch became heavily involved in most of the State's development projects advising on costs and markets.

Publications

In addition to the continuous production of the Queensland Agricultural Journal and various Market Reports and reprints, the Queensland Journal of Agricultural Science, later to be enlarged as the Queensland Journal of Agricultural and Animal Science, published major research articles and shorter communications of scientific interest. The main research papers published during the years 1962 to 1972 are evidence of the wide spectrum of research undertaken by Departmental officers during the period. Officers also published in other scientific journals such as the Australian Veterinary Journal and the Australian Journal of Experimental Agriculture and Animal Husbandry. E. T. Hockings, previously editor of The Producers Review, was appointed Editor of Publications on 29 September 1957.

COMPUTERISATION, MULTI-DISCIPLINARY ENDEAVOUR AND OVERSEAS INVOLVEMENT

The Ministry of Neil John Turner

The Hon. Michael Ahern took over the portfolio of Minister for Industry, Small Business and Technology from the Hon. V. B. Sullivan on 8 November 1983 and Neil John Turner, M.L.A. for Warrego, was elevated to Cabinet as Minister for Primary Industries from the same date.

Neil John Turner was born on 25 June 1934 in Charleville. He was educated at the Morven State School and the Cooper Memorial School at Toowoomba, and attended the Queensland Agricultural High School and College at Gatton for two years. He was a grazier at Morven, a member of the Warrego and Barcaldine Clubs and the Queensland Cricket Club, and was a Freemason.

Turner was a Councillor of the Murweh Shire from 1971 to 1975. He was elected Member for Warrego on 7 December 1974.

Turner's Parliamentary service included membership of the Parliamentary Buildings Committee from September 1979. He was alternate Delegate-elect 1983 Australian Constitutional Convention; Member, Parliamentary Delegation to Asia 1980; Member of the following Government Parties Committees - Police, Sport, Lands, Local Government (1975-77), Premier's, Maritime Services and Tourism, Lands, Forestry and Water Resources, Environment, Valuation and Administrative Services, Lands, Local Government from 1981; and Delegate, 6th Australian and Pacific Parliamentary Seminar, Canberra, Hobart, Wellington 1982.

Legislative Acts of the Turner-Alexander Administration 1983-86

1. Wheat Pool (Validation of Proclamations) Act 1983 (Qd. Govt. Gaz., No. 52, 1983), assented to 19 December 1983. This Act validated certain Proclamations made pursuant to the Wheat Pool Act 1920-1983 following the Queensland Grain Growers Association's decision to enter into voluntary receivership. The State Wheat Board issued a lien pursuant to the Warehouseman's Lions Act 1973 in respect of moneys owed by the Association to the Board for various grains and oilseeds handled by the Board on behalf of the Association.

Under the Wheat Pool Act 1920-1983 power was vested in the Governor-in-Council to extend the operations of the State Wheat Board by proclamation. Proclamations were made on 28 June 1956 and again on 9 November 1967. The purpose of these proclamations was to allow the State Wheat Board to receive, handle, store and treat grains, other than wheat, and any seed crop on behalf of any person. Doubts were

expressed as to the validity of the proclamations but the intention had been apparent since 1967. This Act validated the proclamations.

2. Stock Act and Another Act Amendment Act 1984 (Qd. Govt. Gaz., No. 3, 1984), assented to 6 January 1984. This Act amended the Stock Act 1915-1981 and the Poultry Industry Act 1946-1979, each in certain particulars.

Amendments to the Stock Act included the issue by inspectors of concessional permits for periods not exceeding five years to travel stock frequently between holdings and to saleyards or abattoirs. Owners were to be provided with a duly completed travelling stock declaration containing full particulars of the stock.

An amendment of the Poultry Industry Act 1946-1979 dealt with payments into the Fund and allowed the Chief Inspector to act on behalf of the Minister under section s.10B.

- 3. *Primary Producers' Organisation and Marketing Act and Other Acts Amendment Bill 1984 (Qd. Govt. Gaz.*, No. 62, 1984), assented to 1 July 1984. The amendment sought provided for:
 - (a) determination of term of office of members of Boards where there was a loss of grower confidence;
 - (b) ministerial approval for undertakings of an affiliated body of a Board, where the Board lacked that power;
 - (c) general increase in the forms of accountability of an affiliated body;
 - (d) machinery amendments to be made to the Fruit Marketing Organisation, Wheat Pool, Diseases in Plants Acts Amendment Act 1930-1973.
- 4. Sugar Acquisition Act Amendment Act 1984 (Qd. Govt. Gaz., No. 84, 1984), assented to 26 October 1984, to be incorporated in the Sugar Acquisition Act 1915-1984. The only amendment was to Section 4C of the Principal Act by omitting the words "31 October 1984" and substituting the words "30 June 1987".
- 5. Wheat Marketing Act Amendment Act 1984 (Qd. Govt. Gaz., No. 85, 1984), assented to 26 October 1984 to be incorporated in the Wheat Marketing Act 1979-1984. This Act amended the system of price determination for wheat for home consumption and export over defined periods taking into account costs incurred by the Board.
- 6. *Meat Industry Act Amendment Act 1984* (*Qd. Govt. Gaz.*, No. 87, 1984), assented to 2 November 1984, to be incorporated in the Meat Industry Act 1965-1984. This amendment enabled the Minister for Primary Industries to appoint persons to act as inspectors with limitations with respect to time or place, powers, functions or duties or other circumstance, by notification in the Gazette.
- 7. Torres Strait Fisheries Act 1984 (Qd. Govt. Gaz., No. 101, 1984), assented to 6 December 1984. This Act was designed to promote the good order, management, development and welfare of the fishing industry, to provide for the protection, conservation and management of the fisheries resources and to implement the provisions of the Torres Strait Treaty in the Torres Strait area and for related purposes.

The Torres Strait Treaty, signed at Sydney on 18 December 1978, was the Treaty between Australia and the Independent State of Papua New Guinea concerning sovereignty and maritime boundaries in the area between the two countries, including the area known as the Torres Strait, and related matters.

This Act followed the agreements with the Commonwealth and Papua New Guinea over the management programme covering continued fishing operations in the Torres Strait area.

- 8. Wheat Marketing Act Amendment Act 1985 (Qd. Govt. Gaz., No. 110, 1984), assented to 26 October 1984. This amendment mirrored draft Commonwealth legislation which provided for wheat marketing and stabilisation programmes on a national basis.
- 9. *Hen Quotas Amendment Act 1985.* (*Qd. Govt. Gaz.*, No. 2, 1985), assented to 18 March 1985 to be incorporated in the Hen Quotas Act 1973-1985. This Act amended the Hen Quotas Act 1973-1981. The amendments largely related to matters dealing with the transfer of hen quotas. The aims of the Bill were:
 - (a) to alter the concept of an egg producer's adjusted hen quota to provide for adjustments of both a long-term and short-term nature. The present basic quota system was no longer appropriate for either long- or short-term (seasonal) adjustments;
 - (b) to enable conditional transfers and allocations of quotas to be made with Committee approval. This would tend to reduce speculation regarding the sale and purchase of quotas;
 - (c) to restrict ownership of quotas in the industry by applying qualifications on the right to hold a quota. The qualifications related to the maximum number of hens which might be held by any one quota holder. It was intended to keep the egg industry in Queensland as a family based enterprise;
 - (d) to extend the Hen Quota Committee's powers in relation to the gathering of information relevant to the operations of the Act, particularly in relation to the assessment of the number of hens in a flock and the ownership of that flock. This would restrict establishment of nominee companies or other evasive devices;
 - (e) to allow for the specifying of methods by which the number of hens in a flock might be calculated;
 - (f) to provide for the certainty of appointments of members to the Hen Quota Committee subsequent upon legal advices received in this regard.
- 10. *Primary Producers Organisation and Marketing Act and Another Act Amendment Act 1985* (Qd. Govt. Gaz., No. 18, 1985), assented to 4 April 1985, to be incorporated in the Primary Producers Organisation and Marketing Act 1926-1985. This amendment allowed the Egg Marketing Board to control several commodities and also a levy could be made by the Egg Marketing Board or the Central Queensland Egg Marketing Board as an alternative to an administrative levy in respect to the commodity eggs; make a levy based on egg producers' adjusted hen quota. The egg producer was given a choice of one of the two methods. An amendment was made to the Primary Producers' Assistance Act 1972-1976 allowing variation in the rate of interest set by the Corporation.

- 11. *Deer Farming Act 1985* (Qd. Govt. Gaz., No. 24, 1985), assented to 15 April 1985. This Act introduced a new statutory concept into Queensland. Principally, it provided for the keeping of farm deer for the purpose other than those administered by the National Parks and Wildlife Service.
- 12. Fishing Industry Organisation and Marketing Act and Another Act Amendment Act 1984 (Qd. Govt. Gaz., No. 29, 1985), assented to 1 May 1985. The principal aim of the amendment was to transfer the licensing powers and functions to the Queensland Fish Management Authority from various statutory sources.

Highlights of the Turner - Alexander Administration

Animal Research Institute 1909-84

Seventy-five years of service to the Queensland animal industries were celebrated at the Animal Research Institute, Yeerongpilly, on 30 November 1984. Established in 1909 as the Stock Experiment Station with Dr Sydney Dodd in charge, its purpose was to accommodate the research activities of the Bacteriological Institute, which was then located in College Road, Brisbane. In a Departmental Report of 1909-10 was a statement that Queensland might congratulate itself upon being the first State to possess a thoroughly equipped station to deal with the epizootic diseases in stock and research work in connection therewith.

After Dr Dodd resigned on 31 March 1910 after only seven months to proceed to a position at Sydney University, C. J. Pound, Government Bacteriologist of the Bacteriological Institute, transferred to Yeerongpilly and continued there until his retirement on 1 July 1932. The name was changed to the Animal Health Station. Over the ensuing years, under the Directors J. A. Rudd, Dr F. H. S. Roberts, Dr J. Legg and J. W. Ryley, the station grew.

In the early 1950s the Biochemical and Toxicology sections of the Agricultural Chemistry Branch under Dr J. M. Harvey were transferred to the site and 470 acres (approx. 190 ha) were acquired at nearby Rocklea for animal husbandry research programmes developed by the newly established Husbandry Research Branch.

In 1953 the name was changed to the Animal Research Institute. During the period from that time to the present, major changes that have occurred include the combination of the Biochemical and Toxicological Sections into the present Biochemical Branch and in recent years the accommodating of staff from Sheep and Wool, Beef Cattle Husbandry, Pig and Poultry and Veterinary Services Branches on the site.

Dr Ralph J. W. Gartner, the current Director of the Animal Research Institute, had administrative responsibility for Pathology and Biochemistry Branches based at Yeerongpilly and liaised with members of the other branches involved at the Institute. His area of responsibility also included the Regional Veterinary Laboratory at Oonoonba in Townsville, the brucellosis and tuberculosis testing laboratory at Rockhampton, and the brucellosis and tuberculosis facilities based at Roma and Charleville.

The Pathology Branch was the largest branch at Yeerongpilly and also had staff at Wacol, Townsville, Rockhampton and Charleville. Diagnosis of diseases in animals was its main function and the Branch was organised into five groups:

- 1. diagnostic services;
- 2. special projects research into conditions of immediate or potential importance to industry, plant poisoning, diagnostic techniques, vaccine development and production;
- 3. epidemiology and control production and supply of tick fever vaccines conducted at the Tick Fever Research Centre, Wacol;
- 4. brucellosis and tuberculosis provision of laboratory support to the National Brucellosis and Tuberculosis Eradication Campaign expected to be finalised in the 1990s. Laboratories were located at Yeerongpilly, Rockhampton and Townsville, with regional blood testing facilities at Charleville;
- 5. Oonoonba Veterinary Laboratory similar work to that done at Yeerongpilly, on a smaller scale.

The Biochemical Branch had all of its staff located at Yeerongpilly. It provided analytical services for the Production and Field Service Branches of the Division of Animal Industry. The Branch was divided into three groups:

- clinical chemistry diagnostic tests on samples of blood, plasma, serum, liver, kidney, muscle, bone, urine, faeces, gut fluid and central nervous system fluid. The samples were analysed for a broad spectrum of enzymes, metabolites, minerals and vitamins. Pasture deficient regions were identified for deficiency of copper and sodium, and for selenium. Analyses of materials suspected of poisoning stock were made and poisons such as arsenic, lead, strychnine, pesticides, nitrate, mycotoxins and plant toxins were measured;
- 2. nutritional biochemistry this group assessed the nutritive value of animal foodstuffs. "In vitro" digestibilities of ruminant feeds were also carried out. Disorders resulting from the presence of naturally occurring fungal metabolites in feedstuffs, such as aflatoxins, were investigated;
- 3. organic chemistry this group measured the persistence of synthetic chemical residues in animal tissues, the toxins occurring in Queensland plants, and assisted other branches in animal nutrition problems.

Granite Belt Horticultural Research Station Field Day

The first field day since 1979 was held at the Station in February 1979. Originally started as a small field station by the Council for Scientific and Industrial Research, it was taken over by the Department in 1962. The Department of Primary Industries then added the office-laboratory, glasshouses, a head house, an insectary and a quarantine substation and a range of equipment including a microcomputer, soil steriliser, controlled environment room and a large autoclave room.

Brian Oxenham, Assistant Director-General (Research), who opened the field day attended by 500 visitors, said a further 8.5 hectares of land was added in 1978, bringing the area of the station to 23.6 ha. It serviced the Granite Belt, a horticultural region covering 10 000 ha and producing \$30m worth of apples, stone fruit, grapes and vegetables annually.

Station staff now included specialists in all aspects of crop production, including horticulturists, plant breeders, entomologists and pathologists. The station became a leader in trickle irrigation in Australia. Close planting of apples had the potential to produce 5000 cases of apples per hectare and officers were striving to improve quality by summer and mechanical pruning, and the correct use of growth regulators.

Close planting and improved productivity were also the basis of stone fruit improvement. Other stone fruit research compared "made" tree yields with those of trees on their own roots, establishment trials and autumn versus spring fertilisation. Radiation was used to produce beneficial mutations in apples. Five thousand plum seedlings were bred to produce earlier varieties than the current standard Wilson variety. A high-coloured mid-season peach was produced.

A search was made for a seedless table grape to supersede the highly flavoured seeded varieties of muscats, Hamburg and Waltham Cross and the unsuccessful seedless Sultana variety.

New field stations, research units and Institute

Redlands Poultry Research Unit

This unit was established adjacent to the Redlands Horticulture Reserve on November 14 1984 by transferring the complex from Rocklea. It was to research egg production, meat production, genetics and breeding.

Longreach Arid Zone Research Institute

Land was acquired during 1984 adjacent to the Longreach Pastoral College and the Stockman's Hall of Fame for the establishment of an Arid Zone Research Institute to supplement the Charleville Pastoral Research Station in the study of arid zone problems.

Roma Field Station

A Field Station of 30.1 ha was acquired on 2 March 1985, comprising Reserve 528 Lot 140 on plan Wv 1829, for research in crops and pastures.

Bundaberg Research Station

32.9 hectares of red earth soil comprising Resub 2, Sub 2, Portion 45, Parish of Kalkie was acquired by the Government on 25 March 1985 to undertake research on alternative crops to sugar and cropping systems.

Formation of the Soil Conservation Research Branch within the Division of Land Utilisation

The Department of Primary Industries has long viewed soil degradation by water erosion, and more recently from salinity, as the major constraints for the long-term sustained productivity of Queensland's valuable agricultural and grazing lands. The responsibility for encouraging good husbandry practice, both by research and extension activities, has traditionally been carried out by a number of separate branches.

In accord with a heightened awareness of the responsibility of this generation to conserve our most important natural resource, the soil, the research activities were consolidated into one branch-the Soil Conservation Research Branch. Recognising that such research transcends any one discipline, the new branch contains a carefully considered mix of officers with skills in soil conservation-agricultural hydrology, agronomy, soil physics and farm tillage systems. The charter of the new branch was to define the processes involved in land degradation and to develop and extend practical management systems and techniques that ensure continued land productivity and stability.

Overseas study mission into irradiation of primary products

An overseas study mission led by A. Hegarty, Deputy Director-General, Department of Primary Industries, and consisting of Ian Broadfoot (Assistant General Manager, Bulk Grains, Queensland), Baden Cameron (Chairman, Brisbane Market Trust), Graeme Haling (Chairman, Queensland Fish Board), Don Kidd (Chairman, COD) and Grant Vinning (Principal Marketing Officer, Department of Primary Industries) visited the United Kingdom, Holland, Belgium, Germany and Washington D.C. from 17 April to 3 May 1985 to evaluate the application of irradiation to primary products for the purpose of disinfestation, disease protection, extension of shelf life, and quality enhancement. Broadfoot and Vinning visited Odessa (USSR) from 9 to 14 April to examine the world's only commercial accelerator unit for the disinfestation of wheat imports, while Cameron and Smith visited Japan from 10 to 15 April to examine irradiation equipment and the potato irradiation facility in Hokkaido.

The mission was impressed with the potential of irradiation of foodstuffs and was certain that irradiation up to an overall average dose of 10 kGy introduces no special nutritional or microbiological problems. It is likely that the method will be introduced to Queensland.

Food Research Branch

On 31 January 1985 the new Food Research Branch was created. It consisted of all staff and facilities of the Dairy Research Branch, together with nine staff members from the food technology section of the Horticulture Branch. The new branch had the responsibility for research into all quality and utilisation aspects of foodstuffs, specifically dairy products, fish, meat, fruit and vegetables. However, quality assurance programmes to assist the dairy industry and commodity boards were maintained at their previous level. These services, over many years, resulted in the achievement and maintenance of high quality standards throughout the dairy industry. The formation of the Food Research Branch ensured that the expertise of an experienced group of chemists, microbiologists and technologists would be available to all Queensland food industries.

Wheat Marketing Review

During February 1985 the Honourable the Minister announced the formation of the Wheat Marketing Review Committee with the following terms of reference:

- 1. to examine and report on the advantages and disadvantages of Queensland's continued participation in Australia-wide wheat marketing arrangements as against the State Wheat Board, handling and marketing wheat in its own right;
- 2. to examine aspects of existing wheat marketing arrangements that were disadvantageous to Queensland wheat growers and to make recommendations for change;
- 3. to examine and make recommendations concerning the storage and handling of wheat, classification systems and payment and premium systems most suitable to the needs of wheat growers in Queensland.

Computing

C. P. Hamilton, Assistant Director of Marketing, supplied the following information.

The history of computing began in the early 1960s when the Department, along with several other Departments, participated in the acquisition of the GE225 computer at the University of Queensland. Privileged access to this computer satisfied the Department's needs for more complex statistical analysis of experimental data by its biometricians for the next decade. Several large statistical packages were written by the biometricians and are still in use, having been converted to newer computing facilities in more recent years.

In 1974, the Department was advised that the GE225 computer was to be taken out of service. Options open at the time were to convert the programs to ICL computers at State Treasury, to the new PDP10 at the University, to utilise bureau services provided by several private computer networks or to join the CSIRO system. After due consideration of each option and prolonged negotiation with the Public Service Board, the Department decided to use the CSIRO system.

Initially, use was made of CSIRO computing facilities at the Cunningham Laboratories, which enabled close liaison with officers from the CSIRO Divisions of Computing Research and Mathematics and Statistics. Support from these divisions was a major factor influencing the decision to join CSIRONET, the CSIRO computing network.

In 1975, a CSIRONET node comprising a PDP11/10 computer, line printer, card reader and console terminal was installed in Mineral House with communication to the CSIRO Cyber 76 computer in Canberra. This facility enabled Departmental officers to process their statistical data within the Department and avoided the necessity to make twice-daily trips to St Lucia to deliver and pick up punched cards and computer results.

A second CSIRONET node was installed at the Department's offices at Toowoomba in 1976 and paved the way for establishing regional units of biometricians at provincial centres. In subsequent years, biometricians were also stationed at Townsville and Rockhampton, again having access to CSIRONET through local CSIRO computing facilities.

This early experience with remote access to centralised computer facilities gave the Department a significant lead in data communication over most other State Government departments. Not only did the Department have the back-up support of two CSIRO divisions in computing and statistical mathematics, but also the computer facilities became locally available to a significant number of Departmental research officers, many of whom had developed considerable skills in computing during their academic training.

By the late 1970s, it had become apparent that computing skills were even more widely dispersed than could be satisfied by the four access points to CSIRONET. While biometricians continued to rely on punched cards for data entry for the greater part of statistical analyses, other research officers became increasingly dissatisfied with the capabilities of programmable calculators and started pressing for terminal access to CSIRONET. Dial-up access to CSIRONET, initially to Canberra and subsequently to CSIRO establishments at St Lucia and Rockhampton, enabled use of Texas Instrument teletype terminals with dual cassette drives to be used for local data entry and down-line loading of data to the main computer. One of the first terminals to be installed was at the Charleville Pastoral Laboratory. These terminals provided a stop-gap until the advent of microcomputers at the turn of the decade.

While the main thrust of computing activity was to satisfy the needs of research officers for substantial analysis of experimental results, computers were being used elsewhere in the Department. The first stand-alone computer, a PDP8 minicomputer, was installed in the Agricultural Chemistry Laboratories in 1969. This machine was used to collate data from soil and plant analyses undertaken in the laboratories for more than a decade. A second stand-alone PDP11/10 was installed in 1977 to capture data directly from laboratory equipment and to collate reports from plant analyses. This computer was the 100th digital processor sold in Queensland and a special plaque was presented to the Department and fixed to the front of the computer to commemorate the event. The original PDP8 was the fifth digital computer in Queensland.

In 1978, three Data General Nova 3/12 minicomputers were provided by the Bureau of Animal Health to assist in the processing of data arising from the Brucellosis and Tuberculosis Eradication Scheme. These computers were located at the Animal Health Laboratories at Yeerongpilly, Townsville (Oonoonba) and Rockhampton. Interchange of data between these laboratories and the Bureau of Animal Health was effected by exchange of magnetic disks. In 1979 the then Queensland Meat Industry Organisation and Livestock Authority installed a General Automotion GA 16/220 minicomputer to collate data from weighing scales and livestock prices for preparation of daily market prices for livestock.

The use of computers in the livestock industries was substantially increased with the move to computerise the livestock branding records. In an innovative project lasting about five years from 1980, details of all horse and cattle, sheep and pig brands were transferred from manual records, some going back to 1872, to the computer data base. Initially, a Honeywell DPS 6/57 minicomputer with twin 67 megabyte disk drives with Apple IIe microcomputers as terminal devices was used to develop the system. The system was upgraded to a larger Honeywell DPS 6/95 computer with three 256 megabyte disk drives in 1984. The original computer was retained for development of communication of the brands information to regional centres, with Videotex offering the most effective medium and being under active consideration by mid 1985.

Extensive use of computers by the Division of Land Utilisation located at Indooroopilly saw the first Departmental connection to CSIRONET with an interactive terminal as early as 1974. Use of the CSIRO Long Pocket node, in premises adjacent to the Indooroopilly laboratory complex, satisfied needs for a number of years. The Areas of Erosion Hazard Information System was developed to assist in soil conservation activities by the division, with access to the system at Toowoomba being facilitated by the CSIRONET connection used by the biometricians. Land resource and utilisation studies by the division were assisted by installation of a Digital LSI 11/73 minicomputer at Indooroopilly in 1981. This facility not only absorbed the Areas of Erosion Hazard Information System but also enabled transfer of the Herbarium records from the State Government Computer Centre's Univac System to the Department's own facilities. Recording of information relating to the hundreds of thousands of Herbarium specimens onto computer media commenced in the early 1970s, originally onto magnetic tape and subsequently onto magnetic disks. The problem of retrieving information from the records was one of the main reasons for the transfer as the State Government Computer Centre was not equipped to handle the spasmodic demands of Botany Branch, which were best met from within the Department. The new Indooroopilly computer also enabled initial work on computer-aided mapping, experience from which enabled Departmental officers to play a leading role in advising on computing needs of the Department of Mapping and Surveying.

The Division of Dairying also made use of computers with the Dairy Herd Recording System at an early stage. Initially use was made of the original Treasury ICL computer, and then the work programme was transferred to the Univac System at the State Government Computer Centre. Unsuitability of the Centre's system to meet contemporary needs of the Division led to installation of a Digital PDP 11/23 minicomputer in 1981, followed by a Digital Vax 11/730 at Wacol in 1982. The latter computer was linked to laboratory equipment for analysis of milk samples and generated reports for each cow on individual dairy farms. A second minicomputer, a Digital Vax 11/750, was also installed at Wacol to process data relating to the Artificial Insemination Centre and to enable statistical analysis of genetic information associated with the Centre. When Fisheries joined the Division, access to the CSIRONET system became available at Fisheries Research Centres at Deception Bay and Cairns.

As indicated earlier, the beginning of the 1980s heralded the introduction of microcomputers to the Department. As with the introduction of computers generally, the initial impetus came from research staff seeking to improve facilities for statistical analysis of experimental data. As costs of using CSIRONET increased, more centres sought to

undertake smaller statistical analyses and data preparation for more complex analyses at research centres. A decision was taken, therefore, to equip all research centres with microcomputers to replace programmable calculators for local statistical analyses and where necessary to provide dial-up connections to CSIRONET for data transfers and more complex analyses. By mid-1985 more than 60 microcomputers were in use for research purposes throughout the Department. Concurrent with the spread of microcomputers for research was a parallel distribution of Apple microcomputers predominantly for use by agricultural economists. Experience by both Brands Section and Economic Services with Apple microcomputers very quickly engendered interest through the Department in utilising word-processing capabilities of microcomputers. By mid 1984 more than 60 Apples were being used for a variety of tasks including program development, statistical and spreadsheet analysis, and word processing. While being useful learning devices, the Apples were recognised as having a number of limitations. In 1984, therefore, a decision was made to cease acquiring the 8-bit technology inherent in the Apples and to move to 16-bit technology now freely available in a range of microcomputers. This decision was reinforced by a State Government contract being awarded to Sperry for provision of more than 1000 microcomputers to State Schools, and the prospect of Sperry providing an assembly plant in Queensland.

In 1985, therefore, the Department determined to equip all divisions and branches with Sperry word processors, and to generally standardise on these IBM-compatible microcomputers wherever required. Initial moves were made to provide more than 40 Sperry units to regional centres for use by extension staff. This year also saw a major step towards integrating all the Department's minicomputers into a Departmental network with the eventual aim of providing communication between all computer facilities, regardless of their location throughout Queensland. Central to the computer networks and major enhancements to the computing facilities used by the Department was acquisition of two Pyramid computers. These were purchased to enable the greater bulk of Departmental statistical analysis to be taken off the CSIRO network and to be processed on the Department's own equipment. High-speed data-communication links were provided between all major centres in the Brisbane Metropolitan area and communication access would be provided for all regional centres within the next two to three years. Important in this latter respect was the intended use of QNET, the State Government's Telecommunications System which was announced in early 1985, having in mind use of AUSSAT I, Australia's first telecommunications satellite launched in August 1985.

Trade Development Section

During 1984-85 the Trade Development Section was formed within the Marketing Services Branch. The section played an important part in the initiating, planning and operation of Queensland's participation in an agricultural exhibition, AgAsia, held at Kuala Lumpur, Malaysia. The exhibition was a major success for Queensland, generating export sales of about \$5 million in the first year alone. Using the theme "Queensland-Australia's State of Tropical Agriculture", the exhibition, along with associated technical seminars, highlighted the importance and relevance of Queensland as a supplier of goods and technology to the tropical world. The Department's role in pioneering a number of advances in tropical agriculture complemented the marketing approaches of a number of the private sector exhibitors.

A high-quality publication *Agriculture Export Queensland* was printed to enhance Queensland's agriculture exports. Copies were distributed via the Agent-General in London, Commissioners for Queensland in Bahrain and Tokyo, and Australia's Trade Commissioners.

Research stations	Locality	Work
1. Ayr Research Station	Ayr	Irrigated and dryland trials of agricultural and horticultural crops.
2. Biloela Research Station	Biloela	Summer and winter grain and forage crops, cotton and sorghum breeding, pig nutrition and breeding.
 Bowen Horticultural Research Station 	Bowen	Horticultural crops, especially tomatoes and mangoes for dry tropics region.
4. "Brian Pastures" Pasture Research Station	near Gayndah	Pastures and beef cattle production.
5. Brigalow Research Station	via Theodore	Brigalow land development and usage for pastures and crops, beef cattle breeding, nutrition and husbandry.
6. Croxdale Field Station	near Charleville	Semi-arid and arid rangeland studies and vegetation monitoring. Sheep nutrition and husbandry.
 Emerald Research Station 	Emerald	Irrigated crop trials and water requirement investigations.
8. Gatton Research Station	near Gatton	General agriculture, vegetables and irrigated pastures.
9. Granite Belt Horticultural Research Station	near Stanthorpe	Deciduous fruits and spring vegetables, especially celery.
10.Hermitage Research Station	via Warwick	General agriculture, sheep breeding and fat lamb studies, fauna studies, weed control, soil fertility, apiculture.
11.J. Bjelke-Petersen Research Station	Kingaroy	General agriculture and forage crops, plant disease, soil conservation.
12.Kairi Research Station	near Atherton	General agriculture, maize breeding, pasture research, dairy cattle nutrition and breeding.
13.Kamerunga Horticultural Research Station	near Cairns	Wet tropical fruit crops, especially bananas.
14.Maroochy Horticultural Research Station	Nambour	Tropical and subtropical tree fruit and nut crops.
15.Millaroo Research Station	Millaroo	General irrigated agriculture, grain and forage crops, rice breeding.
16.Mutdapilly Research Station	near Harrisville	Dairy cattle nutrition and breeding including AFS herd. Irrigated and dryland pasture studies.
17.Redlands	near Cleveland	All vegetable crops and floriculture.
i. Horticutlural Research		
ii. Artificial Insemination Export Centre		
iii. Poultry Testing Centre		
18.Rocklea Animal Husbandry Research	Brisbane	Cattle, sheep and horse nutrition studies (both field and stall feeding).

Index of research stations and research centres

Research stations	Locality	Work
Farm		
19.Southedge Tobacco Research Station	near Mareeba	Tobacco agronomy, breeding, insect and disease control. Coffee trials.
20.South Johnstone Research Station	South Johnstone	Banana, tea and peanut breeding, wet coastal tropical crops and pastures, beef cattle nutrition.
21.Swan's Lagoon Cattle Field Research Station	near Millaroo	Beef cattle husbandry, animal behaviour, breed comparisons.
22.Toorak Sheep Field Research Station	via Julia Creek	Sheep husbandry studies.
23.Walkamin Research Station	Walkamin	General agriculture with irrigation, plus avocado, mango and lychee. Fresh-water fish breeding.
Research centres	Locality	Work
1. Oonoonba Animal Health Station	Townsville	Animal diseases diagnostic laboratory, and animal pathology research
2. Charleville Pastoral Labora	tory Charleville	Animal production and plant ecology studies specific to western Queensland.
3. Wheat Research Institute	Toowoomba	a Breeding, physiology, agronomy associated with winter cereals such as wheat and barley.
 4. Wacol i. Artificial Breeding Station ii. Dairy Herd Improvement Laboratory iii. Cattle Tick Research Control iv. Pig Testing Station 	Brisbane on nt entre	For dairy cattle
5. Animal Research Institute	Yeerongpilly (Brisbane)	y Animal research laboratories

Staff changes under the Turner Administration

On 9 September and 22 November 1984 the Public Service Commissioner announced the following appointments and promotions in the Department.

Appointed 13.9.84	Name	Previous Appointment
Assistant to the Director-General Bne (I-17) (seconded to perform special duties in the DPI)	Van Haeringen, Jan, B.Econ. Dip.Trop.Agric	Director of Economic Services Br., Div. of Marketing, Bne (I-13)
Assistant to the Director-General Bne (I-17)	Kidston, William, B.Comm, A.A.S.A.	Deputy Director of Marketing, Div. of Marketing, (I-17)
Deputy Director of Marketing, Div. of Marketing, Bne (I-17)	Hamilton, Charles Peter, Q.D.A.H., B.Econ., M. Agr. Sc.	Deputy Director of Marketing, Div. of Marketing, Bne, (seconded to perform the duties of Chairman, Rural Reconstruction Board) (I-15)
Executive Officer (Special Projects) Bne (I-13)	Robinson, Ian Burnett, M.Econ.Stud., B. Econ.	Supervising Agricultural Economist, Economic Services Br., Div. of Marketing, Bne (I-10)
Director, Research Stations Br., Bne (I-15)	Stonard, Peter, B.Sc. (Agric)	Assistant Director, Information and Extension Training Br., Bne (I-11)
Director of Organisational Services, Organisational Services Br., Bne (I-14)	Nimmo, Raymond George, B.Agr.Sc., Q.D.A.	Executive Officer, Organisational Services Br., Bne (I-12)

Appointed 13.9.84	Name	Previous Appointment
Director, Biometry Br., Bne (I-14)	Pepper, Patricia Mary, Ph.D., M.Sc., Dip.Auto.Compt.	Director, Biometry Br., Bne (I-13)
Director, Soil Conservation Research Br., Div. of Land Utilisation, Indooroopilly (I-14)	Coughlan, Keppel James, Ph.D., B.Agr.Sc., G.Dip.Bus.Admin.	Director, Soil Conservation Research Br., Div. of Land Utilisation, Indooroopilly (I-13)
Director, Soil Conservation Services, Div. of Land Utilisation, Indooroopilly (I-15)	Berndt, Ross Dennis, B.Agr.Sc., B.Comm.	Assistant Director, Soil Conservation Services Br., Div. of Land Utilisation, Indooroopilly (I-11)
Director, Land Resources Br., Div. of Land Utilisation, Indooroopilly (On secondment to perform special duties with the Commonwealth DPI, Canberra) (I-15)	Briggs, Howard Stanley, M. Agr. Sc.	Director, Soil Conservation Services Br., Div. of Land Utilisation, Indooroopilly (On secondment to perform special duties with the Commonwealth DPI, Canberra) (I-13)
Director, Agricultural Chemistry Br., Div. of Land Utilisation, Indooroopilly (I-15)	Bruce, Robin Cedric, B.Sc.	Director, Agricultural Chemistry Br., Div. of Land Utilisation, Indooroopilly (I-14)
Director of Marketing Service, Marketing Services Br., Div. of Marketing, Bne (I-15)	White, Barry James, Ph.D., B.Econ.	Director of Marketing Services, Marketing Services Br., Div. of Marketing, Bne (I-13)
Director of Agricultural Standards, Standards Br., Div. of Marketing, Indooroopilly (I-15)	Mungomery, William Vaughan, B.Agr.Sc.	Director of Agricultural Standards, Standards Br., Div. of Marketing, Indooroopilly (I-13)
Director of Field Services, Field Services Br., Div. of Dairying and Fisheries, Newstead (I-15)	Juffs, Harley Shields, Ph.D., B.Agr.Sc., Q.D.D.M., G.Dip.Pub.Admin.	Director of Field Services, Field Services Br., Div. of Dairying and Fisheries, Newstead (I-13)
Director, Fisheries Research Br., Div. of Dairying and Fisheries, Bne (I-15)	Pearson, Robert Gordon, M.Sc., G.Dip.Bus.Admin.	Director, Fisheries Research Br., Div. of Dairying and Fisheries, Bne (I-13)
Director, Fisheries Management Br., Div. of Dairying and Fisheries, Bne (I-14)	McCormack, Gordon Brian, B.Com., D.B.A., Dip.Ag.Econ.	Secretary, Central Sugar Cane Prices Board, Bne (seconded to perform special duties within the Queensland Fish Management Authority, Bne) (I-12)
Director, Plant Pathology Br.,	Colbran, Robert	Director, Plant Pathology Br.,
Div. of Plant Industry, Indooroopilly (I-14)	Chester, Ph.D., B.Agr.Sc.	Div. of Plant Industry, Indooroopilly (I-13)
Director, Botany Br., Div. of Plant Industry, Indooroopilly (I-14)	Johnson, Robert William, Ph.D., B.Sc.	Director, Botany Br., Div. of Plant Industry, Indooroopilly (I-13)
Director, Entomology Br., Div. of Plant Industry, Indooroopilly (I-15)	Passlow, Thomas, M.Sc.(Agric)	Director, Entomology Br., Div. of Plant Industry, Indooroopilly (I-13)
Director of Agriculture, Agriculture Br., Div. of Plant Industry, Bne (I- 16)	McNee, Donald Andrew Kidston, B.Agr.Sc. (Hons), Dip. Agr.Extn.	Director of Agriculture, Agriculture Br., Div. of Plant Industry, Bne (I-14)
Director of Horticulture Br., Div. of Plant Industry, Bne (I-16)	Behncken, Geoffrey Martin, Ph.D., B.Agr.Sc.	Assistant Director, Plant Pathology Br., Div. of Plant Industry, Bne (I-11)
Director, Veterinary Services Br., Div. of Animal Industry, Bne (I-16)	Wells, Ian David, B.V.Sc.	Director, Veterinary Services Br., Div. of Animal Industry, Bne (I-14)
Director, Sheep and Wool Br., Div. of Animal Industry,	Winks, Lyle, B.Agr.Sc.,	Assistant Director, Beef Cattle Husbandry Br., Div. of Animal

Appointed 13.9.84	Name	Previous Appointment
Yeerongpilly A.R.I. (I-15)	G.Dip.Bus.Admin.	Industry, Bne (I-11)
Director, Pig and Poultry Br., Div. of Animal Industry, Bne (I-15)	Byrnes, Raymond Valentine, M.Sc., Q.D.A., G.Dip.Bus.Admin.	Director, Pig and Poultry Br., Div. of Animal Industry, Bne (I-13)
Director, Beef Cattle Husbandry Br., Div. of Animal Industry, Bne (I-15)	Hopkins, Peter Stewart, Ph.D., M.V.Sc.	Director, Sheep and Wool Br., Div. of Animal Industry, Yeerongpilly A.R.I. (I-13)
Director, Pathology Br., Div. of Animal Industry, Yeerongpilly A.R.I. (I-15)	Callow, Lennox Lyle, Ph.D., D.V.Sc.,	Director, Pathology Br., Div. of Animal Industry, Yeerongpilly A.R.I. (I-14)
Director, Biochemistry Br., Div. of Animal Industry, Yeerongpilly A.R.I. (I-14)	McEwan, Thomas, Ph.D., M.Sc.	Director, Biochemistry Br., Div. of Animal Industry, Yeerongpilly A.R.I. (I-13)
Director, Veterinary Public Health Br., Div. of Animal Industry, Bne (I-16)	Parkinson, Boyd, B.V.Sc.	Director, Veterinary Public Health Br., Div. of Animal Industry, Bne (I-14)
Director (Queensland Wheat Research Institute), Div. of Plant Industry, Q.W.R.I., Toowoomba (I-14)	Clarke, Allan Lawrence, Ph.D., M.Agr.Sc.	Director (Queensland Wheat Research Institute), Div. of Plant Industry, Q.W.R.I., Toowoomba (I-13)
Secretary, Central Sugar Cane Prices Board, Bne (I-13)	Todhunter, Paul Richard, M.Ed. (Hons), B.A.	Secretary, Central Sugar Cane Prices Board, Bne (I-12)
Qualified Sugar Chemist, Central Sugar Cane Prices Board, Bne (I-14)	Saranin, Alexander Peter, M.E.Chem., Dip.Sugar.Tech.	Qualified Sugar Chemist, Central Sugar Cane Prices Board, Bne (I-13)
Supervising Physiologist, Horticulture Br., Div. of Plant Industry, Hamilton (I-10)	Peacock, Bruce Clifford, B.Sc.	Senior Physiologist, Food Preservation Research Section, Horticulture Br., Div. of Plant Industry (Hamilton) (S-9)
Appointed 20.9.84	Name	Previous Appointment
Director of Economic Services, Economic Services Br., Div. of Marketing, Bne (I-14)	Robinson, Ian Burnett, M.Econ.Stud., B.Econ.	Executive Officer (Special Projects), DPI, Bne (I-13)
Executive Officer (Special Projects) Bne (I-13) (Seconded to perform special duties with Queensland Fish Management Authority)	Neville, Peter John, B.Econ. (Hons.)	Supervising Marketing Officer (Marketing Economic Research), Marketing Services Br., Bne (I-10)
Appointed 22.11.84	Name	Previous Position
Assistant Director, Research Stations Br., Bne (I-13)	Hay, Vincent Thomas, Assoc.Dip., Mech. Eng.	Assistant Director, Research Stations Br., Bne (I-11)
Assistant Director, Information and Extension Training Br., Bne (I-13) (Seconded to perform Special duties in Organisational Services Br.)	Gillespie, James Andrew, B.Econ.	Senior Administration Officer, Personnel Administration Section, Organisational Services Br., Bne (I- 10)
Assistant Director, Information and Extension Training Br., Bne (I-13)	Honour, Trevor Clyde, B.Econ., Cert.Teach.	Senior Agricultural Economist, Economic Services Br., Div. of Marketing, Bne (S-9)
Assistant Director, Field Services Br., Div. of Dairying and Fisheries,	Clark, Colin Henry,	Assistant Director, Dairy Cattle Husbandry Br., Div. of Dairying and

Appointed 13.9.84	Name	Previous Appointment
Newstead (I-13)	B.Agr.Sc.	Fisheries, Newstead (I-11)
Assistant Director, Marketing Services Br., Div. of Marketing, Bne (I-13)	Connor, Anthony Frederick, B.Econ.	Assistant Director, Marketing Services Br., Div. of Marketing, Bne (I-11)
Assistant Director of Agricultural Standards, Standards Br., Div. of Marketing, Indooroopilly (I-13)	Harty, Raymond Laurence B.Sc., M.Agr.Sc.	Supervising Seed Technologist, Standards Br., Div. of Marketing, Indooroopilly (I-10)
Assistant Director, Economic Services Br., Div. of Marketing, Bne (I-13)	Moorhouse, Wallace, A.A.S.A., B.Econ., G.Dip.Bus.Admin.,	Assistant Director, Economic Services Br., Div. of Marketing, Bne (I-11)
	Dip.Info.Process	
Assistant Director, Sheep and Wool Br., Div. of Animal Industry, Yeerongpilly, A.R.I. (I-13)	O'Sullivan, Brian Michael, B.V.Sc., Ph.D.	Assistant Director, Sheep and Wool Br., Div. of Animal Industry, Yeerongpilly, A.R.I. (I-11)
Assistant Director, Pig and Poultry Br., Div. of Animal Industry, Bne (I-13)	Connor, John Kingsley, M.Agr.Sc.	Assistant Director, Pig and Poultry Br., Div. of Animal Industry, Bne (I- 11)
Assistant Director, Veterinary Public Health Br., Div. of Animal Industry, Bne (I-13)	Ramsay, Walter Rennie, B.V.Sc.	Assistant Director, Veterinary Public Health Br., Div. of Animal Industry, Bne (I-12)
Assistant Director, Biochemistry Br., Div. of Animal Industry, Yeerongpilly, A.R.I. (I-13)	Hurwood, Ian Spence, B.Sc., Cert. Nuclear Tech., G.Dip.Bus.Admin.	Assistant Director, Biochemistry Br., Div. of Animal Industry, Yeerongpilly, A.R.I. (I-11)
Assistant Director, Pathology Br., Div. of Animal Industry, Yeerongpilly, A.R.I. (I-13)	Dalgliesh, Robert John, M.V.Sc.	Principle Protozoologist, Pathology Br., Div. of Animal Industry, Yeerongpilly, A.R.I. (I-11)
Assistant Director, Pathology Br., Div. of Animal Industry, Yeerongpilly, A.R.I. (I-13)	Rogers, Russell John, M.V.Sc.	Assistant Director, Pathology Br., Div. of Animal Industry, Yeerongpilly, A.R.I. (I-12)
Assistant Director, Veterinary Services Br., Div. of Animal Industry, Bne (I-13)	Walthall, John Christopher, B.V.Sc., B.Econ.	Assistant Director, Veterinary Services Br., Div. of Animal Industry, Bne (I-12)
Assistant Director, Veterinary Services Br., Div. of Animal Industry, Bne (I-13)	Langford, Glen Francis David, Q.D.A., B.V.Sc., G.Dip.Bus.Admin.	Assistant Director, Veterinary Services Br., Div. of Animal Industry, Bne (I-12)
Executive Officer (Animal Quaran- tine), Veterinary Services Br., Div. of Animal Industry, Bne (I-13)	Nieper, Raoul Edward, B.V.Sc. (Hons), G.Dip.Bus.Admin.	Principal Veterinary Officer, Veterinary Services Br., Div. of Animal Industry, Bne (I-11)
Assistant Director, Plant Pathology Br., Div. of Plant Industry, Indooroopilly (I-13)	Muirhead, Ian Francis, M.Agr.Sc., Ph.D.	Senior Plant Pathologist, Plant Pathology Br., Div. of Plant Industry, Indooroopilly (S-9)
Assistant Director (Pasture Agronomy), Agriculture Br., Div. of Plant Industry, Bne (I-13)	Walker, Barry, B.Sc.(Agric), Dip.Trop.Agric., M.Agr.Sc., Ph.D.	Assistant Director (Pasture Agronomy), Agriculture Br., Div. of Plant Industry, Bne (I-12)
Assistant Director (Agronomy), Agriculture Br., Div. of Plant Industry, Bne (I-13)	Mungomery, Vincent Edward, M.Agr.Sc., Ph.D., G.Dip.Bus.Admin.	Assistant Director (Agronomy), Agriculture Br., Div. of Plant Industry, Bne (I-12)
Assistant Director (Extension Agronomy), Agriculture Br., Div. of Plant Industry, Bne (I-13)	Childs, John Reginald, B.Rur.Sc., M.Agr.Sc., Dip.Ag.Econ.	Assistant Director (Extension Agronomy), Agriculture Br., Div. of Plant Industry, Bne (I-12)
Assistant Director (Extension and Field Services), Horticulture Br.,	Jorgensen, Keith Ronald, B.Agr.Sc.,	Assistant Director (Extension and Field Services), Horticulture Br.,

Appointed 13.9.84	Name	Previous Appointment
Div. of Plant Industry, Bne (I-13)	G.Dip.Bus.Admin.	Div. of Plant Industry, Bne (I-12)
Assistant Director (Research), Horticulture Br., Div. of Plant Industry, Bne (I-13)	Barke, Robin Edward, M.Sc.	Assistant Director (Research), Horticulture Br., Div. of Plant Industry, Bne (I-11)
Assistant Director, Entomology Br., Div. of Plant Industry, Indooroopilly (I-13)	Bengston, Mervyn, M.Sc., Ph.D.	Assistant Director, Entomology Br., Div. of Plant Industry, Indooroopilly (I-11)
Assistant Director, Botany Br., Div. of Plant Industry, Indooroopilly (I-13)	Pedley, Leslie, B.Sc.	Assistant Director, Botany Br., Div. of Plant Industry, Indooroopilly (I- 11)
Assistant Director, Soil Conservation Research Br., Div. of Land Utilisation, Indooroopilly (I-13)	Webb, Alan Adrian Warren, M.Agr.Sc., G.Dip.Bus.Admin.	Assistant Director, Soil Conservation Research Br., Div. of Land Utilisation, Indooroopilly (I-11)
Assistant Director, Soil Conservation Services Br., Div. of Land Utilisation, Indooroopilly (seconded to the position of Assistant Director, Fisheries Management Br.) (I-13)	Venz, Brian, B.Agr.Sc., G.Dip.Bus.Admin.	Supervising Land Resources Officer, Land Resources Br., Div. of Land Utilisation, Indooroopilly (I- 10)
Assistant Director, Soil Conserv- ation Services Br., Div. of Land Utilisation, Indooroopilly (I-13)	Mullins, John Albert, M.Agr.Sc., Q.D.A.(Hons)	Supervising Soil Conservationist, Soil Conservation Research Br., Div. of Land Utilisation, Indooroopilly (I-10)
Assistant Director, Land Resources Br., Div. of Land Utilisation, Indooroopilly (I-13)	Vandersee, Brian Edward, B.Agr.Sc., Q.D.A.	Supervising Land Resources Officer, Land Resources Br., Div. of Land Utilisation, Indooroopilly (I-10)
Assistant Director, Agricultural Chemistry Br., Div. of Land Utilisation, Indooroopilly (I-13)	Hamilton, Denis John M.Sc.	Principal Chemist, Agricultural Chemistry Br., Div. of Land Utilisation, Indooroopilly (I-11)
Appointed 20.12.84	Name	Previous Appointment
Executive Officer (Crop Protection) Div. of Plant Industry, Bne (I-13)	Syme, James (Dr) Robert, B.Sc.Agr. (Hons), Ph.D. G.Dip.Info.Proc.	Supervising Plant Breeder (Winter Crops), Agriculture Br., (seconded to special duties in the Div. of Plant Industry), Bne (I-10)
Appointed 17.1.85	Name	Previous Appointment
Director, Extension Services Section, Bne (I-13) (seconded to perform special duties in Extension Services)	Littmann, Mervyn Douglas, M.Pub.Admin	Director, Information and Extension Training Br., Bne (I-13)
Director, Information and Extension Training Br., Bne (I-13) (seconded to perform special duties in Information and Extension Training Br.)	Durand, Marcus Richard Edward, B.V.M.S.	Director, Beef Cattle Husbandry Br., Div. of Animal Industry, Bne (I-13)
To undertake special duties in the Department of Primary Industries Brisbane (I-13)	Rayner, Ivan Herbert Godfrey, B.Econ., Dip. Agr.Extn.	Director, Dairy Cattle Husbandry Branch, Division of Dairying and Fisheries, Bne (I-13)
Appointed 31.1.85	Name	Previous Appointment
Secretary, Queensland Fish Management Authority (I-13) (seconded to perform special	Neville, Peter John, B.Econ. (Hons)	Executive Officer (Special Projects), Bne (I-8)

Appointed 13.9.84	Name	Previous Appointment
duties in Queensland Fish Management Authority)		
Administration Officer, Queensland Fish Management Authority (I-8) (seconded to perform special duties in Queensland Fish Management Authority)	Elmer, Mark Albert Vincent	Executive Officer, Fisheries Administration Section, Div. of Dairying and Fisheries, Bne (I-8)

Staff salaries

The first Departmental Budget in 1888 included £1800 for salaries. This included £500 for the Under-Secretary, Peter McLean, £300 for the very experienced Colonial Botanist, F. Manson Bailey, C.M.G., F.L.S., and £1000 for "contingencies" to include clerical assistance (E. G. E. Scriven was the Clerk).

