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1920-1921 .
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## 1921

QUEENSLAND.

## ANNUAL•REPORT

OF THE

## DEPARTMENT OF AGRICULTURE AND STOCK

FOR

THE YEAR 1920-1921.

PRESENTED TO BOTH HOUSES OF PARLIAMENT BY COMMAND.

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C.A. $65-1921$

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# REPORT OF THE DEPARTMENT OF AGRICULTURE AND STOCK FOR THE YEAR 1920-21. 

## TO THE HONOURABLE THE SECRETARY FOR AGRICULTURE AND STOCK.

SIR,-I have the honour to submit my Report for the year ending 30th June, 1921.

In the last Report mention was made of the need of help being given to farmers in the direction of seed wheat and fodder, and for the first half of the year under review the conditions threatened a repetition of a similar set of circumstances, so much so that the Government authorised the purchase of seed wheat and fodder, and the manager of the State Produce Agency was commissioned to make purchases of fodder in the South and to obtain seed wheat in Queensland for distribution if sufficient for the needs of the farmers were obtainable here. The result was the purchase in Queensland of 12,228 bushels, more or less, of seed wheat, and 627 tons of fodder in the South. The distribution of the seed wheat was explained in the Report of last year, but the fodder did not come to hand until later in the year when conditions had changed, with the consequence that much of it was unsaleable for the purpose for which it was bought. With three of our crops-wheat, sugar and cotton-the harvest has been most excellent; a record crop with wheat, an approach to a record with sugar, and, if the 1861 to 1864 period of the American Civil War be not counted, a record crop for cotton. Other harvests have been good, but those mentioned stand out prominently.

Generally, the first half of the year was one of anxiety in the regions west of the Main Range, and there was some fear that the conditions obtaining in 1919-20 would be repeated, but with the change during the summer the anxiety passed, and, excepting some areas, the season since has been very good, grass and water for the winter months having been plentiful. The change from war conditions has affected rural industries, as has been the case with town industries, and the first of the former to revert to normal conditions and to the open market was the dairying industry, which, after control had been abandoned by the Commonwealth, asked that it be exempted from the State control of price-fixing. The principle of pooling has apparently, however, found favour with producers, as, following the establishment of the Wheat Pool, the canary-seed growers
formed a voluntary pool under the administration of the State Wheat Pool, the formation of which was approved and helped by the Government, and now the proposition of a legalised cheese pool for the industry has resulted in a Bill now before Parliament. The Regulation of Sugar Cane Prices Act has proved to be of great value for the adjustment of relations between grower and manufacturer, and has eliminated the power that, before the Acts came into force, was in the hands of the manufacturer.

The tests with the Harvey Fruit-fly Lure were completed in February last, and the conclusions by the officers appointed to carry out the tests were that the Harvey Fruit-fly Lure, as supplied to them by its inventor, had failed (in the course of all the experiments at their hands, to which he personally or by deputy had been a party) to attract any other fruit-fly than the one which, in its egg and maggot conditions, infests, and is propagated by, the fruit of the Solanum auriculatum or wild tobacco. This particular fruit-fly had never been bred by the officers engaged in the test from the fruit of any cultivated fruit tree, either in the course of the investigations, even when such fruit had been derived from spots where the Harvey lure had displayed its attractiveness, or any time previously : the latter statement covering, in the case of one of the officers engaged, a score of years.

This fly, though related to the notorious one with which the name Tryon is associated, is readily to be distinguished from it by one invariable character, i.e., the absence of colour in the basal half of the costal cell, although this is not its sole characteristic feature.

Messrs. Tryon and Benson, who were the officers appointed, found that the Harvey lure could serve no purpose whatever in controlling our pestiferous fruit-fly, and in this respect had no virtues as a specific. Experiments have been made by officers of this Department in relation to the fruit-fly for several years past, and the means have included lures, fruit-fly traps run by clock work and other means, bails, revolving horizontal dises smeared with lure, and other devices, but so far the difficulty of controlling the pest has not been overcome.

The tables indicating the proportion of the population engaged in agricultural and pastoral occupations to the total population are continued for the information of those interested in the settlement of people upon the land, and they are this year somewhat more interesting, in so far that they show in some manner the return to normal conditions after the war period.

|  |  |  |  | Number of Owners <br> Engaged in Cultivation. | Proportion to <br> Population. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1915 | $\ldots$ | $\ldots$ | $\ldots$ | 22,095 | $0 \%$ |
| 1916 | $\ldots$ | $\ldots$ | $\ldots$ | 23,077 | $3 \cdot 255$ |
| 1917 | $\ldots$ | $\ldots$ | $\ldots$ | 23,053 | $3 \cdot 447$ |
| 1918 | $\ldots$ | $\ldots$ | $\ldots$ | 22,098 | $3 \cdot 32$ |
| 1919 | $\ldots$ | $\ldots$ | $\cdots$ | 22,126 | $3 \cdot 18$ |
| 1920 | $\ldots$ | $\ldots$ | $\cdots$ | 26,921 | $3 \cdot 00$ |
|  |  |  |  |  | $3 \cdot 66$ |

Cattle.

| Caitle. |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year. | Number of Persons Owning up to 300 Head. | Proportion to Population. | Number of Persons 1,000 Head. | Proportion to Population. | Number of Persons Owning over 1,000 Head | Proportion to Population. |
| $\begin{array}{ll} 1915 & . \\ 1916 & \text { O } \\ 1917 & \ldots \\ 1918 & \cdots \\ 1919 & \ldots \\ 1920 & \ldots \end{array}$ | $\begin{aligned} & 38,437 \\ & 38,015 \\ & 38,720 \\ & 40,560 \\ & 41,315 \\ & 43,634 \end{aligned}$ | $$ | $\begin{array}{r} 943 \\ 1,010 \\ 1,145 \\ 1,356 \\ 1,411 \\ 1,682 \end{array}$ | $\begin{aligned} & \% \\ & \cdot 139 \\ & \cdot 150 \\ & \cdot 16 \\ & \cdot 195 \\ & \cdot 191 \\ & \cdot 229 \end{aligned}$ | $\begin{aligned} & 671 \\ & 702 \\ & 799 \\ & 819 \\ & 850 \\ & 916 \end{aligned}$ | $\begin{gathered} \% \\ \cdot 09 \\ \cdot 104 \\ \cdot 11 \\ \cdot 117 \\ \cdot 115 \\ \cdot 124 \end{gathered}$ |



Last year a valuation was made upon the figures for 1919 of the primary industries at first values only, and without including anything in a manufactured stage, such as butter, cheese, \&c., nor did it include the value of the products of stock in the form of meat, fats, oil, lard, tallow, \&c., because these products are, in a degree, in the manufactured stage.

For comparison, the figures for the two years are given:-

| Stock (horses, cattle, sheep, pigs, mules, camels, goats) | 1919 $£ 43,651,667$ | 1920. £ 4 $11,483,943$ |
| :---: | :---: | :---: |
| Milk . . . . | 3,143,701 | 6,977,349 |
| Wool | 8,606,747 | 8,371,560 |
| Crops . . . . | 6,297,079 | 10,386 283 |
| Poultry and eggs | 354,665 | -387933 |
| Bee products . . . | 24,775 | -32,569 |
| Hides and skins, bones, hoofs, horns, hair, \&c. | 880,042 | 1,238,326 |
| 5 | £62,958,676 | £68,877,963 |

The work under the Pure Seeds Act is growing as the benefits of the Act are better understood, and farmers are now taking advantage of the provisions afforded them by taking action directly, there having been several prosecutions during the year which were instituted individually, in addition to the cases instituted by the Department. In 1915, the first year the Act got properly in working order, 467 samples were analysed, and last year the analyses made by Mr . Coleman, the officer in charge, numbered 2,761 , and there were seven departmental prosecutions for breaches of the Act.

In another part of this Report are two interesting tables, which give the percentage of the samples that complied with the regulation and the percentage of those that did not; and from these tables the importance of being careful of planting only good seed will be understood, and the necessity of purchasing only tested seeds will be appreciated.

The demand under the Stock Foods Act for a proper description of the article sold has caused the disappearance from the market of some proprietary foods that would not bear inspection, and if the Act has not accomplished anything else, it has been warranted by preventing the sale of proprietary foods that were dangerous to stock. But beyond this, there is a decided improvement in the quality of the stock foods upon the market, and the wholesale sellers are appreciating the advantages of the Act to trade generally.

The Agent-General, in that part of his Annual Report dealing with butter, makes some very pertinent remarks upon sales to the Imperial Government in 1918 for the two seasons ended 1920. Reference is made to the opinions of trade authorities that the two years' purchase at 175 s. per cwt. f.o.b. for Australian batter must have been one of the most profitable purchases undertaken by the Ministry of Food, the sales in Great Britain running up to 330s. 4 d . per cwt.

The dried milk industry is making headway in some European countries, and the number of evaporating stations in Great Britain is on the increase. London importing firms state that several large parcels of dried milk, both full cream and skimmed, from Australia have given satisfaction. This form of milk is put to many uses, and its larger consumption is recommended by some on hygienic grounds. The AgentGeneral points out that a leading difficulty against extension of business lies in the fact that much of the article manufactured is insoluble, but as time goes on the public will, no doubt, be educated into wider use of this product.

The total value of the exports of home produce during 1919-20 was $£ 14,362,855$, of which agricultural and pastoral interests contributed $£ 13,968,846$, or 97.26 per cent. of the whole, but, of the two interests mentioned, agriculture only provided 6.65 per cent.; but it is to be remembered that the principal portion of the surplus agricultural commodities for export is sent to the Southern States, so that if that quantity were added to the exports overseas, the percentage would be very different. Pastoral products are exported in quantity greater than that retained for home purposes.

The Amendment of the Co-operative Agricultural Production Act, 1919, under which provision was made for advances under certain conditions for the purchase of dairy cattle, sheep, pigs, or for the erection of silos, became practically in operation in May, 1920. On the 30th June last, 378 applications had been lodged, of which 216 received approval, 95 were rejected, 35 deferred, and 32 were under investigation. Of those rejected, a considerable number were submitted through a misapprehension of the intentions of the Act, which is to help those who are commeneing, and it does not apply to those who have already become established in dairying and have put together a profitable herd. Some people applied for loans, the proceeds of which were evidently to be used for trading; others for lifting mortgages or to consummate family arrangements, and so on.

The total amount of advances approved was £30,745, of which, as at the 30th June last, $£ 22,575$ had been actually paid over to the borrowers, who are scattered through twentyeight electorates. Though liberal provision is made in the Act for help towards the erection of silos, it is a pity that only two applications were made for this purpose among the many that borrowed for the purchase of dairy cattle and pigs. It seems that education in the conservation of fodder is yet far from complete, and that the old habit of talking of it in times of drought and promptly forgetting the subject when there is plenty of grass, still hold good.

So far, the borrowers, as a whole, have met their engagements honourably, and some have paid their indebtedness before due date; and the fact remains that, although the number of dairy cows, pigs, and sheep in the State may not have been increased by means of this Act, the proper distribution has been materially helped, and, by the number of those who have obtained loans, the producers have been increased. Moreover, those people have been enabled to cross the struggling border line that under other circumstances would probably have taken years to overcome.

Departmental experiment plot work, which generally can be described as cultural work upon a farm, the owner of which undertakes to cultivate a certain area with certain crops under instruction from the officers of the Department, is becoming an important part of the educational section of the Department, and is having a great effect upon the methods and ideas of the farmers in those areas in which funds have permitted this kind of propaganda to be carried on. The experiment work at the State Farms is of a different kind to the cultural experiment work of the plots, and it cannot be expected that the farmer can spare the time to regularly follow such work; the antithesis is to bring the work to the farmer, and this was the foundation of the experiment plots. It is very difficult, indeed impossible, to put money values on educational work, but take the record wheat harvest of 1920 as an example. It may safely be said that the success of that crop was mainly attributable to the distribution of good seed wheat by the Department and the influence of the Pure Seeds Act. In maize, a correspondent lately admitted that by following the instructions given with regard to seed selection, and by using Departmental seed, he had increased the yield on his farm by 40 bushels an acre. Again, in the Gympie district, 117 bushels of maize to the acre were obtained from following the education offered and using Departmental seed. Two years ago an experiment plot of peanuts was planted in the Atherton district, and the grower obtained $£ 62$ 10s. to the acre as a gross return; now there are 200 acres under peanuts in the district. Many other instances could be shown, but these will indicate the value of plot work.