The key salaries over the ninety-seven years 1887-1984 and the number of staff were as follows:

	1890	1924	1951	1984
Staff numbers	42	435	657	2 390
Under-Secretary (Director-General)	£500	£1 000	£1 700	\$65 606
Senior Clerk	£250	£575	£950	
Accountant		£525	£1 030	\$33 944
(Colonial) Government Botanist	£350	£525	£1 130	\$38 375
Director of Agriculture	£750	£650	£1 290	\$40 494

The classification and increment scale from 9 April 1984 was as follows.

Classification and Increment Scale

First Line - Annual Salary Range These figures are actual and operate form 9.4.1984 Second Line - Fortnight Salary	
HPA	65,606
Director General	2514.90
I-26	53,512
Deputy Director	2051.20
I-24	50,442
Assistant Director Generals	1933.50
I-21 <u>Directors</u> - Division of Plant Industry; Division of Animal Industry; Division of Marketing; Division of Dairying and Fisheries; Division of Land Utilisation	46,134 1768.40
I-17 <u>Director</u> - Administration, Director - (Staff Development) <u>Deputy Director</u> - Division of Plant Industry; Division of Dairying and Fisheries; Division of Marketing; Division of Land Utilisation; Division of Animal Industry; Animal laboratories Assistant to Director- General	41,164 1577.90
I-16	40,494
<u>Directors</u> - Agriculture; Horticulture; Veterinary Services; Veterinary Public Health	1552.20

I-15 <u>Directors</u> - Pathology; Sheep and Wool; Ma Conservation Services; Land Resources; Entor Pig and Poultry Branch; Dairy Cattle Husbar Services; Research Stations Branch; Agricultur	rketing Serv mology Branc ndry Branch; al Chemistry	ices; Agricu ch; Beef Cat Fisheries I Branch	lltural Stand tle Husband Research; E	ards; Soil ry Branch; Dairy Field	39,781 1524.90
I-14 <u>Director</u> , Organisational Services Branch; Econ Information and Extension Training Branch; Pla Biometry Branch; Extension Services Branch; F Research; Biochemistry Branch; Qualified Suga	omic Service ant Pathology Fisheries Mar ar Chemist	es; Soil Cons / Branch; Bo nagement Br	ervation Re btany Branch anch; Dairy	search; ;	38,375 1471.00
I-13 <u>Assistant Directors</u> (Pasture Agronomy); (Exter Field Services); (Research); Veterinary Service Officer, (Special Projects) (Animal Quarantine); <u>Assistant Directors</u> of Agricultural Standards; S Conservation Research; Land Resources; Ento Pathology Branch; Research Stations Branch; I Branch; Information and Extension Training Bra Health; Beef Cattle Husbandry Branch; Sheep a Pathology Branch; Dairy Research Branch; Offi	nsion Agrono s; Agricultura ; Secretary, C oil Conservat mology Bran Economic Se anch; Pig and and Wool Bra icer in Charge	my); Horticu Il Chemistry Central Suga tion Services ch; Botany E rvices Branc I Poultry Bra anch; Bioche e, Charleville	lture; (Exten Branch; Exe r Cane Price s Branch; Sc Branch; Plan ch; Marketing nch; Veterin emistry Bran e Pastoral La	sion and ecutive as Board il t g Services ary Public ch; aboratory	36,979 1417.50
I-11 <u>Principal</u> Pasture Agronomist; Principal Extensi Protoozoologist; Principal Veterinary Pathologis Officer; Principal Plant Breeder; Principal Chem Horticulturist; (Field Services) Assistant Directo	on Officer, P at; Principal B hist; Principal r, Organisatio	rincipal Para iometrician; Soil Scientis onal Service	asitologist; P Principal V st; Principal s Branch	rincipal eterinary	33,734 1293.10
					33,944 1301.10
I-10 <u>Supervising</u> Agronomist; Supervising Husbandı Officer; Meat Quality Officer; Officer in Charge, Senior Administration Officer, Program Plannin Administration Officer, Personnel Development	ry Officer; etc Oonoonba V g and Methoo	; Divisional ` ′eterinary La ds; Senior	Veterinary boratory;	32,643 1251.30	32,853 1259.30
S-10 Executive Engineer Division II	31,002 1188.40	31,942 1224.40	32,615 1250.20	33,285 1275.90	33,943 1031.10
S-9 <u>Senior Scientist</u> Senior Botanist; Senior Husbandry Officer; etc.		30,522 1170.00	31,002 1188.40	31,942 1224.40	32,615 1250.20
I-9 Senior Information Officer (Publications - Prima	ary Industries)		30,809 1181.00	31,019 1189.00
S-7 <u>Scientist Division I</u> Pasture Agronomist Division II; Engineer Division II; etc		26,372 1010.90	27,793 1065.40	28,999 1111.60	30,191 1157.30
l-7			28,187	28,292	28.397
			1080.50	1084.50	1088.50
District Adviser Division; District Inspector Divis Experimentalist Division I; Editor, Queensland A Assistant Technical Administrative Officer; Insp Supervising Draftsman	tion I; District Agricultural Jo Pecting Cane	ournal; Test;	20,043 1021.30	20,748 1025.50	20,853 1029.30
S-5			18,860	19,912	20,948
<u>Scientist Division II</u> Pasture Agronomist Division II; Engineer Divisio	on II; Veterina	ary Officer	723.00	763.00	803.00

Division II; Programmer (Graduate)

					22,242 852.60	24,013 920.50	25,599 981.30
I-5 District Adviser Divisior Experimentalist Divisio Agricultural Journalist I Marketing Reporter	n II; District Insp n II; Regional In Division I; Senio	ector Division formation C r Laboratory	on II; Distric Officer Divisio / Techniciar	t on I; ; Senior	25,357 972.00	25,462 976.00	25,567 980.00
I-4 Regional Information C Agricultural Journalist [Officer Division II Division II	l;			24,044 921.70	24,149 925.70	24,254 929.70
I-3 Assistant Senior Marke	eting Reporter				22,565 865.00	22,670 869.00	22,775 873.00
D-1 Draftsman	18,769 719.50	19,411 744.10	20,042 768.30	20,684 792.90	21,318 817.20	21,962 841.90	22,775 873.00
T-3 Adviser Division I; Expe Laboratory Technician Fisheries Technician D Analyst Division I	erimentalist Divi Division I; Mark ivision I; Regist	sion I; Inspe eting Techn ration Office	ector Divisio lician Divisio er Division I;	n I; on I; Seed	20,948 803.00	21,394 820.10	21,869 838.30
					22,304 855.00	22,775 873.00	
I-2 Marketing Reporter; Co	ommercial Artist	t			21,274 815.50	21,379 819.50	21,484 823.50
T-I Adviser Division II; Insp Cereal Tester; Laborate Instrument Maker and Officer Division II; Fishe	bector Division I ory Technician I Repairer; Seed eries Techniciar	I; Experime Division II; S Analyst Divi n Division II	ntalist Divisi Senior Wool ision II; Reg	on II; Classer; istration	18,769 719.50	19,207 736.30	19,651 753.30
					20,079 769.70	20,517 786.50	
PA-1 Professional Assistant	(Scientific); Pro	fessional As	sistant (Ma	rketing)		18,769 719.50	19,207 736.30
AS-1 Assistant Scientist; Ass etc.	sistant Marketing	g Officer;	15,735 603.20	16,398 628.60	17,060 654.00	17,713 679.00	18,378 704.50
L-1 Commercial Art Assista Age 21 \$582.50	ant		10,355 397.00	11,678 447.70	12,886 494.00	15,735 603.20	16,398 628.60
			17,060 654.00	17,713 679.00	18,378 704.50	18,785 720.10	
AD-1 Field Assistant; Techni Assistant Draftsman; A Cereals Assistant	cal Assistant; A ssistant Fisheri	ssistant Insj es Technicia	pector; an;		15,735 603.20	16,398 628.60	17,060 654.00
					17,713 679.00	18,378 704.50	
II-18 Pilot Plant Technician						18,934 725.80	19,114 732.70
II-13 Laboratory Mechanic						17,457 669.20	17,637 676.10

II-10 Processing Assistant; Senior Seed Tester; Senior Fleece Tester		16,789 643.60	16,969 650.50
II-9 Senior Assistant, Information and Extension Training Branch		16,591 636.00	16,771 642.90
II-7 Attendant		16,194 620.80	16,374 627.70
CDT Cadet (Senior Exam) (Age 21 \$582.50)	7,478 286.70	8,978 344.20	10,355 397.00
	11,678 447.70	12,886 494.00	
I-11 Accountant		33,734 1293.10	33,944 1301.10
I-8 Administration Officer; Private Secretary; Administration Officer and Reg Veterinary Surgeons Board; Senior Inspecting Cane Tester; Technical Administration Officer	gistrar of	29,497 1130.70	29,707 1138.70
I-7 Assistant Accountant (Budget)	28,187 1080.50	28,292 1084.50	28,397 1088.50
I-6 Assistant Accountant (Administration); Registrar of Brands; Assistant Secretary and Statistical Officer, Central Sugar Cane Prices Board; Regional Administration Officer (Toowoomba)	26,643 1021.30	26,748 1025.30	26,853 1029.30
I-5 Senior Clerk, Division of Plant Industry; Division of Dairying and Fisheries; Internal Auditor; Assistant Administration Officer; Assistant Administration Officer (Methods); Assistant Administration Officer (Accommodation); Assistant Administration Officer and Registrar of Primary Producers' Co-operative Associations; Administration Officer, Toowoomba	25,357 972.00	25,462 976.00	25,567 980.00
I-4 Senior Clerk (Marketing); Senior Clerk (Accounts); Records Clerk; Personnel Liaison Officer; Officer in Charge, Commercial and Despatch Section; Senior Clerk, Personnel Administration Section; Administration Officer (Fisheries)	24,044 921.70	24,149 925.70	24,254 929.70
I-3 Senior Clerk, Division of Land Utilisation; Agriculture Branch; Horticulture Branch; Animal Research Institute; (Animal Health); Beef Cattle Husbandry Branch; Standards Branch, (Administration); Senior Clerk, Mareeba; Rockhampton; Inspector of Agents' Accounts; Clerk and Deputy Registrar of Veterinary Surgeons Board; Clerk (Expenditure Analysis); (Salaries); (Salary Deductions); (Relieving); (Animal Quarantine); Clerk, Veterinary Public Health Branch; Field Services Branch; Assistant Internal Auditor; Deputy Registrar of Brands			
			22,670 869.00
			22,775 873.00
I-2 Clerk, Branch, Clerk (Establishments) (Relieving) (Records) (Accounts) (Grant Analysis) (Vouchers)	21,274 815.50	21,379 819.50	21,484 823.50
I-1 Clerk, Branch, Administrative Officer, Clerk (Personnel) (Leaves)	19,936 764.20	20,066 769.20	20,196 774.20

(Methods) (Relieving) Etc.

C Clerk Temporary Clerk - <i>Maximum</i> \$679.60	7,480 286.80	8,665 332.20	9,873 378.50	11,026 422.70
Age 21 \$550.30				
	12,132 465.10	14,355 550.30	14,788 566.90	15,205 582.90
	15,628 599.10	16,061 615,70	16,476 631.60	16,904 648.00
	17,319 663.90	17,728 679.60	18,153 695.90	18,584 712.40
II-19 Ministerial Steno-Secretary			19,393 743.40	19,573 750.30
II-18 Executive secretary to the Permanent Head			18,934 725.80	19,114 732.70
II-16 Executive Secretary to Deputy Director General; Director (Ad Assistant Directors General	dministration)		18,216 698.30	18,396 705.20
II-12 Supervising Stenographer Grade IV, Supervisor Data proces	ssing		17,201 659.40	17,381 666.30
II-10 Supervisor, Keyboard Services Grade IV			16,789 643.60	16,969 650.50
II-5 Senior Messenger			15,798 605.60	15,978 612.50
Am I <u>Administrative Assistant Grade I</u> (includes previous classifications of Stenographer, Clerk- Typist, Clerical Assistant, Male Assistant, Drawing Office Assistant Grade I)	7,446 285.50	8,649 331.60	9,828 376.80	11,018 422.40
SA <u>Scientific Assistant</u> (includes previous classification of Lab Attendant) TEL Telephonist <i>Age 21 \$533.00</i>				
	12,142 465.50	13,903 533.00	14,183 543.70	14,444 553.70
	14,712 564.00	14,989 574.60	15,278 585.70	15,555 596.30
	15,839 607.20			
AM II Administrative Assistant Grade II (includes old classifications of General Assistant, Seed Testing Assistant, Attendant, Drawing Office Assistant Grade II) Age 21 \$514.90	6,974 267.40	8,179 313.60	9,359 358.80	10,548 404.40
	11,670 447.40	13,431 514.90	13,713 525.70	13,971 535.60
974 History of DPI

14,243	14,519	14,809	15,083
546.00	556.60	567.70	578.20

Division of Plant Industry from 1983

Agriculture Branch

Wheat

Of the one million hectares sown to wheat in 1983, 750 000 ha, or 75%, were sown to varieties released by the Queensland Wheat Research Institute. As a comparison, only 10 per cent of the 400 000 ha 1973 wheat crop was sown to Queensland-bred varieties. A new variety, Vasco, was released in June 1985.

Excessive dough stickiness was found in some wheat cultivars derived from rye. Because this material offered improved disease resistance and agronomic properties, the dough characteristics were studied further.

Screening of wheat for resistance to weather damage was increased and research began on ways to reduce damage caused by sprouting of grain after rain.

Early March-planted wheat is now widely adopted in the Central Highlands and the Dawson-Callide area to produce more reliable yields and provide adequate levels of crop stubbles for soil protection during the early summer storm period and subsequent mid- and late-summer "wet". It also helps to spread the State grain harvest and take some pressure off wheat deliveries to silos. This practice is being evaluated in the Western Downs and Maranoa.

Barley

The 1983-84 barley harvest reached a record 596 000 tonnes, despite 25 000 tonnes being lost because of hail damage. The average yield was 2.09 t/ha. Some 685 000 t were sold on the domestic market as malting barley and feed grain, the remainder being exported to Japan, Europe, and Saudi Arabia. The new variety Grimmett, released in 1982, was planted in 64% of the State's barley area in 1983, joining a feed barley, Corvette, released in the 1970s.

Grain sorghum

A sorghum pest management package comprising a suite of computer programs called Sorpest was developed by the entomologists. The package allowed a grower to enter pest infestation and crop development information into a computer and to obtain advice recording expected income. The breeding line QL29 was released in 1983 and three others were soon to follow. These had midge resistance. QL was the first female line released.

Soybeans

A new variety, Centaur, resistant to *Phytophthora*, was released in 1984-85. It was found that the old bicarbonate (BSES) method for assessing soil phosphorus was unreliable for the red soils of Kingaroy and a new P sorption test was more reliable. A new test for potassium also gave better prediction. The tests were also promising for potatoes. These developments were a joint success for the agronomists and agricultural chemists.

Peanuts

Yields in north Queensland would be increased by some 35% with the release of a new variety, Shulamit, in 1985.

Chick peas

Strains resistant to *Phytophthora* were identified by R. Brinsmead and these would improve yields from this crop.

Sunflowers

During 1983-84, D. George released pollen and seed that carried resistance to two races of sunflower rust (*Puccinia helianthi*) to seed companies and also to India and South Africa. They carried resistance also to *Alternaria helianthi*. The breeding programme included breeding for high linoleic acid. The Agricultural Chemistry Branch assisted with this programme.

Cotton

Deltapine 61 was replaced during 1985 by Deltapine 90 with improved fibre quality. Siokra (super okra) variety was released by CSIRO and outyielded Deltapine 61. All seed cotton for Australia was distributed by Cotton Seed Distributors of New South Wales from 1980. The chairman of the Queensland Cotton Board was a director of this company. A computerised Pest Management System named SIRATAC was developed by CSIRO, the University of Queensland and the Department of Primary Industries and its information, where available, was paid for by some 30% of growers.

During 1983-84 the industry consolidated previous gains and produced a record crop exceeding 5 bales/ha. Research and extension officers contributed significantly to this advance in the areas of crop establishment, crop nutrition, irrigation management and pest control. A record yield of 9 bales/ha was obtained at St George in 1985.

Sesame

This crop was grown in a small way. A major problem was the hulling of the seed but a New South Wales processor solved this problem and was seeking seed.

Tobacco

A new variety, Southedge, resistant to Potato Virus Yellows, was released for areas where this problem existed.

Onions

White rot disease of onions was investigated. Improved cultural techniques helped control and selection was made for resistance to the disease. In conjunction with the Plant Pathology Branch a biological control of the bacterial cause was investigated using microbes.

Pastures

Pasture seed production research by the Department led to the establishment of a \$0.5m industry producing Callide and Samford Rhodes grass seed in the coastal areas south of Bundaberg. The Department has earned an international reputation in tropical pasture and fodder-seed production. Two new annual pasture legumes, Glenn jointvetch and Wynn cassia, were released in conjunction with the CSIRO. Glenn jointvetch was suited to poorer soils of the central coast. It tolerated water-logging and could withstand heavy grazing. Wynn cassia was suited to light soils receiving more than 500 mm of annual rainfall. It tolerated heavy grazing better than Siratro and appeared disease-free. The cultivar Shaw of *Vigna parkeri* was released during 1984-85 for use in the higher rainfall area of the near North Coast. It was a surviving and spreading residual species at a number of old 1960 trial sites, which had enforced its consideration as a desirable legume. All three legumes were released by the Pasture Liaison Committee consisting of CSIRO, commercial seedsmen, Departmental and University representatives.

A total of sixteen trainees from ten overseas countries participated in a DPI-organised seed-production course during 1983-84. J. K. Teitzel, Dr R. T. Cowan and Dr M. A. Gilbert ran the Fifth FAO Regional Training Course on pasture development and production in the higher rainfall tropics of South-east Asia at the Faculty of Veterinary Medicine and Animal Science, Universiti Pertanian, Malaysia, in November-December 1984, catering for thirty-odd officers from Malaysia and other South-east Asian countries.

A long-term study was initiated in central Queensland to monitor the effects of land use and management on tree and shrub populations in the Eucalyptus woodlands. To date (June 1985) some 13 to 25 km of transects spread over 23 sites have been established in areas that represent some 55% of the central Queensland Eucalyptus communities. A previous study had already shown that soil type, climate and past grazing history largely determined the suite of native pastures and tree species and their proportions present at any site.

Studies with a cone thresher at Gympie showed promise of providing a simple method of drastically improving the handling qualities of the chaffy seeded grasses such as Hatch Creeping bluegrass (*Bothriochloa insculpta*) and Indian bluegrass (*Bothriochloa pertusa*). The awns, sterile florets and surface hairs were removed without any apparent effect on seed viability. In the case of Rhodes grass (*Chloris gayana*), up to 60% of the caryopses could be removed from the florets, again without any apparent damage.

Arid land studies

The land use inventory of the arid lands of Queensland was published in parts - Part IV was published in 1978, Part II in 1981, Part I in 1982, Parts III, V and VI were in the process of publication with the Land Use System maps for Part VI published in 1984. Monitoring of the sites representative of the land units susceptible to degradation continued. Favourable seasons from 1983 allowed germination of green turkey bush (*Eremophila gilesii*) seedlings, a major unpalatable woody weed species in south-western Queensland. Transects to monitor the spread of woody weeds in central, western and north-west Queensland were established in November 1983.

The survey of the extent and severity of degradation in the Paroo, Quilpie and Eulo regions indicated that 30% of the hard mulga lands had lost 2 cm or more of topsoil and that more than 50% of the soft mulga lands had less than 10% woody weed canopy cover. A study of the effect of sheet erosion on soil fertility and, in the long term, on pasture productivity in the mulga lands, was commenced.

A study of the susceptibility of woody weeds to fire and the impact of fire on the ground flora was carried out from February 1982 to February 1984 in the Charleville district, and continued.

Fires controlled *Eremophila gilesii* (green turkey bush), *Dodonaea attenuata* (narrow-leaved hopbush) and *D. tenuifolia* (fern-leaved hopbush), but not *E. sturtii* (turpentine bush) or *E. bowmani* (grey turkey bush). Greatest success attached to spring and summer fires, which also prevented seedling regeneration of *E. gilesii*.

Lignum (*Muehlenbeckia cunninghamii*) and belalie (*Acacia stenophylla*) occur in dense thickets, which increase mustering costs and reduce fodder production over 36 000 km² of the Channel Country of south-western Queensland. Additionally, mustering difficulties hampered the Brucellosis and Tuberculosis eradication programmes, so fire and herbicides were used to control both plants. Burning, hexazinone and 2,4,5-T controlled lignum. Burning and 2,4,5-T were most effective against belalie and 2,4,5-T also prevented suckering. Given the large areas involved, fire seemed to be the best option for controlling both species.

Sixteen years of research into suitable grazing plants introduced for reseeding for improving mulga country at Charleville had so far not revealed any ready for release into commercial production. A full report of results from 1966 to 1983 was prepared. Greatest success was with grasses, with Biloela Buffel the most suited to regular grazing, but difficult to establish. The main problems were:

- i. infertile, acidic soils with a low available P status;
- ii. severe radiation frosts each winter;
- iii. unpredictable incidence of good establishment rains;
- iv. two clearly definable pasture-growing seasons.

Pelleting Buffel grass seeds with phosphate fertiliser gives better germination in the first three months after sowing, and more rapid growth; but better techniques for pelleting are required.

Thyridolepis mitchelliana and *Eragrostis curvula* CPI30374 regenerate well from seed in good seasons in the mulga country. Biloela Buffel (*Cenchrus ciliaris*) gives the highest carrying capacity but seed regeneration of all Buffel cultivars is poor. Only three Buffel lines and the native *T. mitchelliana* (Mitchell Mulga) have maintained dominance in their respective paddocks. The persistence and economic value of sown pastures of two Buffel grass cultivars, *Eragrostis* and *Anthephora pubescens*, compared with native pastures are being studied as a long-term project. *Anthephora* has almost been replaced by native species since sowing in November 1979, while the *Eragrostis* still occupies 33% of the paddock.

Long-term studies on the changes in botanical composition of permanent Mitchell grass (*Astrebla* spp.) plots on the cracking clay soils of Blackall have been monitored under sheep grazing and enclosure since 1975. Rainfall, soil, plant and stocking are recorded in April each year and forage consumption again each October. In wet winters, winter herbage species germinate and these are consumed in preference to Mitchell grass. Seed of the weedy grass species *Aristida latifolia* (feathertop) and *Aristida leptopoda* (White speargrass) in Mitchell grasslands is being studied for seed dormancy. After 24 weeks, storage *A. leptopoda* germination was 89.3% compared with 40.7% soon after harvest, whereas that of *A. latifolia* failed to exceed 10%.

Horticulture Branch

From 1971 the Commonwealth and State Governments joined in a Fruit Variety Foundation (FVF) in producing plants derived from good horticultural propagating material in Australia and free from all important virus diseases. Crops involved in the scheme on the Granite Belt and the viruses the scheme eliminated were: apples (mosaic, green crinkle, ring spot), flat limb pears (stony pit), stone fruit (necrotic ring spot, prune dwarf, plum line pattern) and grapes (leaf roll, fan leaf, yellow speckle). National repositories were established for the purpose and Queensland submitted virus-tested material to the scheme and also obtained other virus-tested varieties. These were then multiplied at the Granite Belt Horticultural Research Station and later distributed, mainly to accredited nurserymen. The scheme was locally administered by the Queensland Deciduous Fruit Budwood Committee. An apple breeding line 35-155, four to six weeks earlier than Delicious, was released to growers for evaluation. During 1983-84 the stone fruit collection was extended to 258 varieties, with 67 new overseas and interstate introductions. Orion peach, with similar chilling requirement and maturity to Springold, had superior fruit quality. Flavortop, a mid-season nectarine, had highly coloured fruit of excellent appearance. Fairtime, a large-fruited dessert peach, extended the available maturity range by one week to the end of February.

After a 20-year battle to overcome quarantine barriers, Queensland citrus growers exported the first Australian citrus to Japan in September 1982. Many negotiations and experimental trials relating to fruit fly control preceded the initial shipment. A follow-up shipment of about 11 000 cartons of navel oranges was made in June 1984. With the withdrawal of EDB as a fruit fumigant, low-temperature cold sterilisation (19 days at 1.5%) was investigated.

A system of propagating citrus in containers was developed for Queensland conditions. The trees were grown in a sand and sawdust potting mix in plastic containers instead of field beds. Through demonstrations at field days the system was rapidly adopted.

The role of the Maroochy Horticultural Research Station (MHRS) was strengthened during 1983-84 by the completion and commissioning of the new administrative and laboratory complex and associated facilities, including the controlled environment units for horticulture and entomology. Costs were borne by the State Government with the help of growers' organisations. Associated with this expansion was greater cooperation, awareness and technical interchange and research results were interpreted to the field situation and spread faster throughout the State. There was a balance of disciplines. Integrated research, development and extension were aimed at subtropical productivity. There were more than

twice as many trees in experiments off the station as there were on the station. Technical, administrative and clerical staff played a major role in the organisation of and publication of the proceedings of the Australian Banana and Macadamia Industry Workshops in 1982 and 1983 respectively and organising an International Symposium on Fruit Tree Physiology in 1985.

Research at the MHRS included a study of crop physiology and water use to understand response to temperature and moisture stress, use of carbohydrate reserves and factors controlling flowering, fruit set and fruit growth. Computer modelling for predicting plant response was used. The controlled environment unit allowed precise studies.

The selection of clonal rootstocks to obtain disease tolerance, crop uniformity, tree size control, and uneven bearing was carried out with subtropical fruit. Studies of high density management of tropical fruits were done. Vegetative propagation of clonal rootstocks for avocados, custard apple, kiwi fruit and macadamia proceeded. For avocados the main aim was for a rootstock tolerant to *Phytophthora cinnamomi*. The development of tissue culture for papaws and ginger was successful.

Bananas

A major banana varietal introduction programme was in progress to find commercially acceptable varieties resistant to Black Sigatoka leaf spot disease and Fusarium wilt Race 4.

Custard apples

Five newly selected cultivars were recommended for commercial plantings to replace the varieties African Pride and Pink's Mammoth.

Subtropical grapes

Early-maturing varieties of grapes were selected to receive high prices in the local and southern markets. Fifty varieties and 120 breeding lines from CSIRO were evaluated.

Guava

Guavas were researched to take over marginal horticultural land and provide a processing variety.

Kiwi fruit

The first significant plantings in Queensland occurred in 1975. It was shown that the crop was unlikely to be viable in coastal areas of Queensland lower than 500 m elevation. Varieties and rootstocks were compared.

Persimmon

Good prospects existed for developing a local and export market for persimmons based on recently introduced non-astringent cultivars. Of the non-astringent ones tested, the cultivar Fuyu possessed excellent yield and fruit quality. Sixty cultivars were under test. A rootstock, *Diospyros kaki*, was recommended for non-astringent cultivars.

Pineapple

Critical levels for soil and leaf of potash, phosphorus, calcium and magnesium were established and minor elements were understood. Reactions between elements were studied. Selection and breeding work continued to increase fruit size and numbers and to obtain *Phytophthora* resistance. Selection from RNA-winning exhibits did not produce improvement. Selection from known clones for fruit weight, good shape, freedom from knobs and preferably with a single crown was carried on. Trials in the environmental control facility confirmed that low temperatures of 20°C and below during the final three to five weeks of fruit growth would result in blackheart development.

Mangoes

In conjunction with CSIRO Food Research, Sydney, studies were undertaken to allow mangoes to be stored and transported for longer periods. A major upsurge in mango production was expected in the next five years.

Durian

The Kamerunga Nursery near Cairns produced its first durian fruit crop in 1985. It was very much sought after in South-east Asia and there should be a market amongst Australia's South-east Asian-born population. The Australian public might gradually develop a taste for it.

Coffee

Harvesting of fifty-seven varieties of Arabica coffee introduced since 1981 started at Southedge and Kamerunga in 1985 with the varieties Catuai, Catimor, Blue Mountain Kenya, SL34 and K7 performing best in north Queensland conditions. Techniques for mechanical harvesting and processing of the crop were developed.

Vegetables

Varietal improvement work was conducted with tomatoes, cucurbits, crucifers, beans, capsicum, sweet corn, processing beetroot, and peas; packaging, handling and transport also receive close attention.

Tomatoes.Tomato improvement programmes emphasised fruit yield and quality, disease resistance and production systems. Release of a variety resistant to Fusarium wilt (Race 3) was expected for the Bowen district and more broadly based resistances were being derived from interspecific and intergeneric crosses with *Lycopersicon pimpinellifolium* and *Solanum penelli*.

The fresh market variety Delta Contender produced larger fruit and higher yields than Flora-Dade during the main winter production season at Bowen and did well in the Lockyer and Bundaberg areas. It had better eating quality and longer shelf life. Tomato production systems incorporating raised beds, plastic mulches, seedling transplants and trickle irrigation were widely adopted and machinery was developed to perform all operations. The systems were also applied to melons and other vegetables. The high capital costs were offset by higher yields of marketable fruit, better pest and disease control, and more convenient management. In the post-harvest management sphere, DPI demonstration and training programmes led farmers to convert 50-tomato ripening rooms into trickle ethylene systems at Bowen. DPI promotion resulted in many farmers adopting pretransport cooling on their farms.

Trickle irrigation

With the decline in sugar returns, vegetable production was increased enormously in the Bundaberg district and more than 500 vegetable growers adopted trickle irrigation, saving 20% in water usage, with better pest and disease control, saving in labour requirement, and an average yield increase of 25%. In the Bowen areas approximately 90% of growers used some trickle irrigation.

Extension

The demand for horticultural advice increased remarkably, with several new growers entering the industry, the development of new growers and new production techniques. Regular training of extension staff by way of seminars and interstate travel to conferences and to visit production areas took place. Crop management calendars for the ten major crops to indicate the correct timing of production operations were drawn up. An excellent 226-page illustrated book entitled *Tropical Tree Fruits for Australia* was published by the Department in 1983 and was in strong demand.

Floriculture

Research on cut flower production and maintenance potting mixtures and weed control was undertaken.

Botany Branch

From July 1983 to June 1985 some 26 000 plants were identified for primary producers, consultants, DPI staff, other State and Commonwealth Departments, tertiary institutions and the general public. Advice on poisonous properties, weed potential, and control and distribution was supplied for many of these.

Certificates of identification under the Health Act were issued for 5117 cases involving samples of marihuana (*Cannabis sativa*) submitted by State police officers. In addition, identifications were required for 55 seizures made under the Customs Act. This indicates the seriousness of the drug traffic in this State.

Forty new species of plants were described by taxonomic botanists during 1984-85. In addition, twelve species, of which nine were new to Australia, were recorded for the first time in Queensland.

The computerised data base of Herbarium records contained 377 400 entries during 1983-84, making a vast amount of information readily accessible. The Herbarium collection was increased by 24 000 specimens during 1983-85 and the backlog of specimens awaiting incorporation was greatly reduced with the assistance of temporary staff provided by employment schemes during 1984-85. Some 14 500 specimens were exchanged or lent to other herbaria during 1983-84. During 1983-84 the first of three volumes of *the Flora of South-eastern Queensland* was published. This was the first substantial work on the flora of the State in 80 years. Major contributions were made to the *Flora of Australia*, a Commonwealth project aimed at publication of 50 volumes over the next 20 years.

A summary report and species list for the coastal Moreton region were published during 1984-85. This was based on previously published vegetation maps of the region. The report discussed the relationships of the vegetation and flora of the region in an Australian context, provided information on the status of rare and threatened plants and made recommendations for conservation and research management.

Two vegetation maps at a scale of 1:1 000 000, covering approximately 20% of the State, were published during 1984-85. These maps of south-western and south coastal Queensland provide one of the resource bases for planning and using and organising research priorities.

Entomology Branch

The banning of the fumigant ethylene dibromide (EDB) by the United States was serious for the Australian fruit trade, which required disinfectant treatments for pests such as the Queensland fruit fly. Development of alternative treatments became a priority. The feasibility of using ionising irradiation in the longer term was studied. In the shorter term, dips and spray treatments using dimethoate or fenthion were tried on fruit for export.

Recapture experiments in Victoria investigated the dispersal of the Queensland fruit fly. The flies were sterilised to prevent the establishment of a colonising infestation. The purpose of the dispersal studies was to determine if fruit fly populations in Victoria were derived from resident over-wintering flies. The results could have important implications for Queensland fruit growers. Adult fruit flies fed on leaf and fruit surface bacteria and research was in train to isolate the specific bacterial food of different fruit fly species and use this as a bait spray. Bacteria from the stomachs of field-collected fruit flies attracted up to 20 times more flies than autolysed brewers yeast then used in bait sprays.

A reflective mulch for rockmelon crops deterred the aphids which spread the virus from landing and feeding, infecting the plants with virus in the process. Silver-sided reflective mulches almost doubled the previous yield of the crop.

The use of the insecticide carbofuran to control white rice stem borer increased rice yields at Mareeba by 1 tonne per hectare.

Use of "Beetle Bait" to control soil-inhabiting insect pests resulted in increased plant populations and more even stands of sunflower crops in the Central Highlands. The bait comprised crushed wheat or sorghum grain, sunflower oil and the insecticide chlorpyrifos. Baiting of infested areas reduced the populations of false wire worm beetles, field crickets and wingless cockroaches, which could inflict serious damage on sunflower seedlings. Farmers distributed bait over about 40 000 ha of the Central Highlands during 1983-84. The retail florist trade in Queensland imported large quantities of flowers and ornamental leaves from New Zealand and Asia. About 12% of flowers arriving from New Zealand during January-February 1984 were infested, mainly with thrips. Whenever the Plant Quarantine Service discovered infestations of exotic insects in imported flowers, the blooms were treated immediately to eliminate the infestations and prevent establishment of the pests in Australia.

A sorghum pest management package comprising a suite of computer programs called Sorpest was developed and a computer model of sorghum production produced. The package allowed a grower to enter pest infestation and crop development information into a computer and obtain advice on the expected loss of income and the control measures required. Computer models for soybeans and sunflowers were under investigation.

DPI entomologists continued to investigate the relationship between numbers of female sorghum midges visiting sorghum heads in flower and the resulting grain yield loss. Results indicated that midge-susceptible hybrids lost five times more weight of grain per visiting midge than the most resistant hybrids from the DPI's breeding programme. Resistant hybrids sprayed with insecticides yielded about 6 t/ha whereas susceptible hybrids produced 3.7 t/ha. The same hybrids, unsprayed, produced 4.8 t/ha and 1.3 t/ha respectively.

Grain protectant insecticides for use on maize and rice during storage were studied in a project supported by ACIAR (Australian Centre for International Agricultural Research). Collaborative research on the project in South-east Asian countries involved agreements with the National Post Harvest Institute for Research and Extension in the Philippines and negotiations were proceeding with the Malaysian Agricultural Research and Development Institute.

Every effort was made to coordinate the research on the *Heliothis* caterpillar which severely attacked so many field crops. A timing strategy was aimed at to delay the build-up of resistance and an attempt was made to encourage chemical companies to promote their products at the right time and put a constraint on their use.

A *Heliothis* insecticide use strategy was developed by T. Passlow, Director of the Entomology Branch of the Department, in conjunction with Australian Veterinary Chemicals Association (AVCA), some specialist groups such as COD, Queensland Grain Growers Association (QGGA), Queensland Agricultural College (QAC), commodity boards and the University of Queensland during the 1982-1984 seasons in an attempt to curtail the development of insecticidal resistance (particularly to the pyrethroids) in *Heliothis armiger*. This resistance had originally developed in the Central Highlands but was now occurring in all areas. Initial surveys showed that the strategy had limited the resistance problem. Periods for the use of pyrethroids were suggested for the various summer crop growing areas of the State, viz central Queensland (10 January to 20 February), south coastal Queensland (20 September to 31 October) and Ayr-Bowen-Mackay (1 August to 10 September). Cotton and sorghum growing areas were primarily involved but *Heliothis* had a wide host range.

A pesticide application manual went on sale in the Department during 1983-84. Its aim was to increase awareness of the principles and practices involved in all forms of pesticide application for plant protection. More than 200 DPI and Bureau of Sugar Experiment Stations extension and advisory officers did an intensive course on pesticide application.

Plant Pathology Branch

A new race of sorghum head smut (Race 3) was found in a male parent line TAM 422 in a sorghum-crossing plot at Mt Tyson in November 1983. Tests began to determine whether any commonly grown hybrids were resistant. The race had not been found elsewhere in the State and a subsequent planting of sorghum cultivars at Mt Tyson was not affected.

Zucchini yellow mosaic virus was recorded for the first time in Queensland on pumpkins in the Lockyer Valley during 1983-84, and in the Bowen district during 1984-85. This virus was related to watermelon mosaic virus, but caused more severe symptoms. Breeding lines resistant to watermelon mosaic virus also appeared to be resistant to zucchini yellow mosaic virus. Seed of all cucurbit crops from infested areas was tested to determine whether the virus was seed-transmitted. Resistant cultivars were bred. Cucurbit powdery mildew proved difficult to control in many areas of Queensland. In a study of fifteen isolates of the causal fungus from various parts of Queensland, all were resistant to benomyl and seven exhibited varying degrees of resistance to triadimefon.

The most severe epidemic of wheat stem rust for many years developed on cv. Oxley and crops from the Central Highlands to Miles were severely damaged during 1984-85. A farreaching result of the epidemic was the selection of a new strain of stem rust which affected the related cultivars Cook, Shortim, Timson, Timgalen and Mendos.

Stripe rust was detected in commercial wheat crops in Queensland for the first time in July 1983 in the Toobeah-Goondiwindi area and later throughout the Darling Downs, and south-east Queensland. Between 10 000 and 15 000 ha of wheat were sprayed with bayleton or propiconazole in an attempt to control the disease. Disease severity was generally low during 1984-85.

Boil smut of maize continued to spread throughout south-east Queensland during 1983-84, being reported as far north as Cloyna near Murgon and as far west as the Dalby-Cecil Plains road. Generally, few plants in any one crop were affected. Laboratory tests indicated that the fungicide Bawsan [R] killed spores contaminating maize seed without adverse effects on germination after 12 months' storage.

Poor growth of rice in the Ayr district was shown to be caused by needle nematodes feeding on the outside of roots only after the rice was flooded. Once permanent water was removed, nematodes survived in a quiescent state, mainly at depths of 15 to 25 cm.

Sunflower breeding lines with resistance to races 1 and 3 of sunflower rust were released for use by public and private plant breeders during 1983-84. This material was derived from crosses between oilseed sunflower (*Helianthus annuus*) and wild sunflower (*H. argophyllus*) by plant breeders. Bacterial blight of cotton was widespread in central and

southern Queensland during 1984-85. The high level of seed transmission in acid-delinted commercial seed proved to be a major source of primary inoculum. In dry years seedling blight was minimal despite a high inoculum level in the seed, but under favourable conditions severe seedling blight occurred with a build-up of bacterial blight in the crop with subsequent yield loss.

Phytophthora root rot was recorded in the major soybean growing areas of southern Queensland but not in the Central Highlands or north Queensland. The cultivar Nesser was not affected. Anthracnose remained the major problem of stylosanthes in tropical pastures, reducing productivity of leaf and seed production. More than 300 plant selections from the Departmental collection and promising lines from CSIRO were screened for resistance. It was hoped that an interim line might released from this work to replace cv. Fitzroy.

Black Sigatoka disease remained confined to bananas in the northern part of Cape York Peninsula and a few islands of the Torres Strait. A publicity campaign initiated in 1981 to inform local residents and travellers of the prohibition on the movement of bananas from the Torres Strait region to other parts of Australia was expanded.

Race 4 of the fungus that causes Panama disease has continued to spread in banana plantations in south-eastern Queensland. Exotic banana cultivars have been introduced from Honduras, Cook Islands, South Africa and the Philippines and are being tissue-cultured prior to testing their resistance to Panama disease.

Phytophthora root rot of avocados was controlled by injecting trees with phosphorous acid at a fraction of the cost of conventional fungicide treatment with fosetyl (Aliette [R]) or metalaxyl (Ridomil [R]). Phosphorous acid was not registered for commercial use.

Citrus canker was found on West Indian limes and sweet oranges on Thursday Island in May 1984. All diseased trees were destroyed. The disease was not found on the Australian mainland or on other islands of the Torres Strait.

Bacterial spot was the most serious disease facing the expanding mango industry. An integrated programme involving the establishment of windbreaks and regular fungicide sprays to protect new growth flushes and fruit gave promising results. Several varieties from Florida exhibited useful levels of resistance.

Solarisation, which involved heating soil by covering with thin, clear, plastic sheeting for several months during summer, gave good control of verticillium wilt of tomatoes at Redland Bay but did not control Fusarium wilt in the Bowen district where Race 3 of the pathogen was spreading and posing a serious threat to the future of the tomato industry.

Division of Land Utilisation from 1983

The role of this Division was:

— to identify the State's land resources and land use capabilities;

- to develop and promote the implementation of land use, land management and soil conservation practices to conserve productivity and stability of land resources; and
- to provide specialist technical services to other branches, Government departments and primary industry in the fields of soil and land resources and agricultural chemistry.
- The main responsibilities of the Divisional Directorate were:
- to formulate and advise the Director-General on agricultural land use policies and to research and interpret Government Departmental policies and priorities on these issues and advise branches accordingly;
- to provide liaison with other organisations and to coordinate related Departmental activities in land use matters;
- to ensure satisfactory planning and coordination of inter- and intra-Divisional activities.

The main responsibilities of the Land Resources Branch were the:

- description and mapping of soil and land resources of the State;
- interpretation and evaluation of land resource information;
- planning of land use and land management to ensure long-term productivity and stability of land.

The main responsibilities of Soil Conservation Research Branch were:

- to determine the effects and costs of land degradation;
- to research and define land degradation processes;
- to evaluate land management practices;
- to develop, test and promote management systems which ensured long-term land productivity.

The main responsibilities of the Soil Conservation Services Branch were:

- to create awareness of soil conservation needs and promotion of conservation practices to minimise soil loss and land degradation;technical advice on soil conservation;
- to prepare land management and soil conservation plans for groups or individuals;
- to provide technical and administrative support for the planning and implementation of schemes within declared Areas of Soil Erosion Hazard to Project Areas under the Act;
- to monitor and evaluate practices and works.

The main responsibilities of the Agricultural Chemistry Branch were:

 to provide a chemical resource service to other branches and Government departments and to primary industry; — to assist in achieving more efficient primary production in Queensland by carrying out research in fields of plant, soil and pesticide chemistry, soil fertility and cereal science.

Land Resources Branch

While the Land Resources Branch was not involved in making land use decisions it did assist in this area by providing land resource information to landholders, industry, local authorities and government.

During 1984 H. S. Briggs was on secondment to the Commonwealth Department of Primary Industry on the National Soil Conservation Programme and the previous branch director, Noel Dawson, moved to the National Parks and Wildlife Service. Brian Vandersee undertook the dual responsibilities of Director and Assistant Director. A staff interchange programme was implemented with the Department of Scientific and Industrial Research, Wellington, New Zealand, and C. M. Ellis, Assistant Senior Cartographer, left Brisbane for Wellington on 3 May 1985. It was hoped that this would be the forerunner for similar programmes in the future.

The branch's staff were located in eleven country areas - at Ayr, Bundaberg, Charleville, Emerald, Ingham, Kingaroy, Mackay, Mareeba, Rockhampton, Roma and South Johnstone Research Station - in addition to a base team at head office at Indooroopilly. Staff training courses and intrastate workshops and conferences were also undertaken.

Land resource (land systems, soils, vegetation, land suitability, geology, land capability, geomorphology, land degradation, on ground water) mapping was carried out throughout the State during the 1981-85 period. Agricultural development studies were made for the Department of Lands for the Nebo-Collinsville region where cropping increase was rapid. It was suggested that rain-grown cropping as a sole enterprise had little potential, but that substantial potential for rain-grown cropping in association with beef cattle production existed. Soil mapping for farm development in the Burdekin Irrigation Area continued. A survey showed that approximately 1400 ha east and north-east of Sheep Camp Creek were suitable for general irrigated agriculture. Some 3000 ha in the Mulgrave section were surveyed for rice production for the Irrigation Commission but their suitability was questioned. The soils map for the Elliott River - Bowen region was completed and irrigation suitability for a range of crops provided for the Queensland Water Resources Commission.

The Burnett area was surveyed and a number of areas with development potential for agriculture were identified. A detailed soil map of the "Brian Pastures" Pasture Research Station was completed. A soil survey of the Lockyer Valley was under way, and a 1:10 000 soils map of the Department's Mutdapilly Research Station was completed as a basis for planning. A map was also provided to the Queensland Wheat Research Station of its experimental farm at Wellcamp.

An inter-branch booklet entitled *Cropping in the Maranoa and Warrego* was released for sale by the Department. Detailed studies were made of selected areas of the Roma and Wallumbilla areas in relation to land use as cropping extends westward. It was estimated that some 10.7 million ha in central Queensland could be readily cultivated although only 3.7 million ha had potential for long-term cropping. Funding was provided under the

National Soil Conservation Programme to carry out a land resource assessment and land management project in the dry tropics. Land studies to assess the land resources available to the sugar industry for Cardwell-Tully, Innisfail, Ingham, Mackay, Plane Creek and Maryborough, were undertaken and these data would be valuable in assessing the future limits to sugar cane production in line with the possible restructuring of the sugar industry. A study of horticultural land use in the Sunshine Coast was nearing completion and was sought after by Departmental, industry and private organisations in the area.

Monitoring of pasture condition and trends was carried out at Wallen, Croxdale and Lanherne in western Queensland and a study of land degradation in Quilpie was expected to be completed in 1985. A joint study with the Lands Department to assess the present condition of the Mulga lands in the area enclosed by a line joining Charleville, Quilpie, Thargomindah and Cunnamulla was under way.

An important activity of the Land Resources Branch was assisting local authorities with draft town planning schemes, strategic plans and development control plans.

Soil salinity became an increasingly important hazard to land utilisation and the branch included its occurrence in its regional surveys.

Soil Conservation Research Branch

This branch was formed in 1983. The existing Soil Conservation Research Group already operating within the then Development Planning Branch was augmented by including soil physics expertise from the Agricultural Chemistry Branch and conservation cropping management expertise from the Soil Conservation Services Branch and four agronomists from the Agriculture Branch.

Soil salinity was monitored at Clermont, Biloela, Rockhampton, Darling Downs, Lockyer Valley, Maryborough and Bundaberg. A series of workshops was held by the Departmental Salinity Co-ordinating Committee, the first being held at Rockhampton in May 1985. The specific aims of these workshops were:

- to outline basic principles of landscape salting processes, soil and water salinity, salinity measurement and data interpretation;
- to provide guidelines on the minimum information on salting outbreaks that should be obtained by local officers to enable planning and reclamation management;
- to provide guidelines for assessment and management of irrigation waters for different crops, environments and soil situations;
- to discuss specific regional salinity issues including management, prevention and reclamation approaches in order to determine the best regional options and additional research needs.

The two main areas of salinity degradation under investigation by the branch were irrigation and dryland. Fifty-three per cent of Queensland's irrigation was from ground water with over twenty per cent of waters of sufficiently high salinity to reduce crop yield.

A smaller proportion had sodium problems. A model of irrigation water quality assessment was developed which quantified the water, soil, climate and crop to give a much better estimate of available resources and salinity hazards. The long-term effects of irrigation and clearing of up-slope areas on the salinity of the alluvial aquifers and streams in the Lockyer Valley were modelled. The model suggested that the time required for alluvial aquifers to reach a new salt equilibrium varied from many decades to several centuries.

Sites on the Darling Downs and in the Burdekin were studied in detail to elucidate dryland salting following removal of native vegetation.

The branch assessed the direct effect of soil erosion on land productivity in the areas of removal of surface soil and in-situ degradation or grazing. The effects of land management on soil erosion were monitored from intensive land use (sugar cane and pineapples), extensive cropping (grain and oil seed) and grazing land. Catchments being studied ranged from 0.1 ha in caneland to 6500 ha in crop land.

The major work to date was the study of run-off and sediment transport with a rainulator and of infiltration with a small rotating disc rainfall simulator.

Soil physical studies were an important aspect of the branch's research, especially under irrigation and with the cracking clays. The swelling gray clays of south-east Queensland had problems of seed establishment and subsoil moisture penetration associated with a cloddy surface and high levels of exchangeable sodium. When the cracking clays were wet to saturation, visible soil crumbs were destroyed by slaking.

More effective methods of data measurement were developed.

Soil Conservation Services Branch

A summary of the land degradation situation for the grazing and cropping lands of the State was presented in the 1982-83 annual report of the Soil Conservation Branch. Various forms of degradation due to the variable climate, erodible soils and years of exploitation for rural production were identified. Rainfall was too low and variable in many parts of the State to sustain good plant growth and when it did fall, high rainfall intensity often caused serious damage. The form of degradation differed according to location, land resource and land use.

Arid Lands. Land with insufficient rainfall for growing crops or improved pastures accounted for 84 million ha, or 52% of the State's land under rural use. Most of this suffered vegetation degradation, while some 20 million ha suffered moderate to severe soil erosion as well. Vegetation degradation, if unchecked, was likely to expose soil to wind and water erosion over a much wider area.

Non-grazing land. About 31% of the 75.2 million ha of non-grazing land was degraded. Sheet and gully erosion occurred on about 17.2 million ha of this land. Siltation effects were observed in water catchment areas.

Cropped land. Ninety per cent (2.5 million ha) of the 2.8 million ha of cropping land suffered from water erosion (sheet, gully and sill). Most of this (2.2 million ha) was in extensive

cropping areas, i.e. land used primarily for grain production under dryland conditions. This land was developed for crops (1982-83) at the rate of about 77 000 ha annually. It contained a good deal of former brigalow and open downs land. At May 1983 it was estimated that 4 673 300 ha of the State required treatment and only 1 573 000 had been treated.

Departmental officers were involved in cooperative trials in conservation cropping development at Toowoomba, Kingaroy, Emerald, Biloela, Wallumbilla and Monto. At Wallumbilla moisture conservation and soil loss were being monitored under a variety of management practices and at Monto studies of conservation systems for brigalow soils were conducted on three grain properties. Grower interest in reduced and zero tillage and no-till increased and trash retention in canelands increased. During 1983-84 an area of 64 110 ha of cultivated land was treated with soil conservation works such as contour banks (55 630 ha) and other surveyed measures such as strip cropping and strategic banks. A total of 122 farm plans covering an area of 70 100 ha were prepared for areas not subject to statute requirements and five Project Plans covering 5625 ha were approved by the Governor-in-Council in areas of soil erosion hazard. Funding for staff, capital costs and operating costs was obtained through the National Soil Conservation Programme for three soil conservation group schemes in the grainlands of central Queensland.

Early "teething" troubles with McLatchey electronic mobile staves and laser units were largely overcome and the equipment greatly increased output. Electronic tachometers proved most reliable and suitable for rapidly obtaining detailed topographical survey information.

Requests for services remained high, with 4233 landholders seeking advice during 1983-84. The employment of assistants under the Commonwealth Employment Scheme (CEP) for topographic surveying, field surveying, drafting and technical assistance helped in the achievement of branch objectives. Planning under the Soil Conservation Act 1965-80 in the areas of erosion hazard, comprising eleven Shires on the Darling Downs and parts of the Isis and Gin Gin districts near Bundaberg, and the five project plans covering 5625 ha was approved by the Governor-in-Council. Project plans covered a number of properties in a sub-catchment and, following approval, landowners were required to undertake prescribed soil conservation works. A total of 82 plans covering 119 468 ha of agricultural land were approved up to June 1984 since the programme had begun in 1973. A Project Plan for 49 landholders in the 2420 ha Cherry Creek Project Area on the Atherton Tableland was approved. Provisional planning was also accomplished for 182 properties on the Darling Downs and Burnett areas covering 27 734 ha.

Drafting services for farm plans and other mapping operations related to soil conservation planning were provided by staff at Brisbane, Bundaberg, Rockhampton, Dalby and Kingaroy.

Technical and research developments included gully control structures, run-off and soil loss estimation in Darling Downs catchments, and advanced surveying equipment. At Crawford, Kingaroy run-off and rainfall data from two years of records were digitised. The data were used to validate the runoff coefficient for use with the Rational Formula. Land Management Field Manuals were prepared for the Coastal Wide Bay-Burnett, Inland Burnett, Wandoan, Roma, Atherton, South-east Darling Downs and Goondiwindi areas in conjunction with the Land Resources Branch.

Grass species for waterways were evaluated at Mutdapilly and in the coastal Burnett areas.

Branch efforts to improve the adoption of conservation cropping measures during the year 1983-84 included 56 talks given to schools and universities, 52 field days and farm walks, 30 show displays and 109 press articles and farm notes. Farm walks and field days appeared to be the most effective. A DPI/BSES field day on minimum tillage in the Mackay district attracted 300 canegrowers; and 50 land holders in the Chinchilla, Dulacca and Wandoan areas attended a seminar entitled "Protecting the Sloping Brigalow Lands" at Chinchilla. Two videos-"Better Farming with Stubble" and "Talking about Stubble Mulching"-were widely distributed and the film "Soil, There's plenty of it ... isn't there" was heavily borrowed by schools, colleges and service organisations.

Agricultural Chemistry Branch

The Agricultural Chemistry Branch comprised laboratories at Mareeba, Ayr, Biloela and Toowoomba as well as the head office laboratory complex at Indooroopilly. Branch research covered a range of activities in the fields of soil, water, plant and agrochemical sciences. Research was often dependent on funding from non-government sources. Financial support during the 1983-84 year came from the Wheat Industry Research Council, Barley Industry Research Council, Queensland Wheat Industry Research Committee, Queensland Barley Industry Research Committee, Tobacco Industry Trust Account, Oilseeds Research Committee, COD, Cotton Research Committee, Rural Credits Research Fund, Rice Marketing Board, Honey Research Committee, Burdekin Project Associated Works, Fresh Fruits Disinfection Subcommittee, Queensland Grain Growers' Association, Macadamia Research and the National Soil Conservation Programme.

The Agricultural Chemistry Branch also had a significant routine analytical service role to provide support for regulatory, extension and research staff of other Branches.

Regulatory samples included fertilisers, agricultural lime, stock foods, referee wheats, export grains, pesticides, veterinary medicines, pesticide residues, fumigation chambers and miscellaneous analyses. Service samples for research officers included elemental analysis, oilseed content and quality, tobacco alkaloids, cassava (starch, fibre and total fermentables), soil surveys and analyses, waters and pesticide residues.

In the area of pesticides and agrochemicals research centred on the persistence of dimethoate in dips, analysis of dithiocarbamates, phenoxy herbicide specifications, insecticide residues in horticultural produce following field application, bee investigations (evaluation of attractants), dimethoate residues in mangoes and avocados, fenthion residues in tomatoes, and glyphosate residues in plant samples. Results demonstrated that the residues of dimethoate could be detected in avocado skins of fruit treated according to Departmental recommendations for up to 14 days after treatment. The Australian Maximum Residue limits to 2mg/kg of dimethoate. In the area of cereal science, research centred on wheat quality evaluation, weathering resistance in wheat, barley variety evaluation, methods of evaluating barley quality and rice quality evaluation.

Plant organic chemistry studies included sunflower oil quality improvement, peanut quality improvement, tobacco variety evaluation, and development of insect resistance in cotton.

In the area of inorganic chemistry, a study was made of inter-crop migration of *Heliothis*, and the compilation of an analytical laboratory method book was under way.

Computer system investigations included studies on laboratory data acquisition subsystems, including instrument interfacing and development of field-based data acquisition and recording systems. A major portion of the work of the Chemical Laboratory was the laboratory assessment of soils from land surveys, soil chemical processes, land management and soil chemical properties (stubble retention), scalds, reduced tillage, nitrogen studies in degraded pastures, soil and plant test calibration, fertiliser strategies and effects, soil and water salinity/saline seepages, groundwater chemistry, effect of water quality on soils and plants, analytical methods, and environmental monitoring of EDB in groundwater.

Division of Animal Industry from 1983

The meat industry

Although the industry downturn during 1983-84 affected Queensland less than other States, Mareeba and Roma abattoirs remained closed during 1983-84. Biloela, Maryborough and Huttons (Brisbane) closed for part of the year but later reopened under new ownership. After change of ownership, works at Rockhampton and Dinmore closed, with reopening subject to industrial award ramifications. The export industry was still concerned about excess capacity and viability. In contrast, small domestic works generally were busy, being able to process at a lower cost.

Meat inspection

On 1 April 1985 the Primary Industries Minister, Neil Turner, signed on behalf of the State an agreement with the Commonwealth that transferred to the Commonwealth the inspection of meat slaughtered in export abattoirs for domestic consumption. This followed the abolition of State fees in export registered works, which relieved producers of dual meat inspection fees and resulted in substantial savings to the industry.

Under the new arrangements the State continued to have a viable and efficient meat inspection service. Officers of the State Government would continue to provide inspection services at domestic abattoirs, slaughterhouses, knackeries, smallgoods-processing plants and retail meat outlets. In addition, they retained responsibility for monitoring domestic meat marketing, including classification, trade and consumer identification.

With this rationalisation of meat inspection services within Queensland 23 inspectors were transferred to the Commonwealth. Random testing of meat samples for species of origin was carried out through 1983-84. Samples were collected from retail meat outlets, smallgoods manufacturers and some pet food stores. None of the 1000-odd samples contained unacceptable meats. Kangaroo and horse meat were detected only in pet foods. Economic problems continued in the pet food industry and an industry consultative group

was set up. A number of State officers were authorised as officers under Commonwealth regulations to help control export game meat.

Meat quality

The meat quality section of the Department's Veterinary Public Health Branch convened a working group representative of the pig industry to develop a code of practice for handling animals from farm to slaughter. The code was published.

The Veterinary Public Health Branch, in conjunction with the Livestock and Meat Authority of Queensland, was active in promotion of meat as a nutritious food. A beef promotion film, Tough and Tender, was launched by the Minister for Primary Industries late in the year. Changes were made in retail meat trading by permitting meat sales over the front counter direct into the malls of air-conditioned shopping complexes.

Limits for pesticide residues in meat for both the local and export markets were set by legislation. Approximately 5000 samples of fat from slaughter cattle throughout Queensland were monitored for residues of 23 pesticides. These analyses indicated a responsible use of these chemicals with a compliance rate in excess of 99%.

The beef cattle industry

Three beef production seminars were conducted at Clare, Mt Isa and Longreach for the managers of pastoral company properties. The seminars were a new communication initiative between the DPI and cattle managers on the large and remote properties of the west and north of the State and would be a permanent extension activity.

Animal appraisal and marketing courses were conducted for stock and station agents, in association with the Queensland Agricultural College and the Livestock and Meat Authority of Queensland. More than 100 livestock agents participated.

Volumetric loading of multi-deck crates was introduced to exempt them from weighing; it was cheaper, gave quicker transport to markets and saved producers thousands of dollars. It also allowed double-deck cattle transports to deliver cattle to Cannon Hill Saleyards and reduced charges as well as keeping the saleyards viable for cattle trading.

A major activity in advisory programmes was aimed at creating a greater awareness of the need for reducing the age at slaughter and satisfying consumers' demands. This approach was supported by other programmes designed to promote carcass classification and sale by description. Other advisory programmes receiving some emphasis were the use of adapted cattle and objective selection criteria; pasture improvement with stylo and para grasses and management practices designed to reduce labour costs.

A condition of water or pale soft exudate (PSE) had been seen in pig carcasses for some years and less often in beef and buffalo carcasses. It appeared to be caused by stress and excitement before slaughter. The message was "Be kind to animals going for slaughter".

Queensland's cattle producers had available schemes for electronic marketing of cattle including QUEST and NELCM. Officers of Beef Cattle Husbandry Branch assisted in the

conduct of these two schemes by participation in major advisory programmes for producers on the operations and benefits of the schemes. One advantage of these schemes over other methods of selling was that they minimised animal handling and transport. Investigation of the most efficient handling and transport of cattle for both production and welfare aspects was a major endeavour of this Department in recent years. To consolidate this work and that of other organisations and work for future planning, officers of the Department organised a national workshop on cattle handling and transport facilities for personnel in the private and public sectors. Initiatives for research, extension and regulatory consideration were developed.

Staff conducted schools throughout the State to develop the live animal assessment skills of producers. These schools continued and would promote carcass classification trading. About half the export abattoirs now offered price schedules based on premiums and discounts for various carcass classification, weight, fat, age and sex classes.

Tick fever

The Maxwelton Special Area (MSA) was defined in December 1981 as a result of a severe outbreak of cattle ticks in country normally regarded as tick-free. The MSA originally involved 146 properties in movement restrictions. As a result of progress in tick eradication the MSA was redefined as three smaller sub-areas, namely MSA (Julia Creek), MSA (Richmond) and MSA (Hughenden). As a result, 67 properties were released from movement restrictions in May 1985, and further progress was expected.

Additionally, work continued on double-fencing the Great Northern Railway line between Hughenden and Cloncurry. As most is now double-fenced this will act as a barrier against the free movement of tick-infested cattle to tick-free areas south of the railway line.

In this programme also a dip and railway trucking complex were erected at Maxwelton to facilitate the movement of stock from the area.

Because of the strategic importance of a dip at Helidon, a decision was made to construct a Government-owned facility on the Mines Magazine Reserve following negotiations with the Railways and Mines Departments. Construction progressed satisfactorily and the dip was completed and operational by October 1985.

In phosphorus-deficient areas of the State, botulism caused some severe losses in cattle which were exacerbated by the dry conditions. As combined botulism types C and D vaccine was largely unprocurable, graziers were encouraged to vaccinate with the readily available monovalent type D vaccine. It gave excellent protection in the field.

A control programme aimed at significantly reducing the genetic pool of Pompe's disease in Queensland stud Brahman cattle was commenced. The programme had strong support from the Brahman Breeders Association.

Widespread outbreaks of ephemeral fever occurred in cattle from six months to two years of age in eastern coastal and subcoastal areas. Approximately 1% of affected cattle died. The vaccine developed by the University of Queensland Veterinary School to control this

disease was registered and available during 1985. The Department collaborated with the University in field efficacy testing of the vaccine.

Salmonella dublin

Salmonella dublin, introduced to the Mutdapilly Research Station by heifers originating from Victoria, was successfully eradicated from the Station. The disease was also detected on a limited number of commercial properties following introduction of cattle from Victoria. Of concern was an outbreak of *S. dublin* septicaemia in calves purchased from a saleyard in which there was no apparent link with Victorian cattle.

Stock poisoning

Aflatoxin, a mycotoxin produced by the fungus *Aspergillus flavus*, caused losses of pigs, cattle and ducklings. Fungus-infested grain was frequently associated with this intoxication, as was the case in the outbreaks referred to.

Copper is an essential dietary element for livestock and deficiency results in poor growth, anaemia and neurological disturbances. However, it is also a very toxic element and deaths were recorded in cattle that had accidental access to a copper salt; in pigs that were fed a ration in which the added copper was in macro-instead of microfine particles, thus precluding adequate mixing; and in goats that, when being treated to prevent deficiency, were injected with three times the recommended dose of copper glycinate.

Brachiaria sp. pastures are grazed in north Queensland. In South-east Asia animals grazing *Brachiaria* pastures have developed liver necrosis, jaundice and photosensitisation. It has been postulated that this intoxication is due to the fungal toxin which causes facial eczema. Of 30 dairy cows grazing *Brachiaria* on the Atherton Tableland, 11 aborted and 7 of these cows died. Foetal pathology was consistent with the changes described in South-east Asia.

Blue-green algae poisoning caused the loss of 24 cattle on a Mitchell property. Thirty others were also affected out of a mob of 900 mixed cattle that had access to the dam containing the algae growth. The affected cattle suffered from severe liver damage and photosensitisation.

Losses of cattle from poisoning by eating sawfly (*Lophyrotoma interruptus*) larvae containing a liver toxin were estimated at \$10 000 annually from 1972 to 1981. The only satisfactory control was the clearing of silver-leaf ironbark, the main food of the sawfly.

During 1983-84 seven instances of arsenical poisoning were recorded due to neglected containers of arsenic trioxide.

Bryophyllum tuberosum (Mother of Millions) which poisoned cattle and sheep was found to contain three toxins - bryotoxin A, B and C, the A toxin being most potent.

Brucellosis and tuberculosis

In the spring of 1984, the Minister visited north and north-western Queensland and spoke with groups of graziers involved in bovine tuberculosis eradication programmes. He was

accompanied by grazier members of the Pastoral Advisory Committee and senior Departmental staff.

Largely as a result of this visit, eradication policy was modified, in that greater emphasis was placed on graziers developing disease-free groups of young breeding cattle and lesser emphasis upon destocking to achieve freedom from tuberculosis.

Three additional assistance measures were made available to graziers in remote areas. These included a \$2 per head testing subsidy where satisfactory musters were obtained and a 75% freight rebate for cattle purchased for restocking which travelled in excess of 200 km. The interest rate for finance available to eligible graziers to erect capital improvements to assist in disease eradication was reduced from 8.5% to 4% for the first five years. Also, there was a negotiable period up to three years for the deferral of interest and redemption, provided the full loan was repaid within the approved term, while the loan limit was raised from \$100 000 to \$150 000. These revised terms applied retrospectively to the commencement of the 1984-85 financial year.

Satisfactory progress was maintained in the eradication of brucellosis and tuberculosis. The whole of Queensland was declared a Provisionally Free Area for brucellosis on 30 June 1984 and the Provisionally Free Area for tuberculosis was extended to include the Shires of Winton and Diamantina and the western parts of the Shires of Barcoo, Bulloo, Longreach and Quilpie.

Destocking of the Queensland section of the Simpson Desert National Park was undertaken during November-December 1983. Helicopters were used and 261 feral cattle were destroyed. Destocking was necessary to protect properties that had undertaken costly BTB eradication programmes from re-infection from feral cattle in the district. A safe period between destocking infected areas and reintroduction of clean cattle was assessed for north Queensland as no longer than eight weeks.

The brucellosis eradication campaign is the most complex animal health programme undertaken in Australia, but progress made is very satisfactory. In 1985, 99.2% of Queensland's breeding herds were classified as negative or free for brucellosis and a further 0.2% were provisionally clear. As recently as 1979, only 50% of herds had a similar clean status.

Only 146 herds were classified as infected for tuberculosis in 1984-85 and most were located in remote areas. However, the number of cattle with tubercular lesions at slaughter had been reduced from 2952 (0.15%) in 1975-76 to 763 (0.04%) in 1984-85.

Enzootic bovine leucosis (EBL)

The prevalence of EBL was to be progressively reduced to a level that allowed total eradication at some future time. To support this policy, the DPI established an EBL accreditation scheme. Initially, the scheme focused on stud herds, but applications from commercial herds were considered. About 220 herds, involving about 25 000 cattle, were tested during 1983. Results showed that 76% of herds and 14% of cattle were infected.

Experiments showed that the EBL virus could be killed by the flash pasteurisation temperature of 73°C for 15 seconds.

Twenty-one dairy herds were granted accredited free herd status during 1984-85 and over 1000 underwent one or more herd tests. Nearly 600 of the State's 2500 dairy herds pursued testing towards accreditation. Test results showed a reduction in overall prevalence of reactors to the test from 14.2% to 7.8% during the year.

The reagents used to test serum from cattle in the accreditation scheme for enzootic bovine leucosis are now produced at the Animal Research Institute. Before March 1985, the only reagents available came from the United States of America, at considerable cost. The use of locally made products saved over one dollar in materials for each test.

A survey showed that *Stephanofilaria*, a small worm that lives part-time in the skin of cattle, causing irritation and damage to the hide, was present in 5% of cattle in south-east Queensland, but in 94% in Cape York Peninsula. The prevalence increased with the age of cattle. The worst infected were old *Bos taurus* cattle. Research indicated that the lesions were caused by the worm being transmitted by the buffalo fly.

Post-weaning diarrhoea in beef calves in some areas of Queensland may be due to coccidiosis, a disease caused by the intestinal parasite *Eineria zuernii*. Studies in north Queensland indicated that infections picked up by calves early in life remain unapparent until weaning. The stress of weaning apparently allows parasite numbers to build up in the gut wall, and clinical disease can result. Methods for control of the condition were being investigated.

In the past, numerous field trials have been conducted to test the effects of growth promotants coming onto the market. These trials were continued with newer products and assessments were made on the effect of long-term use of these products. There were indications that in terms of liveweight advantage, use during the final fattening season was as good as extended use.

Recent research had demonstrated the improvement to the nutritive value of bagasse with alkali treatment. Bagasse treated with alkali, urea and molasses maintained cattle in a drought situation. The results of this project were presented to the sugar industry and one mill prepared to treat bagasse during the crushing season. Treated bagasse would be fed in feedlot rations and/or sold as a drought feed.

Sheep and Wool Branch

Lyle Winks took over from Dr P. Hopkins as Director of the Branch in September 1983.

Sheep blowfly

A film financed by the Wool Research Trust Fund, "Three Costly Days", was released during 1983-84. It dealt with the primary sheep blowfly (*Lucilia cuprina*), describing its life cycle, its costs to industry and methods of control, and emphasising the need for timely control. The

film was made available to educational institutions and private companies. Flystruck sheep show a drop in tensile strength of the wool proportional to the degree of strike.

Reduced fibre diameter and/or a drop in tensile strength will have more significance when Sale by Description is established.

A strike with more than 1500 larvae could cause economic loss in wool production due to a larval toxin, reaching 15-30% with counts of 3000-4000 *Lucilia* larvae. Larvae can overwinter in the soil as prepupal larvae for up to eight weeks. This method of survival had not been previously demonstrated. Larval excretions were used to screen sheep for resistance to blowfly strike and antibodies were sought to reduce larvae survival.

Wool production

High producers are more efficient in converting food to wool, and when supplemented with the sulphur amino acid, methionine, at 2.5 g/d on a mulga diet, the high producers gave a 32% response in wool growth compared with an 18% response in the low producers. The provision of a nitrogen-phosphorus-sulphur supplement improved wool growth rates of sheep consuming mulga by 21%.

Ingestion of broad-leaved plants

Ingestion of some broad-leaved plants appears to have some toxic effect on lamb marking percentages. Ewes between 100 and 130 days' gestation running in a paddock cleared of broad-leaved weeds marked 82% of lambs compared with 51% marked from ewes grazing a paddock containing the weeds.

Extension

A short-term (one month) mass media campaign in the north-west by Sheep and Wool Branch officers produced five times as many enquiries as had been received in the previous month. A display by the Information and Extension Training Branch at "Boonoke", Deniliquin, NSW, led several commercial companies to offer to collaborate in sheep and wool research programmes.

During 1984-85 five video films covering the management of mulga and Mitchell grasslands, water medication, production and fortification of bush hay, and flock management to improve reproductive rates, were prepared in collaboration with other branches.

The pig industry

Imported and local pig breeds continued to be evaluated in boar performance tests at the Department's Pig Testing Station, Rocklea. Sufficient imported Durocs were evaluated to obtain a significant estimate of performance. Canadian Yorkshires and Durocs outperformed local breeds in both economy of production and carcass trials.

The Central Boar Performance Test Station at Rocklea processed a record 462 boars during 1984-85. More pigs of Canadian origin in the Queensland herd improved the average performance at the station to 0.96 kg daily gain, 2.59 food conversion and 15.2 mm backfat.

In 1984 the Royal National Association's "Producer of the Year" was judged within the pig industry. Departmental staff were closely associated with the Queensland Pork Producers Organisation in the conduct and judging of the competition, which had participants in every pig-raising district in the State. The successful candidate was K. Williamson of Bundaberg.

A new initiative in trading was introduced in 1985. Leading processors contracted with producers for regular supplies of pigs. Bonus incentives were offered for top-quality pigs under such agreements.

Encephalomyocarditis virus infestation of pigs was a disease of increasing importance. It causes sudden death due to severe heart damage, usually in young pigs. The disease is carried and spread by rodents and the virus had been recovered from rat faeces in one of the recent outbreaks in Queensland. Mouse plagues were associated with an increasing occurrence of this disease in southern States.

The first positive field isolation in Australia of vomitin, a mycotoxin, was obtained at Beaudesert during 1983-84 after the harvest of weather-damaged winter cereal grain. The fungus *Fusarium graminearum* produces vomitin, and toxicity to pigs is characterised by feed refusal, vomiting and oestrogenic effects. A deoxynivalenol concentration of 2mg/kg or more in rations decreased feed intake and growth rate. Meatworks surveillance of baconers for melioidosis resulted in cases of the disease being detected in southern Queensland for the third successive year in 1983-84. Several intensive piggery units at Mundubbera and Gayndah were involved. Chlorination equipment reduced the incidence.

In feeding pigs for growth and back fat the optimum ratio of lysine per megajoule of digestible energy for 20 to 50 kg male and female pigs was 0.7:1. Above 50 kg liveweight, females required no more than 0.5 lysine per megajoule of digestible energy, while boars required a ratio of 0.6:1.

The poultry industry

An economic survey of the egg industry in south-east Queensland was completed during 1984-85. The data enabled producers to calculate costs of egg production. The trend generally was for a greater adoption of record-keeping and a greater demand for economic advice.

Mild weather conditions prevailed throughout the year, resulting in very few disease problems. After the significant economic losses from infectious laryngotracheitis (ILT) the previous year, in 1984, many producers implemented a vaccination program recommended by the Department to control ILT.

Following detection of 0.05 mg/kg dieldrin in a sample of egg pulp, a survey of pesticide residues in eggs produced in south-east Queensland was initiated. The Maximum Residue

Limit (MRL) is 0.1 mg/kg. 206 samples from 174 producers were analysed. Only five exceeded the MRL. Correction of this situation began.

Psittacosis caused the death of a number of parrots transported by car from Townsville to Mt Isa. The vehicle driver was subsequently hospitalised with suspected psittacosis. The general public should be aware of the possibility of this zoonosis by close association with such birds.

Husbandry research for the egg industry was directed at improvement of nutrition. Particular attention was paid to the inclusion of isoleucine, sunflower meal, calcium and weed seeds in diets at various levels to determine responses and effects. During the year *Nutrient Composition of Feedstuffs for Pigs and Poultry*, a saleable publication, was released.

Chicken meat industry investigations concentrated on the prediction of slaughter weight, a survey on lighting intensities and the introduction of dry cup drinkers.

A vaccine against infectious coryza was developed in conjunction with the Victorian Department of Agriculture. Killed *Haemophilus paragallinarum* (serotype C) mixed with aluminium hydroxide as an adjuvant vaccine gave increased egg production.

The cashmere-bearing goat industry

The natural cashmere growth cycle of these goats was defined. This allowed the optimum shearing time for different classes of goats to be identified so that maximum cashmere yields could be achieved.

Brands

The progress made by computerisation of brands via the COBRA project was as follows: the horse and cattle brand, cattle earmark, pig tattoo brand and office moneybook systems were totally implemented and were used on the Computer Operated Brands Recording and Acquisition System. Current owners in 30 of the 37 sheep brand districts were entered, and were used, on the system. Entry of sheep brand current ownership data was completed by August 1985.

Staff attended the Farmfest Agricultural Fair in Toowoomba and the Eumundi Field Day, displaying the COBRA system through brands enquiries from the showgrounds.

The original concept of providing country offices with access to the COBRA database was to be via microcomputer. This was reviewed in the light of changing technology and it was proposed to give this access via a Departmental Videotext system.

Quarantine

Access to overseas sources of animal genotypes was expanded further during the year with the import of sheep and goats from North America, pigs from the United Kingdom and the development of protocols for the import of semen and embryos of various species from a number of countries. As the diagnostic capabilities of the high-security Australian National Animal Health Laboratory are developed, access to genotypes of potential value to the Queensland beef industry will be possible to an increasing extent.

The signing of the Torres Strait Treaty posed new problems to the maintenance of an effective quarantine barrier in this vital area. The enhanced risk of incursion of goods of quarantine interest from the Protected Zone demanded a greater input of resources into several of the existing quarantine programmes in the region and increased the need for the proposed livestock-free buffer zone towards the top of Cape York Peninsula.

The Fort Lytton Quarantine Station, which had catered for the quarantine of imported cats and dogs for northern Australia for many years, was closed by the Commonwealth Government as an economy measure at the start of 1985. North Australian importers now had to use the quarantine facility near Sydney.

Deer farming

Deer farming was a growth industry in Queensland. Fifty-four deer farmers were farming about 5000 deer during 1983-84. The sale of locally produced venison to the restaurant trade was expanding, and velvet prices remained satisfactory.

The Division of Dairying and Fisheries

The dairy industry

The 1984-85 year was characterised by a poor export market for dairy products and continuing high national milk production. Attempts to develop a new national marketing plan to counteract the poor export situation and to reduce production failed. Despite lower prices for milk, Australian production continued to increase from a trough of 5.2 megalitres in 1981-82 to 5.9 ml in 1983-84. Since 1980/81, dairy cow numbers had declined by 25 000 and farm numbers by 234 to 20 058. Average annual production per cow continued to increase, reaching 3303 litres in 1983-84 but Queensland recorded the lowest figure for any State in 1983-84-2700 litres. Cream suppliers dropped from 243 in 1981-82 to 141 in 1984-85, milk suppliers from 2443 to 2424. Forty-six per cent of milk receivals at Queensland factories was purchased for market milk. Average net price paid to producers for all milk received was 22.4 cents per litre compared with 22.3 c/l in 1983-84 and 23.1 c/l in 1982-83. Gross average pay for market milk was 37 c/l, and for milk delivered within the Brisbane Milk District 38.75 c/l. Gross pay to producers for manufacture milk averaged \$2.92 per kg butterfat (11.4 c/l) during the twelve months ending March 1985. Utilisation of milk for table cream, flavoured milks and modified milks increased by 11%. The introduction of a new 2 litre plastic bottle for milk resulted in a considerable consumer demand for this pack.

Dairy Field Services Branch

This Branch organised its activities and programmes in three sections: (1) Farm Production, (2) Dairy Products and (3) Resources and Services.

Extension work relating to dairy farm production was in the areas of dairy cattle nutrition, mainly in providing feed during the winter-spring and late summer-autumn periods, using irrigated ryegrass and/or clover pastures during winter-spring and Callide Rhodes grass in summer-autumn. The making and storage of maize or sorghum silage was the subject of a National Silage Workshop at Armidale in August 1984 and a DPI book *Silage Management in Queensland* went on sale in 1984.

Dairy Herd Improvement involved herd recording, herd management and artificial breeding. Do It Yourself (D.I.Y.) AI was accepted by farmers as an important procedure and 1100 dairy farmers were using this practice in 1985 and training and refresher courses conducted by the Department of Primary Industries were held throughout the State. Through the Australian Dairy Herd Improvement Scheme (ADHIS) lists of sires and their breeding values were provided to all dairy farmers to assist them in selection of genetic material.

Advisory work included milking systems and dairy sheds, especially the herringbone system, herd health (mastitis and reproductive performance) collaboration with dairy industry groups, discussion groups and on-farm meetings, farm walks, farmer study tours, mass media, radio talks, journal articles, farm notes and regulatory services.

The dairy products section dealt with packaging. Consumer preference became dramatically evident after the introduction of blow-moulded two litre bottles. Within six months these packages accounted for 28% of pasteurised milk sales at one factory.

A study of the Dalby district gave a per capita consumption of milk as 130.8 litres. Flavoured milk accounted for 8.8 per cent of the total. A comprehensive survey of all milk transport was made. Transport costs for farm milk ranged from 0.81 c/l to 2.44 c/l. Milk tankers from factory to factory returned an average of from \$0.68 per km to \$1.44 per km.

Technical assistance was given to production of new cheeses-cheese spreads, parmesan cheese, neufchatel cheese, low-salt cheeses-and the control of meltability of processed cheese. Trials were made with a commercial fungicide (Delcovid) to control mould growth on cheeses during and past the brining period.

Spectacular success had accompanied new cream whipping equipment which could increase ice-cream yields by up to 400 per cent.

Following consultation with the Queensland Cheese Board, a Mature Cheddar Cheese Assessment Programme was initiated to encourage industry to present a mature cheese of consistently high quality for the consumer. A complete review of the Australian Code of Practice for Dairy Products culminated in a five-day National Workshop conducted in Brisbane in April 1985 under the auspices of the Standing Committee for Agriculture. Dr H. S. Juffs, Director of Dairy Field Services, acted as Chairman of the Organising Committee for the review of the Code. Testing for pesticide residues, iodine, and antibiotics revealed a satisfactory control of these substances.

Training schools for and examinations for certificates for factory personnel were conducted during 1985.

In the area of resources and services there was a major increase in computer use. An updated computer version of the Mastitis Bulk Milk Cell Count was implemented.

Claudia Underwood produced three volumes, *The Learning Strategies of Queensland Dairy Farmers*, which were printed and distributed. A three-month Dairy Husbandry/Technology course for 18 participants from the Philippines was completed in June 1984 and a three-month Dairy Technology Course specifically for South-East Asia (Sri Lanka, India, Pakistan, Nepal and Bhutan) was commenced in April 1985. Queensland officers visited these two areas to assess the usefulness of these courses.

Judges were appointed each year from the Dairy Field Services Branch for the RNA Dairy Farm Management Competition.

Goat research

A problem with goat milk supply was the decline in winter production. Research was in train to alter the kidding pattern through synchronisation of oestrus, and to provide intensive water pastures.

Dairy Cattle Husbandry Branch

Herd recording

The demand for herd recording services increased by 9.2% in 1984-85. Over 40% of all dairymen in the State (1015 herds) were registered to obtain herd recording services (931 of these were actively using the service). This compared with only 16% six years before. Seventy-six per cent of farmers using the Herd Recording Scheme also used the bi-monthly Somatic Cell Count Testing Service as an aid to mastitis control. Twenty-seven per cent of farmers using the Herd Recording control. Twenty-seven per cent of farmers using the Herd Recording Scheme were now in the Farmers Own Sampling (FOS) Scheme. Dairy associations were purchasing milk-recording equipment and hiring them to farmers.

The Herd Management Scheme was introduced in July 1983. It provided reports on cow reproductive performance and mastitis status for individual animals. An additional 126 bull proving members also submitted mating information to assist the scheme monitoring. A complementary Scheme, the Dairy Practitioners Information Service (DPIS) came into operation on 1 July 1985 for use by veterinarians.

Approximately 52% of the cost of providing the Herd Improvement Services was recovered from farmers' fees during 1984-85.

The Holstein-Friesian Bull Proving Scheme was used by 37% of the dairymen. The Illawarra scheme was used by 85 herds in 1984. The Jersey Scheme was discontinued in 1983. A Dairy Herd Improvement Scheme was conducted in conjunction with the RNA.

Development of the Australian Friesian Sahiwal herd continued to build up the herd at Warrill View to over 80 milkers. Embryo transfers were made and technology to free embryos was studied to build up an export trade. Other AFS herds were located at Kairi Research Farm and with 25 co-operating farmers in south-east Queensland, one in New South Wales and one in the Northern Territory. There were now five proven AFS bulls through progeny testing. Export semen from bull S2019 was sent to New Zealand. A nucleus of CSIRO's Sahiwal herd was kept at Warrill View. Bulls from this herd entered the AI Export Centre at Ormiston to provide semen for sale. Artificial breeding services were located at the Wacol Centre, the AI Export Centre, Ormiston, and the Herd Improvement Laboratory, Wacol. A total of 230 616 doses of unrestricted semen were distributed from Wacol in 1983-84.

Semen was exported to New Zealand, South-east Asia, Sri Lanka, Dubai, the Republic of South Africa, and Indonesia. Pasture trials were conducted in conjunction with the Agriculture Branch.

The fishing industry

The research trawler *Gwendoline May* was extensively used in the Gulf of Carpentaria and northern Barrier Reef waters, where it undertook prawn, squid and deep water exploratory work during 1983-84. It was stationed in Cairns during 1984-85 and undertook monthly sampling of red spot king prawns off Townsville, assessment of the east coast prawn closure between Cairns and Princess Charlotte Bay, work on tuna fishing gear development and prawn behaviour. Facilities included colour radar, satellite navigation, an Omega position-fixing system. A Furuno colour sonar was fitted for near-reef work and performed exceptionally well. Several otter board designs were tested as part of a research programme on fishing gear technology. Curved boards were better than the standard boards used by the industry in terms of catch per litre of fuel burned.

Prawn research

Intensive tiger-prawn sampling around Mornington Island was completed in January 1984. A marked peak in recruitment of juvenile prawns to the inshore seagrass nursery grounds occurred in June and July 1983, with migration to the fishery taking place in late summer. Maps of the distribution and abundance of seagrass were prepared. Juvenile prawns were studied around the Wellesley Islands in the Gulf during 1984-85. The results obtained on the timing of the juvenile phase of life cycles of the brown tiger, endeavour, and western king prawns were presented at the Second National Prawn Seminar in October 1984. The life cycle of these prawns is completed in a year, with spawning taking place in late autumn. Juveniles were found to enter commercial fishing grounds between November and March. These results were used to establish seasonal closures designed to reduce the capture of juvenile prawns.

During 1983-84 a prawn resources survey of the Saumarez Plateau showed valuable resources of eastern king prawns east of the Swain Reefs near Burnett Heads and a potentially commercial resource of the little-known giant scarlet and red prawn species was found in water depths of 600-700 m.

Coastal seagrass beds that form nursery grounds for juvenile commercial prawn species were mapped between Cape York and Cape Grafton in November 1984. Nine species of seagrass were found, all in depths less than 15 m. Four of these species commonly supported large populations of juvenile commercial prawn species. The largest beds of seagrass found were proximal to Princess Charlotte Bay. Commercial prawn resources in the south-east Gulf of Carpentaria were found to undergo changes in species and size composition between sites and from month to month. Information so gained was used to aid the management of the Northern Prawn Fishery.

Closure of the north-east Queensland coast to trawling from January to February 1985 resulted in the weight of brown tiger prawns, the main species, more than doubling, showing the industry the value of such closures.

Studies were made on the life histories and population dynamics of the red spot and blue leg king prawns near Townsville and a descriptive study of by-catch in the fishery was commenced to determine the impact of trawling within the Great Barrier Reef Marine Park.

Crab research

The sand crab is one of Queensland's most important fisheries products. In southern Queensland, commercial crab pot fishermen, prawn trawlers and recreational fishermen exploit the sand crab heavily. An intensive study of the Moreton Bay sand crab began and 2200 tagged crabs were released.

A joint project with the University of Queensland funded by the ACIAR (Australian Centre for International Agricultural Research) commenced a study of coconut crabs in Vanuatu.

By 1985 spanner crabs provided an income of \$300 000 in south-east Queensland annually. Management recommendations from surveys, now included in the Fisheries Act, included a minimum legal size and a prohibition on the taking of oviferous or egg-bearing female crabs.

Gill net fishery resources were surveyed in the south-east Gulf and north-east Peninsula coast, especially involving data on the sexuality, seasonality, stock identity and fishery statistics of barramundi and threadfin salmon. The Burnett Heads Research Station completed a survey of the central Queensland coast area in October 1984.

Demersal fisheries

Analyses of ovary samples of seven reef fish species suggested that all were spring to summer spawners. The red emperor large mouth nannygai, spangled emperor and coral trout were studied for longevity and length and age at maturity.

Pelagic fish

A tagging experiment to determine the effect of Taiwanese fishing adjacent to the Queensland fishing zone was carried out with Spanish mackerel.

Tuna potential

The potential of tuna and other high-value species from Queensland waters as exports to the lucrative Japanese sashimi (raw fish) market was assessed during a seven-month tour. The tour personnel found no problems in fostering markets in Japan and Hawaii and on the west coast of the USA.

Native freshwater fish research included successful fertilisation of wild barramundi eggs captured near Weipa. They were transferred and hatched and reared to juvenile stage at Cairns and taken to Walkamin Research Station.

The jungle perch was found to spawn in a marine environment. Hatchery production was continued; and fingerlings of sooty grunter and silver perch were stocked in Boondooma, Eungella, Kinchant and Moondarra Dams.

Saucer scallop protection

A minimum shell size of 80 mm was defined for the winter spawning period.

Nile Perch

All capital works for the Nile Perch quarantine complex at the Walkamin Research Station were completed in May 1984. A source of the fish was sought in Africa and it appeared that fingerlings would have to come from Lake Victoria in Kenya.

Torres Strait Treaty

This treaty rationalised fishing activity in the prawn, rock lobster, mackerel and pearl fisheries in this area. Management of the industry by the Queensland Fish Management Authority allocated primary licences to all vessels that provide full-time work for a Master Fisherman.

The establishment of a Research Advisory Committee during 1984-85 will provided direction for the Department's research programme.

Food Research Branch

Acceleration of flavour development in cheese

Three methods were under study-elevated storage temperature, the incorporation of modified (mutant) starters and exogenous enzyme addition. An optimum temperature of 15°C was determined for rapid maturation of cheddar cheese. Early results with mutant starters were encouraging. A study was made of the components which contribute to the desirable flavours of cheese.

Cheese with reduced salt (sodium)

With community awareness of the need to reduce salt intake, trials were done to replace the normal salt (sodium chloride) with potassium chloride. Fifty per cent replacement yielded cheese with almost half the sodium content of normal cheddar and consumers were unlikely to detect the difference.

Losses caused by mastitis

Trials with milk from cows suffering from mastitis (high somatic cell count milk) showed that use of such milk results in lower grade scores for pasteurised milk, reduction in shelf life and increased starter activities for yoghurts, and lower grade scores, higher moistures and texture defects for cheddar cheeses. Manufacture is also more difficult.

Early detection of psychrotrophic spoilage

Psychrotrophic organisms cause spoilage in refrigerated milk. A major achievement during 1984-85 was the successful production in the laboratory of monoclonal antibodies, which led to a rapid method of low levels of the organisms in raw or pasteurised milk products.

Practical application of fluorogenic media

Fluorogenic media promise to become a very useful tool for microbiological analysis of food products. The technique developed in the laboratory not only estimates the number of bacteria present, but gives an indication of the types present and the sources of their entry into the product. Procedures were undertaken to pinpoint raw milk quality problems and provide a sensitive indicator of process contamination and provide estimates of product shelf life.

Automation of chemical testing

A new computerised instrument, the Infralyser, revolutionised the chemical analysis of foodstuffs. Working on an analysis of near infra-red spectra, the instrument was set up to measure fat and total solids in dairy products. It had potential for measuring a wide range of components of both liquid and solid food products.

Computerisation of quality control data

Revision of the computerised system for reporting the results of liquid milk quality assessment to the dairy industry resulted in a greatly improved system. This scheme also facilitated the development of similar programs for other food products. New equipment now allowed data entry directly to the system from both the Brisbane and Malanda laboratories, thus reducing the result-reporting time.

Irradiation of foodstuffs

Irradiation of foodstuffs showed great potential as a means of extending their shelf life. This branch undertook a major review of this subject and made recommendations on the purchase of suitable equipment for both research and commercial applications.

Tuna research

A major research program aimed at improving the profitability of the Queensland tuna fishery commenced. This work should assist the Queensland industry in producing highquality yellowfin and bigeye tuna for the lucrative Japanese sashimi market. Different methods of catching and handling the tuna were used to produce fish of the highest possible quality. Alternative uses for any fish not meeting the high standards required for sashimi, such as smoking, were examined.

Introduction of Ballandean Nouveau wine

The concept of marketing light soft red wines immediately following vintage culminated in the release of Ballandean Nouveau. A streamlined processing sequence was designed to accomplish the red style suitable for early consumption. A new label design common to all Granite Belt producers of the style was used to promote the product.

Initiation of meat research

A study of the combined effects of common industrial and household beef-handling practices on the attributes of beef palatability to the consumer was initiated. Surveys of butcher shops and Brisbane households provided valuable initial data on common handling practices.

Division of Marketing from 1983

Review of marketing legislation

A comprehensive review of the Primary Producers' Organisation and Marketing Act introduced originally in 1926 began in close consultation with the Council of Agriculture in 1984.

Sugar industry poll

In April 1984 a poll of the State's 6000 sugar cane growers was taken on the Queensland Cane Growers Council's proposal to levy cane growers to allow it to become involved in the fertiliser industry. More than 80% of growers voted. Almost two-thirds of the votes supported the levy, which would be imposed at a rate of 6 cents/tonne on all cane from assigned lands supplied to Queensland sugar mills for two consecutive seasons ending on 28 February 1986. The money from the levy would be used to subscribe capital to a primary producers co-operative association, which would acquire a majority shareholding in North Queensland Fertilisers Pty Ltd.

Industries Assistance Commission Inquiries

Evidence was presented to IAC hearings into the dairying and wheat industries during 1983-84, held to hear evidence on the IAC's draft reports on these industries. Evidence had
previously been given at the main hearings. Evidence was also presented to the IAC's inquiry into the Rural Adjustment Scheme.

Wheat Marketing Plan

After the release of the IAC's "Report on the Wheat Industry", the Standing Committee on Agriculture formed a working group to recommend on the next Wheat Marketing Plan. The DPI was represented on the working group. The next five-year Wheat Marketing Plan started on 1 October 1984.

Wheat Marketing Review

During February 1985 the Honourable the Minister, N. J. Turner, established a Wheat Marketing Review Committee.

Grain handling and storage charges

At the Queensland Grain Handling Authority's request, DPI officers made an independent study of the equitable application of handling and storage charges in Queensland. Discussions were held with all grain industry sectors, and a draft report was presented to the Authority in early May 1984.

Farm management and taxation

The DPI booklet *Farm Taxation* was added to the group of DPI saleable titles that deal with farm management and taxation. *The Farm Management Handbook* was bought by 1500 producers during 1984.

Overseas research project

The DPI, in collaboration with the Papua New Guinea Department of Primary Industry, prepared and submitted a research project proposal to the Australian Centre for International Agricultural Research (ACIAR) to do an agro-economic survey of Papua New Guinea's major tree crops. The project was designed to improve Papua New Guinea's crop monitoring capability and provide technical and economic information about its coffee, cocoa and coconut industries. It identified key industry statistics and measured the reliability and cost of collecting those statistics. The three year project was funded by ACIAR.

Sugar Industry Working Party

A Sugar Industry Working Party, comprising an independent Chairman and representatives of the Federal and Queensland Governments and the sugar industry, was formed during 1984-85 to develop an industry plan to devise long-term assistance to the sugar industry. The terms of reference required the Working Party to prepare a plan that would enable the

industry to cope efficiently and competitively with the changing market situation. The Working Party was to consider:

- the acceptance of the need for restructuring within the industry;
- the assistance needs of the industry to facilitate that re-structuring;
- the sugar industry staying under State government legislative control;
- an agreed assessment of the market outlook for sugar;
- the mechanisms to bring about restructuring and rationalisation;
- appropriate short- and/or long-term assistance measures necessary to achieve the objectives of the plan; and
- the joint administration of the plan.