The Principal of the Queensland Agricultural College draws attention to the need for more land in the district for relief paddocks, and mentions that twice during the last six years the College stock have been sent to the coast country during dronght times, to the detriment of the stock and loss to the College. He is of opinion that the keeping of pure-bred stock for the benefit of the farming community should not form part of the educational work of the institution, and should be maintained as a separate establishment. The oversight and care of these
animals requires a staff that in reality have no connection with educational work, and the expenses under the existing system are charged to the College, thus making the cost of the upkeep of the educational side appear greater than it should be. More teachers in particular subjects are, in his opinion, needed, it being quite out of the question for those who are now allotted to the College as teachers to know or to be able to know the many-sided subjects of agriculture to the degree that the College should be able to teach the students.

The system of vocational training for returned soldiers, under arrangement with the Repatriation Department, has now come to an end, and during its continuance 139 students received instruction, and of them, as a whole, the Principal speaks highly. A table in the Principal's report shows that since the beginning in 1897 some 1,500 people have received instruction, and if they have, in a measure only, spread the knowledge they have gained, the cost of the upkeep of the College has been fully repaid.

A proposition emanating from residents of the district for the instruction of boys from 14 years to 16 years in elementary agriculture has not, though the scheme has received approval, yet developed into a fact. The idea is a most excellent one for filling in that period that is otherwise utilised in the High School where many subjects are taught that are of no use to children who intend to follow a country life; moreover, such a school might reasonably be expected to turn some from town life to country life. The College has the machinery, and it is hoped that a trial, at least, will soon be given to the proposal.

The annual Poultry Conference was held, at which about 150 attended.

The electric light is still carrying a far greater burden that it should be called upon to carry, and sooner or later there will be a breakdown that may be disastrous. A duplication of this plant is badly needed, and has been long asked for. Apart from the danger, as things are at present, there is a continuing accumulated loss of power, the saving of which would go far to help to pay the cost of duplication.

The area of the College land is 1,688 acres, and of this, 627 acres were under crop last year. The land is excellent, but the Principal is of opinion that better results would be obtained from a College point of view owere it situated in the neighbourhood of Brisbane. The site was chosen for the reason, apart from the nature of the soil, because it was away from either Brisbane or Toowoomba, though easy of access to either, and because establishing it in the neighbourhood of large towns would not be conducive to the proper education of practical and educated farmers, of whom many are wanted in the State.

The difficulty in obtaining the glassware for the service of the agricultural laboratory has not yet been wholly overcome; prices are still very high, and the quality in some instances is very poor. Material ordered more than a year ago has not yet arrived, and investigation work has had to suffer accordingly. The analyses of different kinds, details of which are given by the Agricultural Chemist in his report herewith, numbered 2,403 , and were practically the same in number as the volume of this class of work for 1919-20. In addition, tests of dairy glassware were made to the number of 6,244 , a class of work that, through the Dairy Produce Act of 1920 , which is now coming properly into operation, will probably greatly increase this year.

The Agricultural Chemist last year drew attention to the remarkable depletion of some of the Atherton tableland in mineral plant foods, potash particularly, and has followed up his remarks with further investigations of soils from as nearly as possible the places whence samples were taken for analysis in 1903. He has found that a serious depletion has taken place during the last thirteen years, and that replenishment with complete fertilisers has become a serious question for thought. The number of dip fluils analysed was less than in previous years, possibly owing to the more extended use by inspectors of the portable dip-tester, concerning which further researches are being made to perfect it for general use. In some twenty cases the cause of poisoning was ascertained in the many analyses of viscera and stomachic contents that were made.

Apart from the formal work, a notably interesting investigation was made with regard to fodder crops, grasses, and such like material, the most important of which was in connection with a complete collection and classification of the different kinds of sweet potato obtained from departmental stud plots at Alton Downs. This investigation is not yet completed, and will be continued, but the principal idea of the investigation is in some measure to ascertain the varieties suitable for different districts and the soil requirements for each district. The experiments in this connection outside the laboratory have been under the control of Mr. Brook $\$$, the Agricultural Instructor in the Central district, who originated them. A grass that has come here from Africa, under the name of elephant grass, and has been much advertised by agents, has not been found to be better than any of the fodders that we already have; indeed, it is only in its earliest stages that it has a good feed value, but it is free from hydrocyanic acid-yielding glucoside.

An analysis of the tubers of one of the sedges found in the northern coastal swamp country, growing in brackish water and used as a food
by the aborigines, showed the food value to be near that of the sweet potato, and, therefore, possibly of economic value. There is much to be done yet in investigating grasses, fodder crops, \&ce., and particularly plants that are or may be poisonous to stock, and the Agricultural Chemists recommends the foundation of scholarships to help on investigation.

The work of the Agricultural Laboratory covers many avenues; all the results are for the benefit of the agricultural and pastoral community, and it is for the members of it to seek the help they may require.

In the fruit world the year has been good, and, in the opinion of the Director of Fruit Culture, the conditions were generally good, and, excepting for the prevalence of Irish blight in potatoes and tomatoes, for which the season was favourable, the growers should have but small complaints. Pineapples gave but a very moderate summer crop, but have made good growth, and a heavy winter crop is expected. The quality of the banana crop has been good and the yield satisfactory, and the same may be written of vegetables and small crops.

The trade with the Southern States, outward and inward, by land and by sea, has much increased, and great credit is due to the organisation of the fruitgrowers under which the land carriage for quick delivery of fruit in the Southern States has been accomplished and maintained. It has taken years to develop this system, and many difficulties have been met with, but success has been achieved, and this, perhaps, will induce the shipping companies to give more attention to the needs of the fruit trade than has been their practice heretofore.

The banana industry, that years ago was almost wholly in the hands of Chinese growers, is now with European growers, principally in the Southern portions of the State, and the prices paid for land are very high. The position has been further improved by the Customs tariff on bananas, which has practically cut out the Fijian trade; but, notwithstanding this increased tariff, the market value of bananas in the Southern States, which the Fijian trade supplied, has not improved. On the other hand, had there been no increase in the tariff, there is little doubt that in good seasons the values of bananas would fall to much below present market values and depreciate the value of banana lands.

The Director of Fruit Culture, in his report, traverses the different fruit crops, such as bananas, pineapples, citrus fruit, and other fruits and vegetables, and draws attention to the departmental experiments in relation to bunchy top in bananas. Several methods were tried, but no conclusive result was obtained by which the
disease may be avoided. The affection is of an obscure nature that demands a thorough scientific examination, which is now being carried out by the Entomologist.

The trouble that growers have suffered from when dealing with Victoria in citrus and other fruits, owing to the view taken in that State with regard to the Queensland fruit-fly, has now been overcome. It has always been held by this Department that this fly would not thrive in that State, otherwise it would, owing to the great quantity of larver that must have been landed there in bygone days, have entirely overrun that State. This view has now been accepted by Victoria, and, subject to the reasonable conditions now imposed, growers should not now have any difficulty in landing and marketing their fruit.

The number of inward packages of fruit and vegetables at the different places of examination was 777,211 , and the outward, 656,207 , the balance being thus against us in interstate trade. Under the Quarantine Act 108,905, and under the Commerce. Act 8,397, packages were examined on behalf of the Commonwealth.

Upon matters agricultural, the Director of Agriculture states that, excepting certain areas, the season for farming for the year to 30th June last was favourable, and there were developments in the important rural industries of wheat, maize, cotton, and peanuts. Mention is made of the successful invention of a machine to harvest maize in one operation-that is, pick, husk, shell, and bag. The machine is not yet on the market, but if sold at a price within the reach of the ordinary farmer, it will undoubtedly mean a much greater production. The moisture in maize grown in the tropics, and even outside the tropics, is a problem that will have to be handled, whatever may be the cost. The production in the tropies far exceeds the local consumption, and the long journey southwards to a market is a direct help to the deterioration that has commenced from the time of bagging. It is, perhaps, not too much to say that if it were possible to arrive at the loss in a year, as against the return that would have been obtained had the maize been landed in the market in a dry condition, it would be found that the cost of a drying plant would have been covered by that loss; at any rate, that would be so in a large maizegrowing district, such as Atherton. Testers for moisture have been introduced by the Department into this district, which will enable information to be supplied to growers upon this subject.

Southern people with capital have embarked upon a project for peanut-growing and oil extraction upon a large area-some 6,000 acres -and the development of this project, if successful, will open up encouragement for a big
extension of this industry, because this plant can be grown practically throughout the coastal area, and the demand for the oil is large, let alone the feed meals that can be made from the refuse. Another departure is an attempt to cultivate flax upon the Downs, which, if successful, will possibly result in the establishment of a mill. Flax has been attempted intermittently several times during the past years, and, although the crop grew satisfactorily, failure in attaining profitable results was always found in the retting, but if a mill for that purpose were established here that difficulty would be overcome.

Thirty different kinds of sorghums were obtained from America and the Sudan, and are under trial, the latter making exceptional growth of stalk under the altered conditions of climate and cultivation.

The wheatbreeding work at the Roma State Farm has been extended into field plots outside the farm, some 90 acres in the different wheatgrowing districts being utilised for this purpose. The largest yield upon any one of these plots was in the Inglewood district, where $37 \frac{1}{2}$ bushels to the acre were obtained. This experiment-plot work for other crops was spread throughout the State under the supervision of the Agricultural Instructors, and covered the principal crops, such as maize, sorghum, cotton, fodder, and root crops, onions, sweet potatoes, \&c. For instance, in the Central district, ninety-two acres of experiment plots were laid down, on which eighty-six distinct crops were under test, embracing 1,476 individual tests.

In dairying matters, which now almost equal in value that of the wool production, the Chief Dairy Expert has found that, compared with 1919-20, the production of butter has increased by $14,500,000 \mathrm{lb}$. and cheese by over $3,000,000 \mathrm{lb}$., and condensed milk by over $4,000,000 \mathrm{lb}$., and that in the aggregate the returns are greater than in any former years. The standard of quality has been well maintained, and Mr. Graham is of opinion that the principle and practice of neutralisation and pasteurisation is extending in the factories, and that, though a moderate improvement has been effected in the quality and general appearance of the cheese made, proper efficiency will not be gained until pasteurisation is generally adopted for cheese factories and a standard size of crate and cheese hoop is used; but it must be remembered that the development of the cheese industry is of much more recent date than the butter industry. The export trade in cheese has reached proportions that require the general adoption of the principle of pasteurisation in manufacture, and to do so would place our export products upon a higher plane in the European market. The

Chief Dairy Expert, in his report, emphasises the point in this connection with the export trade that Great Britain requires the best only, and that inferior qualities are not wanted. The everpresent question of the timber for butter-boxes for the export trade and the question of taint is met by the proposal that all butter factories should paraffine the boxes used, and thus escape liability of charges of taint in the produce manufactured by them. There is need for much more efficient preparation of cheese submitted for export, particularly with regard to crating, some cheeses being sent down loose to be crated by the agents in Brisbane. The consequences are obvious-damage to the cheese and frequent obliteration of identification marks, and mixing of quality-an unbusinesslike method that can only recoil upon the company concerned. The cold storage provision, as it now stands, has become a serious matter in connection with the industry, and more accommodation is urgently needed, and had not accommodation been available at certain times at meatworks which were not then working, the position would have become very irksome, and particularly so as the usual channel of freight for export goods was upset. More cold storage is absolutely needed, and if the season continues as at present promises, there is no reason to expect other than that congestion in the stores will again happen, unless opportunities improve for maintaining the balance between production and the cold storage accommodation pending export.

During the war the margarine makers in Europe had the advantage over butter manufacturers, and it is now for the latter, by carefully attending to the needs of their markets, to regain the ascendancy. Many people have become accustomed to margarine, and the low price at which it can be bought is a powerful factor in the market values of inferior grades of butter, and it would seem that the resumption of the balance of power is in the direction of quality.

Several thousand dairy cattle have been tested by the Herd Tester during the year, and dairymen are now realising the advantages to be gained by the practice. The Chief Dairy Expert points out that in the average milk yield of cows employed for dairy purposes there is a great deal of room for improvement, and that the average yield per cow in this State is much lower than in many other dairying countries. This Department has for several years past been testing stud stock for Herd-book Societies, but with the accumulation of departmental work in the dairying industry this work has reached the stage of interference with the ordinary work of inspectors, and there may soon be a need for considering whether the Herd-book Societies should not undertake their own testing.

At the State Farm, Kairi, there are now two stud breeds of dairy stock-the Jersey and the Milking Shorthorn-the latter being founded on the Darbalara stud in New South Wales. The Berkshire pigs are eagerly sought after, and the demand exceeds the supply. Two new crops that have lately been tried here are promising well, the Kikuyu grass from Rhodesia and hill taro; and the nursery for the rehabilitation of sugarcane for use on the coastal districts has justified its establishment. This farm has been reduced by 500 acres, which have been surrendered for the use of returned soldiers, and though up to the present this area has not been utilised for farm purposes, the loss of it later on, when the farm develops, will be felt.