Submissions to inquiries

Evidence was presented to IAC Inquiries into the Apple and Pear Industry and into fertiliser consumption, and also to an independent specialist inquiry into the Australian Grape and Wine Industries.

The Department's Submission to the Apple and Pear Inquiry drew attention to the manner in which the diversion to the domestic market of apples destined for export had depressed returns within the domestic market. The Department sought the continuation of an export incentive scheme, the use of Tasmanian Freight Equalisation Funds for export market development rather than encouraging shipments to mainland Australia, and a redirection of the activities of the Australian Apple and Pear Corporation to more active involvement in export market development.

The Submission to the Grape and Wine Inquiry recommended abolition of the 10% sales tax on domestic wine, the introduction of measures to increase research funds for viticultural research, the introduction of a Plant Variety Rights Scheme and the introduction of measures to reduce the surplus production of sultana grapes.

Counselling for the Brucellosis and Tuberculosis Eradication Campaign

A team of agricultural economists based at Townsville and Mareeba and in western Queensland provided financial counselling to graziers affected by the Brucellosis and Tuberculosis Eradication Campaign. The team developed a computerised budgeting model which was used in on-property financial counselling. The model permitted assessment of cash flow and profitability implications of alternate management and destocking strategies that formed the basis of the individual property eradication programs.

Overseas Development Unit

An Overseas Development Unit was established as a subsection within the Extension Services Section on 7 December 1981, with Kerry Brendon Fitzgerald as Administrative Officer. The function of the Unit was to coordinate and administer Departmental activities concerned with overseas consultancies and the training of overseas officers both in Queensland and in overseas countries. It collaborated in research with the Australian Centre for International Agricultural Research (ACIAR), of which the Director-General, Dr G. I. Alexander, was a member. The unit was funded by its own efforts, the Department contracting for its services. The unit was reconstituted as the Overseas Development Section, Central Administration, from 30 August 1984.

Interstate and overseas travel

With Queensland's vast experience in tropical and subtropical agriculture, personnel with special skills in this wide area were constantly sought by international agencies and individual countries in the Third World to advise on administrative procedures and local problems such as the setting up of research stations and extension program and the training of local staff in their own environment with their specific tasks. Funding for overseas visits for such purposes usually came from the requesting agencies or countries, from Australian aid programmes with some minor support from the Department of Primary Industries.

There was also special experience and expertise in some overseas countries that Queensland needed to acquire in protecting its own animal and plant industries against disease and insect pests likely to enter Australia which could cause great disruption of productivity. Instances were foot and mouth disease and the screw-worm fly in cattle, rabies in dogs and humans, and various plant diseases affecting the whole range of agricultural and horticultural products. Quarantine measures needed to be studied as well as the diseases and pests common to overseas production. Such developments required overseas travel by local officers to familiarise themselves with the diseases and pests and the methods of containment. The following lists indicate the yearly involvement of Queensland Department of Primary Industries' staff in these activities.

Several members of the staff undertook further study at Australian Universities, e.g.:

1972-73

DR V. E. MUNGOMERY (AGRICULTURE) Completed his Ph.D. in Genetics and Plant Breeding at Queensland University

DR J. K. LESLIE (AGRICULTURE) Undertook post-doctoral studies at the University of Western Australia

DR E. K. CHRISTIE (AGRICULTURE) Completed his Ph.D. studies at Macquarie University

DR D.A. IVORY (AGRICULTURE)

Completed his Ph.D. degree in pasture science at Queensland University

Those who undertook overseas studies included:

JAN McCULLOCH (NEMATOLOGIST) Left for twelve months training at postgraduate level at the Imperial College University of London

DR R. W. JOHNSON (BOTANY) Ph.D. studies at the University of Utah, USA

DR R. G. HENZELL (AGRICULTURE) Plant breeding and genetics at the Texas A & M College, USA

JOCELYN TOMMERUP (BIOMETRY) Biometry studies at Texas A & M College, USA

DR PATRICIA PEPPER (BIOMETRY) Biometry study at Southhampton University, England

DR B. WILSON (QLD WHEAT RESEARCH INSTITUTE) Weed Science, University of Hawaii

DR P. BRENNAN (QLD WHEAT RESEARCH INSTITUTE) Plant breeding, University of Saskatchewan, Canada

DR W. J. SCATTENI (AGRICULTURE) Pasture studies, University of California

With funds from the Commonwealth Extension Grant (CESG) three officers went overseas:

W. D. MITCHELL (DIRECTOR OF DAIRY FIELD SERVICES) Visited Indonesia, Britain and Europe for eight weeks to study milk production, processing and distribution and dairy advisory services

I. J. L. BYFORD (DAIRY HUSBANDRY) Application of husbandry research in England, Scotland and Ireland

MELDA MOFFETT (PLANT PATHOLOGY) Visit to New Zealand to study bacterial plant diseases under Dr D. W. Dye

T. RUDDER (CATTLE HUSBANDRY) A five-week study tour of USA financed by a syndicate of Rockhampton graziers

DR G. W. SAUNDERS (DIRECTOR, FAUNA CONSERVATION) As a member of the Australian delegation to the International Convention on Trade on certain species of wildlife held in Washington, D.C. in early 1973 W. F. Y. MAWSON (DEVELOPMENT PLANNING) Visit to South Africa, the West Indies and the USA from 26 April to 24 June 1973

I. D. GALLOWAY (ENTOMOLOGY)

To the British Museum of Natural History for four weeks to study parasitic wasps

W. PONT (PLANT PATHOLOGY) Visit to New Guinea to check on tropical and subtropical plant diseases not yet in Queensland

J. K. THOMPSON (ECONOMIST) Farm management recording systems in the dairy industry in England

1973-74

DR K. RICKERT (AGROSTOLOGIST) University of Western Australia-Ph.D. studies

DR W. H. BURROWS (AGROSTOLOGIST) Australian National University-Ph.D. studies

DR B. WALKER (AGROSTOLOGY)

University of Queensland - Ph.D. studies. Undertook postgraduate studies in Australian Universities.

DR J. F. BEALE (AGROSTOLOGIST) University of Colorado, USA

DR E. R. ANDERSON (AGROSTOLOGY) University of Orange Free State, South Africa

Overseas visits were made by:

DR J. M. HARVEY (DIRECTOR-GENERAL)

Attended International Sugar Conference with the Minister in Geneva and studied agricultural developments and market opportunities in North America, UK, Europe and Japan

S. L. EVERIST (GOVERNMENT BOTANIST)

At the invitation of the US National Academy of Science joined a panel on Unexploited Tropical Plants of Promising Economic Value in Washington, D.C., and visited the US National Herbarium, Smithsonian Institute, for discussions on Pacific botany

A. C. PEEL (DIRECTOR, AGRICULTURAL STANDARDS)

Represented Queensland at the Warsaw Congress of the International Seed Testing Congress

B. PARKINSON (DIRECTOR, SLAUGHTERING AND MEAT INSPECTION)

Visited Europe and the USA to study modern trends in meat processing and hygiene and attended the Food Hygienists Conference in Denmark

A. C. E. TODD (PIG BRANCH)

Made a study tour of pig establishments in North America, the Netherlands, Denmark and UK

D. G. CAMERON D.L. LLOYD (AGROSTOLOGISTS) & L. WINKS (HUSBANDRY OFFICER)

Represented the Department at the 12th International Grassland Congress in Moscow in June 1974

N. S. KRUGER (CHIEF HORTICULTURIST)

Studied floriculture in Japan, USA and Europe and attended the 19th International Horticultural Congress in Warsaw

M. A. BURNS (CATTLE HUSBANDRY)

Was invited by the South Pacific Commission to lecture at a two-week animal husbandry course for technical officers in Fiji

F. QUINTON (HUSBANDRY OFFICER, WACOL AI CENTRE)

Visited research and artificial insemination centres in South Africa and Kenya and studied the developing export trade in semen in Thailand and Malaysia

K. HOWARD (CATTLE HUSBANDRY)

Was granted leave of absence to help drought relief operations in Ethiopia

P. MEIKLEJOHN (ECONOMIST)

Received a Churchill Fellowship award to Western Europe to conduct a programme in product development with the English Milk Marketing Board

Overseas travel 1974-75

H. S. BRIGGS (SOIL CONSERVATION)

Senior Soil Conservationist to visit India, USSR and USA to study soil conservation

D. L. LLOYD (AGRICULTURE)

Senior Agrostologist, to visit USSR and UK to attend International Grassland Conference and to visit research institutes

D. G. CAMERON (AGRICULTURE)

Assistant Director of Agriculture, to visit USSR, USA, Mexico, India and UK, to attend International Grassland Conference, to examine research/extension liaison, to collect pasture legumes and to visit the Indo/Australian sheep breeding centre

L. WINKS (BEEF CATTLE HUSBANDRY)

Senior Husbandry Officer, to visit USSR and South Africa to attend International Grassland Conference and to visit research centres

N. S. KRUGER (HORTICULTURE)

Chief Horticulturist, to visit Japan, USA and Europe to attend International Horticultural Congress, to study horticultural mechanisation and to study floricultural husbandry (from June 1974)

G. R. BEESTON (BOTANY)

Ecologist (Recall) to visit UK, the Netherlands and France, to attend an International Conference on Ecology and to visit research institutions

B. J. CRACK (AGRICULTURAL CHEMISTRY)

Assistant Director, Agricultural Chemical Laboratory Branch, to visit UK, USSR, Holland, Bulgaria and South Africa to attend an International Soils Congress and to study research work on soils and land assessment

V. J. NOVAK (AGRICULTURE)

Agronomist (Recall) to visit West Germany, the Netherlands and Denmark to study potato agronomy and processing

DR J. P. EBERSOHN (AGRICULTURE)

Chief Agrostologist to visit UK to study techniques of production prediction in relation to soil-plant-animal interactions

B. W. CAREY (SOIL CONSERVATION)

Soil Conservationist (Recall) to visit South Africa to study soil conservation farm planning

G. VINNING (MARKETING SERVICES)

Marketing Officer Division II, to visit Canada and USA to attend a Bean Industry Conference and study the marketing of navy beans

DR P. S. HOPKINS (SHEEP & WOOL)

Senior Husbandry Officer, to visit UK to examine research work in ruminant physiology and to attend an International Conference on Beef Cattle Production in Developing Countries

D. C. CLAGUE (VETERINARY SERVICES)

Divisional Veterinary Officer, to visit Bali to assist in controlling an outbreak of foot and mouth disease

G. B. McCORMACK & P. N. THURBON (DAIRY CATTLE HUSBANDRY) District Experimentalist and Senior Husbandry Officer to visit Afghanistan (Consultancy) to carry out a dairy feasibility study for the Australian Development Assistance Agency

DR L. L. CALLOW (PATHOLOGY)

Chief Protozoologist, to visit Iran, Malaysia and Indonesia to attend a conference on tick fevers and to investigate tick fever problems

G. G. CRITTALL (DAIRY FIELD SERVICES)

Assistant Director, Field Services Branch, to visit Saudi Arabia and United Arab Emirates (Consultancy) to carry out a dairy feasibility study for Gunn Rural Management Pty Ltd

W. KIDSTON (MARKETING SERVICES)

Marketing Officer Division I, to visit Fiji to examine rice marketing

E. O. BURNS & E. R. G. WHITE (MARKETING & MINISTER'S OFFICE) Deputy Director of Marketing and Private Secretary to visit the Middle East and Far East as members of a State Trade Mission

N. M. DAWSON (DEVELOPMENT PLANNING)

Supervising Development Planning Officer, to visit Mali, UK and the Netherlands to attend a seminar on tropical rangelands and to examine land resource investigation methods

DR C. P. McPHEE (HUSBANDRY RESEARCH)

Senior Husbandry Officer, to visit UK and Europe to attend a meeting of the European Association for Animal Production and to study pig breeding programmes

M. D. CONNOLE (PATHOLOGY)

Supervising Microbiologist, to visit Japan and Philippines to attend an International Mycology Conference and to visit mycology research institutions

B. P. TRENDELL (AGRICULTURE)

Agronomist, to visit USA and Canada to examine tobacco husbandry (Rotary International Exchange)

T. J. TIERNEY (BEEF CATTLE HUSBANDRY)

Husbandry Officer Division I, to visit Ghana (Consultancy) to provide technical advice to livestock industries for the Australian Development Assistance Agency

J. K. TEITZEL (AGRICULTURE)

Senior Agrostologist, to visit Malaysia (Consultancy) to advise on pasture research for CSIRO

K. G. TRUDGIAN (AGRICULTURE)

Supervising Agronomist, to visit UK, Europe and USA to study agronomy research on oilseeds and grain crops

DR L. L. CALLOW (PATHOLOGY)

Chief Protozoologist, to visit Italy to participate in an FAO meeting on tick-borne diseases and to visit Malaysia for the ADAA

S. R. WALSH (AGRICULTURE)

District Adviser, to visit Fiji (Consultancy) to advise on grain sorghum production for the Commonwealth Government - South Pacific Aid Programme

J. B. GREENAWAY (AGRICULTURE)

District Experimentalist, to visit Liberia (Consultancy) to advise on rice production for Dalgety Farm Management Pty Ltd

B. A. WOOLCOCK (BEEF CATTLE HUSBANDRY)

Director, Beef Cattle Husbandry Branch, to visit visit South Africa, Kenya, UK, USA and Mexico to attend 20th World Veterinary Congress and to study cattle husbandry

K. G. PEGG (PLANT PATHOLOGY)

Senior Plant Pathologist, to visit Fiji, to visit research institutes dealing with diseases of horticultural crops

M. D. LITTMANN (INFORMATION & EXTENSION TRAINING)

Assistant Director, Information and Extension Training Branch, to visit UK, the Netherlands, Canada and USA, to study agricultural information services

G. H. ALLEN (RESEARCH STATIONS)

Executive Officer, Research Stations Section, to visit Europe and America to study administration of research stations

Overseas travel 1975-76

B. WALKER (AGRICULTURE)

Supervising Agrostologist, to visit East Africa (Consultancy) to take part in an FAO training course on tropical pastures

T. PASSLOW (ENTOMOLOGY)

Director, Entomology Branch, to visit USSR, UK, West Germany, Switzerland and Singapore to represent Queensland in the entomological group for scientific co-operation with Russia, to attend the Commonwealth Institute of Entomology Conference and to study entomological research

M. J. CHESTER (DAIRY CATTLE HUSBANDRY)

Husbandry Officer Division I (Recall) to visit UK to study artificial breeding systems

P. S. BRENNAN (AGRICULTURE)

Plant Breeder Division I, to visit UK and Europe to tour plant breeding centres

R. E. LEVERINGTON (HORTICULTURE)

Assistant Director of Horticulture, to visit Hawaii and USA to attend a conference and to visit post-harvest technology research centres

DR L. L. CALLOW (PATHOLOGY)

Officer in Charge, Tick Fever Research Centre, to visit Italy and Malaysia to attend a conference and to visit research institutes

N. P. MCMENIMAN (HUSBANDRY RESEARCH)

Senior Husbandry Officer, to visit USA to study range science, ruminant nutrition and computer simulation

M. A. BURNS (BEEF CATTLE HUSBANDRY)

District Adviser Division I, to visit Solomon Islands (Consultancy) to attend a training course in beef cattle production for the South Pacific Commission

D. L. BOOTHBY & J. E. NORCOTT (DAIRY CATTLE HUSBANDRY)

Husbandry Officer Division II and Experimentalist Division I to visit Bangladesh, Malaysia and Thailand (Consultancy) to assist in an ADAA dairy project in Bangladesh and to study the dairy industry in the other two countries

M. E. McKAY (HORTICULTURE)

Horticulturist Division I, to visit USA, Israel and South Africa to study floriculture (Churchill Fellowship)

W. R. WEBSTER (VETERINARY SERVICES)

Veterinary Officer (Recall), to visit UK to study pig disease control

R. C. BRUCE (AGRICULTURAL CHEMISTRY)

Officer in Charge, Plant Nutrition Section, to visit UK, the Netherlands, Eire, USA and Canada, to visit soil chemical laboratories

I. F. MARTIN (AGRICULTURE)

Senior Plant Breeder, to visit USA and Europe to study maize breeding

R. V. BYRNES (PIG AND POULTRY)

Supervising Husbandry Officer, to visit North America, UK and Hong Kong to study poultry production and extension

W. KIDSTON (MARKETING SERVICES)

Supervising Marketing Officer, to visit Cook Islands (Consultancy) to attend a vegetable production and marketing course for the South Pacific Commission

DR R. A. I. DREW (ENTOMOLOGY)

Entomologist Division I to visit Hawaii to investigate oriental fruit fly control

S. W. IVERS (MARKETING SERVICES)

Assistant Director, Marketing Services Branch, to visit UK and Europe to study the marketing of dairy products

A. S. GREASLEY (AGRICULTURE)

Supervising Irrigation Agronomist, to visit France, Israel and USA to study irrigated crops

T. J. BECKMANN (AGRICULTURAL CHEMISTRY)

Director, Agricultural Chemistry Branch, to visit Europe, UK, USA to attend an International Pesticides Analytical Council Meeting and visit agricultural chemistry research centres

Overseas travel 1976-77

DR M. BENGSTON (ENTOMOLOGY)

Assistant Director, Entomology Branch, to visit USA and Canada to study stored product pest control

S. R. WALSH (AGRICULTURE)

District Adviser Division I, to visit the USA and Canada to lead a tour of Queensland Grain Growers

L. D. WARD (SOIL CONSERVATION) & C. NORRIS (ENGINEERING SERVICES) District Adviser and Agricultural Engineer to visit USA and Canada to investigate conservation tillage systems

F. J. SLATTER (DAIRY CATTLE HUSBANDRY)

District Experimentalist Division I, to visit USA to study dairy herd improvement

R. V. COLLARD (EXTENSION SERVICES)

Senior Extension Officer, to visit Fiji (Consultancy) to attend a training course on Agricultural Extension for the South Pacific Commission

M. A. BURNS (BEEF CATTLE HUSBANDRY)

District Adviser Division I, to visit Solomon Islands (Consultancy) to attend a training course on Agricultural Extension for the South Pacific Commission

DR R. A. I. DREW (ENTOMOLOGY)

Senior Entomologist, to visit Hawaii, to attend an International Fruit Fly Seminar

H. W. PAULI (SOIL CONSERVATION)

Director of Soil Conservation, to visit Italy (Consultancy) to attend a conference on soil degradation for FAO

DR J. K. KOCHMAN (PLANT PATHOLOGY)

Plant Pathologist Division I, to visit the Philippines to attend a soybean rust workshop

DR T. McEWAN (BIOCHEMISTRY)

Assistant Director, Biochemistry Branch, to visit Indonesia (Consultancy) to advise on toxicology research for ADAA

D. W. CURREY (HORTICULTURE)

Horticulturist to visit Indonesia (Consultancy) to give training in plant quarantine equipment for ADAA

DR I. C. CUNNINGHAM (ENTOMOLOGY) Senior Entomologist, to visit North America to inspect tobacco research activities

V. J. HANSEN (AGRICULTURE)

Plant Breeder Division I, to visit North America and Japan to look at tobacco breeding research

D. J. HAMILTON (AGRICULTURAL CHEMISTRY)

Supervising Chemist, to visit UK to examine examine chemical research methods used for pesticides

S. J. BARKER (AGRICULTURE)

Supervising Agronomist, to visit Kenya (Consultancy) to advise on maize growing for McGowan and Associates

A. C. ARVIER (STANDARDS)

Technologist Division I, to visit Indonesia to attend the Asian-Pacific Weed Science Society Conference

S. G. KNOTT (VETERINARY SERVICES)

Assistant Director, Veterinary Services, to visit USA, Canada and UK to attend a course in exotic diseases and to study the organisation of veterinary services

W. F. Y. MAWSON (DEVELOPMENT PLANNING)

Assistant Director, Development Planning Branch, to visit Tanzania (Consultancy) to report on an integrated livestock programme for ADAA

A. P. SARANIN (CENTRAL SUGAR CANE PRICES BOARD)

Qualified Sugar Chemist, to visit Hawaii, USA and Mexico to attend an international sugar technology conference and to examine cane growing and processing

P. B. HODGE (BEEF CATTLE HUSBANDRY)

Supervising Husbandry Officer, to visit USA, Mexico, UK, Europe and India to investigate cattle breeding

R. T. F. ARMSTRONG (SHEEP AND WOOL)

Husbandry Officer Division I, to visit South Africa, Kenya, Sudan, Israel, Iran, Indonesia and India to investigate goat husbandry

B. A. WOOLCOCK (ANIMAL INDUSTRY)

Deputy Director, Division of Animal Industry, to visit Malaysia to attend a veterinary conference

DR A. J. WILSON (PATHOLOGY)

Senior Veterinary Pathologist, to visit Tanzania (Consultancy) to assist in an integrated livestock project for McGowan and Associates

D. A. K. McNEE (AGRICULTURE)

Assistant Director, Agriculture Branch, to visit USA and the Netherlands to investigate the integration of research and extension

F. W. BERRILL (HORTICULTURE)

Assistant Director, Horticulture Branch, to visit Cook Islands (Consultancy) to take part in a banana seminar for the South Pacific Bureau for Economic Co-operation

B. W. CULL (HORTICULTURE)

Chief Horticulturist, to visit South Africa, Israel, USA, Jamaica and Honduras, to study aspects of sub-tropical fruit and nut crops

J. L. BELL (MARKETING SERVICES)

Marketing Officer Division I, to visit USA to investigate LANDSAT technology relating to crop forecasting

Overseas travel 1977-78

K. J. MIDDLETON (PLANT PATHOLOGY)

Plant Pathologist Division I, to visit USA to study peanut husbandry

J. K. TEITZEL (AGRICULTURE)

Senior Agrostologist, to visit Solomon Islands (Consultancy) to attend seminar on pasture research for ADAB

A. R. HUGHES (STANDARDS)

Senior Technologist, to visit UK and Europe to attend an FAO meeting and a crop protection conference and to study controls on agricultural chemicals and aerial agriculture

K. B. McRAE (HORTICULTURE)

District Adviser Division I, to visit Fiji (Consultancy) to advise on citrus growing for the Fiji Government

DR J. P. THOMPSON (PLANT PATHOLOGY) Senior Soil Microbiologist, to visit UK and Europe to study soil microbiology research

J. D. GLENNIE (HORTICULTURE)

Horticulturist Division I, to visit the New Hebrides (Consultancy) to report on the potential for pineapple production for ADAB

DR L. L. CALLOW (PATHOLOGY)

Officer in Charge, Tick Fever Research Centre, to visit Italy, India, Pakistan and Malaysia (Consultancies) to attend a meeting on tick-borne diseases for FAO, to consult with veterinarians for ADAB and to consult with Malaysian veterinarians re cattle exports

DR G. I. ALEXANDER (ADMINISTRATION)

Chief Advisory Officer, to visit India to attend a workshop on co-operative dairy programmes

S. J. MILL (ECONOMIC SERVICES)

Agricultural Economist Division I (Recall) to visit USA to study computer management aids used in agricultural extension

A. J. GILLIES (DAIRY RESEARCH)

Assistant Director, Dairy Research Branch, to visit UK and Europe to attend 20th International Dairy Congress and study dairy research activities

J. K. TEITZEL (AGRICULTURE)

Senior Agrostologist, to visit Colombia and Hawaii to attend a forage production workshop and inspect current pasture research

DR J. M. HOPKINSON (AGRICULTURE)

Supervising Agrostologist, to visit Colombia and Brazil to attend a forage production workshop and to inspect pasture seed production systems

R. B. BRINSMEAD (AGRICULTURE)

Supervising Agronomist to visit USA, Mexico, Colombia and Brazil to study the agronomy of tropical grain legumes

J. E. BARNES (AGRICULTURE)

Agronomist Division I, to visit Philippines to attend a rice conference and study rice research programmes

W. KIDSTON (MARKETING SERVICES)

Supervising Marketing Officer, to visit New Caledonia (Consultancy) to act as a marketing consultant to the South Pacific Commission

T. J. BECKMANN (AGRICULTURAL CHEMISTRY)

Director, Agricultural Chemistry Branch, to visit Europe and UK to attend two international pesticide conferences and to visit chemical laboratories

E. WHITE (MINISTER'S OFFICE)

Private Secretary, to visit Malaysia and Singapore to accompany the Minister on sugar contract negotiations

B. L. OXENHAM (PLANT INDUSTRY)

Director, Division of Plant Industry, to visit China as a member of an Australian Agricultural Mission

Overseas travel 1978-79

R. J. F. HENDERSON (BOTANY)

Supervising Botanist, to visit New Caledonia, Hawaii, USA, Singapore and UK to visit botanical institutions and to act as Australian Botanical Liaison Officer at the Royal Botanic Gardens, Kew, England

G. SWAINE (ENTOMOLOGY)

Supervising Entomologist, to visit USA, Canada, UK and Austria to study fresh fruit disinfestation

DR J. KOCHMAN (PLANT PATHOLOGY)

Plant Pathologist Division I (Recall) to visit West Germany, USA and Canada to attend an international plant pathology conference and to visit research institutes

C. K. DIMMOCK (PATHOLOGY)

Temporary Senior Haematologist (Recall) to attend an international congress on haematology and blood transfusion in France

B. I. BROWN (HORTICULTURE) & A. WILEY (HORTICULTURE) Senior Chemist and Horticulturist to visit Fiji (Consultancy) to look at ginger growing for ADAB

D. W. CURREY (HORTICULTURE)

Horticulturist, to visit Fiji (Consultancy), to instruct on plant quarantine equipment for ADAB

L. PEDLEY (BOTANY)

Assistant Director, Botany Branch (Recall) to visit UK to attend an international conference

DR L. L. CALLOW (PATHOLOGY)

Chief Protozoologist, to visit Burma (Consultancy) to advise on tick fever for FAO

J. R. MILLS (DEVELOPMENT PLANNING)

Development Planning Officer (Recall) to visit USA to attend an International Rangeland Congress

J. R. WYTHES (BEEF CATTLE HUSBANDRY)

Husbandry Officer Division I (Recall) to visit UK to investigate carcass classification and bruising

DR P. S. HOPKINS (HUSBANDRY RESEARCH)

Supervising Husbandry Officer, to visit Thailand, Malaysia, Philippines, Burma, Bangladesh, India, Pakistan and Vietnam (Consultancy) to advise on the goat industry for ADAB

K. R. JORGENSEN (HORTICULTURE)

Senior Horticulturist, to visit Western Samoa (Consultancy) to advise on citrus culture for the Government of Western Samoa

DR A. T. OHTA (ENTOMOLOGY) Temporary Entomologist, to visit Philippines and Hawaii to study fruit flies

G. S. PURSS (PLANT INDUSTRY) Deputy Director of Plant Industry, to visit India to discuss plant pathology research

DR B. M. O'SULLIVAN (PATHOLOGY)

Senior Veterinary Pathologist (Recall) to visit USA, for training at the University of California, Davis

K. B. FITZGERALD (DAIRY FIELD SERVICES)

District Adviser, to visit India and Indonesia to attend a dairy workshop and to follow up International Training Course Projects

T. D. WILSON (ECONOMIC SERVICES)

Agricultural Economist Division I (Recall) to visit USA and Canada to look at extension evaluation techniques

M. C. COX (AGRICULTURE)

Plant Breeder Division I (Recall) to visit USA to attend a plant breeding symposium

DR R. L. DODMAN (PLANT PATHOLOGY)

Supervising Plant Pathologist, to visit South Africa to study wheat diseases and attend a workshop

DR P. S. HOPKINS (SHEEP AND WOOL)

Director, Sheep and Wool Branch, to visit India (Consultancy) to attend a workshop on goats for APHCA

J. E. RICHARDS (AGRICULTURE)

Extension Officer (Recall) to visit UK to study farm mechanisation and extension

P. H. TWINE (ENTOMOLOGY)

Entomologist Division I (Recall) to visit USA to investigate a parasite of the citrus mealy bug

S. G. KNOTT (VETERINARY SERVICES)

Director of Veterinary Services, visit to Thailand, Malaysia and Singapore to study the adoption of Australian cattle

W. F. Y. MAWSON (ADMINISTRATION)

Assistant to the Director-General, visit to China (Consultancy) to investigate a livestock development project for the Department of Trade and Resources

DR L. B. MURPHY (PIG AND POULTRY)

Husbandry Officer Division I (Recall) visit to UK, West Germany, Switzerland and the Netherlands to study poultry behaviour research

J. B. WATKINS (HORTICULTURE)

Physiologist, visit to USA to study cooling systems for fruit and vegetables

E. W. B. VAN DEN MUYZENBERG (AGRICULTURE)

Agronomist Division I (Recall) visit to Europe to study tissue culture techniques

K. B. FITZGERALD (DAIRY FIELD SERVICES)

District Adviser, visit to Singapore, Malaysia and Thailand (Consultancy) to accompany overseas students on the post conference study tour of the Australian Veterinary Association

R. J. DALGLIESH (PATHOLOGY)

Senior Veterinary Officer, visit to Burma (Consultancy) to assist the Government of Burma in tick fever control for FAO

A. F. CONNOR (MARKETING SERVICES)

Supervising Marketing Officer, visit to UK, USA and Canada to examine marketing intelligence services

DR G. M. BEHNCKEN & DR J. L. DALE (PLANT PATHOLOGY)

Assistant Director, Plant Pathology Branch and Plant Pathologist Division I visit to China (Consultancy) to study tropical and subtropical crops under the Australia/China Scientific Exchange Agreement

DR R. C. COLBRAN (PLANT PATHOLOGY)

Director, Plant Pathology Branch, visit to USA, Canada and Europe to visit plant pathology research centres

Overseas travel 1979-80

DR J. R. SYME (AGRICULTURE) Senior Plant Breeder, visit to UK, Sweden and the Netherlands to study wheat breeding

DR J. L. ROSE (AGRICULTURE) Senior Plant Breeder, visit to USA and Canada to study soybean breeding and agronomy

G. S. PURSS (PLANT INDUSTRY)

Deputy Director, Division of Plant Industry, visit to Europe, North America and South Africa to study research/extension administration, pesticide problems and plant protection procedures

R. E. BARKE (HORTICULTURE)

Assistant Director of Horticulture, visit to USA, Israel, India and Malaysia to study vegetable research and breeding

I. H. RAYNER (DAIRY CATTLE HUSBANDRY)

Director, Dairy Cattle Husbandry Branch, visit to Malaysia, Israel, UK and Western Europe to study dairy husbandry research

R. J. ROGERS (PATHOLOGY)

Principal Veterinary Pathologist, visit to South Africa to attend an International Veterinary Symposium and visit research institutes

DR L. L. CALLOW (PATHOLOGY)

Principal Protozoologist, visit to Southern Africa to attend an International Veterinary Symposium, to visit research laboratories and to undertake a two week FAO consultancy in Mozambique

A. P. SARANIN (CENTRAL SUGAR CANE PRICES BOARD)

Qualified Sugar Chemist, visit to Philippines to attend Congress of International Society of Sugar Cane Technologists

K. G. REICHMANN (BIOCHEMISTRY)

Chemist Division I (Recall) visit to UK to study biochemical aspects of poultry disease and production problems

DR R. SHORTER (AGRICULTURE)

Plant Breeder Division I, visit to USA and India to examine peanut production and plant breeding techniques

D. SCHMIDT (DAIRY RESEARCH)

Dairy Technologist Division I (Recall), visit to France and Holland to examine non-cheddar cheese manufacture

J. STEINER (AGRICULTURAL CHEMISTRY)

Chemist Division I (Recall) visit to UK to attend International Conference on Atomic Absorption Spectroscopy and visit research laboratories

B. A. DONALD (PATHOLOGY)

Microbiologist Division I, visit to USA and Canada to examine research on mycobacteria and to attend a conference on mycobacterium

P. J. NEVILLE (MARKETING SERVICES)

Marketing Officer Division I, visit to Cook Islands to attend a course in agricultural marketing

B. J. WATSON (HORTICULTURE)

Senior Horticulturist, visit to Western Samoa, (Consultancy) for South Pacific Commission to advise on pineapple production

R. J. DALGLIESH (PATHOLOGY)

Senior Veterinary Officer, visit to Venezuela (Consultancy) for FAO to assist in a veterinary training course on tick-borne diseases

E. O. BURNS (DIRECTOR-GENERAL)

Director-General, visit to Italy, as an Australian delegate to FAO conference

K. B. HALE (VETERINARY SERVICES)

Principal Veterinary Officer, visit to Cyprus (Consultancy) for FAO, to help eradicate brucellosis in goats

DR I. F. BEALE (AGRICULTURE)

Senior Agrostologist, visit to Brazil (Consultancy) for IICA and EMBRAPA to advise on semi-arid pasture production

L. J. WADE (AGRICULTURE)

Agronomist Division I, visit to India to study sorghum plant breeding and physiology at ICRISAT

D. R. J. DENSLEY (DIVISION OF MARKETING)

Deputy Director of Marketing, to accompany the Minister to London to attend the International Sugar Organisation

K. B. McRAE (HORTICULTURE)

District Adviser, visit to Fiji (Consultancy) for Fiji Ministry of Agriculture and Fisheries to advise on citrus research programmes

K. J. MIDDLETON (PLANT PATHOLOGY)

Plant Pathologist Division I, visit to USA to act as consulting plant pathologist at the University of Georgia and carry out research work on peanuts

E. J. GILBERT (AGRICULTURE)

Extension Officer Division I, visit to USA to examine rice production methods and research

DR P. S. HOPKINS (SHEEP AND WOOL)

Director, Sheep and Wool Branch, visit to India (Consultancy) for Victorian Department of Agriculture to advise on a Corriedale crossbred sheep programme

G. M. MURPHY (BIOCHEMISTRY)

Senior Chemist, visit to Uruguay (Consultancy) for FAO to advise on mineral deficiencies in grazing animals

J. C. WALTHALL (VETERINARY SERVICES)

Veterinary Officer Division I, visit to USA and Mexico to examine measures to control the screw-worm fly

W. J. TAYLOR (BEEF CATTLE HUSBANDRY)

Visit to USA re simulation for extension purposes and current developments in crossbreeding beef cattle

I. F. MUIRHEAD (PLANT PATHOLOGY)

To visit United Kingdom to attend Symposium on Microbiology of Leaf Surfaces at University of Aberdeen

V. E. MUNGOMERY (AGRICULTURE)

To visit Mexico/Canada/United States of America to study agronomic research and administration

K. J. JACKSON (AGRICULTURE)

To visit United States of America to study recent developments in sunflower agronomy

D. GRAMSHAW (AGRICULTURE)

To visit United States of America and United Kingdom to increase knowledge and experience in lucerne agronomy

K. G. RICKERT (AGRICULTURE)

To visit United States of America to attend Fourteenth International Grassland Congress

J. KILPATRICK (AGRICULTURE)

To visit United States of America to study peanut crop management

L. PEDLEY (BOTANY)

To visit England to revise the legume Tephrosia

D. McGRATH (HORTICULTURE)

To visit United States of America to study root diseases of tomatoes

J. W. TURNER (ENTOMOLOGY)

To visit India to study green vegetable bugs and macadamia nut fauna

M. BENGSTON (ENTOMOLOGY)

To visit Japan, England, France, Switzerland and Israel to study grain protection

G. CRITTALL (DAIRY FIELD SERVICES)

To visit United States of America and Canada to study developments in the dairying industry

C. I. YOUNGER (SHEEP AND WOOL) To visit Indonesia, Singapore, Malaysia, Hong Kong, Japan and the Philippines to determine the type of sheep product most suited to particular markets in South East Asia

K. H. FERGUSON (AGRICULTURE)

To visit the Philippines to attend Seventh Caresta Congress at Manila (Tobacco Agronomy)

R. E. TEAKLE (ENTOMOLOGY)

To visit the United States of America and England to study biological pest control in sorghum, cotton and soya beans

T. J. HALL (AGRICULTURE)

To visit Mexico on plant collection mission

C. H. BEAVIS (STANDARDS)

To visit United States of America to obtain information on current approaches to seed testing research certification and marketing

DR R. LAURENCE (AGRICULTURE)

To visit United Kingdom on potato nutrition research

Overseas travel 1980-81

A. WINTERTON & G. W. MERCER (FISHERIES)

To visit Manila to attend Fourth International Coral Reef Symposium (Marine Park Management)

K. R. CHAPMAN (HORTICULTURE)

To visit Thailand, Hong Kong, China, Singapore and Malaysia to collect suitable subtropical tree fruit material for introduction to Queensland

N. M. DAWSON (LAND RESOURCES)

To visit Malaysia on behalf of the Sugar Board to consider the feasibility of providing technical assistance and developing a consultancy with the Malaysian Plantations

P. B. WYLIE (AGRICULTURE)

To visit England to hold discussions with officers of the Agricultural Development and Advisory Service, Ministry of Agriculture, Food and Fisheries in England (Recall to duty whilst on recreation leave from 21 April to 1 May)

W. J. HALL (BEEF CATTLE HUSBANDRY)

To visit the United Kingdom to undertake a study tour for a research institution, meat processing plant and saleyards (Recall to duty)

W. P. THOMPSON & B. POWELL (LAND RESOURCES)

To visit Sumatra on soil survey work

K. B. HALE (VETERINARY SERVICES)

To visit Indonesia to accompany shipment of cattle from Townsville

DR I. BROWN (FISHERIES RESEARCH)

To visit Central and Western Pacific Countries, to undertake consultancy service on Deep Sea Fisheries Development Project for the South Pacific Commission for six weeks

M. DURAND (BEEF CATTLE HUSBANDRY)

To visit Zimbabwe on ADAB assignment to review needs of livestock industry and recommend program of Australian assistance

R. G. O'BRIEN (PLANT PATHOLOGY)

To visit Cuba on control of blue mould in tobacco

N. I. PAULL (VETERINARY SERVICES)

To visit Cyprus on FAO consultancy on control of brucellosis in goats and the administration of measures against the introduction and control of exotic diseases for twelve months

R. HUMPHREYS (DAIRY FIELD SERVICES)

To visit Papua New Guinea on FAO consultancy on economic dairy production in semitropical conditions

A. STOLAR (HORTICULTURE)

To ASEAN countries to inspect and report upon Australian fruit and vegetable exports to the area

D. L. GEORGE (AGRICULTURE)

To visit United States of America to attend conference of American Society of Agronomy in Detroit re recent research developments in sunflower agronomy and plant breeding. Recalled to duty

J. K. TEITZEL (AGRICULTURE)

To visit Mexico to deliver a series of lectures on animal production from improved pastures

K. J. MIDDLETON (PLANT PATHOLOGY)

To visit India to present a paper at International Workshop on groundnuts - ICRISAT

P. J. JOHNSON (DEVELOPMENT PLANNING)

To visit England to attend First International Soil Conservation Conference. Recalled to duty

K. F. TRUEMAN (VETERINARY SERVICES)

12 month study leave. Visit Canada on 12 months Diploma Course in Clinical Pathology, Vet. College, University of Guelph, Ontario, from September 1980

M. C. FINLAY (AGRICULTURE)

To visit United States of America's rice growing centres - 15 to 25 September 1980

I. F. WHAN (ECONOMIC SERVICES)

To visit Thailand on short-term aid assignment

J. C. WALTHALL (VETERINARY SERVICES)

To visit England and Switzerland for five days during November 1980 to visit animal epidemiology units. Recall to duty

DR J. McEWAN (BIOCHEMISTRY)

To visit East Africa on acaricide analysis consultancy on behalf of FAO - 14 weeks commencing late November 1980

D. L. GEORGE (AGRICULTURE)

To visit United States of America for annual conference of the American Society of Agronomy, Detroit, Michigan - eight days end of November 1980. Recall to duty

R. G. O'BRIEN (PLANT PATHOLOGY)

To visit Cuba for consultancy on behalf of the Cuban Ministry of Agriculture. Two weeks early February 1984

J. BARNES (MARKETING) R. E. CAMM (ADMINISTRATION) To visit Japan to attend Japanese Sugar contract negotiations - 6 to 14 March 1981

D. C. CLAGUE (VETERINARY SERVICES)

To visit northern Australia/Papua New Guinea/ Indonesia - Bureau of Animal Health Study Team - six weeks April, May and July 1981

L. LAWS (DIV OF ANIMAL INDUSTRY) G. ROBERTS (SHEEP AND WOOL) & R. A. JORGENSEN (MARKETING)

To visit South East Asia to assess the potential for the marketing of sheep and sheep meats for three weeks

J. W. TURNER (ENTOMOLOGY)

To visit Indonesia - Information on the existence, distribution and species of exotic fruit flies - 3 May to 11 August 1981

G. M. MURPHY (BIOCHEMISTRY)

To visit Uruguay on FAO consultancy extension for further three-month period 21 April to 20 July 1981

K. R. JORGENSEN (HORTICULTURE)

To visit Cook Islands to study and report on the citrus and pineapple industries for the Cook Island Government - nine weeks in May 1981

R. P. BOWDEN (HORTICULTURE)

To visit Cook Islands to study and report on the citrus and pineapple industries for the Cook Island Government - six weeks in May 1981

T. H. RUDDER (BEEF CATTLE HUSBANDRY)

To visit Fiji on a fertility problem in the Santa Gertrudis herd at the Yagara Cattle Breeding Project - 6 to 8 May 1981. Recall to duty

R. G. HOLROYD (BEEF CATTLE HUSBANDRY)

To visit Indonesia to participate in a training course in Reproductive Diseases and Prevention (Beef Cattle) - 11 June to 21 July 1981

R. M. DOWLING (BOTANY)

To visit Indonesia to consult with staff of Freeport Indonesia and Primal Ltd on the chemical treatment of timber and other plants

K. B. McRAE (HORTICULTURE)

To visit Fiji - Return visit to review progress on a Citrus Industry Development Project - two weeks in June 1981

DR J. A. LINDSAY (BEEF CATTLE HUSBANDRY)

To visit United Kingdom to visit research establishments where beef cattle nutrition research is undertaken. Recall to duty

I. M. LAMBERTH (STANDARDS)

To visit Norway and Bangkok to attend the International Seed Testing Association Tetrazolium Workshop and visits to seed testing laboratories en route - 21 to 28 June 1981

DR R. P. JOHNSTON (AGRICULTURE)

To visit United Kingdom and Western Europe to attend the Fourth International Barley Genetics Symposium plus visits to other organisations - 11 July to 24 August 1981

R. E. REID (LAND UTILISATION)

To visit Fiji as team member for a study of a proposed Australian Aid River Basin Development Project - five weeks from 15 June 1981

J. K. ELDER (ENTOMOLOGY)

To visit Uruguay on FAO Consultancy in data processing - June to September 1981

HON. M. AHERN, HON. R. E. CAMM & D. R. J. DENSLEY (MARKETING) To visit Japan on sugar agreement

R. G. A. STEPHENSON (SHEEP AND WOOL)

To visit Scotland to undertake work at the Rowett Research Institute, Aberdeen, for a period of 12 weeks before 31 October 1981. Recall to duty

Overseas travel 1982-83

R. A. I. DREW (ENTOMOLOGY) To visit Philippines on taxonomy of fruit fly for United States Department of Agriculture

G. E. RAYMENT (AGRICULTURAL CHEMISTRY)

To visit Fiji on soil fertility for Fiji Native Land Development Authority To visit Indonesia to present a paper at International Conference

S. L. WILLIAMS (MARKETING SERVICES)

To visit Japan on tuna export market study for Queensland Fish Board

H. HOLT (MARKETING SERVICES)

To visit Hong Kong, Taiwan, Japan and Korea on Cotton Sales Promotion Mission with Cotton Marketing Board

D. SMITH (ENTOMOLOGY)

To visit Thailand for Citrus Pest Management Program for FAO To visit China on Australia/China Agricultural Exchange Mission on Biological Pest Control (Commonwealth Department of Primary Industry)

A. STOLAR (HORTICULTURE)

To visit Hong Kong and Singapore to identify quality requirements of horticulture markets for Rosevale Trading Company (Queensland)

R. J. DALGLIESH (PATHOLOGY)

To visit Cuba for protozoology study for FAO

G. S. BUSBY (DAIRY FIELD SERVICES) & R. T. COWAN (DAIRY CATTLE HUSBANDRY)

To visit Philippines for dairy training needs assessment for Australian Development Assistance Bureau (ADAB)

J. M. HOPKINSON (AGRICULTURE)

To visit Zimbabwe on tropical seed production for Grassland Management Group

B. BERGE (MARKETING SERVICES)

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To visit Fiji as marketing consultant to South Pacific Commission

D. HAMILTON (AGRICULTURAL CHEMISTRY)

To visit China on Australia/China Agricultural Exchange Program - Feasibility study on agrochemicals (Commonwealth Department of Primary Industry)

P. N. THURBON (DAIRY CATTLE HUSBANDRY)

To visit Nepal on Livestock Development Project for Western Australia Department of Agriculture and Australian Development Assistance Bureau (ADAB)

P. BEASLEY (SHEEP AND WOOL)

To visit Mexico to conduct sheep training course for GRM International (Queensland consultancy firm)

To visit USA to collect data on sheep breeding developments

A. GEORGE (HORTICULTURE)

To visit Fiji for feasibility study on developing horticulture crops for Native Land Development Authority

G. B. McCORMACK (BEEF CATTLE HUSBANDRY)

To visit Thailand on dairy research needs and marketing strategies for Australian Centre for International Agricultural Research (ACIAR)

L. L. CALLOW (PATHOLOGY)

To visit Kenya to attend as Board Member meeting of International Laboratory for Research on Animal Diseases

W. V. MUNGOMERY (STANDARDS)

To visit USA, United Kingdom and Europe on study tour re pesticide regulations

J. G. MILLER (DAIRYING)

To visit United Kingdom, Netherlands, Denmark and West Germany on study tour re dairy cattle nutrition and management

Y. S. CHUNG (PATHOLOGY)

To visit United Kingdom and Europe on study tour re animal disease control

K. J. COUGHLAN (AGRICULTURAL CHEMISTRY)

To visit USA, Canada, United Kingdom, Brazil and Netherlands on study tour re salinity research

P. R. BEAL (HORTICULTURE)

To visit United Kingdom, West Germany and Netherlands on study tour re horticultural research

C. P. HAMILTON (MARKETING)

To visit Philippines, USA, Cuba, Jamaica, Brazil, South Africa and Mauritius on study tour re sugar industry organisation and production control

A. P. SARANIN (CENTRAL SUGAR CANE PRICES BOARD)

To visit Hawaii, Cuba, United Kingdom, Denmark and South Africa on study tour re sugar cane and beet analysis systems

B. J. WATSON (HORTICULTURE)

To visit North and South America on study tour re new horticultural crops

G. G. WHITE (ENTOMOLOGY) To visit Austria, United Kingdom and USA on study tour re stored products fumigation

N. C. GILLESPIE (FISHERIES RESEARCH) To visit New Caledonia, French Polynesia and Hawaii on study tour re ciguatera poisoning

I. W. BROWN (FISHERIES RESEARCH) To visit Hawaii on study tour re spanner crab fishery

B. KITCHEN (DAIRY RESEARCH) To visit Sweden and United Kingdom for visit on dairy milking technology

M. R. MACKINNON (FISHERIES RESEARCH)

To visit Thailand to take part in barramundi fishery training course

G. I. ALEXANDER (DIRECTOR-GENERAL) & J. M. BARNES (ADMINISTRATION) To visit Switzerland, Thailand and Malaysia for sugar talks and visit agricultural projects

P. NEWLANDS (BRANDS) To visit USA on study tour re new computer technology

R. HARTY (STANDARDS)

To visit Canada on study tour re seed testing

Overseas travel 1983-84

R. G. HOLROYD (BEEF CATTLE HUSBANDRY) To visit USA (Hawaii) to take part in a veterinary workshop

M. C. COX (AGRICULTURE) To visit Philippines to visit International Rice Research Institute

To visit Colombia to obtain new rice varieties

P. S. BRENNAN To visit Japan to take part in wheat genetics symposium

T. DICKSON (AGRICULTURE) To visit Japan to attend soybean symposium and visit soybean research centres

R. G. HENZELL (AGRICULTURE)

To visit Italy to take part in workshop on sorghum diseases

P. MOODY (AGRICULTURAL CHEMISTRY) To visit USA, Belgium, UK and Netherlands on study tour re soil phosphorus

B. WALKER (AGRICULTURE) To visit Cuba and Ethiopia on consultancy re tropical pastures

D. S. LOCH (AGRICULTURE) To visit Cuba on consultancy re pasture seed

M. BENGSTON (ENTOMOLOGY) To visit Malaysia and Philippines on consultancy re control of grain storage pests

P. SIMPSON (STANDARDS) To visit Malaysia and Philippines on consultancy re control of grain storage pests

C. W. WINKS (HORTICULTURE) To visit China to lead Commonwealth Mission on subtropical horticulture

K. FITZGERALD (CONSULTANCIES) To visit Malaysia, Philippines and Thailand on consultancy re overseas development projects

L. CALLOW (PATHOLOGY) To visit Sri Lanka, India and Kenya on consultancy re animal diseases

R. V. BYRNES (PIG AND POULTRY) To visit Japan on study tour re intensive livestock industries

I. F. BEALE (AGRICULTURE) To visit China on consultancy re proposed research centre in China

J. K. LESLIE (PLANT INDUSTRY) To visit Kenya on consultancy re collaborative research project

J. W. RYLEY (ASSISTANT DIRECTOR-GENERAL (EXTENSION)) To visit Japan for study tour re intensive livestock, fisheries and horticulture

B. A. FRANZMANN (ENTOMOLOGY) To visit USA for study tour re sorghum midge

B. C. DODD (HORTICULTURE) To visit USA for study tour re deciduous fruit

J. STEINER (BIOCHEMISTRY) To visit East and West Germany for study tour re trace elements in animal nutrition

P. TIMMS (PATHOLOGY)

To visit France and Kenya for study tour re animal diseases (tick fever)

T. H. RUDDER (BEEF CATTLE HUSBANDRY)

To visit South Africa to take part in a World Congress on sheep and beef cattle breeding

H. F. OLSEN (ESTUARINE & FORESHORE MANAGEMENT)

To visit Italy for study tour re estuarine fisheries

DR G. I. ALEXANDER (DIRECTOR-GENERAL)

To visit Indonesia for consultancy re overseas aid projects To visit Switzerland and United Kingdom to accompany Minister to sugar talks To visit USA, United Kingdom and Switzerland on international discussions re sugar

J. BARNES (MARKETING) To visit Switzerland and United Kingdom to take part in sugar discussions

F. J. KEENAN (VETERINARY SERVICES) & P. J. KETTERER (PATHOLOGY) To visit Indonesia on control of foot and mouth disease outbreak

R. H. CHISHOLM (AGRICULTURE) To visit Somalia, Sudan and USA for consultancy re grain sorghum

G. E. RAYMENT (AGRICULTURAL CHEMISTRY) To visit Fiji for consultancy re pigeon pea research

W. KIDSTON (MARKETING)

To visit Singapore, United Kingdom, Netherlands and Italy for study tour of wholesale markets

B. WOOLCOCK (DIV OF ANIMAL INDUSTRY) To visit Korea for conference re animal disease control

T. PASSLOW & J. TURNER (ENTOMOLOGY) To visit Philippines, Malaysia, Singapore and Thailand for consultancy re control of fruit fly

D. R. J. DENSLEY (MARKETING) To visit Sudan, Ethiopia, Somalia and Kenya for consultancy re training needs (FAO)

N. PAULL (VETERINARY SERVICES) To visit Egypt for consultancy re control of brucellosis

R. NIEPER (VETERINARY SERVICES) To visit USA to assist in control of fowl plague outbreak

M. McKINNON (FISHERIES RESEARCH) To visit India for consultancy for FAO re inland fisheries

R. SHORTER (AGRICULTURE) & G. PURSS (PLANT INDUSTRY) To visit Indonesia for consultancy re peanut improvement (ACIAR)

R. BYGOTT (RURAL RECONSTRUCTION BOARD)

Visit to France, Netherlands, UK, Canada and USA for study tour re agricultural lending organisations

B. PEACOCK & B. BROWN (HORTICULTURE)

Visit to Thailand, Malaysia and Singapore for consultancy on mango research (ACIAR)

I. W. BROWN (FISHERIES RESEARCH) Visit to Vanuatu for consultancy re coconut (ACIAR)

D. HOFFMAN (PATHOLOGY) Visit to Indonesia for consultancy re cattarhal fever

P. N. THURBON (DAIRY CATTLE HUSBANDRY) Visit to United Kingdom to attend conference on milk production (DPI)

P. VAN BEEK (EXTENSION SERVICES) Visit to United Kingdom and Netherlands for study tour re agricultural extension (DPI)

R. SHORTER (AGRICULTURE) & K. MIDDLETON (PLANT PATHOLOGY) Visit to Indonesia for consultancy re peanut (ACIAR)

W. D. MITCHELL (DAIRYING) Visit to Thailand for study tour re dairy improvement (DPI)

I. ROBINSON (ECONOMIC SERVICES) Visit to UK on development of export markets in UK (DPI)

M. JORGENSEN (MARKETING SERVICES) Visit to UK and Western Europe on development of export markets in EEC (DPI)

J. C. ARMITSTEAD (BIOCHEMISTRY) Visit to Burundi for consultancy re cattle dip analysis (FAO)

I. F. MARTIN (AGRICULTURE) Visit to USA and Mexico for study tour re maize breeding (DPI)

J. K. TEITZEL (AGRICULTURE) Visit to Malaysia for consultancy re tropical pasture training course (FAO)

R. BARKE (HORTICULTURE)

Visit to Hong Kong, Singapore and Malaysia for tropical fruit and vegetable trade mission (Commonwealth Dept Trade)

P. TWINE (ENTOMOLOGY) Visit to China for consultancy re entomological problems (Commonwealth DPI)

Overseas travel 1984-85

DR G. I. ALEXANDER (DIRECTOR-GENERAL) To New Zealand to attend a conference To Samoa to attend a meeting of Pacific countries To Thailand, Europe and USA re overseas travel To USA for discussions with senior agricultural officers To Malaysia to attend AGASIA 84 To New Zealand to attend a veterinary conference and the Treaty on CER

J. BARNES (MARKETING) To Thailand, Europe and USA regarding overseas travel To New Zealand to attend a veterinary conference and the Treaty on CER

R. B. BARTHOLOMEW (ECONOMIC SERVICES) To Papua New Guinea to undertake a tree crop survey (ACIAR)

M. BENGSTON (ENTOMOLOGY) To the Philippines and Malaysia to advise on grain storage (ACIAR)

DR P. S. BRENNAN (AGRICULTURE) To the Middle East and Africa for wheat breeding discussions (DPI & ICARDA)

G. J. BUSBY (DAIRY FIELD SERVICES) To the Philippines for a course evaluation (ADAB)

J. E. BUTLER (STANDARDS) To the United Kingdom to attend an International Seed Testing Association Meeting

DR L. L. CALLOW (PATHOLOGY) To China and Hong Kong to advise on the Yunan Livestock and Pasture Development Project (AACM)

B. CAMERON (ADMINISTRATION)

To Malaysia to attend AGASIA 84

To Japan, Europe, USA and Canada with a mission to study the use of irradiation in fruit transport.

To Zimbabwe to attend a pasture workshop (International Development Research Centre)

K. R. CHAPMAN (HORTICULTURE) To Sri Lanka and Thailand to establish a sugar cane research centre (ADAB)

Y. S. CHUNG (PATHOLOGY) To Japan to attend a Virology Conference and undertake a study tour (DPI) DR K. COUGHLAN (SOIL CONSERVATION RESEARCH) To India to attend a Workshop on Management of Vertisols (black cracking clays) - (ACIAR)

DR R. T. COWAN (DAIRY CATTLE HUSBANDRY) To Malaysia to take part in a tropical pasture course (FAO)

B. CULL (HORTICULTURE) To the Philippines to attend a banana conference (ACIAR)

D. W. CURREY (PLANT QUARANTINE) To Sri Lanka to advise on plant quarantine procedures (FAO)

R. J. DALGLEISH (PATHOLOGY) To Kenya and Sri Lanka to take part in an ILRAD Workshop and ACIAR project (ACIAR & ILRAD)

G. DENNIEN (DAIRY FIELD SERVICES) To India to undertake a pre-course evaluation for ADAB

D. R. J. DENSLEY (MARKETING) To Africa to identify training needs (FAO). To Papua New Guinea to plan a survey of tree crops (ACIAR)

A. DIATLOFF (PLANT PATHOLOGY) To Indonesia to make a Rhizobium collection (University of New England)

R. J. DONNET (ECONOMIC SERVICES) To Papua New Guinea to undertake a tree crop survey (ACIAR)

N. J. DOUGLAS (AGRICULTURE) To USA to undertake a study tour of agricultural industries

M. C. L. DREDGE (FISHERIES RESEARCH) To Papua New Guinea to undertake a prawn research project (South Pacific Commission)

R. A. I. DREW (ENTOMOLOGY) To Hawaii to attend a conference on fruit flies (DPI)

G. EGAN (AGRICULTURAL CHEMISTRY) To Switzerland to study quality assessment trials (ARL) Australia

J. ELDER (ENTOMOLOGY) To Indonesia as a consultant on epidemiology (James Cook University)

R. B. ERSKINE-SMITH (OVERSEAS CONSULTANCIES) To Papua New Guinea to survey tree crops (ACIAR) To South East Asia to discuss ACIAR projects. To Vanuatu as follow-up to crab project (ACIAR)

DR M. A. GILBERT (AGRICULTURE) To Malaysia to conduct a pasture training course (FAO)

N. G. GILLESPIE (FISHERIES RESEARCH) To Tahiti and Canada to attend a Ciguatera Conference (DPI) To Philippines to attend a Conference on Penaeid prawns and shrimps

D. J. HAMILTON (AGRICULTURAL CHEMISTRY) To China to undertake an agrochemicals project (ADAB)

J. R. F. HARDMAN (ECONOMIC SERVICES) To Papua New Guinea to attend an ACIAR project (ACIAR)

R. HARTY (STANDARDS)To France to represent Queensland at an OECD MeetingTo Colombia and Peru to attend a workshop on seed testing (DPI and ISTA)

N. W. HEATHER (ENTOMOLOGY) To Hawaii to attend a fruit fly conference (DPI)

J. B. HEATON (PLANT PATHOLOGY) To New Zealand to attend a Plant Pathology Conference (DPI)

A. HEGARTY (ASSISTANT DIRECTOR-GENERAL) To Europe, USA and Canada to lead a mission to study irradiation of agricultural products

M. E. HERRINGTON (HORTICULTURE) To USA to consult a US law firm (Pillsbury, Madeson, Wisconsin)

D. HOFFMAN (PATHOLOGY) To Indonesia in connection with a catarrhal fever project (ACIAR) To Indonesia to visit the MCF project (James Cook University)

G. HOSEGOOD (ECONOMIC SERVICES) To Papua New Guinea to study the tree crop project (ACIAR)

T. HOSHINO (FISHERIES RESEARCH) To Taiwan and Japan to study prawn rearing techniques (DPI)

K. J. HOUSTON (ENTOMOLOGY) To the United Kingdom on a study tour (DPI)

K. F. HOWARD (BEEF CATTLE HUSBANDRY) To Ethiopia to advise on a cattle feedlot (AACM)

D. R. JONES (PLANT PATHOLOGY)

To USA on a study tour (DPI)

W. KIDSTON (MARKETING)

To Papua New Guinea in connection with the Torres Strait Treaty
DR J. KOCHMAN (PLANT PATHOLOGY)

To Argentina to attend the IIth Sunflower Conference and make local visits (DPI)

D. P. LAPIDGE (ASSISTANT DIRECTOR-GENERAL)

To New Zealand to attend the Veterinary Conference and the Treaty on CER (DPI)

DR J. K. LESLIE (PLANT INDUSTRY)

To Kenya to advise on dryland farming (ISNAR)

D. S. LOCH (AGRICULTURE)

To Zimbabwe to attend a pasture workshop and undertake a study tour (IDRC & ACIAR)

R. J. LOCH (SOIL CONSERVATION RESEARCH) To Philippines to attend a Soil Erosion Management Workshop (ACIAR)

H. LOW (STANDARDS) To Colombia and USA for training seed analysts in ISTA methods (ISTA)

G. B. McCORMACK (FISHERIES MANAGEMENT) To Malaysia and Singapore to attend AGASIA 84 (DPI)

B. J. McDONALD (SHEEP AND WOOL) To Japan to attend the conference on Biometrology (DPI)

G. MICKAN (ECONOMIC SERVICES) To Papua New Guinea in connection with the ACIAR tree crop project (ACIAR)

K. MIDDLETON (PLANT PATHOLOGY) To India and Indonesia to attend the ICRISAT Conference on groundnuts (ICRISAT & ACIAR)

To Indonesia to advise on peanut plant improvement (ACIAR)

R. MILLER (DAIRY CATTLE HUSBANDRY) To Indonesia to establish an embryo transplant unit (DPI)

P. MOODY (AGRICULTURAL CHEMISTRY) To Papua New Guinea to discuss volcanic ash soils (SHROP)

DR I. MUIRHEAD (PLANT PATHOLOGY)

To Philippines, Thailand, Malaysia and Singapore to advise on mango post-harvest physiology (ACIAR)

W. V. MUNGOMERY (STANDARDS) To USA and Canada to discuss agricultural chemical problems (DPI)

C. F. MURRAY (HORTICULTURE)

To Thailand, Malaysia, Singapore to advise on mango post-harvest physiology (ACIAR)

P. J. NEVILLE (QUEENSLAND FISH MANAGEMENT AUTHORITY) To New Zealand to attend a Fish Trade Conference

C. R. PARKE (VETERINARY SERVICES)

To Papua New Guinea to take part in a screw-worm fly observation unit (DPI)

R. PARKER (ENTOMOLOGY)

To Philippines to advise on grain storage (ACIAR)

I. PARTRIDGE (AGRICULTURE)

To Solomon Islands to give a training course on beef cattle management (South Pacific Commission)

T. PASSLOW (ENTOMOLOGY) To USA to attend the International Workshop on Sorghum Pests (DPI)

R. G. PEARSON (FISHERIES RESEARCH) To Papua New Guinea for discussions on the Prawn Research Project (ACIAR)

B. POWELL (LAND RESOURCES) To Indonesia to appraise a land use project (ADAB)

I. H. RAYNER (DAIRY CATTLE HUSBANDRY) To Indonesia to conduct a feasibility study for a dairy factory (Asian Dairy Industry, Hong Kong)

DR I. G. REES (PLANT PATHOLOGY) To New Zealand to attend a Plant Pathology Conference (DPI)

B. A. T. RODDA (LAND UTILISATION) To South Africa and USA to study land use (DPI)

M. J. RYLEY (PLANT PATHOLOGY) To New Zealand to attend a Plant Pathology Conference (DPI)

P. R. SAMSON (ENTOMOLOGY) To Philippines to advise on a grain storage project (ACIAR) To Malaysia and Philippines to advise on a grain storage project (ACIAR)

P. SCUDAMORE-SMITH (HORTICULTURE) To ASEAN region to study tropical fruit processing (WAOPA)

R. N. SHEPHERD (SOIL CONSERVATION) To Philippines on a soil conservation consultancy (ACIL)

E. V. SIGLEY (DAIRY FIELD SERVICES) To Philippines for a course evaluation and attend a conference (ADAB) T. SMELTZER (PATHOLOGY) To USA on a study tour and to attend a symposium (DPI)

D. SMITH (ENTOMOLOGY) To China to attend a Biological Conference (FAO & DPI)

G. D. SMITH (SOIL CONSERVATION RESEARCH) To Europe to attend a Soils Conference and then undertake a study tour

I. STAPLES (AGRICULTURE) To India to undertake a plant collection trip (FAO & IBPGR)

R. M. STEPHENS (SOIL CONSERVATION SERVICES) To Malaysia to advise on soil conservation (CSR Ltd)

B. STONE (SOIL CONSERVATION SERVICES) To Fiji to establish a soil conservation pigeon pea project (NLDC)

T. A. STREETEN (VETERINARY SERVICES) To USA and Mexico to study exotic diseases

K. STUART (CENTRAL SUGAR CANE PRICES BOARD) To Papua New Guinea to train in sugar production (Q. SEARCH)

B. SWAIN (VETERINARY SERVICES) To Papua New Guinea to observe screw-worm activity (DPI)

J. R. SYME (AGRICULTURE) To USA, Canada and UK on a study tour

M. L. TIERNEY (DAIRY CATTLE HUSBANDRY) To Korea to attend an animal science congress

HON N. J. TURNER (MINISTER) To Malaysia to attend AGASIA 84 (DPI)

J. VAN HAERINGEN (MARKETING SERVICES) To Brunei to finalise exhibit arrangements (DPI)

G. VINNING (MARKETING SERVICES)To Malaysia, Singapore, Thailand to inspect AGASIA 84 (a pre-mission trip)To Malaysia with AGASIA 84 MissionTo Europe, USSR, USA and Canada with the Irradiation Mission (DPI)

DR P. WALKER (BIOCHEMISTRY) To Indonesia for a virology consultancy (James Cook University)

R. L. WALKER (SOIL CONSERVATION SERVICES)

To United Kingdom to study soil conservation (DPI)

W. R. WEBSTER (VETERINARY SERVICES) To Singapore to observe the outbreak of an exotic disease (Commonwealth and State)

D. WOODRUFF (AGRICULTURE) To Mexico and USA to attend a symposium and undertake a study tour (DPI, CIMMYT)

B. A. WOOLCOCK (ANIMAL INDUSTRY) To Taiwan to investigate the export of Queensland cattle (AMLC)

Abbreviations

AACM Australian Agricultural Consultancy and Management Company P/L

ACIAR Australian Centre for International Agricultural Research

ACIL ACIL Australia Pty Ltd (Australian consulting firm)

ADAA Australian Development Assistance Agency (Now ADAB)

ADAB Australian Development Assistance Bureau

AGASIA Agricultural Expo, Malaysia - held August 1984

AMLC Australian Meat and Livestock Corporation

APHCA Animal Production and Health Committee for Asia

ARL Allied Research Laboratories

ASEAN Association of South-East Asian Nations (Indonesia, Malaysia, Philippines, Singapore, Thailand)

CER Closer Economic Relations (New Zealand)

CESG

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Commonwealth Extension Services Grant

CIMMYT

Centro Internacional de Mejoramiento de Maiz y Trigo - the International Corn and Wheat Improvement Center

CSR LTD Colonial Sugar Refining Co Ltd

EEC European Economic Community

FAO Food and Agriculture Organisation of the United Nations

IBPGR International Board for Plant Genetic Resources

ICARDA International Centre for Agricultural Research in the Dry Areas

ICRISAT International Crops Research Institute for the Semi-arid Tropics

IDRC International Development Research Centre (Canada)

IICA Instituto Interamericano de Ciencias Agricolas, Costa Rica

ILRAD International Laboratory for Research on Animal Diseases

ISNAR International Service for National Agricultural Research

ISTA International Seed Testing Association

NLDC Native Land Development Council (Fiji)

PAC Policy Advisory Council (ACIAR)

SHRDP Southern Highlands Rural Development Project (PNG)

WAOPA West Australian Overseas Projects Authority 1052 History of DPI

REACHING THE CENTENARY

Additional highlights of the Neil Turner Administration

Additional Acts of the Turner Ministry

- 1. Canned Fruits Marketing Act Amendment Act 1985. This Amendment Act extended the existing canned-fruits marketing arrangements in Queensland for a further three years. The objective of the Act was to stabilise the canned deciduous fruits industry by minimising market disruptions and severe price discounting. This would have a positive flow-on to Queensland's canned pineapple industry. Provision was also made for greater flexibility and cost savings in produce insurance. The Act commenced operation on 27 September 1985 by Royal Assent.
- 2. Tobacco Industry Protection Act Amendment Act 1985. Provision was made for increased penalties under the Act to ensure that farmers complied with pest and disease control measures. Non-compliance with such measures had resulted in a serious disease, blue mould, having the potential to become resistant to existing fungicide. Penalties under the Act had not been effective deterrents. The Act provisions commenced on 27 September 1985 by Royal Assent.
- 3. *Milk Supply Act Amendment Acts* 1985 -1986. These Acts provided for a system of market-milk entitlement negotiability within processor groups in a prescribed area to allow producers to buy and sell entitlements at prevailing market prices. The Acts also enabled the Milk Entitlements Committee to maintain distribution pools for market milk by continuing acquisition of market milk growth and by applying a forfeiture in the form of a transfer assessment on milk entitlement transactions where an entitlement was transferred away from the land and registered dairy premises. The provisions of these Amendment Acts were progressively introduced from 27 January 1986.
- 4. *City of Brisbane Market Act and Other Acts Amendment Act 1985.* This Act amended various Acts to ensure that superannuation schemes that operated for the benefit of staff of primary industry statutory authorities were uniformly accountable. The provisions of this Amendment Act commenced on a day appointed by Proclamation, which was 20 February 1986.
- 5. *Veterinary Surgeons Act Amendment Act 1985.* The principal purposes of this Amendment Act were to provide for:
 - a Veterinary Tribunal of Queensland, with the power to hear charges of professional misconduct;
 - specialist registration and referral by the Veterinary Surgeons Board to a body known as the Advisory Committee on Registration of Veterinary Specialists if advice was desired, which would ensure a high degree of uniformity within Australia and New Zealand on specialist registration;

- registration for a limited period of up to 30 days for veterinary surgeons who were registered in other Australian States and Territories. This provision would greatly assist veterinary surgeons who come to Queensland to undertake a locum;
- registration of a veterinary surgeon before actual conferral of qualifications, which overcame the time lag between examination results and graduation ceremonies.

The provisions of this Amendment Act commenced on a day appointed by Proclamation, which was 24 March 1986.

- 6. *Stock Act Amendment Act 1986*. This Amendment Act was mainly concerned with furthering the bovine brucellosis and tuberculosis eradication campaign. It gave the Minister the authority to enter into agreements with owners of infected properties to carry out eradication programmes and the power to require internal fencing to be repaired or erected for disease eradication. General disease control measures were strengthened by:
 - i. enabling the Minister to prohibit, immediately, by Notification, the introduction of infected or suspected stock or animal products from another State or Territory;
 - ii. expanding the notifiable disease provisions to include suspected diseases; and
 - iii. widening the implied disease-free warranty conditions to provide an enhanced remedy for buyers of diseased stock.

The provisions of this Amendment Act commenced on a day appointed by Proclamation, which was 24 March 1986.

7. *Queensland Grain Handling Act Amendment Act 1986.* This Act enabled the Queensland Grain Handling Authority to, offer a "warehousing" service to growers to store grains that had no marketing board. It gave the Authority power to handle commodities other than grain, as approved by the Governor-in-Council.

The date of Royal Assent for this Act was 26 March 1986 and the date of Proclamation was 14 February 1987.

- 8. Soil Conservation Act 1986. This new Act reflected the principle that the prime responsibility for the control of soil erosion rested with individual land-owners and land-users. However, the Act recognised that Government had certain roles to play in soil conservation measures, such as:
 - providing leadership in achieving coordination between affected parties;
 - providing extension services to ensure that the public was aware of the importance of controlling soil erosion;
 - providing technical advice and assistance to enable landowners to adopt erosion control measures; and
 - undertaking research to develop effective and economically feasible methods of controlling erosion.

The Act provisions commenced on the date of Royal Assent, which was 13 September 1986, and the existing Soil Conservation Act 1965-80 was repealed on this date.

- 9. Wheat Pool Act and Another Act Amendment Act 1986. The provisions of this Amendment Act enabled the State Wheat Board to make an annual contribution towards wheat research in lieu of the voluntary levy scheme. This provided a higher level and more equitable funding source of wheat research in Queensland. Research funds would be used in areas such as the wheat breeding programme, based at the Queensland Wheat Research Institute. In recent years, demands in the marketplace had shown that varieties of wheat needed to be adaptable to a wide range of environmental conditions. The provisions of this Amendment Act commenced on 25 September 1986 by Royal Assent.
- 10. *Regulation of Sugar Cane Prices Act Amendment Act 1986*. This Amendment Act contained extensive deregulation measures, which provide considerable economic benefits to growers in future years. The amendments implemented involve the freeing up or deletion of formal approval mechanisms concerning transfer of assignments with or without land and transfer of peaks with or without assignment. In respect of the sale of sugarcane farms as going concerns, no approval would now be required either by the Central Board or a Local Board to effect the transaction. Further, a Local Board upon application could approve the inclusion for canegrowing of further suitable lands not exceeding 15 per cent of the applicant canegrower's assignment provided that only an area equivalent to the original assignment might be harvested in any one season. This procedure was known as roaming. Perhaps the most significant amendment was that the Act now recognised that a canegrower had a property right in his assignment which was capable of being transferred. This right had been assumed for many years but had not existed in law. The provisions of this Amendment Act commenced on 25 September 1986 by Royal Assent.
- 11. *Farm Produce Marketing Act Amendment Act 1986*. This Amendment Act was designed to produce a more equitable system of payments and financial control between growers and selling agents and merchants. One of the main changes was the requirement that farm produce commercial sellers acting solely as merchants were required to hold a fidelity bond which improved the protection for growers against possible default by commercial sellers acting as merchants.

The system of issuing licences (all farm produce commercial sellers or wholesalers of fruit and vegetables in Queensland were now required to be licensed) was streamlined by taking such responsibility away from the Clerk of the nearest Magistrates Court and placing it with the Registrar of Farm Produce Commercial Sellers.

A further amendment removed the previous severe penalty of automatic ineligibility for a farm produce commercial seller to hold a licence for a period of 5 years which resulted from a conviction for any offence against the Act.

The Act amendments also set further guidelines on merchant transaction price agreements and on the time periods within which merchants must pay growers. The provisions of this Amendment Act commenced on 1 January 1987.

Additional major staff changes during the Turner Administration from 8 November 1983 to 1 December 1986

During this period four Assistant Directors-General retired.

- 1. Desmond Percy Lapidge, who began his career as Clerk to the Marketing Assistant in 1951, worked up to Director, Division of Marketing in 1966, became Assistant Director-General, Planning and Development in 1981 and retired in 1986.
- 2. John William Ryley, B.V.Sc., who joined the Department as Assistant Veterinary Officer at Atherton in 1949, rose through the ranks to Director of Veterinary Research in 1964, Director, Division of Animal Industry in 1979, and Assistant Director-General (Extension) in 1980, also retiring in 1986 and was awarded an OAM for services to primary industry in June 1987.
- 3. Brian Lionel Oxenham, B.Agr.Sc., F.A.I.A.S., who joined the Department as a Plant Pathologist in 1949, rose to become Director of Agriculture in 1966, Director, Division of Plant Industry in 1974, and Assistant Director-General (Research) in 1980. He retired in January 1987.
- 4. Kenneth Norman Shea. B.Sc., B.A., Diploma in Public Administration, started with the Department in 1956 as a Plant Pathologist, left the Department to become a Public Service Inspector in 1974 and returned to the Department as Assistant Director-General (Administration) in 1983, retiring in 1986.

This left the top echelon of Dr Graham Irving Alexander, A.O., B.V.Sc., M.S., Ph.D., F.A.C.V.Sc., F.A.S.A.P., Director-General from August 1980, and Austin Hegarty, B.Sc., Q.D.A., Deputy Director-General from 1981, in administrative charge.

Other senior officers who reached the end of their professional service included:

Stanley G. Knott, B.V.Sc, Dip. Agr. Extension, who joined the Department as a Veterinary Officer in 1960, progressed to Chief Inspector of Stock and Director of Veterinary Services in 1978 and retired as Deputy Director of Animal Industry in February 1986. Marcus Richard Edward Durand, B.V.M.S. (Glasgow), who joined the Department in November 1971 as a Beef Cattle Husbandry Officer, rose to Director of Beef Cattle Husbandry on 15 April 1976, became Director of the Information and Extension Training Branch from 16 January 1986 and retired to his own cattle property on 16 February 1987. Gordon Stanley Purss, M.Sc.Agr., F.A.I.S., who joined the Department in Toowoomba in 1950 as a Plant Pathologist, became Director of the Plant Pathology Branch in 1971, then Director of the Division of Plant Industry in 1980, retiring on 20 December 1986. Boyd Parkinson, B.V.Sc., who joined the Department as Divisional Veterinary Officer at Maryborough in 1954, rose through Slaughtering and Meat Control to become Director, Veterinary Public Health on 16 January 1982 and retired on 23 March 1987. Avery Winterton, B.Sc., Q.D.A.H., Dip. Bus. Admin., who had a varied interest in the Department from 24 February 1955 in the Agriculture Branch specialising mainly in tobacco until December 1964 then moving to the Information and Extension Training Branch in 1973, Executive Officer (Administration) and Assistant to the Director-General in December 1974, completed his professional career as Director of Marine Parks, Division of Dairying and Fisheries from 1981 to 1986.

With this major loss of senior officers over a few years, some younger officers than usual were brought higher in the administration and research to join the more experienced officers remaining. Many of these had completed administration and extension training and Gatton College diplomas in addition to basic university degrees to lift the general standard of the senior officers.

New promotions within the senior ranks from 1984 included Brian Aland Woolcock, B.V.Sc., M.A.C.V.Sc., from Director, Division of Animal Industry 1980-86 to Assistant Director-General, 16 October 1986. He had initiated the important brucellosis and tuberculosis eradication campaign which hopefully will succeed by the estimated target date of 1992.

James Gordon Miller, B.Sc.Agr., Dip.Bus.Admin., Q.D.A.H., Director, Division of Dairying and Fisheries 1983-86, to Assistant Director-General, 19 June 1986.

Robert Brian Bygott, B.Econ., Dip.Agr.Ext., who came from being Chairman of the Rural Reconstruction Board to become Director, Division of Dairying and Fisheries on 19 June 1986.

John Gibb, from Director, Administration 1983-86, to Director, Division of Animal Industry on 16 October 1986.

Geoffrey George Crittall to Deputy Director (Dairy Research), Division of Dairying and Fisheries on 17 May 1984.

Ailsa Jean Gillies from Director, Dairy Research Branch to Deputy Director (Dairy Research), Division of Dairying and Fisheries on 17 May 1984.

When Marcus Durand left the Beef Cattle Husbandry Branch he was succeeded in September 1984 by Dr Peter Hopkins, who moved to Deputy Director of Animal Industry in September 1986. Lyle Winks, B.Agr.Sc., Dip.Bus.Admin., took over the Directorate of Sheep and Wool from Hopkins and since October 1984 has been Acting Director of the Beef Cattle Husbandry Branch, with T.H. Rudder, B.Econ., Q.D.A.H., as Assistant Director from June 1985.

John van Haeringen moved from Assistant Director, Marketing Services Branch in 1982 to Director of Marketing Services and in 1984 to Director of Economic Services until September 1984, when he became Assistant to the Director-General, a position he now occupies.

Some Departmental awards and appointments

Dr Graham Irving Alexander, Director-General of the Queensland Department of Primary Industries, was made an officer in the general division of the Order of Australia (AO) in the Australia Day honours list 1986. He received his honour for his services to agriculture, particularly in the field of animal production.

John W. Ryley received the OAM in June 1987 for service to primary industry.

Dr John Standley of the DPI Biloela Research Station shared the World Phosphate Institute (IMPHOS) award with P. M. Moody for contributions to the advancement of knowledge of phosphates, and their application work provided guidelines for phosphorus fertilisation of tropical crops. The award included a certificate each and the shared sum of \$1500.

Dr John Thompson, Senior Soil Microbiologist of the Queensland Wheat Research Institute, undertook a study tour of India with the idea of a joint Australian-Indian research project on zinc nutrition in black clay soils. He was invited to India in 1985 after two prominent Indian visitors had spent some time at the Institute and been impressed with John's work on mycorrhiza fungi, which have an important role in the zinc nutrition of crops.

The Central Queensland Sub-branch of the Australian Institute of Agricultural Science Award was awarded to John Wildin, B.Sc.Agr., Q.D.H., for his excellence in field extension work in the grazing industry and particularly in the development and use of Leucaena.

The Horticultural Travel Award 1986 was awarded to Geoff Bulow, an Extension Horticulturist at the DPI Horticultural Research Station at Redlands; he won one of four \$1850 air-fare awards to attend the 22nd International Horticultural Congress in Davis, California, in August 1986. He worked in the diverse South Moreton horticultural region, handling a broad range of crops and conditions. While in California Bulow studied the latest developments in information transfer, with particular attention to computer-based systems similar to those being developed by the DPI.

Peter Scudamore-Smith of the DPI Food Research Branch won the Vin de Champagne Award 1985 for his expertise in identifying champagne types and his knowledge of the intricate processes that produce the best sparkling wines. The award was a three-week first-class study tour of the champagne district of France donated by the Comité Interprofessional du Vin de Champagne, the French body that controls every aspect of the production and promotion of that country's champagne.

Sheryle Rogers, a Food Technologist at the Food Research Laboratories in Brisbane, was co-winner with Lynne Murray of the Bread Research Institute in Sydney of the Malcolm Bird Commemorative Award for 1987. The award is sponsored by the Australian Institute of Food Science and Technology and named in honour of a former president. It is provided to encourage young members (under 30 years of age) of the Institute in their professional careers and to provide an incentive for them to prepare and deliver a scientific paper in public on their interests in food science and technology. Mrs Rogers won her award for her paper, "The influence of somatic cell count on milk composition and milk product quality" based on her recent M.Sc.Applied thesis to the Queensland Institute of Technology. In this work she was able to demonstrate for the first time that mastitis in a dairy herd can adversely affect the quality of the herd bulk milk and of dairy products such as cheese, milk powder and yoghurt made from this milk.

Foss Electric Australia made the Foss Electric Award to mark its twentieth anniversary of trading in Australia and to allow an outstanding Australian dairy scientist under 36 years of age to visit dairy centres of interest overseas. The winner was Ian Fedrick, a Senior Food Technologist in the QDPI food research laboratories in Brisbane, for his work on the

development of accelerated ripening of cheddar cheese. He received a specially cast medal, a certificate, an economy return airfare to a dairying country or another he nominated and \$2500 towards travel expenses.

Australian inaugural rural industry research councils

In April 1986 the Federal Primary Industry Minister, John Kerin, announced details of fourteen new research councils designed to cover Australia's major rural industries. The councils would allocate \$50 million in 1986-87. Among the Queensland members named were DPI officers John Ryley, Assistant Director-General, appointed to the Pig Research Council; Don A. K. McNee, Director of Agriculture, appointed to the Tobacco Research Council; Dr Vince E. Mungomery, Assistant Director, appointed to the Cotton Research Council (Agronomy); and Dr Barry White, Director, Marketing, Barley Research Council Services.

New Department of Primary Industries facilities

Bowen Research Station

Bowen growers decided on a 0.5 per cent per package levy on tomatoes to go into a Bowen Research Station Fund to provide \$5000 per year to the station. Fearing Fusarium wilt Race 3 might ruin the district's tomato crops, growers contributed \$15 000 to the station for equipment, matched by the Commonwealth Government. Two controlled temperature cabinets at the station enabled researchers to work all the year round on the screening of Fusarium wilt-resistant tomatoes. A workshop, packing shed and plant houses were built in 1985.

Bundaberg Research Station, Kalkie

This new station was opened in September 1986 by the former Minister for Works and Housing, the Hon. Claude Wharton, MLA. The station, costing \$531 000, comprised an administration block and manager's residence. It was to specialise in small crops research, beginning with fruit and vegetables, mainly citrus, low-chill stone fruit, rockmelons, tomatoes, zucchinis and coffee. Graham McGregor was station manager. All the Bundaberg Department of Primary Industries' officers would now be working under the same roof.

Maranoa Research Centre

The keys to this new research centre were handed over to DPI just before Christmas 1986. A residence was built on the block, which consisted of 66 hectares. A legume crop agronomist, a weeds agronomist and a soil conservation officer, with assistants, were appointed. The laboratory/office building accommodates six research workers. The Queensland Wheat Industry Research Committee contributed \$60 000 towards the cost of the building and the DPI spent \$75 000 on implement sheds, fences, and roads. A residence was to be built in the 1986-87 financial year.

This field research centre has a climate marginally suited to cropping and a wide variety of soils which need study. A combination of grain growing and stock raising was envisaged. The Queensland Wheat Research scientists at Toowoomba would work closely with the Roma staff on brigalow soils. Farm trials would be conducted.

Tick Fever Research Station, Wacol

The world's most modern laboratory for producing vaccines against bovine tick fever was commissioned here. The laboratory supplied all of Australia's requirement for tick fever vaccine and met an increasing overseas demand.

The Ministry of the Hon. Neville Harper

Neville John Harper

Neville John Harper was born at Brisbane on 10 September 1926. During World War II he entered the Royal Australian Navy as an Ordinary Seaman and was promoted to Midshipman, then to Sub-Lieutenant and Lieutenant. He is a registered Rural and Urban Valuer.

He was a stock and station agent and then Manager for Mactaggarts Pastoral Company at Cunnamulla when in 1952 he drew the brigalow property "Bungarra", north of Wandoan, which he developed as a stud for polled Hereford cattle and also a commercial herd. He still owns this property and does some cropping to wheat and grazing oats.

Harper was Campaign Director for the National Party in the Maranoa for the 1974 and 1975 elections; Roma Electorate Council Chairman (three terms); Maranoa Divisional Council President (five terms), State Vice-President representing the south-west zone (four terms).

He contested the Local Authority election for the first time in 1976 when elected to the Taroom Shire Council; he continued as a Councillor until 1982, when he did not seek reelection, having entered Cabinet. He was Chairman of the Joint Committee investigating the effects of mining, acquisition and resumption on rural lands; membership co-ordinator for Queensland (elected by State Conference 1978-80). He was elected to Parliament as Member for Auburn on 29 November 1980. He had previously been a Member of the Ministerial Parliamentary Committees for Lands, Forestry and Police; Mines and Energy and Commerce and Industry.

He was Chairman of the Defence and Foreign Affairs Policy Committee for four terms (responsible for the formulation of the National Party policies in these areas), and Chairman of its Rural Policy Committee 1981-83.

He was a Member of the Queensland Parliamentary Delegation to the United States of America in May 1983. He was appointed Minister for Justice and Attorney-General in the Queensland Parliament in August 1983 and Minister for Primary Industries on 1 December 1986.

Harper's community interests were widespread: he was Branch President of the Returned Services League, a member of the Legacy Club of Brisbane from 1961, Foundation Member of the Wandoan Bowls Club and a National Umpire from 1970, and Member of the Wandoan Golf Club; an active Member at Branch level of the Queensland Grain Growers' Association, the United Graziers Association and the Cattlemen's Union.

Promotions in the Neville Harper Administration from 1 December 1986

John Kenneth Leslie, B.Agr.Sc., Ph.D., Deputy Director to Director, Division of Plant Industry, 2 April 1987.

Bryan Aidan Thomas Rodda, B.Agr.Sc., Dip.Agr.Ext., from Deputy Director to Director Division of Land Utilisation vice Brian John Crack, deceased 26 February 1987.

Dr Geoffrey Behncken, B.Agr.Sc., Ph.D., from Director of Horticulture to Deputy Director, Division of Plant Industry

Robin Edward Barke, M.Sc., M.Agr.Stud. to Director of Horticulture.

Dr Barry Walker, B.Sc.Agr. (Notts), Dip.Agr. (Reading), Dip.Trop.Agr. (Trinidad), M.Agr.Sc. (Qld), Ph.D. (Qld) to the foundation Director, Pasture Management Branch.

Division of Administration

Administration

During the period 1984 to 1986 changes in the Department's administration were probably more dramatic and wide-ranging than in the previous decade.

Staff selection process

Until the early 1980s administrative staff were promoted largely on seniority, although limited weighting was given to efficiency. From 1984 a comprehensive interviewing procedure was developed whereby qualified applicants are given every opportunity to demonstrate their efficiency. Promotion is now largely efficiency-based, with seniority playing a small, and diminishing, role. Significantly, this has been achieved without appeals, staff appearing to recognise that performance-based promotion has long-term benefits for them as well as for the Department.

Staff training

Since 1984 all administrative staff have benefited from the Administrative Development Programme (ADP). This is a comprehensive training programme pitched specifically at administrative staff, and aimed at developing their work skills, and changing their attitude to what is expected of them. Clerical officers with significant management functions have been redesignated Administrative Officers. Courses have ranged from half-day specific-purpose seminars to week-long live-in courses where management principles are studied in depth.

Administrative reviews

Since 1984 both metropolitan and country administrative positions have been extensively reviewed by a project team from Organisational Services Branch. A large number of reclassifications, redesignations and new positions have been effected. All metropolitan positions have been filled and a number of country positions would be filled during 1987. The filling of these positions is closely linked to the ADP, with staff being promoted expected to play a much more innovative role in their area of responsibility.

Regional administration

The first Regional Administration Officer was appointed to Toowoomba in 1984 as a pilot, and similar positions were approved for Mareeba, Townsville, Rockhampton and Kingaroy. These positions would be filled subject to availability of establishment positions.

Tertiary training

Recognising the need for formal management training in its senior administrative officers, in 1984 the Department commenced a programme which involved the provision of fulltime university attendance to selected clerical staff. Six officers have commenced this programme, the first graduating in 1986.

Computers

The Department has a long history in computing which dates back to the early 1970s, but computers in administration are a relatively recent development. The first installations were in the Brands Office, where Apple computers were used in conjunction with a Honeywell minicomputer. This was followed by a network in Accounts Branch, again using Apples. The year 1984 saw a major expansion, with a large number of IBM-compatible Sperry microcomputers being purchased for word processing in Central Administration and Divisional offices. Subsequently, branches and some country centres were supplied and some branches installed management systems as well as word-processing facilities. A major leaves-processing system was developed by Organisational Services Branch in conjunction with the Public Service Board; it was designed to be used service-wide. This was based on a network of Sperry microcomputers.

Keyboard staff

The advent of computers greatly increased the productivity of the Department's Administrative Assistants, and consequently their value to the Department. They also brought with them industrial illnesses, such as Repetition Strain Syndrome. In recognition of the expanded role of the Administrative Assistants, the position of Co-ordinator, Stenographic Services, was created, with the specific purpose of developing the skills of keyboard operators, and advising senior management on appropriate policies to manage this large resource effectively.

Conclusion

The developments listed above occurred over a very limited time-frame, and staff would probably benefit from a period of assimilation to maximise the benefit. This is unlikely to happen as continuing development is inevitable, with additional computers, extra tasks, and staff ceilings combining to maintain the pressure on staff to adapt.

Division of Plant Industry

Agriculture Branch

Plant breeding

Maize. Two maize hybrids, QK958 and Sloan, were released. QK958, at the time of release, had superior resistance to *Polysora* rust, lower ear height and better resistance to lodging than previously released hybrids. Sloan, when it was released, also had lower ear height, resistance to *Polysora* rust and improved grain quality and yield. It was also the first hybrid to show a significant yield advance (20-50%) when planted at high densities.

Wheat. The variety Vasco was released by the Queensland Wheat Research Institute as a high-yielding, stem rust-resistant, medium-maturity wheat. This wheat replaced the variety Oxley, which had been widely grown for over a decade but had succumbed significantly to stem rust.

Grain sorghum. Four new hybrid parental lines and one breeding line, all with a degree of resistance to sorghum midge, were released from the grain sorghum breeding programs at Hermitage and Biloela Research Stations. These releases presented a major contribution towards the production of midge-resistant grain sorghums. These lines are presently (1986) being incorporated into commercial hybrids by private seed companies.

Peanuts. The first peanut variety McCubbin was released from the peanut breeding program in 1985. McCubbin is a Spanish type, with higher edible kernel percentage and better potential shelf life than Red Spanish, as well as having a significant yield advantage.

Rice. Lemont was released from the rice-breeding program early in 1986. It matures two weeks earlier than the standard variety Starbonnet and because of its short stature is more

resistant to lodging. Lemont rapidly became the dominant variety in Queensland's rice industry.

Soybeans. Centaur, a quick-maturing sister line of the variety Dragon, was released from the Hermitage Research Station-based soybean breeding program. Centaur has a high level of field resistance to *Phytophthora* root rot and is resistant to bacterial pustule. Centaur has the added advantage of tolerance to manganese toxicity.

Navy beans. Two navy bean varieties, Revenue and Banker, were released from the navy bean breeding program. Revenue has excellent canning quality and a yield advantage of approximately 12% over the major commercial varieties, Kerman and Gallaroy. Banker is a high-yielding variety which has yielded between 12% and 25% higher than Kerman, Gallaroy and Actolac. It also has better resistance to bacterial blight and rust and is tolerant of zinc deficiency.

Tobacco. The tobacco breeding program based at Southedge Research Station near Mareeba has transferred resistance to the north Queensland APT2 race of blue mould from the wild species *Nicotiana cavicola* and *Nicotiana* spp. Ravenshoe to the cultivated tobacco species *N. tabacum*.

Agronomy

Grain sorghum. Research in central Queensland aimed at determining how to obtain high yields from dwarf grain sorghums in tropical areas has indicated that a number of parents adapted to the tropics have given higher grain yields than temperate-based parents when used in hybrids. High yields were associated with higher dry matter production in hybrids of similar maturity.

Burdekin Irrigation Area. Research under irrigation in the Burdekin has indicated that yields of 10 tonnes/ha of maize and 4.5 tonnes/ha of soybeans are possible over a range of planting times and with a number of current maize hybrids and soybean cultivars. Plant population has a significant influence on soybean yields. Studies on the response of rice cultivars to nitrogen fertiliser have indicated that the recently released cultivar Lemont has much higher nitrogen fertiliser requirements than the previous cultivar Starbonnet.

Reduced tillage. Research and development into practices that enable reduced tillage fallow management to become an integral part of grain growing have progressed significantly. Specific programs have been developed to study herbicide substitution for tillage and modification of farm machinery, particularly planting machinery, as well as insect-and disease-control strategies under stubble mulch situations.

Cropping in coastal areas. Considerable advances have been made in the development of cropping techniques in coastal areas following research undertaken into alternative crops to sugarcane. Crops being researched include grain sorghum, maize, soybean, navy beans, pigeon pea and kenaf.

Grain legumes. Improvements in the technology of growing grain legumes have resulted in these crops being grown in increasing areas in all grain-growing areas. The major crops being developed are chickpea, mung bean, and pigeon pea. The advantages of utilising grain legumes in crop rotations to improve soil fertility and minimise pest and disease build-up have been demonstrated in a wide range of environments.

Extension

Computer applications. Computer-based decision support packages to help farmers make crop management decisions have been and continue to be developed. Packages for wheat growers, cotton growers and soybean growers have been evaluated and adapted to farmer requirements.

Reliability of grain cropping. Extension officers have been active in promoting practices that enhance the reliability of grain cropping throughout the State. Emphasis has been given to promoting the use of press wheels and narrow points on planters to improve crop emergence and establishment. Other aspects being addressed include fertiliser strategies, the use of baits and insecticides for soil-borne insect control and correct pesticide application.

Pasture Management Branch

The first Agrostologist (C. Winders) in the Department was appointed on 21 January 1937. Since that time the Pasture Group in the Queensland Department of Primary Industries has grown in size and achievement under the guidance of Stan Marriott, Ross Humphreys, Joe Ebersohn and Don Cameron. It is now widely recognised as a group having personnel with a wide range of knowledge, experience and expertise.

Since 1967 there has been a separate Agrostology Section in Agriculture Branch, under the direction of a separate Assistant Director. In 1983 the name was changed to the Pasture Agronomy Section. On 13 March 1986 the Pasture Agronomy Section of Agriculture Branch became a separate Branch known as the Pasture Management Branch.

The new branch is administered by a Director, an Assistant Director and two Principal Pasture Agronomists (one for sown pastures and one for native pastures) and an Administration Officer. In addition, there are five regional supervisors at present (1986). All former Pasture Agronomy staff in Agriculture Branch were transferred to the new Branch.

Whereas the Branch was given six new positions for the Arid Zone Research Institute at Longreach, the positions of the Director and Principal Pasture Agronomist (Native Pastures) came from the previous Branch establishment. The Administration Officer position was an additional position allocated to the Branch.

The Branch establishment (of 88) as at 1 June 1987 was: Director, Assistant Director, 2 Principal Pasture Agronomists, Officer-in-Charge, Charleville, 4 Supervising Scientists, 36 Pasture Agronomists, 34 Experimentalists, 4 Farm Hands, 1 Seed Storeman, Administration Officer, Clerk, and 2 Administrative Assistants. The first Branch Director was Dr Barry Walker, the Assistant Director was Don Cameron and the Principal Pasture Agronomist (Sown Pastures) was Dr David Gramshaw. The Principal Pasture Agronomist (Native Pastures) had not yet been appointed.