At Warren, the demand for stud stock still continues, especially with regard to pigs, and additions in accommodation became necessary. The continuity of experiment work was somewhat interrupted during the year, owing to the Manager having been gored by a bull, from which accident he lost a leg, and perforce was absent for some months.

At Roma the work of plant-breeding has been continued, and the products have more than held their own with the recognised wheat in general cultivation. Improvement in the Soudan grass for hay and fodder purposes has been prosecuted, and success has been attained in the development of new types of cowpeas that show a resistance to nematodes; and, in co-operation with the Agricultural Chemist, a close examination has been made with regard to many plants reputed to be dangerous to stock at certain stages of their growth owing to the alleged presence of hydrocyanic acid.

At Hermitage, comparative tests under field conditions of a large number of varieties and types of wheats and other cereals was the principal work, the object in particular being to determine which of them are adapted to the heavier soils of the Downs. Several acres were sown with flax, but the rainfall was too light, and the harvest was also light. The crossbred sheep increased satisfactorily, and good prices were obtained.

At Gindie the reputation of the beef shorthorn stud carried there is extending. Success has been attained at the different shows where the animals were exhibited, and there is no difficulty in selling stock at good prices, even in competition with other purebred herds. Ten young bulls were sold to go to Darwin, and a high-class bull was purchased to further improve the herd.

At Home Hill, the irrigation farm, the clearing of 150 acres of land was completed, and a portion of it was graded, broken up, and diviled into the sections to be occupied by the various
crops. Two wells were sunk, and tests showed. that about 50,000 gallons of water an hour could be raised for irrigation purposes. Other work, of a preparatory nature, was finished, and the next Annual Report should show some conerete results.

There are now 3,976 dips registered as being in use, and the work of cleansing areas from the tick has been successful to the extent that the Chief Inspector of Stock was able to recommend the removal of restrictions from a portion of the Helidon, Miles-Chinchilla, and the Burnett areas. This declaration of cleanliness clears the ground for extending operations in other directions, and the area at the Southern boundary, in the Coolangatta district, should have early attention. The very wet winter has been favourable to sporadic outbreaks of ticks in clean areas, through infested travelling cattle, but, as these outbreaks were immediately checked, it may be said that no extension of the tick pest has to be reported.

Due, perhaps, to the wet winter, there were four more outbreaks of pleuro-pneumonia than in 1919-20, the total number of outbreaks being 66 for the year.

The veterinary staff were called upon 468 times, in 108 centres, for treatment of various diseases, principally of an epizootic character, and they examined 103 stallions for soundness, of which 21 were rejected. Two hundred and eighty cows were tested by the tuberculin test, of which twenty-seven gave positive reaction.

Under provisions of the Slaughtering Act, 79 new yards were erected, 9 were renovated, and 18 are under consideration. Though in the populous centres the need for complying with the requirements of this Act are readily understood and accepted, there still seems to be a feeling in some country places that anything will do for a slaughter-yard, and there is no need to be careful about the treatment of the offal or the prevention of animals feeding on it in an uncooked condition. When remonstrance is made, the complaint of the expense of erection is invariably brought forward, and no consideration is given to the fact that the health of the people in the country is of equal importance to the health of the people in the towns, let alone the danger of spreading disease. The Act requires cleanliness and good sanitary conditions, and these can be accomplished without any great expense ; they are an absolute necessity, and no deviation from the requirements of the Act should be permitted. The total number of stock slaughtered-bullocks, cows, calves, sheep, and pigs-in 1919-20 was 537,139 , and in the year ending the 30th June last the number was 626,448 , an increase of 89,309 head, principally of cattle. At the Enoggera saleyards the number passed through was:Cattle, 44,444 ; calves, 7,433 ; sheep, 263,696 ; and lambs, 28,106.

The good rains during the winter have made the prospects for the lambing very favourable, and it is to be hoped that the losses from dingoes will not bo serious-a danger that has caused many an owner to change from sheep to cattle.

The main business at the Stock Experiment Station, Yeerongpilly, was the inoculation of stud stock against tick fever, and during the year 149 head of cattle- 95 bulls and 54 heifers -were received at the Station for treatment, and of these, three died (one heifer from exhaustion), and two bulls, one of which, upon a post mortem, showed lesions of tuberculosis and pneumonia, the other, tick fever lesions. Among so large a number of stock received, the small mortality indicates the care that is given to stock under treatment; in addition, 851 head of cattle were inoculated upon their own pastures, and 7,020 doses of blood were sent to pastoralists and farmers for use by them. The demand for prepared bleeders was good, and twenty-five animals, after preparation by the Government Bacteriologist, in which testing for tuberculosis, vaccination for blackleg, and inoculation for pleuropneumonia is included, were sold for use upon stations and farms. Beyond this principal work in connection with tick fever, the bacteriological work is very varied, and included water from butter factories and elsewhere and investigations into the contamination of condensed milk with mould fungi. This is a trouble that has affected the factories to a considerable degree, and for which a remedy was proposed by the Government Bacteriologist by protecting the can at the time of filling against dust and mould laden atmospheres.

There were 28 examinations of pathological tissues of various descriptions, and examinations of 17 specimens of milk received from suspected cases of contagious mammitis, of which in twelve the streptococcus and pus cells were detected, while five gave negative results. Six cases of milk suspected as being cases of tuberculosis in the udder also gave negative results.

An important investigation of brine from bacon factories was conducted, examination being made of 254 specimens.

In relation to pleuro-pneumonia, there was a greater demand for virus than usual, possibly owing to the continued wet weather during the winter, and virus sufficient to treat over 18,000 head of cattle was sent from the station to many places in the State, the farthest distances being to Windorah and Cunnamulla.

The specialty that is made at the Station of vaccine for blackleg is increasing in favour, as it is better understood by stockowners, and sufficient vaccine was distributed during the year to treat 10,500 calves. As this disease is of but
short duration, the animal dying but a few hours after the typical acute symptoms are recognised, stockowners in a suspected blackleg district should protect all young calves by vaccinating them twice a year, the material for which can be obtained from the Stock Experiment Station.

The Stock Experiment Station at Townsville is developing, and during the year a house has been erected for the Director, an essential for a place where valuable animals are received for treatment, and a laboratory is now being erected. The principal work during the year was the inoculation of cattle against tick fever, and the number so treated was 191, but with the completion of the laboratory there will be scope for other investigations of benefit to that region. The report of the Director herewith gives details of the work done, which included, in addition to the inoculation mentioned, 378 analyses by the chemist of dipping fluids, 12 analyses of limestones and deposits, 5 of water, 4 of viscera, 2 of suspected poisonous plants, 1 of dip concentrate, and 1 of arsenic, the total analyses in all being 423. Examinations were also made of salt poisoning in pigs and in sheep, bacterial necrosis in pigs, stomach worms in cattle, parasitic mange in pigs, and swine fever in pigs.

## SALE OF FRESH FRUIT BY BARROWMEN.

In times of glut there is no better means of disposing of surplus fresh fruit than by barrowmen, no matter whether same are in the city or in the suburbs, as they are enabled to deal with large quantities of fruit rapidly, and thereby to sell same at a low rate, their quick turnover enabling them to do so.

It frequently happens that more fresh fruit reaches the market in a day than can be disposed of to either the local shops or to country centres, with the result that a considerable quantity of this fruit is left over unsold. The following morning a further supply of fresh fruit reaches the markets, and buyers naturally purchase the freshest fruit, so that the previous day's fruit is frequently allowed to remain unsold. This continues till such time as the surplus fruit becomes valueless and has to be destroyed. In order to obviate this serious loss to the growers, markets should be cleared daily, even though the fruit is sold by the merchants to barrowmen at very low rates, as thereby the fruit will be placed before the consumers at a very cheap rate, which will secure a ready sale, and the loss from damage will be obviated.

Barrowmen must purchase good fruit and sell at a reasonable price, otherwise their trade suffers; consequently, in order to prevent glutted markets, the barrowman is a good friend of the fruitgrower, as he enables the latter's produce to be disposed of instead of permitting it to remain on the market and thus accentuate the
congestion which naturally arises when large quantities of fresh fruits are being sent to the markets daily.

There is one other point of very great importance, and that is, that by disposing of the fruit at reasonable prices to the general public, persons who otherwise would be unable to purchase fruit can do so with benefit, not only to their own health but to the health of their families.

Fruit sold by the barrowmen is subject to inspection, as is the fruit sold in shops, therefore there is no fear whatever of the general public having inferior fruit foisted upon them, or having the fruit topped for sale.

From returns furnished by the Police Department, there were no barrowmen licensed as at 30th June, 1920, but there were twelve licensed as at the 30th June last, and this number would have been increased to twenty-three if lieenses as temporary stallholders could have been issued. The distinction is that the barrowmen, excepting when actually selling, must move from place to place.

A comparison of prices in July last showed that the average price charged for fruit in the best class of shops was at least 50 per cent., and in shops of lesser degree at least 25 per cent., above the charges made by barrowmen, who sold equally as good fruit as was sold in the shops.

## AGRICULTURE.

The value of all kinds of agricultural production in 1920 was $£ 10,386,233$, as against $£ 6,297,079$ in the preceding year, a good deal of the difference being attributable to the large crop of wheat and sugar-cane, the incidence of the transactions of the State Wheat Pool upon a fixed basis for f.a.q. wheat being the main factor, and to there being no alteration during the year in the price of sugar. Among all the principal crops-wheat, maize, sugar-cane, vines, bananas, pines, and oranges-an increased production was obtained during last year as against the preceding year, but this might be expected, because 1919 was a very dry year, and the season approached closely to designation of a drought year.

Although there was an increase in returns generally, it cannot be said that the total area under crop is expanding as it should. The area for last year, 779,497 acres, has been exceeded twice during the last ten years, and the difference between the average for the decade, 683,443 acres, and the 1920 area is not large. In 1860, with but 28,000 people of European descent in Queensland, there were 3,553 acres under cultivation, and this at a time when pastoral life was the principal means of livelihood for the rural community, and now, with a population of 733,000 , there are but 779,497 acres; so that prac-
tically we have not advanced very much during that period. The latest Commonwealth Statistics state that in 1918-19 the area under crop represented about 1 acre in every 143 acres. Western Australia, which is of much greater acreage than Queensland, had 1 acre under cultivation in 389 acres, as against 1 in 82 acres in this State. Of the other States, the proportion was: In Victoria, about 1 in 14 ; in New South Wales, 1 in 51 ; in Tasmania, 1 in 66 ; in South Australia, 1 in 78 ; and the Federal Territory, 1 in 338 acres. Generally, conditions are similar in New South Wales, Western Australia, South Australia, and Queensland, the pastoral interests predominating in each, yet notwithstanding the great variety of cultural possibilities, compared with the other States, we are behind in the area of cultivated land. Possibly the lack of skilled employees has a bearing on the matter, and it is undoubted that it is difficult to obtain reliable men in sufficient numbers to effectively carry on farming properly, but with a return of good seasons, such as we are now experiencing, a change for the better may be obtained.

The area cultivated last year was $1,018,444$ acres, an increase of 3.02 per cent. over the previous year, which, no doubt, can be attributed to the interest shown in the cultivation of wheat. This average is not a record, having been surpassed twice within the last ten years, viz., in 1915 and again in 1916, in which years special efforts were made by farmers in relation to the war needs. The number of holdings was 26,921 , as against 26,713 in 1919, an increase of 0.77 per cent., but when the advent of the soldier settlers is considered in relation to normal advance in agriculture, it does not seem that the State is progressing as quickly as it should. In 1910 there were 794,826 acres under cultivation; so that, after ten years, the State has only increased its area under cultivation by 223,618 acres, or, on an average, 22,361 acres a year.

For the purpose of agricultural pursuits there were 31,388 persons engaged in dairying and 33,340 in farming, or a total of 64,728 persons; but this total must not be taken as absolutely correct, because of the tendency or habit of some persons, who follow both secupations on one holding, of returning themselves in the two capacities, instead of choosing the principal of the two, so far as they are concerned, as the main occupation. To carry on these occupations, the capital invested in farming machinery and implements was $£ 2,063,765$; in dairying, $£ 516,121$; in irrigation, $£ 255,339$; and in travelling machinery, $£ 49,115$; a total, for the whole, of $£ 2,884,300$, an increase of $£ 523,145$ as compared with 1919, the greater part of which was employed in the sugar industry. It is now about sixty years since the manufacture of sugar was first attempted here, and in a manner that was
very crude indeed compared with such mills of to-day as South Johnstone and Babinda, with their chemical control. About 94 per cent. of the sugar produced in Australia is produced in Queensland, the balance being made in New South Wales, where the industry, however, is at a standstill, if not declining. The consumption in Australia is estimated to be about 285,000 tons, and only once, in 1917-18, has the manufacture exceeded that quantity. There are about 4,000 farmers cultivating sugar-cane, and the estimate of production this year is 250,000 tons of sugar for Queensland, to which is to be added, say, 20,000 tons for New South Wales; consequently, though the total will not quite equal the consumption, it will be very near to it. Of late years there has been a considerable improvement in the industry, as shown by the following figures :-

|  | 1899-1908. <br> Tons. | $1909-1918$. <br> Tons. |  |
| :---: | :---: | :---: | :---: | :---: |
| Average tons of cane |  |  |  |
| to each acre $\ldots$ | 14.76 | $\ldots$ | 17.37 |
| Average tons of <br> sugar to each <br> acre |  |  |  |
| Average tons of cane <br> to 1 ton of sugar | 1.60 | $\ldots$ | 1.99 |

The Council, Federal and State, formed in accordance with the Sugar Agreement with the Commonwealth Government, met in Brisbane, the work of the State Committee being completed at a meeting in Mackay, with the result that no increase in the price of sugar was decided upon, and that certain amendments were needed in the Regulation of Cane Prices Acts.

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 sugar-mills, employing 5,228 people, but the number of plantations is not increasing. In 1916 there were 4,211 plantations ; in 1918 the number stood at 4,148; and in 1920 there was a drop to 3,930 , a difference of 281 plantations in five years. The total area under cultivation also shows a decrease; in 1916 the area was 167,221 acres, and in 1920 it had fallen to 162,619 acres.

The average area under maize during the last ten years has been 146,862 acres, but for 1920 the area did not reach that figure, the area being 115,805 acres, a difference of 31,057 acres, but much of this debit may be placed to the credit of the wheat area; neither did the production average the return for the previous ten years, which for the ten years ending in 1919 stood at 21.13 bushels to the acre, but for 1920 the average amounted to 17.55 bushels only. Notwithstanding that maize is in use throughout the State and there is a good market in the South, the area planted each year is very vary-
ing, and does show signs of expanding; for instance, the greatest area in any one year during the last ten years was in 1916, with 181,405 acres, and the variation went down to 105,260 acres in 1919. The average yield to the acre found by the Commonwealth Statistician for the ten years 1909-19 shows that Queensalnd comes third, with 22.18 bushels to the acre, Victoria being first with 46.64 bushels, and New South Wales second with 27.82 bushels. This is not as it should be, because this State is nearer in climate to the natural climate of maize than the other States, and it would seem that more care is required in the cultivation of it. Without doubt, however, the education offered by the Department in seed maize selection is having an influence, and as the advice spreads throughout the land, better results will follow. A great difficulty that has to be overcome is the excess of moisture found particularly in maize grown in the tropical parts, brought about by the humidity of the atmosphere, and afterwards in shipping to market, the carriage by water and the atmosphere of the holds being prime factors for the presence of the weevil and other forms of destruction. The obvious remedy would be drying before shipment, and means for this purpose are badly wanted. The settlers do their best, and in the Atherton district much money has been spent by farmers in providing storage tanks of galvanised iron, but that is not sufficient; a central place or factory is wanted to which growers could take their maize for drying or manufacture and receive negotiable warrants, with provision for adjustment at the end of the season. Several inquiries have been made and specifications prepared to supply this need, but the cost is too high to entertain erection at the present. Instruments for testing the moisture in maize have, however, been imported, and, if use of them is made by farmers, more will be obtained. A disposition was manifested during the year for establishing a Maize Pool upon similar lines to the Wheat Pool, but it was not pressed. The fact that so many people grow maize in greater or lesser quantity, and that there are so many local buyers for one purpose and another, would create difficulties for the formation of a successful pool. Wheat, on the other hand, has a limited market, and, therefore, is much easier to manage. The importations of maize into the United Kingdom in 1919 amounted to $16,860,000$ cwt., of which the British Empire contributed 1,633,800 cwt. only, the balance coming from foreign countries. South America was the principal exporter, the quantity from there being $14,133,100$ cwt., the principal portion of which came from the Argentine Republic. With such a market available, it does seem that Queensland should take part in the business, but at the ruling freight rates that is out of the question.

## WHEAT.

In writing of the wheat crop of the last year, it will be sufficient to say that it was the largest yet known in this State, and reached $4,174,155$ bushels. This, of course, is a small total compared with the returns of the wheatgrowing States, but it is indicative of another step gained towards the production within our area of the needs for our purposes, and this position had its beginning in the issue by the Government of a guaranteed price, which encouraged growers to enlarge their areas and to put down fresh land for this crop. The passing of the Wheat Pool Act, under which the management of the Pool was placed in the hands of the farmers, was a distinct advance towards giving stability to the industry. A general statement, prepared by the Chairman of the Wheat Board, is herewith, and a perusal of it will give full information concerning its operations and what it has done for the farmers in the wheatgrowing areas, as a body; and though it is quite impossible for a Board to have satisfied everybody, the results of its operations have quite justified its existence and the wisdom of leaving the management to the growers, instead of following the Southern systems.

The area placed under crop in 1920 was 175,750 acres, and was the largest area during the last ten years, excepting in 1916, when 227,778 acres were under crop. The planting of that year was a special effort for war purposes, but it was a year of drought, and the return reached $2,463,141$ bushels, or 10.81 bushels to the acre, as against 23.69 bushels in 1920. Given a good year, Queensland always shows a better average to the acre than the Southern States, excepting Tasmania, and, taking the cycle of our existence as a State, the average returns have been, since average statistics were published:-

Bushels to the acre.

| $1882-1891$ | . | .. | 12 |
| :--- | :--- | :--- | :--- |
| $1891-1900$ | . | .. | 15.45 |
| $1901-1909$ | .. | . | 13.84 |
| $1910-1919$ | .. | .. | 11.94 |

The average for the Commonwealth for the ten seasons 1909-1919 was 11.17 bushels, so that Queensland for that period has well maintained its position with regard to wheatgrowing possibilities, but it does not average the yield of countries that might be comparable with it. The average of Egypt is 25.30 bushels; of Chile, 17.12 bushels; Algeria, 15.45 bushels; and Uruguay, 12.68 bushels. India returns but 10.70 bushels, but in that country the methods of agriculture prevent its being on an equality with other countries.

It is yet early to definitely say what the export value of fair average quality wheat will be, but it may be assumed that it will be in the close neighbourhood of $9 \mathrm{~s} .2 \frac{1}{2} \mathrm{~d}$. at London,
including freight charges, \&c., which amount to 1s. $8 \frac{1}{2} d$. per bushel, and if this be the case it will exceed any values ever received by growers from the mills in the State, excluding the harvest of 1920-1921 under pool conditions. The nearest approach will be the value in 1919-1920, when it was about 7s. 1d. In 1915-16 the value per bushel was $6 \mathrm{~s} .9 \frac{1}{2} d$., a drought year, and the lowest value was reached in 1913-14, when 3s. $1 \frac{1}{2} \mathrm{~d}$. was paid for milling wheat per bushel. The success of the Queensland Pool, which has been free of those difficulties experienced in the Southern States, has so impressed the growers that a succeeding Pool has been asked for in the coming season of 1921-2. A ballot has been taken among those growers who supplied wheat to the Pool of last harvest, with the result that $87 \frac{1}{2}$ per cent. were for a continuation of the Pool and $12 \frac{1}{2}$ per cent. against continuation. Each voter was asked to indicate upon his ballot-paper the area he had placed under wheat this year, and, after allowing for those who did not comply with the request and for those who are not cultivating wheat this year, it may be assumed that the figures obtained represent about 85 per cent. of the wheat now growing. This would mean, upon a fair estimate, that the total acreage of wheat for 1921 would be about 178,000 acres, as aaginst 175,750 acres in 1920. It is not expected, however, that this year's crop will equal the returns of last year, because the season at the planting time and during the early stages of growth were somewhat against an equal return to the acre. The Chairman of the State Wheat Pool has been good enough to furnish a report which is here published for public information, setting forth in brief the transactions of the Board.

## REPORT OF THE CHAIRMAN OF THE WHEAT BOARD FOR 1920-1921.

"The Wheat Pool Act of 1920" was assented to on the 29th November, 1920, and the State Wheat Board was gazetted early in the following month.

Five representatives of growers and a Chairman comprise the Board.

The Board was empowered ander the Act to receive, store, handle, and market the whole of the crop of the 1920-1 harvest.

## Commencement of Operations.

Owing to the late formation of the Pool, the initial difficulties of the Board were considerable.

Before it was in a position to bring into being an organisation to meet the demands of growers, a considerable area had been harvested, deliveries had been made to mills, and quantities of grain had been sold on the local market.

It was an entirely new undertaking, so far as the State of Queensland was concerned, and it was a strenuous task to endeavour to give satisfaction to a large number of growers, and at the same time place the organisation of the Pool on a sound business footing. The demand from every point of the wheat belt was for prompt delivery and payment, and the Board endeavoured to meet the situation fairly in the interests of the growers as a whole.

At the same time, the Board had to carefully guard against, as much as possible, some of the grave mistakes made by the earlier Pools in the South, and avoid, if possible, the huge losses made in initial pooling efforts elsewhere.

## Approximate Crop.

The crop is estimated at approximately $4,250,000$ bushels, practically the whole of which has been delivered to the Board.

Commonwealth Guarantee of 5s. Per Bushel.
The Board was able to secure the extension of the Commonwealth guarantee of 5 s . per bushel to this State, which enabled it to make a first and second advance of 2 s . 6 d . each per bushel to growers of f.a.q., and also advances to growers of inferior wheat.

Total Advances made to Growers.
Per bushel net.
s. $d$.
F.A.Q. (or f.a.q. subject to
a milling dockage)
No. 2 Milling $\quad . . \quad$.. 48

No. 3 Milling .. .. 3
Scented .. .. .: 3 9
No. 1 Red Wheat .. .. 50
No. 2 Red Wheat .. .. 36
No. 1 Feed .. .. .. 4 0
No. 2 Feed .. .. .. 30

## State Government's Guarantee of 8 S.

The State Government's guarantee of 8 s . per bushel encouraged the cultivation of wheat, and undoubtedly had the effect of influencing the fixation of the home consumption price at 9 s . per bushel.

The fact that the home consumption price was fixed at 9 s . per bushel has been responsible for the good return assured to growers of milling wheat.

## The Australian Wheat Board.

My Board is not represented on the Australian Wheat Board. Owing to the comparatively small exportable surplus in the State, it was not considered desirable that my Board should have a voice in the general management.

My Board decided that it was preferable to use the machinery of the Australian Wheat Board for the disposal of its surplus.

Had it acted independently, it would have come into competition with the Australian Wheat Board, not only in marketing operations, but also in freight fixtures.

## Oversea Sales.

Immediately after its formation, my Board endeaveured to secure the necessary tonnage for its exportable surplus, but did not succeed in this direction until the end of March, 1921.

The great difficulty experienced by the Board throughout its operations has been the limited storage at its disposal. In consequence of this, every effort was made to secure shipping space.

When, however, the necessary arrangements were made, shipping freights showed a marked decline, which compensated the Board for its inability to operate on the more favourable market available in the earlier part of the year.

It was of course, impossible for the State Wheat Board to enter into any contracts for sale last year, as it was not then known definitely whether the State would have an exportable surplus. When some of the early contracts were entered into by the Australian Wheat Board, the State Wheat Board of Queensland was not in existence.

Up to the 31st August last the Board has exported 620,400 bushels. The average price realised in London is 9 s . $2 \frac{1}{4} \mathrm{~d}$. per bushel for f.a.q. wheat, and the cost of landing in London, including freight and all charges, 1s. $8 \frac{1}{2} \mathrm{~d}$. per bushel.

The average freight per ton on wheat shipped to the 30 th June, 1921, is 50 s. 3d.

Of the f.a.q. wheat shipped, advice has been received of the sale of all except 750 tons.

No advices have yet been received from the Australian Wheat Board as to the amount realised for the second-grade wheat, but the wheat was carefully sampled before shipment, and it is anticipated that a satisfactory return will result.

## Dumping.

To endeavour to take more rapid delivery from growers, dumping operations were carried out at important centres.

It was necessary, however, to dump only a very small portion of the total crop. Losses may have occurred as a result of the Board's policy of dumping-a policy that has been found necessary in all other States, but they have been small and of little consequence spread over the whole crop.

## Local Sales.

The Board's local sales have been entirely satisfactory. The local market for chickwheat is limited, and, acting in unison with the other States, we confined our sales of chickwheat to our own market. Good, sound wheat, suitable for export, not required locally, has been shipped overseas.

## Costs.

The cost of indoor administration will be under one penny per bushel, and outdoor administration under three farthings per bushel.

A statement of receipts and expenditure to 30th June last will be found on page 63 in the Report of the Auditor-General.