Field staff were located at nineteen centres throughout Queensland. The Pasture Management Branch was the most widespread research group in northern Australia and this posed unique problems in terms of management, supervision and research interaction.

The roles of the Pasture Management Branch were to:

- 1. carry out research and development work on all aspects of pasture maintenance, stability and improvement for both sown and native pastures;
- 2. maintain an overview of Queensland's pastoral resources and their development;
- 3. survey and monitor the condition of the State's pastoral lands;
- 4. provide a resource for extension services that would help Queensland's pastoral property owners maintain and develop their pastures; and
- 5. liaise with State and Commonwealth instrumentalities, and with industry groups, to develop sound guidelines for pastoral land use.

Pasture extension continued to be handled by extension agronomists with Agriculture Branch and staff of the animal production branches. However, Pasture Management Branch staff were expected to devote about 20% of their time to extension/development work. Most of this would be done in liaison with other QDPI branches and organisations.

The Pasture Management Branch had direct links with and serviced more than twelve other branches which meant that many new roles and relationships were being established.

Significant actions and events since Pasture Management Branch was established were:

1. Branch Consultation Workshop

As part of the process of establishing the direction and management of the Pasture Management Branch, a Branch Consultation Workshop was held at Surfair, Marcoola, from 18 to 21 August 1986. The workshop enabled all branch staff to have a say in and influence on such matters as branch objectives, management, structure, staffing, training, reporting, publications, communication, program management, liaison with other branches and organisations, industry needs, research and development opportunities, etc. This workshop was a genuine attempt to seek ideas and participation from branch staff to formulate the future direction and management of the branch.

2. External funding

The Australian Meat and Livestock Research and Development Corporation, which took over the role of the previous Australian Meat Research Committee, reviewed its northern Australian projects in May 1986. The AMLRDC defined an objective of increasing beef turnoff in northern Australia by 20% by 1994 and directed that all

projects aimed at this objective be brought together in one programme under Dr K. Entwistle of James Cook University. The Coordinator for the pasture projects across northern Australia was Dr B. Walker.

This redefining of the AMLRDC objective stimulated a number of changes in the Pasture Management Branch's AMLRDC Projects, particularly increasing its efforts on development pasture agronomy. The seven AMLRDC projects in the Northern Programmes were:

- i. seed multiplication and associated technologies;
- ii. practices to halt sown pasture decline;
- iii. mineral nutrition of legume-based pastures (joint project with CSIRO);
- iv. developmental pasture agronomy;
- v. woody weed control;
- vi. animal production from native pastures (joint project with CSIRO); and
- vii. evaluation of forage management opportunities.

In addition AMLRDC agreed to fund a separate joint CSIRO/QDPI project on plant introduction and evaluation with longer-term objectives than those of the Northern Project.

Other initiatives taken since Pasture Management Branch was formed were the development with Agricultural Engineering Section of a forage peanut harvester (from Rural Credits) and a native grass seed harvester (from QDPI New Initiatives Funds).

Other external funding continued to be provided for five projects from Australian Wool Research and Development Trust Funds and two projects with the National Soil Conservation Programme.

Arid Zone Research Institute at Longreach

The new Research Institute started in late 1987 and four new pasture agronomists and two experimentalists were appointed. This group would complement the work being undertaken at Charleville and Toorak.

Studies with a cone thresher at Gympie showed promise of providing a simple method of drastically improving the handling qualities of the chaffy seeded grasses such as Hatch Creeping bluegrass (*Bothriochloa insculpta*) and Indian bluegrass (*Bothriochloa pertusa*). The awns, sterile florets and surface hairs were removed without any apparent effect on seed viability. In the case of rhodes grass (*Chloris guyana*), up to 60% of the caryopses can be removed from the florets, again without any apparent damage.

A long-term study was initiated in central Queensland to monitor the effects of land use and management on tree and shrub populations in the Eucalyptus woodlands. By 1986 some 13-25 km of transects spread over 23 sites had been established in areas that represented some 55% of the central Queensland *Eucalyptus* spp. communities. A previous study had already shown that soil type, climate and past grazing history largely determine the suite of native pasture species present at any site, and the number and species of trees present determine the proportions of the different native grasses in the pasture.

Evaluation of a long-term program of testing pasture plant introductions for use in the drier areas of the State indicated that it was going to be extremely difficult to locate plants adapted to the harsh conditions, initial establishment in particular often proving difficult. Buffel grass (*Cenchrus ciliaris*) especially cultivar Biloela remained the best introduced grass available for most situations tested in this study.

Studies on the use of fire for the control of woody species in western Queensland showed good control of green turkey bush (*Eremohila gilesii*) and two hop bushes (*Dodonaea attenuata* and *D. tenuifolia*) but not turpentine bush (*Eremophila sturtii* or *E. bowmanii*). Spring and summer burns were most successful and also prevented seedling regeneration.

Following a joint assessment with CSIRO, cultivar Shaw of creeping vigna (*Vigna parkerii*) was released for use in the higher rainfall areas of the Near North Coast. It is a surviving and spreading residual species at a number of old 1960 trial sites that has forced itself into consideration.

J. K. Teitzel and Drs R. T. Cowan and M. A. Gilbert ran the fifth Regional Training Course on pasture development and production in the higher-rainfall tropics of South East Asia at the Faculty of Veterinary Medicine and Animal Science, Universiti Pertanian, Malaysia, in November-December 1984. This three-week course catered for thirty-odd people, predomintly from Malaysia but with others from other South East Asian countries.

Horticulture Branch

Fruit

Bananas. Plant spacing experiments in north Queensland showed that overall yields per unit of time under a range of densities were not significant. Higher densities gave fewer fingers on each hand rather than increasing finger size. Bunch covering gave longer average finger length and reduced bunch emergence to harvest by days. There was no overall profit in hand removal.

Banana plant improvement: over 95% of Australian production is based on the Cavendish group. Panama disease and to a lesser extent Black Sigatoka disease pose threats to Cavendish production. There is no known means of control of Panama disease. New varieties have been sought, including SH-3362 and SH-3426 from the FAO breeding programme in Honduras-the latter variety having resistance to Race 4 of Panama disease- and the varieties Eumaleg and Senorita from the Philippines. Results from the plant crop and ratoon 1 indicate that there are no varieties "Inferior" to Williams in yield.

The first commercial quantities of tissue-cultured bananas were delivered in 1984. The tissue culture process involves selecting a suitable plant, removing some tissue (usually from the corm) which is surface-sterilised before being placed on a nutrient medium in a growth cabinet. The tissue is multiplied with the addition of plant growth substances. Once multiplied, a different growth substance is applied so that a plantlet is formed with roots and leaves. The technique allows for rapid multiplication of large quantities of plants. Plants are available to growers in plastic pots or poly bags when the plants are about 30 cm high. Types available are Nelson Clone Lady Finger, G.L.I., Chinese Cavendish, W & R1

and W & R2. It is hoped that a Cavendish plant with resistance to Race 4 Fusarium wilt can be identified. COD has approved a research grant of \$8000 supported by DPI and the Banana Industry Protection Board for Fusarium wilt Race 4 research over six years.

A four-year grant of \$16 000 from the Banana Sectional Group (SGC) of the COD to Sydney University and the South Johnstone Research Station from 1983 was earmarked for the study of maturing bronzing (a red skin blemish in fully developed fruit) which makes the fruit unmarketable. Annual losses in north Queensland amount to 3000 tonnes worth \$2.5 million. A grant of \$5250 was provided by the SGC in 1983 to continue for three years to determine the water requirements of the banana plant and the most suitable irrigation system for differing soil types at South Johnstone Research Station and on cooperating farms. A further grant to the Plant Pathology Branch of \$2000 was given to develop methods for detecting bunchy top virus in bananas.

Avocados. The DPI helped the RNA conduct its "Producer of the Year" contest. Improved avocado growing and marketing techniques were explained to groups at an RNA field day and at seminars and farm walks. As a result, forty Sunshine Coast and Tamborine growers thinned overcrowded plantings to increase yields, an estimated seventy-five growers improved the shape of their fruit by treating previously unrecognised zinc and boron deficiencies, and fifteen growers changed to bait sprays to control fruit fly. The supply of healthy plants from nurseries was achieved by inspecting and crediting nurseries that were found free from Phytophthora root rot. Research showed that *Phytophthora* adversely affects nutrient uptake. It has been found that the water needs of avocados rises when the trees flower. A cheap and effective method of controlling *Phytophthora* root rot is by trunk injection with phosphoric acid; two major field days were organised at Maleny and Tamborine in February 1987 to demonstrate the technique.

Mangoes. A major research programme to investigate the post-harvest physiology of mango fruit was under way jointly by CSIRO Food Research in Sydney and research organisations in Malaysia and Thailand to develop technology to allow mangoes to be stored and transported for long periods. Preliminary results indicated that rind blemishes due to sap burn could be reduced by harvesting only fully mature fruit early in the morning, cooling the fruit after harvest and applying dry powders to the fruit to absorb the sap. Taste panels found that the total solids content of the fruit was a satisfactory indicator of fruit maturity. With a major upsurge in mango production expected over the next five to ten years, technology will be required to facilitate larger exports. The 1986 mango production in the Burdekin was valued at \$5.9 million and will increase.

Lychees. A lychee conference organised by growers and DPI officers at Nambour attracted 280 delegates. The conference focused on marketing aspects and ways to increase profit from new crops.

Citrus. Graft-transmissible dwarfing and polyploid rootstock research were two approaches to dwarf citrus the subject of DPI research in the Burnett region at Mt Debateable. Trees were inoculated with G.T.D. (graft-transmissible dwarfing) factors. These were strains of CEV (Citrus Exocortis Viroid) which confer dwarf characteristics to citrus. Tree size was lowered but more trees could be planted per acre. Planning was in progress for a research project to develop seedless versions of some existing citrus

varieties through the use of polyploidy. If successful, DPI could release polyploid citrus dwarfing rootstock lines for commercial use-a world first.

Macadamias. Trials to compare the performance of a range of Hawaiian and Australian macadamia selections were commenced in 1985 at Walkamin, Gunalda, Gympie, Glasshouse Mountains and Lismore and fifty-six selections were identified as having potential. A trial at Beerwah showed advantages for Australian selections of Mason 97 and Daddow over the main Hawaiian varieties. It has been shown that nitrogen can be used to modify the timing and extent of vegetative flushing, flowering and yield in macadamia with best results from application in June and April prior to anthesis. Boron sprays have increased yield and nut quality. High temperatures and low humidity result in increased nut drop. With varying size and quality, selection of lines had to be made. To overcome the extraction of kernels from the shell, Leverington developed a cross-draught hot-air dehydrator which solved the problem. Accelerated storage tests to investigate the shelf life of roasted macadamia nuts to help overcome acidity problems were in progress.

Papaws. A range of advanced papaw lines was under evaluation on growers' properties from breeding programs at Maroochy and Yarwun. Large quantities of seed of select lines were distributed to industry to improve crop types, uniformity and yield. A demonstration plot of selected clones propagated through cuttings was established.

Coffee. Coffee growing attracted increased interest in the Mareeba district and coastal canegrowing areas partly because of high prices. The DPI research program identified three hybrid cultivars, CATUAI and CATIMOR and their common parent CATURA, as the most promising in yield and bush shape of the varieties tested. Queensland used the *Coffea arabica* variety which, if grown at high altitudes, produced high-quality beans with about one per cent caffeine content.

Ginger. Queensland has the only ginger-processing plant in the Southern Hemisphere and produces about 5000 tonnes annually. Roland Leverington of the DPI showed that harvest had to take place at an earlier stage than was customary and developed a ginger fibrometer to determine the tenderness of the rhizome. This led to maximum recovery of the product and an increase in succulence and overall marketability. A technique of tissue culture was developed at Maroochy and a Hawaiian clone successfully propagated using this method was released in 1985.

Grapes. The dormancy of grapes grown in a subtropical environment was broken by spraying them with a stabilised commercial grade solution of hydrogen cyanamide. The flowering and maturity time were both advanced by an average of 18 days for all cultivars tested. As a result of the treatment increased bud-break was recorded for both the two-bud spurs and the dormant buds on the arms. On the non-treated vines, bud-break occurred mainly at the terminal positions of the arms, making selection and pruning spurs difficult. No detrimental effects of phytotoxicities were recorded at the concentration used. Grape growing was expected to increase on the Atherton Tableland.

Stone fruit varietal improvement. A further 32 new varieties of stone fruit were introduced from overseas and 34 from interstate during recent years. A total of 290 potential stone fruit varieties were under evaluation at the Granite Belt Horticultural

Research Station. One hundred and twenty-seven separate budwood distributions of promising new varieties were made to growers and nurseries during 1985.

Pineapples. Pineapple breeding aimed at developing a better fresh-market pineapple, produced plants with larger fruit size and larger, flatter eyes than the Queen cultivar, while still retaining the good internal quality and slice characteristics. The plants selected were all smooth-leaved. Separate selection work within the Cayenne processing type identified 12 elite families of new clones.

Vegetables

Tomatoes. Queensland produces 62% of the value of the Australian tomato crop and half the value of pumpkins and beans. With the decline in sugarcane production, tomatoes have taken over a large area of former cane land at Bundaberg, making this the leading Queensland production area. For 1986 the value of Bundaberg's production was \$59.4m, and production studies showed that solarisation, a system of heating the soil for two months using heat from the sun trapped under a clear plastic mulch, could be a practical way of controlling Verticillium wilt. Solarisation of infested soil gave a 74% increase in yield and most weeds were controlled as well. Leaving the plastic mulch on the beds during the growth of the crop gave a 35% increase in yield compared with removing it.

Rapid tissue tests for he spot determination of the nutritional status of tomatoes showed promise at Bundaberg. "Merckoquat" nitrate test strips were useful field test for nitrate.

New varieties recently released by the Department included Redlander, and Redlands Summertaste (from Redlands) and Delta Contender (from Bowen) found a niche in the industry. "Redlander" carries resistance to bacterial wilt, has the jointless fruit characteristic, and is resistant to Verticillium wilt race 1 and Fusarium wilt races 1 and 2. It produces a good yield of high-quality fruit and acceptable firmness.

Carrots. Edgell-Birdseye presented carrot washing and grading equipment to be used in a Carrot Improvement program aimed at reducing or eliminating the black ring characteristic which was devastating the Queensland processing-carrot industry. Research was devoted to developing new lines of finger-type carrots for processing and superior fresh-market carrots.

Sweet corn. Research at the Gatton Research Station was aimed at developing whole cob or cobette types to reduce imports, and sweet tasting varieties. A cultivated "Golden Early" matured several days earlier than the standard "Rosella" and was suitable for early season processing and for filling gaps caused by rain. The cultivar "Jubilee" produced exceptional early yields, had excellent quality for both whole cob and kernel production but was not suitable for medium- or late season sowing.

Capsicum. The cultivar "Redlands Sweet Sue" was released from Redlands to replace the long yellow-fruited "Hungarian Yellow". It is resistant to bacterial leaf spot and potato virus Y, which limit capsicum production in south-west Queensland. Exceptional yields of good-quality fruit have been obtained commercially.

Tissue culture techniques

These were developed for the multiplication of strawberry, pineapple, papaw, sweet potato and gypsophila and expansion of this technique was under way.

Research into transport of horticultural produce

Transport of horticultural produce is a major cause of damage, and research to reduce the losses from mechanical injury, short shelf life, wilting and other produce deterioration factors associated with the transport journey were under way under the direction of Dr D. Schoorl and associates. Computer modelling of transport vehicles and package design and protection were major considerations.

The Food Preservation Research Laboratory Branch was absorbed into the Horticulture Branch in 1969 and the laboratory was renamed the Sandy Trout Food Preservation Research Laboratory. In that year three new Assistant Director positions were created in the branch to take charge of the research, extension and food preservation sections. In 1985 the fruit and vegetable processing research functions of the branch were transferred to the food and technology branch, and the physiology and transport groups were combined with the marketing extension group within the horticulture branch to form the horticulture postharvest group. Since 1982, Research Stations Branch has managed the horticultural research stations previously managed by the Horticulture Branch. Assistant Directors appointed in 1969 were Hubert Groszmann (research), Frank Berrill (extension) and Roland Leverington (food preservation). Neville Kruger took over as Director from Groszmann in 1984, when Groszmann was promoted to the extra Deputy Director's position created in the Division of Plant Industry. He took with him to the position of divisional deputy director the title `chief quarantine officer (plants)' with the responsibility of overseeing the branch's plant quarantine functions carried out on behalf of the Commonwealth Government.

Until 1988 the Food Preservation Research Laboratory at Hamilton was divided into four main sections-physiology, food technology, microbiology and chemical. The physiology section developed methods of storing and handling fruit and vegetables to eliminate wastage; the food technology section studied methods of canning, freezing and dehydrating foods; the microbiology section identified spoilage organisms; and the chemical section dealt with changes in stored and processed foods and evaluated food quality.

The success of the laboratory is shown by the large number of research developments that have been adopted in commercial practice by processors and producers, for example, improved apple storage technology, forced air cooling, improved packaging (including palletisation), processing quality evaluation of new varieties of crops and ginger crystallisation technology, development of minimum quality standards for marketing fresh fruits, and fruit product developments such as frozen avocado spread, mango puree and canned mango.

Plant Pathology Branch

The detection of brown rot of stone fruit caused by *Monilia laxa* and the spread throughout south-eastern Queensland of boil smut (*Ustilago maydis*) of maize were two important pathological events in 1983.

Following the detection of brown spot at Brisbane markets, *M. laxa* was found on 8 of 67 orchards surveyed in the Granite Belt. Boil smut had previously been found only in the Beaudesert and Gatton districts but by 1983 it had spread to seven areas on the Darling Downs, Brisbane Valley, Granite Belt and the Killarney district.

During 1983, a program funded by the Department of Health, Canberra, in cooperation with Plant Pathology and Horticulture Branches was initiated to eradicate black sigatoka (*Mycosphaerella fijiensis* var. *difformis*) from Cape York Peninsula and adjacent Torres Strait Islands.

Stripe rust was detected in commercial wheat crops in Queensland for the first time in July 1983. The disease was initially recorded in the Tobeah-Goondiwindi area and appeared later throughout the Darling Downs.

Rice decline which results in poor growth in rice crops in the Ayr district was found to be due to a needle nematode (*Paralongioderus australis*) feeding on the outside of roots. The nematode attacks rice only under flooded conditions.

Investigations into the efficacy of solar energy for disease control were initiated during this year. Plant sheeting covering the soil was used to heat soil to temperatures lethal to the soil pathogens, *Verticillium* and *Fusarium* spp. Early results using this technique for the control of Verticillium wilt of tomatoes were very promising. The release by DPI of sunflower breeding lines resistant to races 1 and 3 of sunflower rust for use by public and private plant breeders was a significant step in the control of this disease. The material was derived from crosses between sunflower (*Helianthus annuus*) and wild sunflower (*H. argophyllus*). Research into the control of avocado root rot (*Phytophthora cinnamomi*) demonstrated that phosphorous acid gave as effective control as fosetyl (Aliette [R]) and metalaxyl (Ridomil [R]).

The appearance of new stem rust strains on resistant wheat cultivars and cucurbit powdery mildew strains resistant to benomyl and triadimefon fungicide occurred in 1984-85. Wheat cultivars Cook, Shortim, Timson, Timgalen and Mendos were associated with the worst epidemic of wheat stem rust for many years. The difficulty experienced by growers in controlling cucurbit powdery mildew was found to be due to the selection of fungal strains with resistance to the eradicant fungicide benomyl and with varying degrees of resistance to triadimefon.

Exotic banana cultivars were introduced from Honduras, Cook Islands, South Africa and the Philippines in an endeavour to locate a source of resistance to race 4 of Panama disease which attacks Cavendish-type bananas in south-eastern Queensland. Tissue culture techniques are being used to increase genetic variability and to rapidly multiply plant material for breeding purposes.

An outbreak of citrus canker occurred on West Indian limes and sweet orange on Thursday Island. A survey of all citrus trees on Thursday Island was carried out and an eradication program was implemented. The disease was not found on citrus on the mainland.

Bacterial black spot developed into the most serious disease threatening the expanding mango industry. An integrated control program involving the use of windbreaks and regular fungicide sprays, particularly on new growth and fruit, gave promising results. Resistance to bacterial black spot is present in several Florida varieties.

Although bacterial leaf blight was recorded on rice in 1985, the extent of the damage this disease can do was not observed until 1986. Following cyclone Winifred, bacterial leaf blight rapidly spread through rice crops in the Arriga district and yield losses up to 50% were experienced by individual growers.

Downy Mildew occurred on maize on the Atherton Tableland and in the Tableland Downs region in north Queensland. Quarantine legislation was implemented requiring that all seed produced in a defined Atherton Tableland Maize Quarantine Area be treated with the systemic fungicide metaloxyl prior to movement to other areas of Australia.

Cylindrocladium black rot was responsible for major losses in peanuts, particularly in North Queensland.

The second year wheat problem on the Downs after long fallow after sorghum was found by Dr John Thompson of the Queensland Wheat Research Institute to be due to high populations of root lesion nematodes in the soil; this condition is widespread across the Darling Downs. The nematodes occur not only in the topsoil but in high numbers down to 60 cm in the soil and they are hard to control economically with nematocides. However, they can be controlled by rotation with barley and sorghum, growing wheat no more frequently than once every four or five years. Some nematode-tolerant varieties are being identified.

Long fallow disorder has been traced to the run-down of a fungus named vesicular arbuscular mycorrhizae during a long fallow which colonises crop roots and greatly helps them take up zinc and phosphorus from the soil. Thus with this fungus, crops can more efficiently turn fertiliser into grain yield. The more intensive the cropping of wheat, barley and sorghum, the more of these beneficial mycorrhizal spores are produced in the soil. These can then colonise subsequent crops and for very dependent ones, such as maize, chick peas and linseed, the increase in growth is truly amazing.

Wheat planting times, choice of variety and planting equipment are now based on consideration of water use, frost risk and yield expectancy.

Botany Branch

Forty new species of plants were described by taxonomic botanists during 1985-86. In addition twelve species were recorded for the first time in Queensland; of these, nine were new to Australia.

More than 14 000 plant specimens were identified for primary producers, consultants, DPI staff, other State and Commonwealth Departments, tertiary institutions and the general public. Advice on poisonous properties, weed potential and control and distribution was supplied for many of these. This represented a 17% increase in such identifications over the 1983-84 total.

Certificates of identification under the State Health Act were issued for 2473 cases involving samples of *Cannabis sativa*. In addition identifications were required for 55 seizures made under the Customs Act.

1. The first two vegetation maps and booklets of the *Vegetation Survey of Queensland* - South Central and South Western Sheets - covering approximately 20% of the State were released. These vegetation maps at a scale of 1:1 000 000 form one of the resource bases used in planning land use and organising research priorities.

A summary report and species list for the coastal Moreton region was published. This was based on previously published vegetation maps of the region. The report discussed the relationships of the vegetation and flora of the region in an Australian context, provided information on the status of rare and threatened plants and made recommendations for conservation and research management.

The Herbarium collection was increased by more than 10 000 specimens and the backlog of specimens awaiting incorporation was greatly reduced with the assistance of temporary staff provided by employment schemes. Closer ties with herbaria in Southeast Asia were developed.

Two vegetation maps at a scale of 1:1 000 000 covering approximately 20% of the State were published. These maps of south-eastern and south-central Queensland provided one of the resource bases for planning land use and organising research priorities.

During 1986-87 the Branch completed a review of the conservation status of the vascular plants of Queensland.

Taxonomists described two new genera and 21 new species of Queensland plants. Both new genera were discovered on Cape York Peninsula. The HERBRECS Herbarium label data base, the second largest in the world, is now playing an important role in the conservation activities in the State. Much use is being made of the system by other government departments such as the Department of Forestry and Queensland National Parks and Wildlife Service for conservation planning. It also played a central role in a review of the conservation status of Queensland vascular plants-ferns, gymnosperms and angiosperms-published during the year. Of the approximately 8000 recognised species, 1115 are considered rare or threatened. Five species are believed to be extinct, 47 are endangered and 216 are vulnerable. Information on the plants' habitat, geographic range within the State and representation in National Parks and environmental parks was also recorded. The success of the project depended to a large extent of the computerised data base of Herbarium information (HERBRECS).

Cooperation with officers of Pasture Management Branch and CSIRO in their plant introduction programs continued. Advice was given on the relationships of legumes introduced as possible pasture plants. Many identifications of species of *Aeschtnomene*, *Rhynchosia*, *Tephrosia* and *Indigofera* were made. Officers of the branch contributed a chapter on toxic native and garden plants in subtropical Queensland to a book, *Toxic Plants and Animals*, published by the Queensland Museum. Field work was carried out in western Queensland in connection with the production of a field guide to plants poisonous to stock in Queensland. The project was a collaborative one with officers of the Division of Animal Industries. A handbook would be produced which would enable producers to identify poisonous plants. All plants would be illustrated with colour photographs.

During the year botanists identified 11 650 plant specimens for primary producers, DPI officers, other State and Commonwealth bodies, and the general public. This was a slight decrease on the previous year. The decrease could be attributed to dry conditions prevailing over much of Queensland and a decline in CSIRO activities. Availability of two of the three volumes of the *Flora of South Eastern Queensland* might also have contributed to the decline. Despite the decrease, the branch's resources were strained due to the appointment of a senior staff member to the position of Australian Botanical Liaison Officer at Kew Gardens, England, for a year. This officer provided a botanical service for Australian research workers and overseas botanists with interest in the Australian flora. The third volume of the *Flora* was at an advanced stage of preparation. A major part of the volume was an account of the grasses and sedges. As a preliminary to the volume, a guide to the identification of sedges and rushes of Queensland was published.

The vegetation survey of Queensland continued at an advanced rate. Preparation of the 1:1 000 000 Central-Western map sheet was well advanced. Field work was completed and vegetation types delineated on eleven of the sixteen 1:250 000 map sheets that covered the area. A draft of the text of the accompanying explanatory book was finished and was checked. Preliminary field work for the Central sheet, which includes the Mitchell grass downs of the Winton-Longreach-Blackall area, was carried out by an officer of Pasture Management Branch on loan to Botany Branch. The 1:100 000 *Moreton Region Vegetation Map* Series progressed satisfactorily. The map of the vegetation of the Ipswich sheet was prepared and was checked before being printed. Field work for the Warwick sheet was completed, map units were defined and aerial photographs were being marked up. Explanatory booklets for both the Warwick and Ipswich sheets were prepared. A report and map of the vegetation of the Sunshine Coast was ready for publication. Flora inventories of the Whitsunday and Cumberland Islands were carried out at the request of the National Parks and Wildlife Service. As a result of this work, a flora inventory of Penrith Island was prepared.

Plant taxonomists described two new genera and 21 new species of plants from Queensland and provided seven new names for Queensland plants. Discovery of the two new genera was largely the result of collections in Cape York Peninsula made by a botanist stationed at Mareeba. Botanists contributed to both the *Flora of Australia* and the *Flora of South Australia*. The contributions to the former work were most important as they incorporated the results of taxonomic research on 14 genera of the large and diverse lily family. Botanists also advanced proposals to amend the

International Code of Botanical Nomenclature. The proposals would be considered at the XIV International Botanical Congress in Berlin, July 1987.

Maintenance of Herbarium collections continued, and 8200 specimens were added to the Herbarium. The HERBRECS data base now contained information on 450 000 specimens. The project to complete the mounting of all specimens of native plants which began in 1983 was successfully concluded. Since that time 41 400 specimens had been mounted. To ensure the Herbarium collection was maintained in a safe condition, approximately 45 000 specimens in the exotic collection remained to be mounted. The carpological collection was sorted, made more accessible and indexed, and sorting the collection of wood samples continued.

Overcrowding of the botany building reached such a level that it was considered that the weight of stored material might cause structural damage. A temporary building was to be erected which provide room for storage of material at present difficult to access and for expansion of the collections for about four years. The building was expected to be ready for occupation by the end of 1987. Planning for moving specimens to the new building was well advanced.

Entomology Branch

SORPAK, the computer-based sorghum management package was being accepted for financial savings. The package calculates and prints out detailed information on planting rates, fertiliser requirements, suitability of sorghum varieties, weed-control, where and when to sample for pest infestation levels as the crop develops, and saves dollars in pest control.

This management system developed by DPI entomologists won an agriculture software competition in 1985-86 run by the national newspaper, *The Australian*. It was tested by DPI extension and research staff at ten locations in sorghum-growing areas. Begun as a pest-control system, it was expanded to include total crop management information.

Control of the two-spotted mite (*Tetranychus urticae*) on ornamental plants in glasshouses was improved by the release of a predacious mite *Phytoseiulus persimilis* during summer and autumn.

Elephant beetle control by the use of synthetic pyrethroid insecticides against avocado and lychee crops was successful. Rates of the granular insecticide carbofuran as low as 0.25 kg active constituent reduced the percentage of damaged peanuts in field trials at Kingaroy. It is applied at planting to control scarab larvae, which scarify the nuts, penetrate the shell and cause destruction of kernels.

Broadcasting of "Beetle Bait"-a cracked grain, vegetable oil and insecticide mixture-on the soil surface after planting maize, sorghum and sunflower controlled black earwigs and wireworms.

A simulation model of the population dynamics of the eastern false wireworm (*Pterohelaeus darlingensis*) showed that a winter crop of wheat or barley provides the best

single-crop situation for *P. darlingensis* development. Double cropping increases survival and speeds development.

Fruit spotting of the avocado was found to be caused by juvenile fruit-spotting bugs and not, as suspected, by fruit-fly "stings", so that control treatment was changed from using dimethoate, the standard treatment for fruit-fly damage.

Studies in the marketing of cabbages and broccoli have shown how much leaf removal could be made in a pest-management approach. The use of silver reflective mulches together with insecticide sprays of demeton-5-methyl and albarol resulted in a 90% increase in yield of marketable zucchini fruits in trials in north Queensland. The method prevents aphids from transmitting watermelon mosaic virus. North Queensland zucchini and rockmelon growers adopted the method with outstanding success.

Entomologists in north Queensland devised monitoring techniques for brown planthopper to refine insecticide spraying programmes for rice crops in the Burdekin and Ingham districts. They used yellow pan traps to attract winged hoppers migrating into the crops from outside, while they examined the rice plants for wingless hoppers. Earlier studies had shown that a population level of two hoppers per tiller required treatment with insecticides to prevent economic loss of yield. Information on pest numbers so derived enabled farmers to apply timely control measures before damage and crop losses occurred.

Low doses of a commercially produced virus gave good control of infestations of the corn earworm (*Heliothis armigera*) in sorghum in trials at Gatton. The virus treatments were applied to coincide with peak hatching of the larvae, which concentrated their feeding in the sorghum head. Previous studies had shown that hatching usually occurred when almost all the florets of the sorghum head were flowering. This information enabled accurate timing for applying the virus. The young larvae fed almost entirely on the contaminated pollen sacs, which ensured a high level of infection. At this early stage of development they were extremely susceptible to the virus. After about 5 to 7 days infected larvae died, liberating millions of virus particles to provide a new source of infection. Other larvae became infected through feeding on the re-contaminated head or through cannibalistic feeding on infected larvae. Almost all the larval population was lethally infected as a result of this secondary spread of the virus. The virus, which attacks only *Heliothis*, has no direct harmful effects on other beneficial natural enemies in the crop and is quite harmless to human beings.

Trials of a sex attractant for avocado flushworm (*Homona spargotis*) in North Queensland showed the pheromone to be a valuable tool for monitoring egg laying cycles. The flushworm, a serious pest, attacked the young growing tips and also damaged the rind of the fruit, reducing its market appeal. The caterpillars built shelters by webbing leaves together or webbing leaves to the fruit and feeding within. DPI entomologists devised special insecticide combinations to control the pest.

Ecological studies examining the influence of insects on flowering of field-grown hibiscus proved the primary cause of bud drop was a small black beetle (*Macroura concolor*) which invaded the bud to feed and lay eggs. During spring and summer when beetle numbers were high hardly any flowers were produced despite an abundance of buds. Buds fell from the plants prematurely when invaded by more than 15 beetles per bud, but when beetle numbers

were reduced below this number by using insecticides prolific flowering resulted. A secondary problem occurred when two spotted mites previously controlled by natural enemies increased and the insecticide killed the beneficial predators. This problem was investigated.

At least 40% of spray costs for macadamias was saved in trials in the West Moreton district through integrated pest management (IPM) with no loss of yield or nut quality. The management strategy involved development of quick, efficient monitoring systems for key pests, determining action levels and applying appropriate insecticides only as necessary to prevent economic damage.

Division of Land Utilisation

Land Resources Branch

Land Resources Branch promotes the protection of valuable agricultural land and its long-term productive use by providing detailed land resource information to government and non-government agencies and industry organisations. This information is also used by departmental extension staff.

Land resource information is collected by specially designed surveys and then evaluated to determine the land's potential for sustained production under various land uses. Reports and maps are also compiled as a base for planning agricultural development at both regional and property levels.

The Bureau of Investigation and the Divisions of Land Research and Regional Survey of CSIRO conducted the first land resource surveys in Queensland. These land resource evaluation activities became the responsibility of the QDPI in the 1960s. During this period, extensive land development to introduced pastures for beef cattle production commenced in the brigalow region of central Queensland. However, the State Government could not fund such a development scheme itself and so the Commonwealth Government was approached for financial assistance. The Fitzroy Basin (Brigalow) Development Scheme resulted and was funded by the Commonwealth Government. The State Department of Lands administered the scheme. The Development Planning Branch (later renamed Land Resources Branch) of the QDPI was responsible for technical advice on land classification and property development. All land in the scheme area was surveyed and assessed according to its development potential. When new properties were balloted, the new owners, representatives of the Lands Department and the Land Resources Branch of the QDPI planned the physical development of the property based on the land classification. Financial planning was also incorporated to ensure physical development to improved pastures was balanced by stock numbers. The brigalow scheme was a success and some 360 new cattle properties were established.

The Branch was involved in the evaluation of the extensive pastoral lands of far western Queensland. These surveys, called the Western Arid Region Land Use Studies, involved the description, assessment and mapping of some 122 million hectares of land. These surveys provided detailed information on the physical environment and included management recommendations to ensure the continued productivity of these fragile grazing lands.

In 1982 the soil survey section of Agricultural Chemistry Branch was transferred to Land Resources Branch. The soil survey section was then, and is still, involved in mapping and describing the soils of the Burdekin River Irrigation Area in north Queensland. An initial low-intensity survey of the Burdekin River lands, commenced in 1974 and covering some 380 000 ha, indicated areas with irrigation potential. High-intensity surveys over 80 000 ha commenced in 1981 on those areas likely to be developed for irrigation. The soils were classified in terms of their suitability for various crops and this information formed the basis for farm design and irrigation layout.

A number of irrigation feasibility studies were also undertaken by the Branch. Examples include the Bradfield scheme, and the Proserpine, Barker, Barambah, Maranoa, Ceratodus, Teviot Brook, Cave Hill and Border River proposals.

The Branch has had a large commitment in undertaking land evaluation studies for rural industry organisations. These studies are concerned with the loss of valuable agricultural land to urban and other uses which may affect the economic well-being of an industry. Land suitability studies have been undertaken for all the sugarcane growing areas in Queensland. These studies will provide the sugar industry and local authorities with estimates of the total area of land suitable for sugarcane production and will form the planning base for local authorities' strategic plans. Land suitability studies were completed for Rocky Point, Moreton, Isis, Mackay, Plane Creek, Maryborough and Julatten areas. Similar studies were undertaken for grain-growing areas. These studies provide information and guidelines on various regions suitable for agricultural development and their management requirements. Such evaluation studies cover the eastern Darling Downs, the Burnett region, the Wide Bay-Southern Port Curtis region, the Maranoa-Warrego region, the Kilcummin region of central Queensland and the Einasleigh-Atherton region of the dry tropics. The Branch is also involved in environmental impact assessments and in undertaking feasibility studies for such innovative crops as tea, oil palm and cassava.

While town planning is primarily the responsibility of the Department of Local Government in cooperation with local authorities, Land Resources Branch assists in this planning process by inspecting and commenting on Draft Town Planning Schemes, Strategic Plans and Development Control Plans. In some cases, local authorities have commissioned the branch to undertake land resource evaluation for town planning purposes.

Land Resources Branch is involved in extension activities through the provision of *Land Management Field Manuals*. This program is designed to provide, on a district basis, a comprehensive resource base for Departmental extension officers. These manuals are used for farm planning, designing specifications for runoff control structures and appropriate conservation management systems. These manuals are being provided for all the cropping regions in Queensland.

Western Arid Land Information System (WARIS) is an internationally recognised computerised data handling system developed by Land Resources Branch. It enables the

storage, manipulation and outputting of land resource information relating to both sites and areas delineated on maps. Almost all surveys undertaken by Branch staff since 1974 have made use of this system.

Western Arid Region Land Use Studies (WARLUS) described and mapped the land resources of 60 m ha of the arid and semi-arid lands in western Queensland. Some 200 sites were recorded in a transect across the western part of the region as part of the study to assess the cost of land degradation to the rural industry. This study, supported by funds from the Wool Research Trust Fund, was completed and the report was presented to the Production Research Advisory Committee of the Australian Wool Corporation.

In conjunction with the Lands Department the present condition of the mulga lands in the Paroo region was assessed and funding was made available for a project to monitor range condition and soil loss in the western mulga lands of south-west Queensland. The project was aimed at determining the relationship between grazing management strategies and soil loss, run-off, pasture condition and productivity of these mulga lands. In addition a series of colour photographs of the more common grasses and forbs of the mulga lands were prepared together with forage level photographs. These were distributed as a supplement to the newsletter *Mulga Line* to assist graziers in better management of the fragile mulga lands.

There is an increasing community awareness of salinity on farms and detailed work on salting was carried out with local Departmental officers in Oakey, Clifton, Theodore, Lockyer, Kalbar, Roma, Rockhampton, Mackay and Clermont areas. New occurrences of salting and soil salinity located during 1986 included:

- salting in cultivated red soil uplands in the Kingaroy area, caused by perched water tables in laterised basalts;
- high salt values in deep profiles in red brown basaltic colluvia in the Kilcummin area, central Queensland; and
- high salt values beneath scalds and throughout deep profiles in cracking clay alluvia or mudstones in the Roma area. Regional salinity workshops organised under the auspices of the Departmental Salinity Co-ordinating Committee were held at Toowoomba and Ayr during 1986 and further workshops were planned for Bundaberg and Emerald or Brisbane in 1987.

Soil Conservation Research Branch

This Branch continued its research in surface hydrology and erosion agronomy, soil physics and salinity and ground water hydrology.

Surface hydrology and erosion research. The major emphasis was, the effect of land management practices on run-off and soil loss. Retaining crop residues was very successful in the grain areas of the Downs and Central Highlands, and in the cane lands reduced production costs, bringing a remarkable reduction in soil erosion on sloping lands and significant yield increases in dry years.
Much-needed data on soil erodibility were obtained in catchment hydrology following land clearing of brigalow in central Queensland. Catchments of up to 5000 ha were studied to obtain data on large-scale management of run-off. Emphasis was placed on developing system modelling techniques which integrate cropping, hydrology, erosion and management effects and their interaction. Modelling also allows assessment of management options for a range of soils, landscapes, crops, cropping sequences and climatic combinations for which comprehensive field trials would be impossible.

The modelling activities involved include development of an integrated systems model called PERFECT (Productivity Erosion Runoff Functions to Evaluate Conservation Techniques). This model incorporates crop models developed by the Agriculture Branch to suit the environment. The hydrology is based on the USDA CREAMS (Chemical Runoff and Erosion from Agricultural Management Systems) hydrology component. An evaluation of CREAMS model using rainulator and field data has been made for clay soils in Queensland by Silburn, Freebairn and Loch. They showed that they could model erosion easily once they could model hydrology.

Much innovation was carried out by the staff. A telephone link between equipment in the field catchment and a computer in Toowoomba allowed measurements to be relayed immediately to the office. The problems addressed by the Branch stem from Queensland's high variable and erosive rainfall patterns. Research has to find ways to make the best possible use of rainfall and at the same time minimise the damage from run-off. By using extensive field trials and integrating these with computer-based technology the staff developed methods of controlling erosion that are acceptable to the farming community.

Studies on run-off, soil loss and crop production on the black earths at Capella using wheat, sorghum and sunflower crops and three different tillage systems, disc plough, blade plough and zero tillage, showed that sunflowers produced least cover and had the highest run-off. Stubble cover of all three crops was greatest from zero tillage, then decreased in blade-ploughed plots to those cultivated with a disc. Run-off showed the reverse trend.

Studies on residue retention in canegrowing at Innisfail, Mackay and Bundaberg showed zero tillage and residue retention, especially following a green (no burning) cane harvest, reduced soil erosion and improved soil moisture retention in green harvest; trash retention plots increased cane yield at Bundaberg by an average of 18 per cent over three harvests. Green cane trash retention also suppresses weed growth and has resulted in savings of up to \$183/ha.

At the Brigalow Research Station a catchment study showed land clearing can produce a sixfold increase in the peak rate of runoff. Soil nutrient levels, salinity, crop and pasture productivity and depth of ground water will be monitored over a long-term study of land use.

Agronomy studies by the Branch included a study of the fallow period between crops, especially over the summer to maximise rainfall infiltration whilst minimising the risk of run-off and soil loss. Fallow management, water balance, weed control and economics of tillage systems and land stabilisation by grassing of waterways were studied. Indian blue grass (*Bothriochloa purtusa*, Bowen strain) was shown as a promising species for grassing waterways. The branch showed that farmers could confidently maintain or improve yields

by adoption of conservation tillage without increasing management inputs to uneconomic levels. The Branch was active in developing tillage machinery and showing that nitrogen application can be economic.

Studies on stripping soil of varying depth of soil have been made to document the effect of soil removal on productivity and farmers were able to relate erosion to future loss of productivity.

Studies on the risk of cropping the semi-arid tropics were made. Basic studies of the physics of the soil were made in the areas of infiltration and evaporation and in soil properties such as the structural stability of surface aggregates, irrigation management of cracking clays, surface sealing under rain and the use of gypsum to increase seedling emergence.

Salinity and ground water hydrology was another field of research by the Branch. The areas under examination were:

- prediction of salinity hazard areas in the Burdekin Irrigation Area;
- development of quantitative methodology for irrigation water quality;
- prediction of salt leaching at Wowan, Emerald and in the Lockyer Valley;
- determination of processes causing ground water salinity in the intensive ground water irrigation areas of the Lockyer, Callide and Dee River Valleys; and
- processes of dry land salting on the Darling Downs.

The Burdekin Valley study was important for the selection and allocation of farms under the new irrigation scheme.

Gypsum and sulphuric acid neutralisation treatment was used to reduce the levels of residual alkali (sodium carbonate and sodium bicarbonate on the heavy cracking clay of the Mutdapilly Research Station).

Guidelines were developed for irrigation management to reduce increase in soil salinity in the Dee Valley.

In the Lockyer Valley research postulated that the Winwill conglomerate on the creek sides has restricted salt distribution and salt accumulated upstream of this restriction.

Soil Conservation Services Branch

On 1 October 1984 State Cabinet approved the preparation of a Bill to repeal the Soil Conservation Act 1965-1980 and to replace it with a new Soil Conservation Act. This decision was taken because no trusts had been formed under the 1965 Act, and the use of the Area of Soil Erosion Hazard provisions had resulted in landholders seeing soil conservation as a Government responsibility. The proposed Act would clearly establish that soil conservation is a landholder responsibility, and would provide statutory procedures to ensure the coordination of surface runoff necessary for soil conservation schemes.

The first meeting of a Soil Conservation Advisory Committee established by the Minister for Primary Industries took place on 11 December 1984. The committee comprised the General President and a representative of the Queensland Grain Growers' Association, the Chairman and a representative of the Queensland Canegrowers' Council, a representative of the United Graziers' Association, a representative of the Australian Cattlemen's Union, the Director-General, the Director of the Division of Land Utilisation and the Director of Soil Conservation Services Branch.

The development of grazing land for cropping in central and south-west Queensland continued at an estimated rate of 70 000 to 80 000 hectares per year. The use of electronically controlled surveying systems developed by a branch officer, John McLatchey, and laser levels resulted in a doubling of the rate of surveying of contour banks in extensive cropping areas. As a result, contour measures were implemented at record rates of 60 000 to 70 000 hectares per year. The adoption of conservation cropping practices in grain-growing areas increased, with herbicides being increasingly substituted for mechanical tillage operations. In cane-growing districts, trash retention practices gained grower acceptance following earlier research and development work. Approximately 25% of canegrowers in the Mackay district used minimum tillage practices in the 1984-85 crop and 30% of the cane grown in the Douglas and Mulgrave Shires was harvested green.

On 25 March 1985 State Cabinet decided to discontinue providing subsidies in declared Areas of Soil Erosion Hazard for the purchase or modification of machinery for stubble mulching purposes, and for the purchase or construction of farm dozer blades for constructing soil conservation works. Cabinet also decided that subsidies provided to landholders in declared Areas for the implementation of on-farm soil conservation works would be phased out by the end of 1989. These changes were made to allow an expansion across the State of cost-sharing arrangements between the Department and local authorities for road cross-drainage structures and other works of community benefit required in soil conservation schemes.

On 23 April 1985 a special meeting of the Minister's Soil Conservation Advisory Committee was held with representatives of the four Darling Downs Advisory Group Committees, the two Coastal Burnett Committees and the Dawson-Callide Soil Conservation Committee of the Queensland Grain Growers' Association. This meeting was arranged in order to develop guidelines for the formation and operation of District Soil Conservation Committees to replace existing Advisory Group Committees after enactment of the proposed new Act.

The rate of development of land for cropping in central and south-west Queensland declined in 1986 following lower grain prices. Landholder interest in structural soil conservation works also declined later in the year. Interest in conservation tillage practices increased, particularly in cane-growing districts such as Mackay where 70% of growers practised trash retention.

As at June 1986, 12 200 landholders (or 54% of those affected by erosion) had implemented soil conservation measures on their land. In total, 1.1 m ha (or 40% of the crop land affected by erosion) had been treated with soil conservation contour measures.

On 19 March 1986 a Soil Conservation Bill was introduced into Parliament to repeal the Soil Conservation Act 1965-1980 and to replace it with a new Act. Debate on the Bill was held over until the August Parliamentary sitting in order to allow public comment on the Bill.

On 5 September 1986 the *Soil Conservation Act 1986* was assented to and the *Soil Conservation Act 1965-80* was repealed. The 1986 Act was designed to facilitate the implementation of soil conservation measures by land-owners anywhere in the State. It made provision for the preparation and approval of property and project plans which were binding on current and future land-owners.

During November-December 1986 final meetings of all Advisory Group Committees which were established under the 1965 Act were held and action commenced to identify and establish district committees to operate under the 1986 Act. By the time the new Act became operative, the Department of Primary Industries had completed the administrative arrangements for implementation. A soil conservation advisory committee made up of representatives of the Queensland Graingrowers' Association, the Queensland Cane Growers' Council, the Australian Cattleman's Union, the United Graziers' Association, the Local Government Association of Queensland and the Department of Primary Industries was elected. District Soil Conservation Advisory Committees would be established of local people best equipped to develop and to implement coordinated erosion control plans in a practical way. Cost-sharing arrangements would be entered into by Local Authorities and by the sugar mills in the construction of Soil Conservation books of community benefit.

Agricultural Chemistry Branch

Analyses of soils, plants, waters, stockfoods, veterinary medicines, vitamins and pesticides are undertaken to support the Department's extension, agricultural research and regulatory functions. Modern equipment, including auto-analysers, atomic absorption spectrophotochromatography units, is used to perform these analyses. The analytical expertise of the Branch has been utilised in the training of scientists and chemists from other countries, including China.

Diagnostic soil testing is an activity constantly pursued by the Branch. Recent research has seen the development of improved soil tests for P and K for soybeans; Cu and Zn for wheat; B for sunflowers; P for potatoes and Ca for peanuts.

Studies of the chemistry of acid soils have shown that conventional soil analyses have limitations for predictive purposes. The best diagnostic index for A1 toxicity is the activity of A13+ species in soil solution. For Ca deficiency, either exchangeable Ca expressed as a percentage of the soil's effective cation exchange capacity or the activity of Ca in soil solution expressed as a proportion of the sum of activities of all cations in the soil solution has highest predictive value.

Soil fertility declines, caused by continuous cropping, were measured on six major graingrowing soils of southern Queensland. Losses of soil organic matter after 25 years of cropping varied from 30 to 60% and were associated with significant yield declines. Other soil chemical properties including N, P, S, soil acidity and the amount of sodium present on the exchange complex have also been affected. A water data base was developed to enable results from the chemical analysis of Queensland waters to be stored on computer. Sorting of these analyses by Shire enabled the chemical "fingerprints" of bore waters from different Shires to be obtained. It was also possible to produce maps of Queensland based on water-quality criteria such as salinity and sodicity.

In a study of the effects of tillage and surface management treatments on soil microbial biomass in a black earth soil, it was shown that there were amounts of N and P in the soil microbial biomass (0-15 cm) similar to those in the above ground plant biomass of sorghum at anthesis. Retention of stubble increased biomass by up to 55% but the effects of tillage varied with time of sampling.

Soil profile descriptions and soil analytical data for 150 profiles from the Burdekin River Irrigation Area were coded and stored on computer disk. Bulletins summarising salinity characteristics and fertility status were published.

Intense dough stickiness and a low level of tolerance to mixing were found in wheat bred from cultivars derived from rye. The rye-derived parents were a source of disease resistance. Unfortunately, these quality faults made the flours completely unsuitable for commercial bakeries and prevented some otherwise promising crossbreds from being considered for release. Laboratory tests were used to screen rye-derived wheats from Australia and overseas. The aim was to find one that did not have sticky dough, but might have the rust resistance that was normal associated with rye-derived material. Several promising lines were identified.

Sprouting of wheat due to pre-harvest rain is a serious problem for growers. Wheat varieties were screened for resistance or tolerance to sprouting, and many promising sources of resistance were identified. These were used in a backcrossing program by wheat breeders in an attempt to transfer resistance to some commercial wheats.

The amylose content of rice grain is an important indication of its quality. An auto-analyser procedure was developed for amylose to facilitate the screening of samples associated with the Department's rice breeding program. Early generation (F4) crosses were analysed for amylose content and, of these, about half were rejected on the basis of this criterion. Some promising selections emerged from the program's early crosses and a number of promising introductions were under further assessment.

A chemical technique involving half-seed analysis was developed for the selection for high linoleic acid in sunflower oil. The linoleic acid (polyunsaturated component) in sunflower oil decreases when current varieties mature under hot conditions. The procedure involved the fatty acid analysis of the top half (non-embryo section) of individual sunflower seeds. Selected embryo sections were subsequently germinated and used in the breeding program aimed at producing a commercial sunflower with oil high and stable in linoleic acid.

Gossypol and tannin levels in commercial and experimental cotton varieties were monitored during cotton boll development. High concentrations of these compounds in the plant tissue increase the plant's resistance to insect attack. In preliminary glasshouse trials, high tannin lines showed lower levels of insect damage than commercial varieties. The potential for high-volatile herbicides to cause damage to nontarget crops has long been recognised. Ester formulations of 2,4-D, and 2,4,5-T give cause for concern because of the damaging effects of their vapours on plants. This is a separate issue to spray drift. In the past, only biological tests with tomato plants could be used to classify formulations as high or low volatile. A method was developed to enable this to be done using laboratory equipment. High volatile impurities in low volatile formulation could now be recognised in the laboratory.

Residues of the pyrethroid insecticides deltamethrin, phenothrin, fenvalerate, permethrin, cyfluthrin and cypermethrin were determined in silo-scale storage trials with wheat. Residues of the insect growth regulator methoprene were measured in recent experiments. The distribution of the compounds among wheat milling products (flour, bran, pollard) and residues remaining in bread were investigated.

Residues of insecticides applied as post-harvest treatments to fruit and vegetables were measured in experiments which simulated commercial practice. Examples were the organophosphate insecticides dimethoate and fenthion in tomatoes, capsicums, mangoes and avocados. Residue levels found were used either to set maximum residue limits or to determine whether a treatment could be recommended for commercial use. This work enabled interstate and international trading in these commodities to continue.

The Branch's workshops (mechanical, glassblowing and electronic) had an important role in the design, fabrication and repair of laboratory apparatus and field equipment. Recent examples included a vehicle-mounted, hydraulic soil-sampling rig; a soil-shaking machine; centrifuge cups for extracting soil solution; and a high voltage generator and glass cells fitted with electrodes for high-temperature oxidation of nitrogen to oxides of nitrogen.

Queenslanders conduct pesticide course in China

Two Queensland DPI scientists returned from China, after conducting a successful training mission on pesticides. Agricultural Chemistry Branch scientists Denis Hamilton (Assistant Director) and Phil Hargreaves (Senior Chemist) conducted the 11-week training course at the Institute for the Control of Agrochemicals in Beijing. Twenty-two students, including scientists and technicians from Beijing and neighbouring provinces, took part in the course, which was part of an on-going program to further technical cooperation between Australia and China. They studied the organisation and management of the pesticide laboratory, techniques and methods of pesticide chemistry and work efficiency in the laboratory. Hamilton and Hargreaves said the students were very receptive to new ideas and approaches, but were initially shy because most had no previous contact with foreigners.

Division of Animal Industry

Animal Research Institute, 1983-87

During this period the Pathology, Biochemistry and Sheep and Wool Branches and their Directors, along with research groups of the Pig and Poultry Sections, the Poultry Disease Control Officer and a Poultry Extension Officer of Pig and Poultry Branch, a research group of Beef Cattle Husbandry Branch and the Brisbane Divisional Office of Veterinary Services Branch, continued to be located at the Animal Research Institute. In December 1986 following the installation of the mainframe Pyramid Computer further staff of Biometry Branch were transferred to the Institute.

The period saw the development of a major building and rebuilding program to be continued into the 1990s. Whilst plans and specifications were developed for several buildings by the middle of 1987, the buildings completed included a low-security animal isolation unit at Yeerongpilly and Regional Veterinary Laboratories at Rockhampton and Toowoomba. These facilities were under the administration of Pathology Branch. In addition, both human and animal accommodation facilities were connected to the Brisbane City Council sewerage system.

Biochemistry Branch

A revised Branch infrastructure designed to improve management and staffing of several important laboratory functions was introduced in December 1982. Initially, the most significant change was the incorporation of the old Toxicology Section into the Clinical Chemistry Group. The Nutritional Biochemistry Group encompassed the established areas of nutrition and metabolism, together with mycotoxin and antinutrient research, which were to undergo significant future expansion. The Organic Chemistry Group incorporated those specialised areas dealing with monitoring and detection of agricultural chemicals and the isolation of plant toxins. This group was ideally suited to accommodate innovative research into the chemical classification of micro-organisms and the detection and identification of pheromone compounds in response to the industry demands of this decade.

Biochemistry Branch has kept pace with the developments in high technology. Despite staffing constraints, significant increases in productivity were achieved through the introduction of automated equipment in areas such as clinical diagnostics, trace mineral analyses, amino acid analyses and pesticide residue studies. The commissioning of a Finnigan 1020B Mass Spectrometer/Capillary Gas Chromatograph in 1983 heralded a new era of sophistication in the branch's capabilities in identifying organic compounds.

The Branch's continued commitment to the resolution of problems in animal health led to several new and innovative approaches. In 1984, an Immunochemistry Group was established to collaborate in the development of rapid, specific and sensitive diagnostic tests and effective vaccines important to the Queensland livestock industries. In collaboration with Pathology Branch, this technology was directed towards the eventual eradication of enzootic bovine leucosis from Queensland.

The sheep blowfly costs the Australian wool industry \$100 million annually. DPI attacked this problem from several fronts. One project was aimed at manipulating blowfly behaviour through the study of chemical attractants and ovipositional deterrents which will divert the fly from sheep. A second project was concerned with understanding the pathogenesis of blowfly strike in sheep, for which an inflammatory model developed within the Branch for bovine ephemeral fever viraemia was well suited.

Organic chemists in the Branch collaborated with DPI entomologists to separate and identify biologically active compounds responsible for attraction of the Queensland fruit fly with the objective of commercial development of insect lures.

A testing of stud Brahman animals for Pompe's Disease under a program supervised by the Australian Brahman Breeders Association was supported by research into the blood enzymic test and its specificity.

Ill thrift in cattle generally saw a resurgence in interest in selenium deficiency.

Weather patterns in 1983 to 1985 increased fungal damage of crops. Mycotoxin research centred on surveys that identified new diseases of pigs owing to mycotoxins in affected feedstuffs and guaranteed the quality of most feed supplies.

With ever-increasing costs in animal production, the nutritional value of alternative feedstuffs, particularly chemically treated roughage, is of major importance. The laboratory has been actively involved in the evaluation of feeds such as alkali-treated bagasse and ammoniated straw.

The provision of amino acid profiles in support of research programs in monogastric nutrition continued to be the dominant role for the amino acid laboratory. The increased capacity afforded by the Waters 840 HPLC system resulted in a rapidly expanding data base of analytical information on Queensland-grown feedstuffs. The Branch accumulated data on a variety of weed seed contaminants and industrial waste materials in recognition of the possible economic potential of alternative feedstuffs. It was anticipated that the laboratory's activities would continue to increase in parallel with future research demands of the Department in areas such as aquaculture.

The maintenance of product quality for the consumer is essential to the viability of primary industry. Random testing of meat samples for species of origin was carried out using isoelectric focusing electrophoresis. Over a period of three years of monitoring Queensland meat production for possible species substitution in the marketplace, no cases of violation were detected. Kangaroo and horse meats were detected only in pet foods.

Monitoring of organochlorine and organophosphorus pesticide residues in cattle slaughtered in Queensland continued at a steady rate throughout the early 1980s. The laboratory undertook trace-back analysis in conjunction with officers of Veterinary Services Branch in order to ensure the maintenance of a high rate of compliance with pesticide usage in the animal industries. The Branch's expertise in these areas proved invaluable to the beef industry in the light of the intensive monitoring required to protect our export markets. Random meatworks testing increased from 20 per day to 500 per day.

Pathology Branch 1984-87

The period saw unprecedented change requiring branch management and other senior staff to be heavily involved in organisational adjustment and planning. A number of events and, where appropriate, the consequences of the events can be described. G. C. Simmons retired as Assistant Director of the Branch on 14 September 1984 after 38 years of loyal service. Geoff Simmons was an able administrator, but may be remembered longer for his contributions in veterinary bacteriology. Besides being involved in the discovery of a number of new diseases for Queensland, he firmly established microbiology as a major discipline at the Institute. The past and present strength of Yeerongpilly in solving microbiological problems owes much to Geoff Simmons. The branch plans to maintain the high standards created by this dedicated officer. R. J. Dalgliesh replaced Geoff Simmons as Assistant Director on 22 November 1984. Bob Dalgliesh, with his background in service and research, brought purpose and cohesiveness to research performed in the branch. His experience in international technical aid proved invaluable in developing and managing projects sponsored by the Australian Centre for International Agricultural Research (ACIAR).

Following an election promise in 1984, two regional veterinary laboratories, one at Rockhampton and the other at Toowoomba, were completed late in 1986 and opened in May 1987. As well, Pathology Branch trained two officers and sought a third for a unit in the Longreach Arid Zone Research Institute, an initiative also associated with the 1984 State election. The new laboratories took the Branch strongly into a regional system, and structural, adjustments and staffing changes were made to accommodate this.

The Branch was guided towards a broadly tripartite structure: a network of regional diagnostic laboratories at Townsville, Rockhampton, Yeerongpilly and Toowoomba; central reference and research laboratories at Yeerongpilly; and specialist laboratories for the diagnosis of brucellosis and tuberculosis at Townsville, Rockhampton and Yeerongpilly. The Wacol Tick Fever Research Centre and the Longreach Unit would probably be linked with the central laboratories in years to come.

New laboratory buildings for Pathology at Yeerongpilly have been approved. Planning was at an advanced stage, with a view to construction starting late in 1988.

Thus, it appeared that the Branch had the strategy and the structure, and would have the facilities, to make major contributions to the improvement of animal health in the years leading up to 2000. There was some concern about obtaining sufficient resources-extra staff and funding-to make it all work. But even in difficult financial times, the obvious priority of Pathology Branch work leads one to believe that the required support will be forthcoming.

The years 1984-87 saw a rapid expansion of interest in high technology as a means of improving our capacity to diagnose and control animal diseases. The Branch used sophisticated immunoassays to detect infectious agents and the antibodies produced against them. A small molecular biology unit was established. A scientist was trained to lead this unit. Useful work based on the cloning of DNA from several different microorganisms was achieved.

The Branch, by undertaking the laboratory testing, played a major role in the Departmental Enzootic Bovine Leucosis (EBL) Accreditation Scheme. In 1984-87, a total of 374 336 tests was performed at the laboratories in Brisbane and Townsville. While this initiative had a very beneficial effect in markedly reducing the prevalence of infection in Queensland

dairy herds, there was a cost to the Branch. Resources that might have been used for a wider range of investigations had to be concentrated to support the EBL effort.

Another major initiative of the period is the development of a computerised system for recording and reporting information relating to laboratory diagnosis of disease. Called LOIS (Laboratory online information system), the system was developed by departmental staff to suit the specialised needs of our laboratories. It became operational during 1987.

Other major services continued to operate, although not always without some trauma. The tick fever vaccine service was severely tested by a contamination problem in 1986. Bovine leucosis virus entered the vaccine on one occasion, avoiding detection by standard procedures that had been thought to be more than sufficient. Much adverse publicity and financial loss ensued. Conditions to prevent a recurrence were in place. These were obviously more stringent than ever, and were also more cumbersome and potentially expensive.

The Brucellosis and Tuberculosis Laboratories remained busy, performing diagnostic tests of all types (serological, microbiological) approaching 1.5 million during 1986-87. Within the next few years, however, this demand would decrease as the campaign moved from the eradication to the monitoring phase.

Initiatives and changes being considered by the Branch included the formalisation of an epidemiology unit with a strong quantitative orientation, the enhancement of fish diseases' capability and also the introduction of cost recovery systems. The first two projects were likely to involve other branches and would need resources not currently available-and thus became more difficult to realise. The introduction of a wide range of charges might well become a matter of necessity, although its implementation would require careful judgement. The Branch wished to avoid subverting its main purpose the early confirmation of diagnoses of diseases significantly affecting populations of commercial livestock. Parts of the livestock industries are not affluent, and charging could inhibit investigations of damaging disease outbreaks.

Beef Cattle Husbandry Branch

This branch has had two Directors since 1984 and Lyle Winks is currently handling it as Acting Director as well as being Director of Sheep and Wool and has T.H. Rudder as Assistant Director since 1985.

Extension activities

Major components of extension activities during the period under review 1984-87 are described below.

(a) Drought mitigation advice was a major component owing to the below-average summer rainfall for the four years 1983-84 to 1986-87. Fortunately, there was sufficient liquidity in the industry to warrant use of mitigation practices to enhance survival rates. The value of fortified molasses (molasses fortified with urea and protein meals such as meat meal and cottonseed meal) became well established as an alternative to previously established feedstuffs for drought feeding.

- (b) Commercial interest in feedlot fattening increased markedly in the period 1984-87. The major factors leading to this were: a downward movement in grain prices combined with upward movement in beef prices, which improved the economic aspects of feeding grain for beef production; and a higher degree of awareness of the need to supply a consistently high quality product to the domestic market to enhance consumer satisfaction and sales. An extra measure producers could take for drought mitigation was assuring turn-off and reducing stock rates on drought-affected pasture.
- (c) Use of extension demonstration sites in cooperation with commercial producers to validate and disseminate research results increased markedly during 1986 and 1987. In particular, results from Swan's Lagoon and Brian Pastures pen trials with protected protein supplements and rumen modifiers were tested widely under commercial grazing conditions. Also, aspects of automatic cattle management, such as better spear traps and lures to attract cattle to traps, were tested and improved at a number of commercial sites.
- (d) Research during the late 1970s and early 1980s defined factors that minimise loss of meat quality from the paddock to the consumer, for example, reduction of handling and transport stress, provision of feed and water preslaughter, and electrical stimulation. These techniques were incorporated into extension programmes aimed at producers, processors and butchers. Until the early 1980s extension generally stopped at the farm gate and the revised approach would result in improvements to meat quality.
- (e) Further development of beef industry groups was encouraged to improve the quality and commercial relevance of extension programmes. This encouragement was adopted by extension staff and would result in a more effective multi-disciplinary approach to producers' production problems at all levels including those associated with disease control programmes.
- (f) Low-production rates represent a major problem especially in northern and central Queensland. Weaning calves down to c. 3 months offers the potential to reduce nutritional stress on breeders and improve reproductive rates. This practice is being promoted in northern Queensland as an extension to the original strategic weaning concept.

Research activities

The completion of long-term breed and selection comparison studies released resources to divert into other areas that affect beef production. An internal review of current and proposed research projects, combined with widespread consultation with industry representatives, indicated emphasis should be placed on strategies designed to enhance meat quality and growth rate in southern and central Queensland, and reproduction and growth rate in northern Queensland. During 1986 and 1987 the major research programmes developed were:

(a) reducing the effects of transport and pre-slaughter handling stress, with emphasis on methods to restore depletion of muscle glycogen;

- (b) supplementation strategies and identification of additives, for example, rumen modifiers to increase turn-off rates through reduced mortalities and increased growth rates, especially in northern and central Queensland beef herds;
- (c) weaning management strategies to enhance breeder survival and reproductive rates and to define optimum supplementation requirements for young weaners;
- (d) automatic cattle management strategies to enable commercial implementation of improved husbandry practices designed to improve productivity and reduce labour costs;
- (e) refining herd simulation models to allow more accurate identification of economically important herd management factors and to evaluate research priorities.
- (f) investigating specific factors that contribute to net muscle growth.

Veterinary Services Branch

Veterinary Services Branch has responsibility for disease investigation and control, extension of disease prevention, and administration of the Stock Act 1915-1976; the Brands Act 1915-1975 and animal quarantine services on behalf of the Commonwealth Government.

Through the diligence of its staff the Branch maintained steady progress in the campaign to eradicate tuberculosis and brucellosis. The examination of more than 8 million cattle at slaughter and the application of approximately 2 million field tests for tuberculosis were instrumental in reducing the number of tuberculosis-infected properties to 134. This satisfactory outcome enabled extension of the Tuberculosis Provisionally Free Area to include the shires of Diamantina and Winton, and those parts of the shires of Barcoo, Bulloo, Longreach and Quilpie west of the Western Dingo Barrier Fence.

In reducing the number of brucellosis-infected herds to 20, more than 51 000 herd milk ring tests were applied, and 5 million blood samples despatched to laboratories.

If the current rate of progress was maintained it was expected that the target date of December 1988 for freedom from brucellosis and December 1989 for herds to be at least "provisionally clear of tuberculosis" would be met.

An important objective of the Branch is the investigation and control of serious disease outbreaks. Since January 1983 approximately 600 outbreaks of tick fever involving 500 deaths and illness in 1500 other cattle were investigated and control measures instituted. Timely investigations on more than 300 properties minimised losses due to poisoning. Nevertheless, these outbreaks, predisposed to by dry conditions and errors in management, cost industry at least \$10m per year through reduced production, costs of treatment, control measures and reduced use of land because of toxic plants. High priority was accorded prevention and control of other economically important diseases-bacterial, viral, infertility, and mineral deficiency diseases.

Disease eradication programs are developed as they become necessary and practicable. Following incursions of cattle ticks (*Boophilus microplus*) into the tick-free area of north-west Queensland, the Maxwelton Special Quarantine Area involving 75 properties was declared. On-property eradication programs were so successful that the number of quarantined properties was reduced to 21. To prevent tick-infested cattle straying southwards into the tick-free area both sides of the rail corridor between Hughenden and Cloncurry were fenced.

At Helidon a new dipping facility with easy road and railway access was built and officially opened on 23 April 1986. Strategically important in preventing the spread of ticks in south-east Queensland, the new dip also facilitated the movement of cattle from the tick-infested area to markets, abattoirs or pasture in the tick-free areas of Queensland, or to New South Wales.

The total cost was \$100 000, but without costing the voluntary labour, including that of Stock Inspectors Ken McNichol and John Fletcher, and Max Burns, Senior Officer with the Queensland Beef Cattle Husbandry Branch. The yards are packed with features to allow the management of 800 cattle or 600 horses with minimum injury to men or beasts. Centrally hung gates permit a continuous flow of cattle with no danger to the operator and a 15 centimetre agitator pump keeps the chemical liquid agitated.

The promotion of field projects aimed at eludicating disease problems affecting the livestock industries was encouraged. The results of a field project involving blood sampling and testing established that approximately 14% of Queensland dairy cattle were infected with the virus of enzootic bovine leucosis (EBL). Consequently a voluntary accreditation scheme for EBL was introduced in November 1983. Field duties involving collection of over 330 000 blood samples and attendant administration highlighted Branch involvement. Currently 132 herds are granted accredited free status.

Field trials conducted by Branch officers established efficaciousness of a recently developed live attenuated vaccine to protect cattle against ephemeral fever. Soon after their completion, marketing of the vaccine commenced. With the vaccine cattlemen now have a way to protect their herds against a disease that is ever-present in Queensland, particularly in eastern coastal and subcoastal regions.

Good progress was also made in the recently introduced Voluntary Ovine Brucellosis Accreditation Scheme. Already 21 British breed and three merino studs were accredited free of ovine brucellosis.

Veterinary Services Branch was successful in effecting control over stock movements as a disease control measure. Under the provisions of the Stock Act notifications were gazetted which defined revised movement conditions from properties subject to restriction for brucellosis and tuberculosis. Despite restrictions on the movement of livestock from the tick infested to tick-free area, outbreaks of ticks in the latter area still occurred. Nevertheless, the number of properties in the tick-free area quarantined because of cattle tick infestation was reduced from 284 in 1983 to 166 in 1987.

A working party consisting of Branch officers was formed to review tick control measures, procedures and requirements in respect of animal movement whilst maintaining safeguards to prevent the spread of ticks. One of its recommendations was the establishment of buffer zones between tick-infested and tick-free areas. If adopted, movements to tick-free destinations in Queensland and New South Wales would be facilitated.

Extension activities in disease control were actively promoted to increase stockowners' awareness of animal disease matters and acceptance of departmental programs. Despite the near-eradication of brucellosis, abortion continues to be one of the most serious problems confronting the cattle industry. Branch officers successfully conducted an intense press and radio campaign to encourage the adoption of vaccination programmes for vibriosis and leptospirosis, diseases responsible for much of this problem.

Many stockowners were hesitant to use type D botulism vaccine when the bivalent C and D vaccine became unavailable. The use of type D vaccine was successfully promoted as an effective means of preventing cattle deaths from botulism.

More than 4000 samples of fat from cattle at slaughter are monitored annually for residues of 23 pesticides. Levels of pesticides below those permitted are a prerequisite for importation of meat by Australia's trading partners. Instances of excessive levels of pesticides were investigated by branch officers. By visiting offending properties officers located sources of residues and recommended the use of pesticides in accordance with good husbandry and good agricultural practice. So successful was this extension work that by 1987 there was a compliance rate in excess of 99% with legislative requirements governing the use of chemicals.

In cooperation with the Commonwealth Government selected Branch officers maintained animal quarantine services to prevent the introduction of exotic animal diseases, and to assist in the exportation of animals and animal products. Since January 1983 these officers have intercepted more than 4400 kg of meat, 1200 kg of dairy products, 366 kg of egg products and nearly 3000 eggs in passengers' luggage at air and sea port terminals. Otherwise these products would have been imported in contravention of the provisions of the Quarantine Act to pose a risk of introducing potentially devastating exotic diseases. Quarantine veterinary officers thoroughly examined 89 782 cattle, 351 horses, 162 goats, 151 pigs, 2084 dogs and 744 cats to ensure that they were healthy and met the stringent health conditions laid down by importing countries.

Initiatives were developed to prevent incursions of exotic diseases and to promote increased public awareness of animal quarantine activities. These included the compilation of a comprehensive report on the adequacy of quarantine in the Torres Strait to the Senate Standing Committee on Natural Resources; the completion of construction planning for the northern boundary fence of the livestock-free buffer zone on Cape York Peninsula; the continued monitoring of potential pest and disease incursions into northern Australia from the Torres Strait islands; exhibits on animal quarantine at shows in major cities and country towns and many talks on quarantine to producer and public organisations.

A notable piece of legislation, the Deer Farming Act, provides for the control of deer farming in Queensland and its related aspects. Veterinary Services Branch has

responsibility for the licensing of deer farms, fencing standards, movement control and requirements in respect of identification.

Sheep and Wool Branch

The sheep brucellosis accreditation schemes for the merino and British breed stud societies progressed during 1986-87, with accreditation status given to five merino stud flocks and reaccreditation to four merino and 21 British breed flocks.

Deaths in young lambs are a significant industry problem. This was being researched through a study of the role of foeto-toxins of plant origin. These toxins can be identified as constituents of certain plants which, when ingested, detrimentally affect the developing lamb in utero.

Further research into blow-fly vaccine production saw subfractions of larvae successfully used as antigens. Current studies were seeking to refine the antigen further as part of the overall process to develop a vaccine.

The delivery system for administering methionine to grazing sheep was still being tested in response to industry's interest in using the amino acid to increase wool growth. Recent high wool prices had further strengthened the need for research findings that enhanced productivity. The use of this supplement was seen as one way to achieve this goal.

The use of polyethylene glycol to improve the productivity level of sheep on mulga diets was established. Further research was to be directed towards acquiring a cheaper product that retained the desirable attributes of the polyethylene glycol and met practical requirements.

A sheep and wool extension officer was stationed at Longreach to service producers in that district as part of the Department's commitment to develop the Arid Zone Research Institute. Four other staff of the Division of Animal Industry were to begin duties at the Institute soon and would be involved with animal production research and extension in the arid environment.

The Goat Industry

A practical system of exposing cashmere goats to periods of continuous light to improve production was developed. The system employed the findings of previous research and results indicated a 60% productivity increase.

Research showed that shearing cashmere goats twice a year in April and July gave marked increases in cashmere production. Further research was seeking to exploit the consequences of this finding.

Veterinary Public Health Branch

On 1 April 1985 State Meat Inspectors were withdrawn from export licensed meatworks, except for disease control officers (Tuberculosis and Brucellosis). This was part of a rationalisation of meat inspection procedures in this State.

Butcher shop standards were updated to allow direct selling into shopping malls, and selling non-meat products such as stir-fry preparations and other approved packaged products.

In 1985 and 1986, to counter the many incorrect statements about meat, two films were produced giving an accurate picture of the rightful place of meat in a healthy diet. This was done in co-operation with the National Heart Foundation of Australia, as was the production of "Heart Food" posters featuring lean meat in the diet.

Boyd Parkinson retired as Branch Director in 1987.

In 1987, the detection by USA of pesticide residues in meat resulted in greatly increased abattoir sampling for these and antibiotic residues.

Meat industry regulations were rewritten in 1987 with the aim of facilitating trade without compromising hygiene standards.

A pet food industry committee was established, which brought order into a previously fragmented industry.

In 1987 uniform national standards for abattoirs were drawn up, to facilitate the interstate trading of meat.

Pig and Poultry Branch

Pigs

Chilled semen from some of Queensland's top performance-tested boars has been available from artificial insemination since 4 August 1986 from the DPI Wacol AI Centre. Already involved in on-farm performance testing and central boar testing at Rocklea, the DPI saw the wider dissemination of elite genes from accurately tested boars as a logical step to further improve Queensland's pigs. Boars from the centre would come from the top 5 per cent of those passing through the central test station. The first four boars to stand in the centre were Belmont Solkallan 231 and Camenda Rainlover 7994 (Landrace), Caminda Marshall 21Y (Large White) and Bettafield 062 (Synthetic). They remained in the centre for approximately six months before being replaced.

The Department initiated a project to assist and develop a semen transport and storage box. The semen is cooled to 16°C before despatch and during periods when air temperatures exceed 20°C balloons partly filled with water and frozen are used as a coolant. Using a thermometer it is then possible to maintain the storage temperatures below 15°C and 20°C on the farm. Using this system the first three farms at Beaudesert had conception rates

exceeding 80% with two inseminations. The first three artificially inseminated sows to farrow on these farms averaged 10.9 piglets born per litter. To minimise disease spread, the donor boars are isolated, screened for certain diseases by boar and semen medication quarantine procedure and strict control over hygiene during the collection and processing of semen. Before entering the Wacol AI Centre all boars undergo a quarantine period of one month during which they are medicated and treated as part of the sanitation process.

Brucellosis has been found to be unexpectedly high in feral pigs slaughtered for the export game meat trade in the Ipswich, Dalby, Chinchilla, Wandoan, Taroom, Theodore, Moura, Rockhampton and other areas. A free DPI brucellosis testing scheme is available. The scheme involves two blood tests taken at 90 day intervals of every breeder pig in the herd. If the results are clear, the DPI certifies the herd is brucellosis-free. Herds are re-tested every two years. Before buying pigs buyers should see the vendor's brucellosis-free certificate. The DPI local pig adviser can provide details.

The Department's Wacol Pig Research Centre welcomed people to its first open day in six years on 5 June 1985. Demonstrations of artificial breeding, spray cooling, ultrasonic backfat testing, fan-forced piggery ventilation and computer-planning for more efficient piggery management were dealt with. Static displays explained current DPI research into feed formulation for optimum cost-efficient weight gain, breeding for superior weight gain and leanness traits, and disease investigations.

Studying the relationship of protein to energy in pig feed was an important element of DPI research, as was assessing culinary legumes such as navy beans and soybeans for pig feeds. A study was being made of mouldy grains and weed seeds in pig health.

Melioidosis and sarcoptic mange were major pig diseases being researched. Encephalic myocarditis or EMC has caused sudden death in pigs at Beaudesert. The EMC virus is carried by rats and mice and causes unexpected deaths in pigs from 10 days to 6 months of age. Elimination of rats and mice nests and removal of long grass around piggeries are sound prevention measures. Chemical poisoning is not sufficient.

Poultry

The Redlands Poultry Research Station, opened in December 1984, replaced the previous centre at Rocklea, which was devastated by floods in 1974. The facilities consist of an office block, a combined egg packing room, laboratory and slaughter room, feed mixing shed with grain storage silos and workshop and a hatchery. For adult birds there is a high-rise layer shed which holds 2500 birds in three-bird cages, another cage shed with 1700 layers in two-bird cages and a third with 1200 layers in single cages. There is also a breeder shed that can hold 2600 breeders. Young birds are catered for by a broiler shed with capacity of up to 6400, a battery brooder shed that holds 48 groups of 40 chickens, a weaner shed and a pullet rearing shed to take birds to 18 weeks of age.

Permanent staff numbers six, with four field workers. The research team also numbers six. They are Paul Mannion and David Robinson, who both specialise in nutrition and management; Dr Kerrie Rathie, a geneticist; and Dr Linda Murphy and Dr Arthur Preston, who both specialise in bird behaviour. The programs are under the direct supervision of John Connor, Assistant Director of Pig and Poultry Branch.

Research projects are funded mainly out of a levy on the egg and chicken meat industries, the rate being decided by the Poultry Advisory Board. Some funds came from the Poultry Research Advisory Committee and the Australian Chicken Meat Research Committee.

Research includes selection work on Australorps to reduce obesity after sexual maturity. A study of the effect of shell grit on shell quality has shown that providing the diet supplied an intake of four grams of calcium a bird a day, the shell quality was good. The consumption of grit is independent of the calcium content of the diet. Also eggs laid later in the day are smaller and have stronger shells. Selection of Australorps for early sexual maturity and stability of egg weight is aimed at reducing the extent to which egg weight increases as the birds become older. If this is successful it will assist the problems of egg marketing. The effect on productivity of form of diet (mash, pellets or crumbles) is under study, as is the relationship between average egg weight and various levels of essential fatty acids. The toxicity and side effects of various weed seeds is being studied. For broilers, work on response curves of the effect of energy density in the diet at different ages on body weight of broilers will help to decide the most economic diet and the prediction of slaughter weights by sample weighing at different ages. Studies on design of laying cages and suitable alternatives to cages have been initiated.

Producer involvement in field investigations, surveys and research development projects is actively encouraged by DPI extension staff. In north Queensland egg producers were involved in planning and conducting egg-quality surveys and on-farm feed density trials.

Regulations under the Hen Quota Act were amended in November 1985 to permit transfer of hen quotas without the attached land in certain circumstances. This allowed a significant number of quota holders to sell their quotas and leave the industry.

In south Queensland the DPI's chicken meat team did a series of on-farm studies including investigating sample weighing techniques used to predict slaughter weight of meat chicken flocks: surveying lighting systems, ammonia levels and condensation problems in meat chicken sheds at night, assessing the suitability of different types of feeders for meat chickens and studying temperature control in meat chicken sheds.

Poultry section officers, with the cooperation of DPI Economic Services Branch officers, conducted workshops for producers on the application of microcomputers in diet formulations and checking and analysis of farm records.

The main poultry diseases dealt with included infectious bronchitis (IB), chronic respiratory disease (CRD), avian encephalomyelitis (AE) and Marek's disease.

The DPI Veterinary Officer in the Pig and Poultry Branch gave this advice to backyard poultry producers:

Household scraps, wholegrains and greens, lettuce, beans, grass and bread do not give chickens a balanced diet. Greens in scraps give a good yolk colour but good layers need a high-protein diet. To make strong egg shells laying birds need three to four times as much calcium as pullets, a minimum of 3 grams of calcium a day is needed to make shells at all. A feed of grains and greens should be eaten in 10 minutes.

Growers should use chicken-starter mash for the first six weeks, to then a grower mash from 7 to 16 weeks and finally a layer mash (which contains a high calcium content) from 17 weeks on. Layers need 15 hours of light each day and so use light bulbs to achieve this. Vaccinate for Marek's disease and Fowl Pox at hatcheries. Give hens adequate feeder space, make sure feed is always available, help feed dry, water supply clean and housing comfortable.

Division of Dairying and Fisheries

The Dairy Husbandry and Animal Breeding Branch

The period 1985-87 saw changes in the structure of the dairy branches within the Department of Primary Industries.

The former Dairy Cattle Husbandry Branch and the Dairy Farm Production Section of the Dairy Field Services Branch were combined into the new Dairy Husbandry and Animal Breeding Branch. The new branch name reflected the expanded services being offered, particularly through Wacol.

The Dairy Products Section of Dairy Field Services Branch was combined with the former Dairy Research Branch to form a new Food Research and Technology Branch. Again, the new branch reflected the wider overall approach of the branch.

These changes were designed to better serve the primary industries of Queensland as a whole and the dairy industry in particular.

A close relationship developed between the new branches, the Queensland Dairymen's Organisation and the Queensland Milk Board to assist all levels of the industry attain efficient levels of production.

Developments in Queensland dairy industry

The Queensland dairy industry saw dairy cow numbers remain steady at approximately 235 000 cows. The number of farms continued to decline slightly from 2712 in 1983 to 2544 in 1985. Total milk production rose from 572 million litres in 1982-83 to 629 million litres in 1983-84 and 621 million litres in 1984-85.

A significant factor for the Queensland industry was the introduction of new marketing arrangements as from 1 July 1986. These arrangements involved a levy across all milk production to provide 30% support for all dairy-product exports out of Australia. The Queensland industry would contribute in the order of \$10 000 000 through an all-milk levy of 35 cents per kilogram fat together with a product levy on butter and cheese.

In respect to Departmental services, the numbers of herds and cows involved in production recording stabilised after a period of rapid growth in the early 1980s. Trends can be seen from the following table of average 300-day production of herd-recorded cows in Queensland:

Year	Herds	Cows	Milk (L)	Test (%)	Fat (kg)
1980-81	669	44 245	3 003	3.8	114
1983-84	987	73 275	3 395	3.9	133
1985-86	1 045	72 180	3 638	3.9	142

Similar trends were seen in the use of artificial insemination in the State, with 81 435 doses of dairy semen being supplied locally in 1980~81, 132 436 doses in 1983-84 and 140 060 doses in 1985-86.

To keep abreast of developments in the Queensland dairy industry, the range of services offered through the Wacol Herd Services expanded, with services now including production recording, breeding management recording, the dairy practitioner information service and the provision of lactation certificates.

The Wacol AB Centre now provided an extensive range of pig semen and beef semen as well as a full range of dairy breeds. In 1986-87 semen from proven boars from the Rocklea Boar Test Station was collected and distributed. Wacol continued to provide training in doit-yourself artificial insemination for both dairy and beef producers.

Three significant events in recent years in the genetic improvement of the Queensland dairy herd were are the introduction of Australian Breeding Values (ABVs), a large increase in the number of Holstein-Friesian bulls being progeny-tested each year and the use of embryo transfer techniques in breeding programmes. The ABVs enabled all bulls used in Australia to be compared, regardless of the centre at which the bull is standing or whether he is an overseas bull. Valid comparisons were also possible between bulls used in different years. All herd-recorded cows with sires identified also had ABVs determined. This enabled breeding decisions to be based on accurate assessments of the genetic merit of both bulls and cows, and the best cows in the country were now being used to breed young bulls for progeny testing. Wacol semen was actively marketed interstate, particularly in New South Wales and Victoria.

Queensland bull proving was conducted in the Holstein-Friesian, Illawarra and Australian Friesian-Sahiwal (AFS) breeds. With the Holstein-Friesian being, by far, the most numerous breed, the number of young bulls being progeny tested in the breed each year rose over five years, from twelve to in excess of fifty bulls. This allowed a much greater chance of identifying genetically superior bulls.

The advent of the embryo transfer technique enabled a far greater efficiency in the use of contract mating to breed young bulls for progeny testing. By obtaining multiple pregnancies from a mating, there was a better chance of a bull resulting from each mating. A further use of embryo transfer was in the development of a Multiple Ovulation and Embryo Transfer (MOET) program for the AFS breed. Owing to small numbers in the breed, a MOET program, which used information from full and half- sisters rather than from daughters, offered a more efficient method of genetic development in the AFS breed.

The growing international acceptance of the AFS breed was reflected in the sales of AFS semen: these rose from 8000 doses in 1984 to 25 000 doses in 1986. There was also a market for live animals, offering alternative sources of income for Queensland dairy farmers.

History of the Ormiston Semen Export Centre

The semen export centre started in 1972 with a shed, a demountable laboratory and two Illawarra bulls for semen collection for the USA market. The USA required these special facilities to allow the semen to be imported: no other existing AB Centre in Australia was satisfactory as there were other livestock in too close a proximity. The Centre grew gradually over the next five years to a stage where up to 20 Illawarra and Sahiwal bulls were housed here and tens of thousands of semen straws were exported annually to the USA. All these bulls were owned by the Department.

In October 1977 "blue tongue" like virus was isolated from insects and cattle sera in Northern Australia. This caused the USA to immediately ban all further semen imports from Australia. Most other countries also banned all semen imports from Australia.

After extensive research it was discovered in 1978 that the virus was a new strain of "blue tongue" and was not pathogenic to cattle or sheep. Most countries then relaxed the import restrictions, but still required all donor bulls to be tested for this virus.

However, the USA was only just allowing further semen shipments from Australia in 1987.

Fortunately, during the same period large new markets were developed in New Zealand and South East Asia for Sahiwal semen in particular. These still are our largest export markets.

Until 1980 all bulls on the Centre were owned by the Department. However, because of industry demand the Centre was opened up to allow privately owned bulls onto the Centre on a commercial basis. This has developed to the extent that by 1985 the majority of the bulls on the Centre were privately owned.

By 1986, the Centre could handle up to 25 mature bulls at any one time. The average length of stay on the Centre for privately owned bulls was five months, and 120 000 straws of semen were produced annually. The Centre could be divided into two separate isolation areas to meet the quarantine restrictions of two different markets at the one time when required. The DPI now exported more semen than all other AB centres in Australia combined.

The Australian Friesian-Sahiwal (AFS) breed

The Australian Friesian-Sahiwal was officially launched as a Breed Society at the "Dairy Cattle Exports for the Tropics Field Day" held at the Department of Primary Industries Warrill View Research Station on 30 September 1987.

The launching of this Society defined the requirements for entry into the register throughout the world and prevent any misrepresentation of breeding. Production standards were set for registration in advanced registers.

The history of the AFS breed dates back to 1952 when five males and five females of the Sahiwal breed were imported into Australia from Pakistan, via New Guinea. The Sahiwal

was recognised then, as it is now, as the best dairy breed of the many *Bos indicus* breeds of cattle found throughout the world.

In the early 1960s there was fear within the Queensland dairy industry that the chemical control of ticks could break down and put the industry at risk. Dr Graham Alexander decided that some *Bos indicus* blood should be introduced into the dairy breeds. As a result, in 1961, Sahiwal bulls were used for matings with Holstein-Friesian, Illawarra and Jersey cows and heifers. Dr Alexander thought the use of the Sahiwal would add tick resistance, heat tolerance and general tropical adaptability to the already high milk production of the *Bos taurus* breeds.

A few doses of Sahiwal semen from CSIRO Badgerys Creek were also used on the Holstein-Friesian cows at Kairi and the Illawarra cows at Biloela Research Station. The heifers from these matings (H-F, Illawarra and Jersey) were then milked at the Ayr Research Station. Subsequent matings tried to maintain approximately 50% Sahiwal breeding.

Trials in tropical countries have demonstrated a mixture of 50-50 *Bos indicus* and *Bos taurus* to be the best, especially when conditions are at their harshest.

Cows were naturally mated at the Ayr Research Station with the following crossbred bulls:1/2 Sahiwal 1/2 Jersey254 (Creamy) and 266 (Blacky)1/2 Sahiwal 1/2 AISS24 (Dennis)1/2 Sahiwal 1/2 FriesianS16, S18, S72 (Spike) and C01 (Star)

The Department made a decision to concentrate on the 50% Sahiwal 50% Holstein-Friesian cross in the late 1960s. The Jersey and Illawarra component became increasingly diluted in subsequent generations.

As with all *Bos indicus-Bos taurus* crosses, approximately 60% of the first-cross, or F1, heifers did not persist in lactation under machine milking in the absence of the calf. This is believed to be due to the strong maternal instinct in the Sahiwal breed. It is a problem related to milk let-down rather than milk production.

Those heifers that did not persist in lactation were culled. Consequently, very few animals in subsequent generations exhibited this fault. Heifers that persisted in lactation were transferred to cooperators' herds for comparison with other breeds and evaluation under commercial conditions.

After semen became available from the Wacol AB Centre for artificial insemination, natural mating phased out in 1970.

Progeny testing for young bulls began in 1976. A key feature of this programme was that young bulls were evaluated for tick resistance prior to semen collection. All young bulls now are found to have tick resistance of 99% or better.

The first proven bulls were declared in 1983 and by 1987 all young bulls being tested were the sons of proven bulls.

Since 1984, AFS bulls have been evaluated by the Australian Dairy Herd Improvement Scheme, with proofs based on the bulls' Australian Breeding Values. In 1987 there were seven proven AFS bulls with semen available from the Wacol AB Centre.

In the 1986-87 herd recording year in Queensland, 360 AFS cows recorded an average production of 2881 litres of milk, 118 kg of fat at 4.1%, and 98 kg of protein at 3.4%. This represented 73% of the milk production, 78% of the butterfat production and 77% of the protein production of the Holstein-Friesian herd recorded in the same period under Queensland's more gentle climatic conditions.

On a within-herd basis in 1985-86, 38% of all AFS cows produced higher levels of milk and 45% produced more butterfat than their *Bos taurus* herd mates of the same age.

Data from the Northern Territory highlights AFS milk production under truly tropical conditions. AFS milk production is only marginally reduced, while that of the Holstein-Friesian breed drops dramatically.

The AFS produced 12% more milk and 27% more butterfat than the Holstein-Friesian. The AFS also had a 13% shorter length of dry period and a 13% shorter intercalving interval. In fact, the AFS maintained an intercalving interval of just under 13 months, while Holstein-Friesians that re-calved had an intercalving interval of almost 15 months. A number of Holstein-Friesians did not get back into calf under these tropical conditions.

There were significant changes in the AFS breed development over the years to 1987. Firstly, the risk of acaricides breaking down and putting the Queensland dairy industry at risk was now far more remote than it had appeared in the early 1960s. Secondly, sales of semen from proven AFS bulls into tropical dairying countries had risen dramatically since 1984, with annual export sales in the region of 25 000 doses. There was potential for these sales to continue to increase. Much of this semen was being used over F1 Sahiwal Friesian females that were imported into these tropical dairying countries from New Zealand. Some 55 000 F1 animals were exported from New Zealand.

The importing countries now realised that these F1 animals needed to be mated to a breed of bull that was capable of high milk production and reproductive performance in the tropics and at the same time was involved in an on-going genetic development program. The AFS was such a breed.

Thirdly, MOET (Multiple Ovulation and Embryo Transfer) programs had to increase the rate of genetic progress in dairy cattle. These MOET programs were based on the breeding of a number of daughters from each of a group of selected heifers. These heifers were then evaluated on their own performance and their full and half sisters' performances. Similarly, young bulls are selected on the basis of their full and half sisters' performances rather than their daughters' performances. This allowed intense selection on the dam side and a reduced generation interval on the bull side. These effects combined to give rates of genetic progress some two to three times faster than those achievable through conventional bull proving. Such a MOET program was in place at Warrill View Research Station.

So the emphasis in the AFS program switched to the production of AFS cattle for export - as live cattle, semen and embryos - to tropical countries with developing dairying industries.

The Department used techniques to ensure as rapid a rate of genetic development in the AFS breed as possible.

It also took steps to see that export orders could be filled from Australia, and in particular Queensland, rather than from New Zealand.

Duncan Young, of AFS Breeding Services, cooperated with the Department to breed dairy cattle for export and the guarantees offered by this company should develop this lucrative market. It was aimed to export some 6000 AFS-cross heifers yearly. The company offered \$320 for five-month-old heifers that met the contract guidelines. AFS cattle were supplied to Malaysia and AFS semen was supplied to Malaysia, Thailand, the Philippines, Mexico and other tropical countries.

Food Research and Technology Branch 1984-87

One of the first of a series of moves to reshape the Division and the Branch was the closure of the Toowoomba Dairy Research Laboratory in December 1983. Staff were transferred to Brisbane or Malanda, and their duties passed to the Hamilton Laboratories. Ailsa Gillies was promoted to the position of Divisional Deputy Director in May 1984, and no immediate replacement was made. Further changes to branch structure were foreshadowed.

It was during this period of uncertainty that an explosion and fire destroyed the biochemistry laboratory in the Hamilton complex in the early hours of 17 August 1985. Extensive damage was caused to some adjacent laboratories and equipment, and services to the building were disrupted. Quality-control work resumed after a week, but some research projects were delayed for many months. A number of staff were temporarily relocated at other DPI centres. Records and results from three projects were lost. Restoration of the biochemistry laboratory was not completed until January 1986.

On 31 January 1985, Food Research Branch was created: Dairy Research Branch was joined with the Food Processing Section of Horticulture Branch (9 officers stationed in the Sandy Trout Food Preservation Research Laboratory at Hamilton). Dr Harley Juffs was appointed Director of the new branch in September 1985. The Hamilton laboratory complex was renamed the Queensland Food Research Laboratories, comprising the Otto Madsen Building, occupied by Food Research Branch, and the Sandy Trout Building, shared with the Post-harvest Group of Horticulture Branch.

In a further rationalisation of the Division of Dairying and Fisheries in 1986, Dairy Field Services Branch was disbanded, and the Dairy Products Section, comprised of about 16 officers located at Newstead, Toowoomba, Malanda, Rockhampton and Gympie, was integrated with Food Research Branch. These changes were formalised in January 1987, when the branch name was amended to Food Research and Technology Branch.

The administrative changes reflected and further stimulated the diversification of the Branch's areas of interest and expertise. Seafoods research had been initiated in 1982, a meat group was set up in 1984, fruit and vegetable processing research was incorporated in 1985. Food Research and Technology Branch saw its role as ultimately to serve the Queensland food industry in general. The branch mission was

To assist the Queensland food industries, through research, extension and service, in achieving high product quality and efficiency of processing and distribution, consistent with community needs.

Parallel with the expansion into other food areas was a lessening emphasis on dairy research, and a winding-down of dairy industry quality control and regulatory services. Automation of the quality-control testing and computerisation of the reporting system during 1983 to 1986, was followed by a program to assist the dairy factories to assume responsibility for their own quality testing. Full responsibility for the testing of all liquid milk products has rested with the factories since July 1987.

Dairy product investigations nevertheless still constituted the largest research area until 1987. Long-term work aimed at accelerating the ripening of cheddar cheese culminated in the halving of the time needed to produce mature cheese by using higher ripening temperatures. This technique emerged as economically and technically superior to the use of mutant starters or added enzymes. Development of methods of assessing flavour development (such as headspace analysis) was an integral part of the project.