## General.

The Board had a difficult task, but it is gratifying to know that the growers generally have expressed their approval of the system.

Although the Board does not represent the Crown, it has always received every assistance from the Department of Agriculture and Stock.

## CANARY SEED.

The difficulty found by canary-seed growers in selling their products at a satisfactory price caused the formation of a voluntary Pool, which by the agreement of the growers was controlled by the State Wheat Pool Board, and help was given to the voluntary Pool by a guarantee by the Government towards arranging financial matters to enable the early stages of the Pool to be carried out satisfactorily. It was estimated by the Wheat Board that the crop would be approximately 2,000 tons, and that about 830 tons would be sufficient to clear the financial guarantee and pay all expenses of the Pool. The number of growers who joined the Pool was 296, as against 221 growers mentioned as being willing to join the Pool at the time the negotiations for the formation of it were under discussion. Up to the 15 th September last 2,011 tons 1 cwt . $3 \mathrm{qr}, 15 \mathrm{lb}$. of canary seed had been received by the Pool, of which 976 tons 4 cwt. 0 qr. 15 lb . had been sold at the best price obtainable. Some trouble has been met with in the market, owing to seed that was not within the control of the Board being placed upon the market at a lower price than the Board required; this position will, however, pass as that lower-priced seed becomes absorbed. The Commonwealth tariff includes canary seed, hemp, and rape under one heading;
therefore the actual quantity imported is not known. The duty before the revision of the tariff was: General tariff, 1s. 6 d . per cental, and 5 s . per cental with a preferential tariff of 4 s . per cental. The total quantity of the items mentioned, imported during 1919-20, was 33,607 centals, of the declared value of $£ 80,105$, the principal sources of supply according to the places of origin being the Argentine Republic, Japan, and Turkey. New South Wales took 15,705 centals, and Victoria 13,443 centals, while Queensland imported 606 centals, the balance of the quantity imported being divided between South Australia, Western Australia, and Tasmania.

## SUGAR.

Although the yield of sugar last year was a little more than in 1919, the drought conditions of that year persisted, more particularly in the southern sugar districts, practically through the whole of 1920. This was unfortunate in many respects, but chiefly so because it was the first year in which (by the agreement between the Commonwealth and State Governments) the growers and millers were to receive a much larger price for their sugar. The rains did not fall till comparatively late in the year, when the ground in the districts below Mackay was getting too cold to take advantage of the moisture. Above Mackay, however, where the summer heat is of longer duration and the soil retains its warmth longer, the crops made a good recovery, and, in fact, in the Innisfail district, constituted a record for the Mourilyaf and South Johnstone mills. This fact created a similar situation to that occurring in 1919 ; the yields of the Southern districts were poor, while the Northern output was fair to good. Five sugar-mills, all in the South, did not crush at all.

The yield of sugar in 1920 amounted to 167,401 tons, or 5,265 tons more than in the previous year, and 140,313 tons less than in the record year of 1917. This was very largely due to the climatic factors mentioned above, and to the fact that there was not nearly the same amount of standover cane to be harvested as there was in 1917. This short crop led to further importations of foreign black-grown sugar at very high prices.

The total acreage under cane in 1920 was estimated by the Government Statistician to be 162,619 acres, an increase over 1919 of 14,150 acres. Of this area, the cane from 89,142 acres was crushed, also a larger area than the previous season. This left a balance of 73,477 acres, which included cane allowed to stand over till 1921, cane cut for plants, and cane planted for 1921. This area of 73,477 acres was larger by about 10,000 acres than in the previous year, and was no doubt largely due to the enhanced price for
sugar causing a considerable area of new land to be put under cane. The yield of cane per acre amounted to 15.02 tons, slightly better than that of 1919 , and about the same as 1918 , but lower than the average yield for ten years past. The total tonnage of cane harvested was $1,339,455$ tons, and although this was 80,695 tons more cane than the 1919 yield, yet the tonnage of sugar per acre was not so high, being only 1.82 tons, as against 1.91 tons in 1919, due to the commercial cane sugar in the cane not being so high.

The tons of cane taken to make 1 ton of 94 net titre sugar are always of great interest. In 1920 it took 8.1 tons, as against 7.76 in 1919. This latter figure was the lowest ever recorded. During the past ten years there has been a very great improvement in this figure, due to the better varieties of cane now being grown as the direct outcome of the work of the Bureau of Sugar Experiment Stations, combined with more efficient work in the mills.

Turning to the present season, it is gratifying to be able to record that the climatic conditions have been, in both North and South Queensland, very much better than in any year since 1917. In consequence, a fine harvest is anticipated. It is now estimated that some 250,000 tons of sugar will be produced this year, which will make it the second best year on record. This, however, is not wholly due to climatic conditions, but also to the large increase in acreage as a result of the increased price for sugar now being paid, and which will continue to be paid, during this and the next season.

This has had a most stimulating effect upon the industry generally, which is now under a sounder and more prosperous footing than it has been for many years.

The work of the sugar experiment stations, a branch of this Department, has increased very largely during the past few years owing to the establishment of new experiment stations and the expansion of the industry generally. New cane varieties are being tested, and many of these have been found suitable for Queensland conditions. Owing to the establishment of the Central Sugar Cane Prices Board, an insistent demand for higher-class varieties of cane with a better sugar content has arisen, and this is being met by the sugar experiment stations, who distribute approved varieties to farmers free of charge.

Highly successful field days have been held at the Bundaberg and Mackay experiment stations during the year, at which large numbers of farmers attended and received practical instructions in canegrowing. Experiments in cultivation, fertilising, \&c., are also undertaken, and numbers of lectures are delivered throughout the year.

The new experiment station at South Johnstone has proved very successful, and the raising of canes from seed is now being undertaken.

The extended term for which Dr. J. F. Illingworth, the Entomologist, was engaged, having expired, he has now severed his connection with this Department, and left for Hawaii. The entomological work of the Sugar Bureau is at present under the charge of Mr. Edmund Jarvis, whose work had previóusly been much appreciated by sugar-growers.

Full reports upon the work of the sugar experiment stations in all its branches will appear in the annual Report of the Bureau later in the year.

## COTTON.

The history of the values received by farmers for cotton on the farm shows a consistent upward tendency during the last five years, and if it was profitable to cultivate the crop at the values of 1914, there must be a fair margin, should present prices fall, to warrant the continuation of this crop, and that upon a profitable basis. In 1914 the grower received 1.65d. per lb. for cotton on the farm, in 1915 he obtained 2.54 d ., in 1917 the sum of 3.58 d ., in 1918 he received 4 d ., and now he is being paid $5 \frac{1}{2} \mathrm{~d}$. per lb . America is showing a tendency to keep her cotton within her boundaries, and the demand from Europe is very great; so that there does not seem to be any probability of the market value falling below a profitable figure.

The European situation, possibly brought about by the position in America, has no doubt fostered the movement, that is strongly supported by the manufacturers, to encourage the cultivation of cotton within the British Empire to supply the needs of Great Britain, which, according to Mr. Winston Churchill, produces only one-fortieth of the needs, and to this end the British Government has set aside $£ 1,000,000$ of what may be termed war profits to aid the encouragement of cotton.

This year Queensland has a larger crop to handle than has been the case since the days of the American Civil War, and the total of seed cotton for sale will approximately be $923,000 \mathrm{lb}$., or $305,672 \mathrm{lb}$. of ginned cotton; yet with this quantity available it is impossible to sell it in Australia at a fair price-the firms known to be handling unmanufactured cotton were advised of the crop and the sale was advertised-because, as it is understood here, of the importation of unmanufactured cotton from countries, principally in Asia and Africa, where the cost of production is so much less than it is here. In 191617, at the middle of the war, merchants in Australia imported 282 tons, or over $600,000 \mathrm{lb}$. weight; in 1917-18 the quantity was $1,651,740 \mathrm{lb}$.,
of the import value of $£ 80,177$; in 1918-19 some $813,657 \mathrm{lb}$., of the import value of $£ 46,075$; and in 1919-20 the quantity was $611,394 \mathrm{lb}$., valued for import at $£ 44,476$. This material is landed in Australia free of duty, and, as a consequence, not only is Queensland shut out of her home market, but has perforce to seek an overseas market in order to get rid of her crop.

A similar position exists with regard to cotton seed, which is also admitted free of duty, and is used for the expression of the oil in it and for manufacture of meals for food for stock. The importations for a similar period have been : -

1917-18-1,365,500 centals; value, £2,530. 1918-19-15,742 centals; value, £2,663.
1919-20 - 4 centals; value, $£ 11$.
Apart, too, from the fact that, excepting the sale of small lots in Queensland for feed purposes and that there is no sale possible in the Australian market, there is the ever-constant danger of importing disease with the seed, which, if it were to spread to this State, would spread havoc among the crops.

An arrangement has been made, through the Agent-General, with the British Cotton Growers' Association, whereby that Association has undertaken to market Queensland-grown cotton, clean and of good quality, for five years from January, 1920. This arrangement applies to the whole or a portion of the crop during that period, shipped to Liverpool, and thus the right to sell in Australia is reserved. This year's crop will be sent to Liverpool because it cannot be sold in Australia at a remunerative price.

During the year inquiry was made into the capabilities of Queensland for cotton-growing by Messrs. Crawford Vaughan, Johnston, and Armstrong, who, on behalf of their principals, made a thorough investigation of the coast lands from south to north. Their report has not been made public yet, and it is not yet known what may eventuate from their visit, but it is known that, generally, they were satisfied with what they saw from a cotton point of view, and especially so with the opportunities for cotton cultivation in the Central district.

## DAIRYING.

The estimated value of the dairying industry now approximates $£ 8,000,000$ a year, and it is but 33 years since the foundations of this industry were laid, so far as Queensland is concerned, by the establishment of the travelling dairies, which first brought the use of the separator to the notice of the people. The first
attempt at exporting to Europe was made in the early part of 1895, when a small consignment was made, and to encourage the trade a bonus was given under the Meat and Dairy Produce Encouragement Act. The trade export overseas and interstate is now quite another matter, and our productions have earned a reputation upon the London market that is well worth maintaining, the export business exceeding $£ 1,000,000$ a year. This has been accomplished by the people of the State, with the help of the Government in connection with education, railway concessions, and so on, and without any help or encouragement from outside Governments or sources ; it is a purely domestic industry and should remain as such, without interference. The cessation of the Federal Butter Pool brought this branch of the industry upon the open market, and as the alteration happened in the autumn months, the happening was to the advantage of Queensland, which normally is the only State that has surplus butter for sale throughout the year. During 1920 there were 448,634 dairy cows in milk and dry, and the production of butter was $40,751,373 \mathrm{lb}$., and of cheese $11,512,262 \mathrm{lb}$. The year to the 30th June last was, however, for the first six months, very dry, so much so that the Government purchased fodder to help the dairy farmers to preserve their cattle; but, luckily, a change came before it could be used. For that year, notwithstanding the disabilities of the first six months, the production of butter has been about $50,872,000 \mathrm{lb}$., and of cheese about $11,478,662 \mathrm{lb}$., to which is to be added the milk used in condensing factories and for domestic purposes.
"The Dairy Produce Act of 1920 " is being gradually brought into full operation, and this is not upsetting the arrangements of dairymen or causing inconvenience to them. It is a comprehensive measure, and cannot in any way be viewed as being of an experimental nature. It is based upon experience here and upon the legislation in other dairy countries. The two principal points in the Act are those relating to overrun, which factories are now required to distribute pro ratâ among those supplying the factory concerned with milk or cream; and, secondly, the limitation of dairying to areas of not less than 1 acre. The practice of dairying in cities and towns upon areas which may be termed 16 -perch dairies had long been a source of trouble to the Department and to those living in the neighbourhood of them. The Local Authorities had power under their Acts to deal with areas, but the "Dairy Produce Act of 1904" gave no such power; the Local Authorities, though often asked to take action, did not do so for some reason or another, and it became necessary, in order to solve the difficulty, to include
this power in the present Act. A sufficient time has been given to the holders of these small dairies to make other arrangements, and they will soon disappear.

## HORSES.

When saying that the supply of draught and light horses has fallen off, it is not meant that the number of animals is less, but that the quality now offering is by no means what it used to be a few years ago. There are plenty of animals, but one has only to watch the animals in use in our towns to notice the deterioration; the class of draught horse in which the owner and driver took a pride is conspicuous by its absence, and has been replaced by animals of nondescript character and indifferent breeding. It is not altogether the advent of the motor vehicle of the different kinds that are used which has brought about this state of things, the charge lying rather with the many breeders who are content with using entires for their mares that are of no breeding and have no quality other than, perhaps, being good looking. It may be said that the use of the motor will reduce the demand for good draught horses and, perhaps, drive them out of general use; but it has not happened yet, nor is it likely to do so upon the farm, at least, or in the cities. The cost of tractor power over a period, the need for skilled management, the hindrances arising from breakdowns, cost of upkeeping in comparison, and other factors are reasons why the horse will not, at least for a generation, be defeated by the tractor, and consequently attention should be given to the best methods to stay the deterioration that is going on and has been going on for some years now in the breeding of our draught stock. It is not only that attention shall be given to the entires, but oversight is required also over the mares. This Department has for some years past required that Agrieultural Societies receiving Government subsidy shall not give prizes to any stallion which has not received a certificate of soundness from a Government veterinary surgeon, but that safeguard is by no means sufficient; it is only touching the fringe of the matter. Legislation for the purpose of controlling the use of entire animals and mares is needed, and is strongly urged, so that encouragement may be given towards improvement. A Bill has more than once been prepared, and during one session it was presented to Parliament, the object of which was to cover this serious matter, and it is to be hoped that the attention of legislators will again be directed to this object; otherwise that some system may be evolved under which entires of proved quality can be placed at the service of the small breeder as premium stallions.

There are 742,217 horses in the State, an increase of 10,512 over 1919, and of these 6,402
are returned as entires, but of these entires there are many that are not worthy of the title from a breeding point of view.

## STOCK.

The civilised world is gradually increasing its capacity for the consumption of meat, but there does not seem to be any indication of attention being given to the opportunities for increasing the stock-carrying capacity of this country, for which there is probably much room. According to the figures arrived at by the Government Statistician, the live stock in Queensland, calculated in terms of sheep to the square mile; number 133. The figures for other countries, where generally the capacity for stock-raising is not any better, and perhaps not so good, as here, show that this country is lagging behind its possibilities. The next lowest figures are from New South Wales, with 205 head; then Victoria, with 373 ; the United Kingdom with 1,311; Argentine, 334; the United States of America, with 334; and the Union of South Africa, with 255 head. Nations that for centuries have not been meat-eaters are now turning in that direction, but the production is not ascending in comparison with the demand.

The values of the imports into the United Kingdom, during the last few years, for beef, mutton, and pig products, do not, of course, represent normal times, but it is interesting to know that in 1917 the value of these products imported into the United Kingdom was $£ 197,452,076$, and in $1918 £ 323,207,954$, and that the exports were of the value of $£ 268,630$ and $£ 120,321$ respectively. These figures indicate the enormous amount of business done, without reckoning business that is and can be done in other countries of the world, even after making full allowance for the disturbance of normal trade in late years. At pre-war values the imports of meat, dead and manufactured, were about $£ 42,000,000$ a year ; of animals for food, $£ 6,000,000$; and of pork products $£ 18,500,000$. According to the "Statistics of the Commonwealth," the proportion of live stock to population in 1860 stood thus: Horses, 0.38 per cent.; cattle, 3.45 per cent.; and sheep, 17.58 per cent. In 1918 the proportion was: Horses, 0.50 per cent.; cattle, 2.51 per cent.; and sheep, 17.16 per cent. In Queensland in 1860 the proportion to each head of population stood thus: Horses, 8.38 per cent.; cattle, 15.43 per cent.; and sheep, 122.94 per cent. In 1918 the figures were: Horses, 1.13 per cent.; cattle, 8.33 per cent.; and sheep, 26.24 per cent. The populations in each of the States was in the earlier period much greater than that of Queensland at the time of separation from New South Wales; they were more settled, and in every respect advanced to
a higher degree, but, notwithstanding this, Queensland as a stock-raising State made greater advances.

The cattle numbered $6,455,067$, an increase of 514,634 as compared was 1919, and, unlike the sheep population, cattle stock are now in greater numbers than they have been for the last ten years, but towards the fall of the year there was a distinct fall in the marketable value of stock, arising from several causes. Marketable cattle that before the drop were worth $£ 10$ a head upon the station fell in value to half that amount, and in the markets the differences were as between 36 s . and 22 s . a hundredweight, dressed weight. One consequence of these changes has been that the meatworks have run but short seasons, because, owing to the circumstances under which the trade has to carry on its work, the cost price at the ship's side cannot meet the London market values with a fair margin of profit, even when account is taken of the by-products. Feeling has been manifested at the difference in London between the Argentine meat and the Queensland products, and the Agent-General has drawn attention thereto. The Argentine carries about $30,000,000$ head of cattle, as against the $13,000,000$ of Australia, of which about one-half are in Queensland; but, of the Argentine cattle, a proportion only can compare with Queensland stock. In this State there are some 46,232 cattleowners, and the average size of a herd is 140 head, an average that has not been exceeded since 1910, when it stood at 151 head. In 1915 the average Aropped to 119 head, in 1916 it was 120 head, and in 1917 it was 131 head, but, excepting those years, the average has been well maintained between 136 and 140 head during the decade. The number killed for preservation or for freezing for food was 201,120 head of cattle, or, in other words, the foregoing represents the number that passed through the meatworks, the greater quantity of which was intended for export, though a proportion was used for consumption within the State. In addition, there were 229,839 head of cattle and 18,144 calves killed for consumption within the State, and, if account were taken of the bodies from the meatworks that were locally consumed, the average consumption of each one of the 734,379 people in each year in the State would be found to be high. The consumption for each head of population in 1920, of cattle, sheep, lambs, calves, and pigs, directly slaughtered for home consumption, was 177.66 lb ., but it is noticeable that there was a steady decline in the consumption of meat from 1914, when it stood at 278.89 lb . for each person, until 1919, when it rose from 161.21 lb . in 1918 to 195.72 lb . Taking the cattle of Australia as a whole, this State carries about 45 per cent. of
the total, and the State which approaches it most closely is New South Wales, with nearly 26 per cent. of the total.

## WOOL.

The system under which the farmers' wool up to 1,500 head of sheep has been handled has been continued and is developing in favour with the farmers. During the year the instructors visited the selectors' holdings in the sheep-growing districts, and, as a consequence, there has been a big increase in the wool received for classification and sale on owners' account. The instructor, Mr. Brown, draws attention from a wool point of view that the great proportion of the wool received is of the crossbred type, brought about by the keeping of mutton breeds of sheep, and that at the present there is but a limited demand, if there is a demand, for this class of wool.

The experiments for blow-fly, which officially are under the control of the Science and Industry Council, but which are really carried out by officers of this Department, are still being continued, and Mr. Brown has expressed the positive opinion, after many years' connection with this work, that jetting with a poisonous solution is, so far, the best method discovered.

There is, unfortunately, an extension of other pests that affect sheep, and the instructors have found the stomach worms and nasal flies even in the West, where many pastoralists have not before thought that they existed. The instructors have met the farmers and pastoralists upon such subjects in many parts of the State, and have done their best to impress upon their audiences the importance of the matter, and the folly of inaction. The number of sheep in the State in 1920 was $17,401,840$, an increase of 25,508 over the preceding year, and of that number 15,706,426 were shorn, for a return of $114,809,963 \mathrm{lb}$. of wool expressed as greasy. In quality, the clip was somewhat better than in 1919, the average weight of the fleece being 7.03 lb ., which was about 44 lb . higher than in the preceding year. In number, sheep are much less than in the first half of the last decade, the maximum of that period being in 1914, when there were over $23,000,000$, but to the effects of the war and to the years of leanness about that period the drop may in a great measure be attributed; but, in addition, the dingoes have made considerable inroads into the flocks, and the apathy of the cattlemen towards the destruction of this pest, and consequently to the damage of the neighbouring sheepowners, has been a contributing factor. The cattlemen claim that the dingo helps to keep down the marsupial, which eats the grass required by the stock, but that pest was responsible for 13 per cent. of the
total losses of sheepmen during 1920 from drought, flood, fly, dingoes, old age, and lambing and other causes. If the marsupial is the destructive agent feared by the cattlemen, why not make greater efforts to destroy these animals instead of leaving the work to the dingo?

There are some 4,036 sheepowners, and the a verage number to each owner is 4,312 , but there are nine people who own over 100,000 each. To carry on the work of sheep-raising, machinery to the value of $£ 745,417$ was used in 1920

The number of sheep killed for preservation for food or for freezing-or, in other words, mainly for export-was 21,479 sheep and 363 lambs, while for consumption for food within the State there were killed 417,423 sheep and 22,184 lambs.

The lambing for 1920 was upon a 50.36 per cent. basis, from 7,405,279 ewes that were mated with rams, and there were $15,709,426$ sheep shorn during the year, for a production of wool expressed as greasy of $114,809,963 \mathrm{lb}$.

## NATIVE FAUNA AND BIRDS.

A member of the New York Zoological Society, in a recent survey of animal and bird life in Morocco, Algeria, Italy, and France, found that the destruction of wild life was deplorable and proceeding at a rate that promises destruction to many classes of wild animals and birds, the decrease among birds being most noticeable. This reference is made to emphasise the fact that a similar set of circumstances prevails in Queensland, where the question is apparently not one of preservation of the fauna, but what is the commercial value. The publication of the ascertained slaughter of opossums (over $2,250,000$ ) during the year to 30th June, 1920, has not prevented applications being made this year for the rescission of the Proclamation protecting them during this year, and information is frequently to hand of the violation of reserves for native birds, notwithstanding that the position of such reserves is advertised by notice boards.

The Queensland laws, as at present constituted, are difficult to administer, because, excepting that the police have general power under the Acts, there is no power for the appointment of auxiliary help unless it be in connection with a reserve, whereas supervision is greatly needed also in places where there is no reserve.

The attention of the public, especially of lovers of birds and animals, is being directed to the wholesale slaughter that is going on here and elsewhere, and associations are moving towards a more stringent application of protective laws. But lately, the Governors of the Public

Library, Museum, and Art Gallery of South Australia passed resolutions advocating restrictions upon oversea collectors of the fast disappearing Australian fauna, and if the necessity of protection has appealed to such a body, the necessity must be patent for protection from that large army who carry on destruction without any reason other than the profit or pleasure it will bring. A step towards further protection that is needed is the registration of all dealers in birds and animals, with power to regulate the business.

A difficulty in properly administering the law is met with in the different laws in the States and the apathy with which the subject is viewed in some of the States, and a general law is desirable in States and Commonwealth to cover the protection of animals and birds, and so prevent the possibility of protection in one place and not in another. Experience of this kind has been felt in Quêensland, where attempts have been made to land birds caught in the Northern Territory and not protected there, but protected here. It is admitted that some of the birds here, including some of the imported birds, are of no particular use to man, but of the land birds it may be taken that most of them are more or less insectivorous and are thus the friend of the farmer and orchardist, and greatly so in this semi-tropical country where the fruitgrower has so many insect enemies; consequently protection of birds is highly important.

## PURE SEEDS AND STOCK FOODS ACT.

The installation of up-to-date apparatus, and changes in the staff, have enabled me to make many alterations in the methods of working, which has greatly increased the efficiency of this branch.

Both buyers and sellers are freely availing themselves of the services of the laboratory, and on several oceasions it has been necessary to cease taking samples of the stocks held by vendors, in order that the work on hand could be completed without inconvenient delay.

During the period under review, the undermentioned towns or districts were visited for the purposes of taking samples or investigating complaints regarding seeds and stock foods. Places visited more than once are marked with an asterisk:-

| *Allora | Booval |
| :--- | :--- |
| *Atherton | Boowoogum |
| Ayr | Bowen |
| Beaudesert | "Brisbane |
| Beenleigh | *Bundaberg |
| Biggenden | "Cairns |
| Boonah | Charters Tower |


| *Clifton | *Nambour |
| :--- | :--- |
| Gayndah | *Nanango |
| Gladstone | Pittsworth |
| *Gympie | *Rockhampton |
| Ipswich | Roma |
| *Kilkivan | *Stanthorpe |
| *Kingaroy | Tarzali |
| Laidley | Tingoora |
| Landsborough | Tolga |
| Lowood | *Toowoomba |
| Mackay | *Townsville |
| *Maryborough | *Warwick |
| Mount Morgan | Woolooga |
| *Murgon |  |

The number of samples examined at the laboratory each year since the Acts came into force clearly shows the increasing importance of this branch.

| Year. |  | Seed Samples. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Stock Food |  |  |  |  |  |
| 1915 | $\ldots$ | $\ldots$ | 467 | $\ldots$ | - |
| 1916 | $\ldots$ | $\ldots$ | 995 | $\ldots$ | - |
| 1917 | $\ldots$ | $\ldots$ | 1,020 | $\ldots$ | - |
| 1918 | $\ldots$ | $\ldots$ | 1,070 | $\ldots$ | - |
| 1919 | $\ldots$ | $\ldots$ | 1,345 | $\ldots$ | - |
| 1920 | $\ldots$ | $\ldots$ | 2,021 | $\ldots$ | 123 |
| 1921 | $\ldots$ | $\ldots$ | 2,761 | $\ldots$ | 187 |

Seven prosecutions were instituted for breaches of the Pure Seeds Acts, the defendants in each instance being fined for selling seeds which contained a larger proportion or amount of foreign ingredients than is prescribed. On several occasions buyers of seeds have sued the vendors, the certificates of analyses issued under the Acts being used as primâ facie evidence as to the quality of the seed. In each case brought under my notice, the verdict has been in favour of the buyer.