Major projects on bovine mastitis were completed. Methods of rapid diagnosis of mastitis, in the laboratory and on the farm, were developed and/or refined, and evaluated. Bases of the tests were measurement of milk enzyme levels (n-acetyl-B-Dglucosaminidase or NAGase, lactate dehydrogenase) pH, or conductivity. An examination of the quality of the products made from milk from herds with mastitis demonstrated the economic cost of the disease to the industry. A new direction in research in this area was the study of compounds in bovine neutrophils which can destroy mastitic pathogens.

Techniques for enumeration of micro-organisms in foods, particularly dairy products, continued to be an important field of study. Instruments using new technology were evaluated (laser counters, Malthus growth analyser) and new methodologies developed. The latter included the use of fluorogenic media to detect and differentiate small numbers of micro-organisms in heat-treated products, and methods for estimating heat-stable protease activity in relation to gelling of UHT milk. The fluorogenic media techniques were applied to the prediction of keeping quality of pasteurised milk. Hybridoma technology was employed to produce monoclonal antibodies for use in enzyme-linked immunosorbent assays (ELISA) for detecting the spoilage organism *Pseudomonas fluorescens* in milk.

Study of the structure and function of the milk-fat globule membrane led on to an examination of membrane components with possible pharmaceutical application as antienterotoxins.

A study of heat-stable bacterial lipases in dairy products, and development of methods for detecting lipolytic micro-organisms, concluded a series of projects on lipolysis in dairy products.

Problems encountered in the infant dairy goat industry, particularly after pasteurisation of goats' milk was introduced, prompted investigations with sediment formation and `goaty' flavour in pasteurised milk, development of methods for assessing pasteurisation efficiency and iodine residues, and a study of rapid biochemical methods for early pregnancy diagnosis.

Development of new dairy products included reduced-sodium cheese and a rum-based cream liqueur. 50% replacement of salt (NaCl) by potassium chloride yielded cheese with about half (52-55%) of the sodium content of regular cheddar and gave an acceptable product.

New food processing technology spanned several food product areas. Concentration by ultrafiltration and by reverse osmosis (RO) was applied successfully to milk, and the advantages of the use of concentrated products for cheesemaking were demonstrated. The application of RO had the potential for reducing milk transport costs. RO provided a superior quality pineapple juice concentrate with cost savings over conventional techniques. Aseptic packaging of milk, mango puree and fruit juices was investigated using an Australian-designed system.

After undertaking service work and troubleshooting in conjunction with Veterinary Public Health Branch, the meat research group commenced a large-scale project funded by the Australian Meat and Livestock Research and Development Corporation. The effect of common industrial and household meat-handling practices (electrical stimulation and tenderstretching, ageing, freezing and thawing) on the palatability of meat was evaluated by a trained taste panel and by objective measurements.

An important thrust in the area of seafood research was an interbranch project aimed at assisting the development of a local, sashimi-grade tuna fishery. This involved assessment of the fishery and its potential, developing appropriate tuna-handling procedures to maximise quality and training fisherman in their use, and where necessary developing fishing gear.

Mushiness in sand crabs was a problem addressed from a biochemical point of view. The defect was found to be due to proteolysis by the crab's hepatopancreas enzymes, and its incidence could be minimised by modifying cooking, storage and handling procedures.

Other projects handled by the seafood group included the problems of keeping quality of prawns and excessive water content in scallops; development of a ham-like smoked tuna product; assessment of the suitability of a range of fish for smoking; and examination of the acceptability of less-utilised species of prawns and scallops.

A survey of the quality of retail seafoods in the Brisbane area was carried out in 1985, using microbiological, chemical and organoleptic indices of quality. Frozen seafoods from north Queensland were surveyed in 1987.

Many fruit and vegetable research projects `joined' the branch when Dairy Research Branch was fused with part of Horticulture Branch. These included packaging and keeping quality of macadamia nuts, development of a banana juice product, and passionfruit-concentrate production. Varietal trials for vegetables and for peanuts were ongoing interbranch activities. Newer areas of research included the evaluation of the liquoring quality of Queensland-produced coffee beans, and the microbiological quality of prepared salads.

Horticulture Branch had had a considerable input into the recent history of winegrowing on the Granite Belt. This work continued in conjunction with Food Research and Technology Branch, and involved evaluation of wine grape varieties suitable for high-quality wine production in the area, and investigation of new winemaking techniques, such as carbonic maceration. The release of a light red style wine marketed under the district name of Ballandean Nouveau was a major achievement of 1985. The wines from each vineyard were accredited by a consumer panel for release under this label.

Investigations into irradiation of foodstuffs were initiated in 1986, with trials which demonstrated its ability to extend the shelf-life of scallops without flavour impairment. The work was extended to a range of fruit and vegetables the following year.

Financial support for projects was provided by the Australian Dairy Research Council, the Fishing Industry Research Trust Account, Fisheries Development Trust Account, Commonwealth Special Research Grant/Australian Special Rural Research Fund, Rural Credits Development Trust Account, Australian Meat and Livestock Research and Development Corporation, the Committee of Direction of Fruit Marketing, Australian Macadamia Society and the Commonwealth Employment Programme.

Like the research activities, field activities also underwent changes. Registration of vendors' vehicles under the Dairy Produce Act ceased from 1 July 1986, and other registration procedures were streamlined. Quality of dairy produce and standards of dairy processing facilities continued to be priority areas. The Australian Code of Practice for Dairy Factories, which sets standards for processing facilities and equipment, was completely revised in 1986. Extension activities, including training of personnel from the food processing industries, commenced a transition from a dairy orientation to a broader food industry orientation.

Fisheries

The Queensland Fisheries Service operated as a part of the Department from 1974 to 1977 and undertook the roles of licensing, fisheries management and biological research. In 1977 the Service was transferred to another portfolio. In 1981 the Fisheries portfolio again came under the responsibility of the Minister for Primary Industries, and the `commercial' licensing and industry management roles were delegated to the Queensland Fish Management Authority. Other responsibilities under the Act are now carried out by branches of the Department.

The Queensland Fish Management Authority was established on 25 November 1982 under the Fishing Industry Organisation and Marketing Act. It included seven members, including a full-time independent Chairman, W. D. Mitchell, formerly Director of Dairying and Fisheries in the Department of Primary Industries, Dr G. I. Alexander, Director-General and Under-Secretary, Department of Primary Industries, representing the general community and recreational interest of the fishing industry and Deputy Chairman, and a representative each of producers, fishermen's co-operatives, processors, wholesalers and the Queensland Fish Board. The Authority was under the portfolio of the Minister for Primary Industries but was not under the Director-General though he was closely allied with it. It was charged with the management of catching of the fishing resource and control of the marketing of the industry.

Fisheries Research Branch

The role of the Fisheries Research Branch was to ensure the rational long-term utilisation of the State's fisheries resources by providing information and services on fisheries and related matters to Government, industry and the general public. It did this by the following means:

- the definition of marine and freshwater aquatic resources;
- the development of management strategies for these resources;
- the development and/or enhancement of these resources;
- the development of expertise in fisheries science and management; and
- the development of an extension and liaison role with industry and the general public.

The Fisheries Research Branch maintained the following objectives:

- to ensure the establishment and maintenance of data bases for commercial fisheries including economic, biological and catch-effort data;
- to determine the factors influencing the population dynamics of east coast, Torres Strait and Gulf of Carpentaria prawn stocks;
- to determine the factors influencing the population dynamics of existing fish stocks (fin fish, molluscs and crustaceans other than prawns);
- to ensure the establishment and maintenance of data bases for recreational fisheries and for Queensland's estuarine, coastal and freshwater environments;
- to meet Queensland's needs for research and development in aquaculture technologies, including hatchery techniques and grow-out systems, as well as habitat and stock enhancement;
- to determine the relationships between economic and biological factors influencing the State's fisheries; and
- to provide a source of expertise for fisheries consultative work in the Indo-Pacific region.

The Fisheries Research Branch's functions were:

- to undertake research programmes on the biology and population dynamics of the State's fisheries resources and on other fisheries-related matters such as aquaculture and gear technologies;
- to disseminate the research results to Government, industry and the scientific community;
- to provide technical advice, recommendations to the Department of Primary Industries and to the Queensland Fish Management Authority (QFMA) to aid in the proper management of the State's fisheries resources; and
- to liaise closely with the Fisheries Management Branch, the QFMA and the Food Research Branch, and with the industry through the Queensland Fishing Industry Research Advisory Committee, the Queensland Commercial Fishermen's Organisation and other such organisations.

Prawn Research. Prawn research continued as a main investigation with emphasis on the Torres Strait by the Cairns-based research team. Conditions here were tough, with

incessant strong winter winds, strong tides and poorly charted reefs. Studies of the effectiveness of seasonal closures to prevent the capture of small prawns until they reached marketable size continue with initial success. The Torres Strait fishery was jointly managed under treaty with Papua New Guinea. Surveys of the prawn nursery grounds showed that seagrass beds were very important and these were mapped, to eventually cover the whole eastern coastline. It was found that in the Townsville region juveniles of the redspot king prawn were found in some inshore habitats and generally in the sand lagoon tops of coral reefs.

It was found that juvenile tiger prawns (*Penaeus esculentus*) move offshore from the seagrass beds in September and are found as adult prawns in offshore fishing grounds in November-December. Growth ceases in male prawns at a carapace length of 40mm, in females at 45mm. Moulting takes place in late summer and autumn. Moulting prawns are less likely to be caught in the trawl nets.

Because of the importance of the seagrass beds they have been carefully studied in the Gulf of Carpentaria and between Cape York and Cairns under research funded by the Fishing Industry Research Trust Account (FIRTA). Thirteen species of seagrass have been identified. Only one species *Halophila decipiens* was found in water deeper than 11 m indicating that damage to nursery grounds would be less if trawlers operated in deeper water. A detailed study of the life cycle of the redspot king prawn around Airlie Beach showed that they have an atypical life cycle, using coral reef lagoons as nursery areas.

Preliminary analyses by the Northern Fisheries Research Centre suggested two broad spatial groupings of by-catch species, consistent with an inshore shallow, muddy- bottom community and a deeper, offshore sandy-bottom community. Seasonal variations in species composition were also apparent.

The sampling of king prawns, which emigrate to the sea from shallow, estuarine nursery areas such as Jumpin'Pin in South Queensland in spring and summer, took place in December to early January and indicated that closure of the area from fishing would not have been desirable.

A study of technology and instrumentation in prawn trawl fishing in the Northern Fisheries Research Centre showed that up to 65% of experimental prawns could escape from conventional poolrope height and ground-chain arrangements in net fishing. It suggested that modifications of net design and fishing strategies should increase catch and efficiency in fuel consumption.

Crab and lobster research. A tag lottery system offering prizes of \$3000, \$2000 and \$1000 was introduced to study the crab population in Moreton Bay and inshore waters of Bribie Island. Some 17.5% of tags were returned, about 75% of them from professional fishermen. More than 80% of the returned crabs were caught within 2 km of where they were released. The tagging system showed that the Moreton Bay Sand Crab fishery was in a healthy state. There was no indication that the fishery was over-fished and there was evidence to agree to reduce the size limit for male crabs to 140 mm from the previous 150 mm carapace desired by fishermen.

Studies on the bay lobster or bay bug (*Thenus orientalis*) on the king prawn grounds between Lucinda and Bowen were initiated in January 1985. It is nocturnal and highly active. Studies are continuing.

Coconut crab. This crab is still sufficiently plentiful around the Republic of Vanuatu to harvest and in late 1983 the Vanuatu Government approached the Australian Centre for Agricultural Research for funds to study the coconut crab population processes. In 1984 the Queensland Department of Primary Industries was asked to join the Queensland University and Vanuatu Fisheries Department to study the question, with the island of Espiritu Santo as a base. The main aim of the investigation was to estimate the crab's natural growth rate, study the effect of varying harvesting pressure and elucidate recruitment processes. Most crabs are captured at night in coastal rainforests associated with coral limestone refuges, where moulting takes place in subterranean burrows. Growth is slow with marketable sized crabs being as old as 10 years. Females carrying full-term eggs emigrate to the sea to release their larvae, which emerge from the egg mass within seconds of contact with sea water. Studies are continuing.

Finfish research

Tuna. Interest has been shown in taking tuna suitable for the Japanese sashimi tuna market by the longline method. The best known tuna fishing grounds are in the Coral Sea near the Great Barrier Reef. So far results have been poor - the yellow-fin tuna run is short from August to November, the oil content of the immigrating fish is poor -below the level required for the highest sashimi prices.

Demersal fisheries. Deep water dropline trials were conducted off Cairns during 1985 at depths of 200 and 300 m but were hindered by strong tidal currents. Studies with the South Pacific Commission staff were undertaken off New Caledonia to compare results and it was decided that future north Queensland trials should be carried out using anchored droplines or short horizontal longlines.

A study of shallow water demersal reef fish was made, including growth rates, time of spawning and size at first maturity for important reef fish species - large and small mouthed nannygai, red emperor and coral trout. A common name for fish of the family Lutjanidae is "snapper".

Barramundi. Queensland's barramundi resource supports major commercial inshore gillnet fisheries worth about \$86m annually. The recreational angling and sport fishing industry, centred on this species, is valued commercially at more than \$1m.

The gillnet fisheries of the Gulf of Carpentaria and the east coast north of Cooktown target on barramundi and threadfin salmon. The use of very large mesh gillnet in the Gulf during 1985 took high numbers of very large (>120cm length and >20kg weight) and very old (14+ years) fish not formerly caught with smaller mesh netting. These large fish were all female and active in reproduction. If removal of these fish continues at current rates it would result in considerable loss in maintenance of resource stock. As many as ten distinctly different genetic stocks of barramundi were identified by CSIRO in the coastal river systems between Cairns and Cape York. Studies showed that fishing closure during November to January adequately covers barramundi spawning times. Commercial fishery sampling for details of threadfin salmon biology was commenced in February 1986 with gulf and east coast fishermen.

Ciguatera poisoning. Research on this problem is part of a world-wide investigation of the toxin. To date no drug had been able to permanently reverse the effects of ciguatoxin where fish associated with coral reefs are eaten. Research by Dr Richard Lewis of the DPI Southern Fisheries Research Centre at Deception Bay in 1987 showed that intravenous injections of sugar alcohol appear to help the body to get rid of ciguatera toxin and it may mean that a treatment for ciguatera may be available within a few years.

Boondall Wetlands Study. In mid-1985 the Brisbane City Council announced plans for a major development project in the Boondall Wetlands area next to the Bi-Centennial Sports Complex. To study the effect of this on the aquatic fauna the Branch established a short-term project to determine which fish and crustacean species utilise the Nundah Creek mangrove ecosystem and their abundance and their developmental stages. The study showed that the fish and crustacean fauna are both rich and diverse and form the basis of Moreton Bay's commercial fishing industry; the formulation of a foreshore conservation policy for the Moreton Bay area is considered essential.

Nile Perch. It was proposed to introduce this species to the fresh waters of Northern Australia but experience in Lake Victoria and Lake Kyoga in Africa has shown that this predator has eliminated native fisheries and the Australian project was terminated in March 1986.

Fish ladders. A study on the effectiveness of fish ladders on weirs, barrages, and dams on the movement of fish in Queensland streams began in July 1985 and was terminated in June 1987.

Pilot barramundi hatchery. A project, commenced in 1984-85 at Walkamin Research Station, aimed at development of spawning and larvae-rearing technology using eggs from wild, spawning females was successful. Hormone-induced spawning trials with captive brood fish produced fingerlings, which were recovered and used to stock Lake Tinaroo, where they survived and made fast growth. Other larvae were put in tanks at Walkamin for growth; food conversion trials showed a food conversion ratio of between 1.0 and 1.3% - a very favourable performance.

Prawn farming. Studies with nutrition, salinity control and genetic selection of prawns were made at the Southern Fisheries Research Centre, Deception Bay, for prospective aquaculturists in Queensland.

Aquarium fish breeding. Domestic production rather than importation of aquarium fish led to a study of native species, especially the coal grunter, *Hephaestus carbo*, a brilliantly hued black and gold fish from northern Australia.

Freshwater prawns. Studies were made on the lower temperature tolerance of the giant freshwater prawn, *Macrobrachium rosenberg* to determine where in Australia the species

can be found. They cease feeding at approximately 18°C but may survive overnight temperatures dropping to 12°C.

Fisheries Management Branch

This Branch was established in January 1984. The Branch undertakes the Departmental administration of the Fisheries Act 1976-1984 and provides a communication link between the various elements of the fishing industry and Government. The Fisheries Act seeks to promote the good order, management, development and welfare of the fishing industry and to provide for the protection, inspection and management of fisheries resources of the State.

The Branch is organised into four functional groups: Environment, addressing fish habitat protection, biological elements of fisheries management and recreational fishing; the Management Section, addressing economic studies, statistical reporting, commercial and recreational fishing policy; the Extension Liaison Section, addressing freshwater fisheries, communication with industry groups and enforcement duties; and an Administration Section, servicing the programmes described above.

Habitat management is regarded as of critical importance to the survival and maintenance of recreational and commercial fisheries of the State. The branch has a major concern in resolving any conflict of interests between fisheries, tourism, and urban and industrial development. Environmental management seeks a balance between development and conservation, and core conservation areas are identified and declared as reserves.

Three types of reserves are proclaimed - Fish Habitat Reserves, Wetland Reserves, and Fish Sanctuaries. Fish Habitat and Wetland Reserves do not restrict fishing but protect habitats below high water mark. Fish Sanctuaries do not allow any form of fishing and protect all fish and marine species within their boundaries. By 1987 there were 38 Fish Habitat Reserves, 25 Wetland Reserves and 6 Fish Sanctuaries along the east coast of Queensland. If needed for development part of a fisheries reserve may be revoked but this is not common.

Coomera Island was chosen as a salt-marsh study for the tidal wetlands to determine the types of fishes which occur and utilise this habitat and also to develop a method of saltbush mosquito control. Some 26 different fish species, 11 of which are of economic importance (eg. bream, mullet, luderick, flathead) regularly use this land but have little effect on mosquito control. Filling to reduce the area of this habitat by draining into tidal inlets helps reduce the mosquito population.

A fisheries survey of tidal residential canal developments at the Nerang River and Tallebudgera Creek was undertaken. Residential canals are dominated by small bait fish (herring, silver biddy) which are plankton feeders.

Seagrass studies in the seagrass beds of Moreton Bay included grab samples in Pumicestone Passage to the south of Peel Island. Extensive new seagrass beds were found on the southern part of Deception Bay. Seagrass growth in areas closer to prawn fishing was extensive. Mangroves are important to commercial and recreational fisheries. They play an active role recycling nutrients, provide shelter for juvenile fish, help to stabilise the coastline and reduce erosions from storm surges, currents, waves and tides. A study was made of mangrove regeneration along Wallum Creek on North Stradbroke Island in 1929. An area of mangroves was killed by prolonged water inundation. The original mangrove community contained white mangrove (*Avicennia*), red mangrove (*Rhizopora*), spurred mangrove (*Ceriops*), river mangrove (*Aegiceras*) and orange mangrove (*Bruguiera*). By 1983 the area was dominated by the pioneer species white mangrove, with only small numbers of other types and the white mangrove was not expected to recover its original composition for at least fifteen years.

Environmental impact studies. The coastal areas of Queensland contain large urban populations. Development results in loss of adjacent intertidal habitat areas important to the State's fisheries. Guidelines and requirements for an environmental impact study (EIS) are designed to document the impact of a proposal on fish habitat and fisheries and to identify options that minimise such impacts. Consultation between developer (or consultant) and fishing organisations such as the Queensland Commercial Fisherman's Organisation (QCFO) and Queensland Sport and Recreation Fishing Council is a normal requirement.

During 1984-86 the Branch was involved in environmental impact studies for dam construction, surface mining, marina development, boat harbours, land reclamation, port facilities, dredging, canal estates, extractive industry and sewerage.

The Branch also performed an environmental surveillance role for the Department, for example, on the site of Queensland Cement and Lime Company's coral dredging operation on St Helena Island.

The Branch also studied the environmental impact of a proposed reclamation of tidal and subtidal lands at Boondall and showed that the development would adversely affect the productivity of the Moreton Bay fishery and general enjoyment by the community. As a result, the Brisbane City Council deferred its plans for development.

Fisheries permits. These are imposed to ensure that fishery stocks are managed. The major commercial finfish and crustacean fisheries are managed by the Queensland Fish Management Association (QFMA) under the Fish Industries Organisation and Management Act. Licence and permit systems cover various fisheries.

Oysters. Based on Sydney rock, black lip and milky oysters grown and marketed by licensed oystermen, the southern Queensland industry relies heavily on `spat' or juvenile oysters from NSW. These juveniles are grown out under intensive culture to market size. There are about 200 oystermen operating banks, half of which are in the Moreton Bay area. In the Rockhampton and northern regions oysters are commercially harvested from rocky intertidal areas where they settle and grow naturally.

Freshwater aquaculture. There has been a new interest in this activity since 1986, mainly in marron, a crayfish native to Western Australia and licences have been issued by the QFMA to allow farmers to sell marron for human consumption.

Mariculture. Mariculture (marine aquaculture) was becoming increasingly interesting, with projects undertaking peneid prawn, mud crab and giant clam production by June 1986. All sales were of leader or black tiger prawn. The Department screened cultured prawns against disease entry. Virus diseases in prawns can be devastating. Live prawns can be imported from Papua New Guinea and the Northern Territory. The Department and the Queensland University, together with the Fisheries Management Branch developed screening procedures.

Coral, shellgrit and pearls. Areas for collection were specified. Controls were exercised in collaboration with the Great Barrier Reef Marine Park Authority. The pearling industry is based in Torres Strait and is managed under the Australia/Papua New Guinea Torres Strait Treaty.

Trochus and Beche-de-mer. These are collected manually from coastal waters of Queensland. The fisheries are developmental and subject to economic assessment.

Marine aquarium fish. In 1986 a management plan was introduced after discussions between officers of the Fisheries Management Branch, Queensland National Parks and Wildlife Service, the Great Barrier Reef Marine Park Authority and representatives of the fishery. Permits are issued for collection and sale of aquarium fish. Collectors must keep log books on their catches and report to the Branch each quarter.

Fish or marine products permits. These are issued under Section 58 of the Fisheries Act for purposes such as research, commercial collection and holding exotic species.

Cetaceans. All marine mammals or cetaceans, such as dugong, dolphins and whales are protected species under the Fisheries Act. Permits were issued to two dolphinaria to hold and display dolphins and false killer whales. A condition of the permit was the development of public educational programmes in conjunction with the displays. The establishments also conducted breeding and other scientific programmes.

Mangroves and marine plants. These are protected under the Fisheries Act 1976-1984. The term marine plants includes mangroves, seagrass, saltcouch and other plants growing below high-water mark. Each permit application is individually evaluated as to the impact on fisheries versus the benefit to the community. Permits approved are site-specific and normally issued for a period of 12 months to allow the completion of books.

Fisheries statistics and management. Estimating the size, abundance and vigour of fisheries stocks is important in management. The Branch, in association with the Queensland Fish Management Authority, set up a system during 1984-85 for testing with industry. It involved processors' returns, mechanical sorting of scallops, a barramundi logbook program, Northern Prawn Fishery Logbooks, Ocean Beach Fishery details, a Balmain and Moreton Bay bug survey, shark data and Wide Bay Region Inshore Fisheries.

Economic surveys and statistics. These included trawl fishing in southern Queensland, a cost model for otter trawling, commercial fisheries, the oyster industry, the Gulf barramundi fishery, fuel-use efficiency in trawler fishing, vessel unitisation and fuel prices.

Seafood marketing. Studies have been made of tuna, Japanese fish markets, seafood quality assessment, retail seafood quality, etc.

Recreational fishing. A State survey of recreational fishing was made and administrators were able to quantify some of the main aspects of non-commercial fishing. Under this heading:

- 1. a survey of recreational fishing was made in the Gulf of Carpentaria;
- 2. stocking surveys of dams and weirs to determine the best species and likely dangers and the formation of local stocking management groups for community interest were undertaken during 1986-87 and three quarters of a million fingerlings of silver perch, golden perch, Murray cod and barramundi were introduced into fifty dams and weirs. Eleven Local Management Committees were established from the community to accept the day-to-day and long-term management responsibility for these new fish resources;
- 3. a tagging performance was undertaken, where recreational fishing bodies worked in conjunction with the Department to tag and release tailor fish. Tag recapture rate was quite high and produced important behaviour and growth details.

Division of Marketing

Economic Services Branch

The Economic Services Branch became increasingly involved in providing advice to the State Government and industry bodies on sugar industry matters. During 1985 its officers coordinated the activities of the Sugar Industry Working Party (SIWP) appointed by the State and Federal Governments to examine the financial position of the sugar industry and to develop a plan to allow the industry to cope more efficiently and competitively within a changed market situation.

Following involvement with the SIWP, the Branch was asked to analyse and prepare comments on sugar industry issues. The variability of production between districts and between seasons, the number of growers by assignment size by mill district, debt levels, borrowing from the Rural Reconstruction Board and the opportunities for expansion within the industry were some of the issues covered.

Officers of the Branch examined the profitability of farm enterprise combinations and farm sizes for sugarcane and horticultural farmers in the Bundaberg irrigation area. Alternative crops considered were tomatoes, zucchinis, rockmelons, watermelons and capsicums.

The Branch, in collaboration with Papua New Guinea Department of Primary Industry, undertook a three-year study of the PNG coffee, cocoa and copra industries. The main objectives of the study, funded by the Australian Centre for International Agricultural Research, was the development of suitable low-cost, sustainable methods of obtaining agronomic and economic information about the largeholder and smallholder/village sectors

of these industries. One of these methods was the group assessment technique, which uses the consensus opinion of knowledgeable industry people to obtain cost-of-production data about largeholder coffee production. Recently, this technique has been used successfully to collect economic information about north Queensland sugarcane and horticultural industries.

After operating as a mail-in accounting service to primary producers since 1962, the Farm Management Accounting Service ceased after completion of processing for 1985-86. This action resulted from the increased costs of operating the service, the steady decline in numbers of participants, and the increasing availability of on-farm microcomputers suitable for financial record-keeping.

The Branch was keen to foster the involvement of producers in management accounting groups. Such groups provide producers with the opportunity to improve their farm business management. In addition, they provide the Department with a source of information on the economic performance of rural industries. For example, since 1985, producer management groups have operated in the Central Highlands using the accounting service offered by the Agricultural Business Research Institute at Armidale.

The Branch monitored pastoral profitability and pastoral management systems in western Queensland's mixed sheep-cattle areas over the 1970s and early 1980s. Data for the project were obtained from accounting statements and property records provided by owners. Properties monitored were in the Charleville, Blackall and Julia Creek districts.

In 1982, the Branch published a report of a survey on costs of ownership and operation of farm machinery on Darling Downs and south-west region wheat farms. A survey of nearly 300 farms provided information on farm fuel use and repairs and maintenance costs for all farm machinery. Subsequently, officers of the Branch developed a farm machinery costing service which has been popular with farmers seeking information to help them make farm machinery investment decisions and in striking a contract rate for hiring operations.

Since the installation of microcomputers in all centres staffed by regional agricultural economists in 1983-84, Branch officers have developed a wide range of economic and financial applications using acquired software or software developed by the Branch. Contributions in the latter field include EVAL, which is designed to calculate project evaluation measures including internal rate of return, net present value and benefit cost ratios, and the Least Cost Diet Program to help in pig ration formulation. Officers of the Branch also modified cropping, livestock and taxation budgeting models to run on microcomputers. These models, which simplified tedious, repetitive tasks, included one that assesses tillage and harvesting options in the sugarcane industry, and a sheep flock model that calculates flock structures and gross margins and allows assessments of optimum culling percentages and casting ages.

Almost 2000 primary producers attended financial management seminars held at seven centres in south and central Queensland during 1986. Officers of the Branch organised the seminars to help producers in financially managing their properties and coping with the debt crisis. Many producers continued to have problems servicing their debts, because of
high interest rates and low commodity prices. A major seminar topic was alternative ways to finance producers' increased indebtedness.

In late 1986 the Queensland Government announced that a farm financial counselling service would be established within the Branch to counsel farmers in financial difficulty. The greatest demand for counselling services was expected to come from the grain and sugarcane industries. However, counsellors were available to help all farmers in their regions who were experiencing difficulties. They were located in Biloela, Dalby, Goondiwindi, Roma and Toowoomba as well as Ayr, Bundaberg, Ingham and Innisfail.

Marketing Services Branch

The Marketing Services Branch under the direction of Dr Barry White (1987) consisted of a Marketing Research and Extension section, Finance and Management Services, Statutory Organisation and Marketing and Administrative Services.

The Marketing Research and Extension unit deals with market research; IAC inquiries; crop forecasting; market reporting; statistics and general data base, reference notes and farm notes; training, a branch editorial matching briefs on oil seeds; small grains; major non-statutory grains; beef; sheep and wool, pigments, miscellaneous crops, and horticultural crops (outside of COD).

Finance and Management Services handles financial administration and advice; audit reports; annual reports by statutory authorities; appeals tribunals; superannuation; fees and allowances; board elections, co-operatives administration; farm produce administration and wine industry administration.

Statutory Administration and Marketing handles the various marketing boards and associated committees: cotton, tobacco (Tobacco Quota Committee), Bulk Grains Queensland, State Wheat Board, butter, milk (Queensland Dairymen's Organisation), Committee of Direction of Fruit Marketing, Central Queensland Sorghum Board, Central Queensland Eggs, fish (Queensland Commercial Fisherman' s Organisation - Queensland Fish Management Authority liaison), marketing legislation, navy beans, ginger, Hen Quota Committee, sugar (Queensland Cane Grower's Council), Queensland Pork Producer's State Council, Chicken Meat Industry, South Queensland Committee, Commercial Egg Producer's Organisation, peanuts, Atherton Tableland maize, South Queensland Egg Marketing Board, barley, Brisbane Market Trust, Council of Agriculture and rice (Rice Quota Committee).

The Administrative Services Section handled administrative matters.

The Department's centenary, 17 June 1987

In the absence of the Premier, the Honourable Sir Samuel Walter Griffith, who was invited to an Imperial Conference to discuss questions of defence and communications in London, the Honourable Sir James Robert Dickson, Colonial Treasurer, supported by the Minister for Lands, the Honourable Charles Boydell Dutton (Member for Leichhardt), led the

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Executive Council to establish a Department of Agriculture. A notice in the Queensland Government Gazette of Saturday, 18 June 1887 No. 34, read:

Department of Public Lands

Brisbane, 17th June, 1887

NOTICE

It is hereby notified for general information that His Excellency the Governor, by and with the advice of the Executive Council, has been pleased to establish a Department of Agriculture, to be managed by an Under Secretary, with the necessary staff and under the direct control of the Secretary for Public Lands.

C.B. Dutton

The initial budget was \$1800 per year and the Department had only three staff. In 1987, the centenary year, under the Ministry of the Honourable Neville Harper, the budget is \$161 million for a staff of almost 3000 officers.

In February 1986 the Director-General, Dr G. I. Alexander, launched the inaugural edition of the *DPI Centenary Newsletter* to herald the Department's run-up to its official 100th anniversary on 17 June 1987. This inaugural message was:

It was on that day, so many years ago, that a former politician and land inspector, Peter McLean, took up the reins of the newly formed Department of Agriculture. McLean, as Under-Secretary, was quickly joined by the Colonial Botanist of the day, F. M. Bailey and then by the Department's first clerk, E. G. E. Scriven. These three original staff, operating from two small offices in George Street, were charged with helping Queensland achieve agricultural self-sufficiency.

The methods they were to use sound familiar to most of us today: land was to be assessed for its agricultural suitability; native and foreign plant species were to be evaluated for their commercial worth and viability in Queensland; and successful farming practices from southern colonies and overseas were to be sought and applied to local conditions.

The extension, or provision, of learned and practical advice to farmers was then - as now - an integral and important element of the Department's responsibilities.

Peter McLean Dr G. I. Alexander

With the recruitment of more staff and an amalgamation with the Department of Stock in 1897, our predecessors expanded their activities into animal husbandry, quarantine, and other activities that led to the early establishment of viable dairying, beef ,cattle, wheat, tobacco and sugar-cane industries in Queensland.

Many stories lie behind the growth of our Department and the concurrent flourishing of agriculture in our state. Over the next year or so, staff in all branches of the DPI will be researching, developing and packaging information on some of Queensland's agricultural `milestones'.

The *DPI Centenary News*, to be published regularly in 1986 and 1987, will keep all staff informed about projects and activities that will help commemorate our 100th anniversary.

I'm sure that everyone will share some of my excitement at seeing the DPI enter its second century of service to Queensland primary producers.

Dr G.I. Alexander Director-General

Centenary Year Foreword

The Department of Primary Industries celebrated its century of service to the people of Queensland on 17 June this year. During those one hundred years, my Department has achieved an enviable record in helping develop Queensland's food and fibre resources.

Through the cooperation of primary producers and service organisations (of which my Department is the largest in the State), Queensland exports more rural produce than any other Australian State. In 1986-87, our exports were worth \$3206 million, a most significant contribution to Australia's economy by way of export earnings.

Over the years, the tremendous growth in Queensland's primary industries resulted in an expansion of the responsibilities of the Department now called `Primary Industries'. Its goal, however, remained basically the same; that is, to foster and help develop Queensland's rural industries while conserving the State's natural resources for the use of future generations.

To achieve this goal, my Department has maintained a coordinated approach of research, extension and regulation to meet the everchanging needs of primary producers and consumers. The dedication of departmental officers to this task has been significant throughout the years.

They have been involved ... at all levels of primary production, from offering advice on how to grow animals and plants and how to process produce, to assisting with marketing negotiations and working to protect consumers by ensuring the quality of food and fibre products.

During the last financial year, economic problems have been a major concern of primary producers. The Queensland Government, through my Department, has played its part in helping to alleviate these problems by continuing existing services and implementing several new initiatives.

In reaching for the future, we have not forgotten the important lessons of the past. On the marketing scene, where we established the world's first statutory marketing scheme in 1925 (for wheat), officers appointed to grower-controlled marketing boards continue to assist with the responsibilities of those boards.

The establishment of a new Horticultural Export Council is an initiative to further boost exports. Another initiative was the appointment of special financial counsellors in key agricultural districts to offer individual advice to primary producers in financial distress.

This... reflects my Department's proven innovative ability to help in the development of solutions for the changing problems facing primary producers and consumers.

As we begin our second century of service to the people of Queensland, the community, indeed the world community, may be assured of our continuing efforts to expand the horizons of agriculture in this State to meet the challenges facing further development of our food and fibre resources.

> The Honourable N.J. Harper, MLA, Minister for Primary Industries

The year reviewed

A special report by the Director-General, Dr G. I. Alexander

In 1987, the DPI achieved a century of service to the people of Queensland. To highlight this achievement and the Department's history, work and services, a centenary year commemorative programme was planned and implemented. Centenary publications, displays and audiovisuals were produced and special events staged.

Logo and theme

A centenary logo was designed and used extensively on DPI stationery, folders, publications and displays. The theme for commemorative activities was "Helping Queensland Grow".

Poster

A commemorative centenary poster, presenting a four-colour montage of agricultural development, was designed for display in DPI centres and at other venues throughout Queensland. The *Queensland Agricultural Journal* featured the poster on its May-June 1987 cover.

Publications

The DPI's history was comprehensively covered in a series of publications, some completed and others in production.

The official 12-chapter history, researched and written by Dr Percy Skerman, retired Reader in Agriculture at the University of Queensland, was being prepared for placement in library archive collections throughout Australia. This work is a major reference document.

A high-quality illustrated history, *Guiding Queensland Agriculture*, based on Dr Skerman's work, was also being produced. A condensed history monograph was produced and distributed to DPI officers, as were five issues of a *Centenary News* newsletter.

A history brochure, `The DPI ... a century of serving Queensland', proved popular with the general public. The *Queensland Agricultural Journal's* May-June 1987 issue devoted space to the DPI's Centenary and history.

A book of short stories and photos entitled *Harvest and Heartaches: Images and Stories of Queensland's Agricultural Past* was being compiled for sale towards the end of 1987. During its production, rare photographs and unusual stories were unearthed.

A major centenary project was the compiling, designing and production of a series of fourcolour brochures summarising Queensland's primary industries and the DPI's services to those industries. The brochures... cover the field crop, horticultural, beef, sheep and wool, dairy, pig, poultry, and fishing industries, land conservation; and all of Queensland's primary industries.

Audiovisuals

A significant project was the production of a 17-minute 35 mm film, *The Farm Behind the Beach*, which premiered in Brisbane on 27 March and was subsequently screened in Birch, Carroll & Coyle Limited cinemas throughout Queensland. The film presents a series of colourful images depicting the importance of agriculture to Queensland's lifestyles. Video copies of *The Farm Behind the Beach* are available for sale from the DPI's Information Branch in Brisbane. The film was made the centrepiece of the DPI's Brisbane RNA Shaw display during August 1987.

The *Queensland Country Life* newspaper reviewed it as "probably the most entertaining and informative film ever released by the Queensland Government".

A slide presentation, *A History of Service*, detailing some of the DPI's major achievements, was produced and transferred to video for screening at the June 17 Centenary Day celebrations in Brisbane.

Special events

The DPI's Centenary Day on 17 June began with a free public breakfast for more than 3500 people in Brisbane's King George Square. The breakfast, and associated displays and demonstrations, proved popular despite rain. In the evening, the Minister for Primary Industries, Mr Harper, hosted a formal dinner for 300 key agricultural industry figures at the Sheraton Hotel, Brisbane.

Displays and gifts

Historical displays featured at both the formal dinner and the King George Square breakfast. These included a photographic display entitled "The Johanson Collection", and a display listing the DPI's achievements entitled "Milestones". A special historical display called "The DPI ... Its Early Years" was prepared by Peter Lloyd, Lionel Coxen and Mel Aldous, comprising photographs of DPI activities and people between 1890 and 1930s. Special thanks must go to Lionel Coxen of the DPI Soil Conservation Services in Toowoomba for painstakingly photographing many of the historical scenes from DPI publications. Most of the original negatives were lost in a fire in the 1940s. Thanks are due to Peter Lloyd who gathered photographs from all sources and carefully filed them. The historical photos were mounted. Three sets of these boards were made available for use at DPI field days and displays. In addition, three sets of individually mounted photos were made available for mixing and matching by DPI officers in their displays. The Early Years and Milestones displays made the circuit of DPI field days and open days throughout Queensland during centenary year. The DPI produced a range of centenary souvenirs including glasses, coffee mugs, jackets and sweatshirts, and a special Centenary Year port.

Promotion and future

The DPI received extensive mass media coverage of its centenary, from a listing in Telecom's country telephone directories to a 48-page pictorial and feature coverage in the *North Queensland Register* newspaper. Queensland's media outlets were given comprehensive Centenary Information Kits to compile their own DPI centenary stories, and *Queensland Unlimited* gave prime-time television coverage of the Department's centenary. In addition, the DPI produced regular centenary year updates through the *Queensland Agricultural Journal* and its weekly News Items, and the "Rural Industries Today" radio program.

Date	Activity and location	
February 8-14	Merino Week, Roma	
March 10-11	Pasture field day, Gympie	
March 18	Open day, Brian Pastures Research Station	
March 27	<i>Farm Behind the Beach</i> film premiere, Village Twin Cinema, New Farm, Brisbane	

Special events during centenary year

Date	Activity and location	
March ?	Angora wether trial - `Gilbrigialo', Hannaford	
April 9	Open day, Biloela Research Station	
May 21	Open day, Kamerunga Research Station	
May/June	Field day, "Beef Production from Dryland and Ponded Pastures", "Granite Vale" St Lawrence	
June 17	Rural Breakfast and displays, King George Square, Brisbane	
June 17	Formal dinner, Sheraton Hotel, Brisbane	
July 9	Open day, Mareeba	
July 9	Charity fun run, Indooroopilly, Brisbane	
August ?	Banana field day, South Johnstone Research Station	
August 4	Open day, Animal Research Institute, Brisbane	
August 4	Joint seminar QDPI, Australian Agricultural Economists' Society, Australian Institute of Agricultural Scientists and the Australian Society of Animal Production	
August 5	School visits to Animal Research Institute, Brisbane	
August 19	Vegetable open day, Bowen Horticultural Research Station	
August 22	Beef husbandry field day, Kenilworth	
August 24 and 25	Display at ANZAAS, Townsville	
August 26	Open day, Oonoonba Veterinary Laboratory, Townsville	
August 29	Beef husbandry field day, Woodford	
September 4	Open day, Ayr Research Station and Laboratory Complex	
September 8	Field day, "Nindethana", Hannaford	
September 8,9,10	Three-day bus trip to New South Wales to look at beef cross- breeding results	
September 9	Open day, "Croxdale" Charleville	
September ?	Angora wether trial, "Gilbrigialo", Hannaford	
September ?	Queensland Bicentenary wether trial, Muckadilla	
September 17	Open day Gatton Research Station	
September 21-25	Beef industry A.I. course, Gympie	
September 23?	Southedge Research Station open day	
September 28-30	Sheep forum "Success in Sheep Production - achieving your goals", Dalby Agricultural College	
September/October ?	Food Management open day, Food Research Laboratory, Brisbane	
September/October ?	Opening, Boar Testing Station, Wacol	
October 8	Open day, Hermitage Research Station	
October 15	Open day, Redlands Horticultural Research Station	
October 20	Open day, Toorak Research Station	

Date	Activity and location	
October 23, 24	Sunshine Coast Rural Day, Nambour	
October 30	Open day, Toowoomba Tor St Complex	
October	Gympie District Beef Liaison Committee, Annual Field Day	
October/November	Gympie Beef Industry Committee, beef promotion dinner	
November 6-13	Resource Management for Increased Profit" mobile display - Tambo (6), Quilpie (9), Windorah (10), Eulo (12) Wyandra (13) - based at Charleville	
December ?	Mango field day, Bowen Horticultural Research Station	

DPI'S centenary logo

The creator of this logo was Lindy Brennan, senior graphic designer. The Extension Services Board has approved the logo's use on letters, memoranda, newsletters, reports, displays and virtually anything else involving internal and external communication.

Lindy said that the tractor in the logo is symbolic and serves as a tangible and progressive link between Queensland's agricultural past, present and future. The furrows represent the continuum of knowledge and effort that farmers always need to bring forth bounty from the land.

Centenary day - 17 June

The centenary day's activities commenced with a hearty breakfast for thousands of Queenslanders in King George Square. The Minister, the Honourable Neville Harper, arrived in a Model T Ford. The fully restored vehicle, typical of those used by many Queensland farmers in the 1920s, bore the Department's original insignia. Breakfast included fresh fruit, fruit juice, cereals, milk, sugar, toast, margarine, butter, honey, bacon and eggs, baked beans, sausages, tea and coffee and was served from 7 a.m. The theme of the centenary day was "Developing Your Food Resources".

Sheep shearing demonstrations, an animal nursery, films, computerised questionnaires and product tastings were some of the displays but a sudden storm arising after the breakfast was finished, somewhat curtailed inspections but didn't dampen enthusiasm.

In the evening of 17 June 1987 the Minister, the Honourable Neville Harper, hosted the Centenary Dinner at the Sheraton Hotel, where a full house of former Ministers for Primary Industries, other distinguished guests and senior officers of the Department and their wives enjoyed the convivial atmosphere. A centenary cake was cut by the Ministers and Mrs Graham Alexander (wife of the Director-General who was on duty at Moscow).

At the dinner Dr Percy Skerman presented the formal history and the abridged edition *Guiding Queensland Agriculture* to the Minister.

Name	Period	Portfolio
C. B. Dutton	June 1887-August 1887	Public Lands
H. Jordan	August 1887-June 1888	Public Lands
M. H. Black	June 1888-August 1890	Public Lands
A. S. Cowley	August 1890-March 1893	Public Lands and Agriculture
A. H. Barlow	March 1893-May 1896	Public Lands and Agriculture
A. J. Thynne	May 1896-March 1897	Postmaster-General and Agriculture
A. J. Thynne (1)	March 1897-March 1898	Agriculture
J. V. Chataway	March 1898-December 1899	Agriculture
H. F. Hardacre (2)	1-7 December 1899	Agriculture
J. V. Chataway (3)	7 December 1899-April 1901	Agriculture
D. H. Dalrymple	May 1901-September 1903	Agriculture
D. F. Denham (4)	September 1903-April 1904	Agriculture
D. F. Denham	April 1904-January 1906	Agriculture and Public Works
D. F. Denham	January 1906-February 1907	Agriculture and Railways
T. O' Sullivan	February 1907-March 1907	Public Works and Agriculture
W. Stephens	November 1907-February 1908	Public Instruction and Agriculture
T. O'Sullivan	February 1908-October 1908	Agriculture
T. Paget	October 1908-February 1911	Railways and Agriculture
J. Tolmie	February 1911-December 1912	Agriculture and Stock
J. White	December 1912-June 1915	Agriculture and Stock
W. Lennon (5)	June 1915-September 1919	Agriculture and Stock
N. Gillies (6)	September 1919-February 1925	Agriculture and Stock
W. Forgan-Smith (7)	February 1925-May 1929	Agriculture and Stock
H. F. Walker(Acting)	May 1929-June 1932	Agriculture and Stock
F. W. Bulcock (8)	June 1932-December 1942	Agriculture and Stock
T. L. Williams	December 1942-March 1946	Agriculture and Stock
H. H. Collins	March 1946-August 1957	Agriculture and Stock
O. O. Madsen	August 1957-June 1960	Agriculture and Stock
O. O. Madsen	June 1960-June 1963	Agriculture and
J. A. Row	June 1963-September 1963	Agriculture and Stock
J. A. Row	September 1963-June 1972	Primary Industries
V.B. Sullivan	June 1972-July 1980	Primary Industries
M.J. Ahern	July 1980-November 1983	Primary Industries

Appendix 1: Ministers

Name	Period	Portfolio
N.J. Turner	November 1983-November 1986	Primary Industries
N.J. Harper	December 1986-	Primary Industries

- 1. First full-time Minister for Agriculture.
- 2. Minister for Agriculture in the first Labor Government in the world, which lasted only seven days.
- 3. Died in office.
- 4. Became Premier of Queensland (February 1911 to June 1915).
- 5. Became Lieutenant-Governor of Queensland (1920 to 1929).
- 6. Became Premier of Queensland (February to October 1925).
- 7. Became Premier of Queensland (June 1932 to September 1942).
- 8. Resigned to become Wartime Director of Agriculture for the Federal Government at the request of Prime Minister John Curtin.

Appendix 2: Under-Secretaries and Directors-General (1)

Name	Period in office (2)	Comment
P. McLean	July 1887-May 1900	Previously Member of Parliament and then inspector, Department of Lands. Agricultural adviser 1900 to 1903.
P. J. McDermott	May 1900-December 1903	Transferred to Chief Secretary's Department.
E. G. E. Scriven	January 1904-December 1924	Transferred from Lands Department as clerk in December 1887. Retired after 37 years' service.
A. E. Graham	January 1925-May 1938	Joined in 1906 as instructor in dairying. Died in office.
R. Wilson	May 1938-February 1939	Joined as a clerk in 1890. Over retiring age so not permanently appointed.
R. P. M. Short	February 1939-June 1947	Joined Stock Branch in 1898. Retired after 49 years' service.
A. F. Bell	July 1947-May 1958	Joined Chemical Laboratory as Cadet in 1916. Died in office.
W. A. T. Summerville	June 1958-December 1963	Joined Entomology as `learner on probation' in 1922 . Appointed Agent- General in London 1964. Knighted in 1968.
W. Webster	December 1963-October 1964	Seconded as general manager of the public abattoir and chairman of the Queensland Meat Industry Board.
W. J. S. Sloan	March 1965- October 1965	Joined as Entomologist in 1934. Died in office.
J. M. Harvey	December 1965-September 1976	Joined as cadet in Chemical Laboratory in 1933. Retired.

Name	Period in office (2)	Comment
A. A. Ross	September 1976-June 1978	Joined as horticultural adviser in 1939. Retired.
E. O. Burns	June 1978-August 1980	Joined as Cadet in 1933. Retired.
G. I. Alexander	August 1980-	Joined as assistant veterinary officer in 1950. Awarded AO in 1986.

- 1. During 1958-59 the position of Under-Secretary was changed to Director-General and Under-Secretary.
- 2. Includes period acting in position.