It cannot be too widely known that buyers whose main source of income is derived from agricultural pursuits may send samples of seeds for analysis, no charge being made providing the seeds were purchased as seeds for sowing, and the following particulars given:-

## Vendor's name and address. <br> Name of seed.

Quantity purchased.
Locality where the seed is to be sown.
Name and address of purchaser, the weight of the samples sent being that prescribed by the Regulations.

A vendor, within the meaning of the Acts, is "Any person who sells, or offers or exposes for sale, or contracts or agrees to sell or deliver, any seeds."

It will, thorefore, be noted that the common accentance of the Acts, as referring only to
seedsmen, is erroneous. A produce merchant, storekeeper, auctioneer, farmer, or grower of the seed, is a vendor, whenever he sells, offers, exposes for sale, or contracts or agrees to sell or deliver any seeds.

All vendors should have more than a passing interest in the attached tables, which give the percentage of samples germinating as between 0.9 per cent. and 90.99 per cent., and also the percentage of samples that complied with standards prescribed for Schedule A, Schedule B, and the far-too-large percentage that did not comply with the Regulations on account of impurities or an excessive amount of non-germinable seeds.

Under the Stock Foods Act, every Queensland manufacturer of stock foods, or duly authorised agent or any manufacturer, not resident in the State, is required each January to send to the Department a statutory declaration setting out the specific names, proportion or amount of each of the original grains, seeds, materials, or ingredients of the stock food.

This section is doing good work. Already several lines for which exaggerated claims had been made have disappeared from the market, and the appearance of others has been prevented by the label which has to be affixed to each package, stating the specific name of each of the original grains, seeds, materials, or ingredients, and the specific name and proportion or amount or the foreign ingredients, giving suffcient information to the buyer as to the real value of the food so as to render its sale impossible, except at its true value, which in most cases would be less than that of bran or pollard.

Considerable attention during the year has been devoted to the wholesale sellers of stock foods, many of whom will readily admit that they have standardised their methods, and are now putting on the market an article of better value from the user's point of view.

It is often true that he who begins a great deal finishes little, and my efforts have been directed to getting the position as regards concentrated and prepared stock foods thoroughly understood before attempting any serious supervision of chaff, grain, \&c., except in those cases where complaints as to their quality have been made.

Buyers of both stock foods and seeds would do well to let quality, rather than price, be their guide, and, in the case of any doubt as to the goods purchased, to write to the Department without delay, so that an officer from this branch may investigate the matter, whilst the goods are intact and the facts fresh in the memory of both buyer and seller.

Agricultural Seeds Teisted under the Pure Seeds Actis, 1920-21,

|  |  |  | Perchan | tage of | SAMPLE | Germinating. Between- |  |  |  |  | Percentage of Samples up to the Standard of Purity and Germination prescribed for. |  | Percentage of Samples which did not comply with the prescribed Standard on account of - |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 100-90 | 89-80 | 79-70 | 69-60 | 59-50 | 49-40 | 39-30 | 29-20 | 19-10 | 9-0 | $\underset{\text { Grade. }}{\text { A }}$ | $\begin{gathered} \text { B } \\ \text { Grade. } \end{gathered}$ | $\underset{\text { ties. }}{\text { Impuri- }}$ | $\begin{aligned} & \text { Germina- } \\ & \text { tion. } \end{aligned}$ |
| Barley, Cape | $\begin{gathered} \% \\ 82.9 \end{gathered}$ | \% | \% | \% | \% | \% | \% | \% | \% | \% |  |  |  |  |
| Barley, skinless | $76 \cdot 2$ | $14 \cdot 3$ $23 \cdot 8$ |  | $2 \cdot 8$ |  |  | \% |  |  | . | $77 \cdot 2$ | $17 \cdot 1$ | $2 \cdot 9$ | $2 \cdot 8$ |
| Barley, malting | $84 \cdot 6$ | 15.4 |  |  |  |  | . |  |  | . | $76 \cdot 2$ | 23.8 | 2.9 | $2 \cdot 8$ |
| Beans, Mauritius | $33 \cdot 3$ | 66.7 |  |  |  |  | . |  |  | . | $77 \cdot 0$ | $15 \cdot 3$ | $7 \cdot 7$ |  |
| Beans, Soy | $100 \cdot 0$ | 66.7 |  |  |  |  |  |  |  | . | $100 \cdot 0$ | 15 | 7.7 |  |
| Clover, white |  | $25 \cdot 0$ |  | $50 \cdot 0$ |  | $25 \cdot 0$ |  | . | $\ldots$ | . | $100 \cdot 0$ |  |  |  |
| Clover, red | $25 \cdot 0$ | $25 \cdot 0$ | $50 \cdot 0$ | 50.0 |  | $25 \cdot 0$ |  |  |  | . | $25 \cdot 0$ | $50 \cdot 0$ |  | $20 \cdot 0$ |
| Couch |  |  |  | $50 \cdot 0$ | 16.8 |  |  |  |  |  | $50 \cdot 0$ | $50 \cdot 0$ |  |  |
| Cowpea |  |  |  |  | $20 \cdot 0$ |  | $40 \cdot 0$ | $20 \cdot 0$ | $20 \cdot 0$ | $33 \cdot 2$ | $50 \cdot 0$ | $16 \cdot 8$ |  | $33 \cdot 2$ |
| Cotton | 53.9 4.8 | 23.0 | $7 \cdot 7$ | $7 \cdot 7$ |  |  | 40 | $20 \cdot 0$ | $20 \cdot 0$ $7 \cdot 7$ |  | $80 \cdot 0$ 69.2 | $20 \cdot 0$ |  |  |
| Canary seed | 4.8 42.1 | $23 \cdot 8$ 47.4 | $33 \cdot 3$ $5 \cdot 3$ | $33 \cdot 3$ | 4.8 | . |  |  | 7.7 |  | $69 \cdot 2$ 61.9 | 7.7 33.3 | $15 \cdot 4$ | $7 \cdot 7$ |
| Linseed | $90 \cdot 0$ | 47.4 | $5 \cdot 3$ |  | $5 \cdot 2$ |  | . | $\ldots$ | -. |  | $63 \cdot 2$ | $33 \cdot 3$ $5 \cdot 3$ | 26.3 | $4 \cdot 8$ |
| Lucerne | $7 \cdot 6$ | 51.0 | 26.4 |  | $10 \cdot 0$ | $\cdots$ |  |  |  |  | 90.0 |  | $26 \cdot 3$ | $5 \cdot 2$ |
| Mangel | $5 \cdot 6$ | $5 \cdot 6$ | $26 \cdot 4$ | 9.4 29.2 | 1.9 | 1.9 |  |  | 1.8 |  | $54 \cdot 8$ | $30 \cdot 1$ |  | 10 |
| Maize | 68.4 | 21.1 | 10.5 | $22 \cdot 2$ | $38 \cdot 9$ | $16 \cdot 6$ | . | $11 \cdot 1$ | . . | . | $61 \cdot 1$ |  |  | 5 |
| Millet, broom | $50 \cdot 0$ | $12 \cdot 5$ | $25 \cdot 0$ | 12.5 | . |  |  |  | . . | $\ldots$ | $68 \cdot 4$ | $28 \cdot 1$ |  | 38.9 3.5 |
| Millet, Foxtail (Setaria) | 50.8 | $27 \cdot 0$ | 11.1 | $12 \cdot 0$ $3 \cdot 1$ | 6.4 | $\cdots$ |  |  |  | $\ldots$ | $75 \cdot 0$ | 25.0 |  | $3 \cdot 5$ |
| Millei, Japanese . | $38 \cdot 2$ | $20 \cdot 6$ | 16.1 | $7 \cdot 3$ | 6.4 3.0 |  |  | $1 \cdot 6$ |  | - | $79 \cdot 3$ | $4 \cdot 7$ | 8.0 | 8.0 |
| Millet, French . | 15.4 | $30 \cdot 7$ | $15 \cdot 4$ | $23 \cdot 1$ | 15.4 | $4 \cdot 4$ | $3 \cdot 0$ | $4 \cdot 4$ | $3 \cdot 0$ | $\ldots$ | $67 \cdot 8$ | $8 \cdot 8$ | $7 \cdot 3$ | $16 \cdot 1$ |
| Oats | 72.5 | 13.7 | 15.4 | 23.1 | $15 \cdot 4$ |  |  |  |  |  | 53.8 | 23.1 | 15.4 | $16 \cdot 1$ 7.7 |
| Paspalum | 72 | 13.7 | 9.8 |  | $5 \cdot 7$ |  |  |  | $2 \cdot 0$ | $2 \cdot 0$ | 68.6 | $19 \cdot 6$ | 15.4 7.8 | 4.7 4 |
| Panicum, white | 66.7 | $22 \cdot 2$ |  |  | $5 \cdot 7$ | $10 \cdot 0$ | $11 \cdot 4$ | $14 \cdot 3$ | $28 \cdot 6$ | $30 \cdot 0$ | $32 \cdot 8$ | $37 \cdot 2$ | 7.8 | 4.0 $30 \cdot 0$ |
| Prairie | $6 \cdot 0$ | $12 \cdot 1$ | $27 \cdot 3$ |  |  |  |  |  | $11 \cdot 1$ |  | $66 \cdot 7$ | 11.1 | $11 \cdot 1$ | 11.1 |
| Rhodes grass |  | 12.1 | 27.3 0.6 | 27.3 1.8 | $12 \cdot 1$ $3 \cdot 6$ | $6 \cdot 1$ $14 \cdot 5$ | $6 \cdot 1$ | $3 \cdot 0$ |  |  | $60 \cdot 6$ | $27 \cdot 3$ | 11.1 3.0 | 11.1 |
| Rice .. | $55 \cdot 6$ | $22 \cdot 2$ | 11.1 | 11.1 | $3 \cdot 6$ | $14 \cdot 5$ | 16.4 | $27 \cdot 9$ | $23 \cdot \mathrm{I}$ | $12 \cdot 1$ | $32 \cdot 1$ | $29 \cdot 1$ | 4.0 | $9 \cdot 1$ $33 \cdot 9$ |
| Rye grass (Italian) | 5-6 | 22.2 | $75 \cdot 0$ | 11.1 | $25 \cdot 0$ |  | . | . . |  | . . | $77 \cdot 8$ |  | $4 \cdot 9$ | $33 \cdot 9$ $22 \cdot 2$ |
| Rye grass (Perennial) |  | $25 \cdot 0$ | 50.0 |  | $25 \cdot 0$ |  |  |  |  |  | 75.0 | $25 \cdot 0$ |  | 22.2 |
| Rye . | $80 \cdot 0$ | $20 \cdot 0$ |  |  |  |  |  | $25 \cdot 0$ | . | - | 75.0 |  |  | $25 \cdot 0$ |
| Rape | $46 \cdot 2$ | 23.1 | $23 \cdot 1$ | $3 \cdot 8$ |  |  |  | $\ldots$ |  | . | $80 \cdot 0$ | $20 \cdot 0$ |  | 250 |
| Sorghum | $34 \cdot 2$ | $30 \cdot 9$ | $20 \cdot 0$ | 3.8 6.6 | $5 \cdot 0$ | $3 \cdot 3$ | $3 \cdot 8$ |  |  |  | 88.5 | $7 \cdot 7$ |  | $3 \cdot 8$ |
| Soudan grass | $10 \cdot 3$ | $39 \cdot 4$ | $20 \cdot 3$ | 6.6 12.8 | $5 \cdot 0$ $7 \cdot 3$ | $3 \cdot 3$ $3 \cdot 6$ | 1.8 |  |  |  | 77.5 | $13 \cdot 3$ | 0.9 | 8.3 |
| Tares | 85.7 |  |  | $14 \cdot 3$ | 7 | 3.6 | 1.8 | $2 \cdot 7$ | 1.8 |  | $59 \cdot 6$ | $21 \cdot 2$ | 1.8 | $17 \cdot 4$ |
| Tobacco |  |  | $75 \cdot 0$ |  |  |  |  |  |  |  | $85 \cdot 7$ | $14 \cdot 3$ |  |  |
| Wheat | 12.5 82.6 | 12.5 | 12.5 | 25.0 | $12 \cdot 5$ |  |  |  | 25.0 | 25.0 | $75 \cdot 0$ |  |  | $25 \cdot 0$ |
|  |  | 13.1 | 4. |  |  |  |  |  |  |  | 75.0 82.6 | 17.4 |  | $25 \cdot 0$ |

Vegetable Seeds Tested under the Pure Seeds Acts, 1921-21.

|  | Prroentage of Samples Germinating. Betivee |  |  |  |  |  |  |  |  |  | Percentage of Samples up to the prescribed Ptandard of Germination. | Percentage of Samples that did not comply with the prescribed Standardon account of- |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 100-90 | 89-80 | 79-70 | 69-60 | 59-50 | 49-40 | 39-30 | 29-20 | 19-10 | ${ }^{9-0}$ |  | Impurities. | Germination. |
| Beet | $\begin{gathered} \% \\ { }_{2 \cdot 2} \end{gathered}$ | $\frac{\%}{17 \cdot 8}$ | $\stackrel{\%}{\%}$ | \% | - | \% | \% | \% | \% | \% |  |  |  |
| Beans, Broad | $100 \cdot 0$ |  |  | $26 \cdot 7$ | 6.7 | $20 \cdot 0$ | $2 \cdot 2$ |  | $2 \cdot 2$ | \% | 71.1 |  |  |
| Beans, French | 67.2 | $10 \cdot 4$ | $10 \cdot 4$ | $3 \cdot 4$ | $5 \cdot 2$ |  |  |  |  |  | $100 \cdot 0$ |  | 28.9 |
| Beans, Lima | $33 \cdot 3$ | $33 \cdot 3$ | 16.7 | $3 \cdot 4$ | $5 \cdot 2$ | 16.7 |  |  | 1.7 | 1.7 | 82.8 |  | 17.2 |
| Cauliflower | 27.2 $20 \cdot 0$ | $33 \cdot 4$ $13 \cdot 3$ | 17.3 | 7.4 | 5.0 | $3 \cdot 7$ | 1.2 | $2 \cdot 4$ | $2 \cdot 4$ |  | $83 \cdot 3$ 84.0 |  | 16.7 |
| Carrot | $20 \cdot 0$ | 13.3 6.0 | $13 \cdot 3$ | 26.7 | 6.7 | $13 \cdot 4$ | $6 \cdot 6$ | 2 | $2 \cdot 4$ |  | $84 \cdot 0$ $73 \cdot 3$ |  | 16.0 |
| Cress |  | 6.0 | 14.0 | 18.0 | 20.0 | $10 \cdot 0$ | 12.0 | $4 \cdot 0$ | 6.0 | 10.0 | $73 \cdot 3$ 46 |  | 26.7 |
| Cucumber | $66 \cdot 6$ | $33 \cdot 4$ |  | $80 \cdot 0$ |  | $20 \cdot 0$ |  | .. | 6 | 10 | $80 \cdot 0$ |  | 54.0 20.0 |
| Celery |  | 20.0 | $20 \cdot 0$ | $40 \cdot 0$ |  |  |  |  |  |  | $100 \cdot 0$ |  | 20.0 |
| Kale ${ }_{\text {Kohl }}$ Rabi | $75 \cdot 0$ | $25 \cdot 0$ |  |  |  |  |  |  | $20 \cdot 0$ |  | 80.0 |  | $20 \cdot 0$ |
| Leek | $40 \cdot 0$ | $40 \cdot 0$ 33.3 |  |  |  |  |  |  | $20 \cdot 0$ |  | $100 \cdot 0$ |  |  |
| Lettuce | $50 \cdot 0$ | $33 \cdot 3$ | $33 \cdot 3$ | 16.7 | 16.7 |  |  |  |  |  | 100.0 |  | 20.0 |
| Melon | $20 \cdot 6$ | $16 \cdot 7$ $41 \cdot 1$ |  | 16.7 14.8 | $5 \cdot 5$ |  | $11 \cdot 1$ |  | .. |  | 77.8 |  |  |
| Marrow | $28 \cdot 6$ | 42.8 | 14.8 | 14.8 14.3 | 2.9 14.3 | $2 \cdot 9$ | $2 \cdot 9$ |  |  |  | 82.4 |  | $17 \cdot 6$ |
| Mustard Onion | 25.0 | 25.0 | 50.0 |  |  |  | . |  |  |  | $71 \cdot 4$ |  | 17.6 |
| Peas | 16.7 | $20 \cdot 9$ | 16.7 | $8 \cdot 3$ |  | $12 \cdot 5$ | 4.1 | 12.5 | 8.3 |  | $100 \cdot 0$ |  |  |
| Parsley | 61.9 | 21.4 | 4.8 | 9.5 |  | 2.4 | $4 \cdot 1$ | $12 \cdot 5$ | $8 \cdot 3$ |  | 62.6 |  | 37.4 |
| Parsnip |  | 12.5 | 37.5 | $25 \cdot 0$ | 12.5 |  |  |  |  | 12.5 | $83 \cdot 3$ 87.5 |  | 16.7 |
| Pumplkin | $54 \cdot 6$ | 18.2 | 27.2 | $9 \cdot 1$ | 18.2 | 18.2 | 27.3 |  |  | 27.2 | 72.8 |  | 12.5 27.2 |
| Radish Rhubarb | 25.8 | $29 \cdot 1$ | 22.6 |  |  |  |  |  |  |  | $100 \cdot 0$ |  | $2 \%$ |
| Rhubarb |  |  | 33.3 | -20.3 | 15.3 | $3 \cdot 2$ |  | $3 \cdot 2$ |  | $3 \cdot 2$ | $90 \cdot 4$ |  | $9 \cdot 6$ |
| Sweet Corn | 11.8 42.8 | 41.2 57.2 | 11.8 | 17.6 | 5.8 |  | $5 \cdot 9$ | 5.9 | 31.1 |  | 68.9 |  | $31 \cdot 1$ |
| Spinach . | $42 \cdot 8$ | 57.2 |  |  |  |  |  |  |  |  | 76.5 100.0 |  | 23.5 |
| Turnip | $45 \cdot 9$ | $27 \cdot 1$ | 13.5 |  |  | 20.0 | 20.0 | 10.0 | $10 \cdot 0$ | 10.0 | 30.0 |  |  |
| Tomato | $35 \cdot 3$ | $32 \cdot 4$ | 14.7 | $5 \cdot 4$ 2.9 | 5.4 2.9 | 2.7 | $\stackrel{\square}{5} 9$ | .. |  |  | $89 \cdot 2$ |  | 70.0 10.8 |
|  |  |  |  |  |  |  | $5 \cdot 9$ |  | 5.9 |  | $82 \cdot 4$ |  | $17 \cdot 6$ |

- 7 R REPORT OF THE REGISTRAR OF BRANDS.
Sir,-I have the honour to submit herewith a report on the administration of "The Brands

Acts, 1915 to 1916," for the year ended 30th June, 1921.

Details of registration of brands and earmarks are as follows :-


The volume of registration shows a decrease on the previous year's figures in the number of three-piece brands registered, but this is accountable to the fact that during the year 1919-20 owners took the opportunity of securing the choice of a new series of brands introduced, and the number of registrations effected was abnormal. The registration of cancelled brands has practically ceased, due to the fact that a list of these brands has not been prepared, and owners are quite satisfied to accept the present series of brands available at the lower fee. A comparative decrease is also noted in the volume of registration of cattle earmarks, sheep brands, and sheep marks. Symbol brands are, however, in greater demand than previously.

A number of stockowners are of opinion that the provisions for the imprint of distinctive brands on the cheek to denote age, class, or description of stock could, with advantage, be altered to permit of the use of an earmark for these distinctive purposes. This proposal cannot, however, be entertained, as it would certainly tend to depreciate the value of the registered station earmark. If the station earmark could be confined to one ear, it would then be possible to set apart a distinctive mark for the opposite ear, but the registration of marks, consisting
of two imprints in one ear or one imprint in each ear, was found necessary to meet the increased demand, and to prevent confusion in the registration of similar marks in one district.

The compulsory branding by owners of horses and cattle is advocated in many quarters, and would undoubtedly be of advantage to provide primâ facie evidence of ownership of stock, which is so necessary in case of stock-stealing.

Many irregularities in the use of brands and marks are still noted. Prosecutions have had the desired effect in some cases. The fines imposed during the year for breaches of "The Brands Act of 1915'" and Regulations totalled £483 12s.

Richd. P. M. Short,
Registrar of Brands.

## DINGO AND MARSUPIAL DESTRUCTION

 ACT.The total endorsement paid by the Government for the destruction of marsupials, dingoes, and foxes, since the commencement of the system in 1877 , has been $£ 309,382$, and the total bonus paid by the Boards, including the Government endowment, has reached $£ 858,348$, but yet there is no appreciable diminution of the pest ; indeed, the dingo menace is worse than ever, and the presence of it is in a great measure due to the
action, or want of action, of the Boards in not enforcing the powers given them by the Act. There is ample power under the Act for a Board to employ scalpers and pay them out of their funds; and, this being so, there is no reason why action should not have been taken by Boards in whose areas there are or were owners who have not done their duty to their neighbours by destroying dingoes. The argument of the cattleowner that the dingo keeps down marsupials which eat up the grass is but poor consolation for his neighbour who keeps sheep and loses many in one night, and a great many in the aggregate. The number of dingoes killed in 1920 was 52,333 , an increase of 10,000 scalps over the preceding year, which, in its turn, gave a cent. per cent. increase over 1919; consequently it may be reasonably claimed that this Act has effiected a considerable amount of good, and it would seem that if the Boards were more strenuous in carrying out the Act it would be found that an amendment or alteration would not be required, other than reducing the bonus imposed for foxes.

The operations for the year ended 31st December, 1920, show a decided increase in the volume of dingo destruction in comparison with that of the previous year, and reached the maxinum yet attained in any year. There is little doubt that this is due primarily to the inducements held out by the increase in the rates of bonus payable, and provides an argument to the supporters of the bonus system that these inducements are an incentive to extra activity amongst scalpers. There are, however, unfortumately, indications that strenuous and systematic operations are necessary to combat this ever-growing menace which threatens the pastoral industry, notwithstanding the cooperative efforts of the Boards and stockowners towards the extermination of the pest.

A decline in the volume of fox destruction on the previous year's figures is noted, but this is partly attributable to the fact that Boards in districts where this pest is present in large numbers have been forced to suspend operations in this direction owing to lack of funds. It appears to be a generally accepted fact that the fox is much more easily secured than the dingo, and, as a result, members of Boards throughout the State are almost unanimous in their opinion that a decrease in the minimum bonns for this
class of scalps could, with advantage, be provided. The number of wallabies paid for shows a decrease, but a decided increase is noted in the number of bonus payments for the smaller marsupials. At present only seven Boards are paying for the former and eight for the latter class of scalp.

The bonus payments for the year under review reached the unprecedented amount of $£ 54,721$, and the fact that stockowners, through their representatives on the various Boards, have taxed themselves to provide an annual assessment for 1920 or $£ 66,256$ is ample evidence that the dingo and fox menace is appreciated.

During the year under review there has been a persistent advocacy by Western pastoralists for the establishment of a Central Board to deal with the question, but there is an equally strong opposition to any drastic alteration in the methods at present in vogue. The advocates for the Central Board are also of opinion that the bonus system has outlived its usefulness, and suggests that the destruction of dingoes be compulsory on all landholders, and compulsory universal poisoning be instituted. The members of Boards in the coastal and other settled districts offer strenuous opposition to the above scheme, and ask that the bonus system be retained, with the reduction of the minimum payable for foxes.

The present Act has only been in force for a period of about two years, and has been extended to all parts of the State, and stockowners who suggest that the present system, with minor alterations, deserves a trial, seem to have the balance of argument on their side. Some of the Boards are concerned at the rapid increase in the number of marsupials, and as this class of skin is not now as marketable a commodity as hitherto, it will probably be necessary for them to again provide bonus payments, especially in the settled farming districts.

The need for compulsory legislation for the destruction of dingoes is aptly illustrated by the following extract from the "Pastoralists" Review" for September last:- "The lambing returns have been very satisfactory, but in some districts wild dogs are making a considerable reduction in the numbers. One station in the Charleville district, which expected to mark 90 per cent., is said to have reduced its estimate by 27 per cent." This statement can be applied to other places also.

The following is a table of operations in respect of dingo and marsupial destruction from the inception of legislation on the subject until 31st December, 1920:-

Particulars of Destrudtion.

| Year. | Kangaroos Wallaroos. | Wallabies. | Bandicoots, Paddamelons, and Kangaroo Rats. | Dingoes (including Foxes) | Total. | Bonus Paid. | Government <br> - Endowment. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | £ s. d. | £ s. $d$. |
| $\left.\begin{array}{l}\text { From } 1877 \text { to } 30 \text { th } \\ \text { June, } 1906\end{array}\right\}$ | 7,935,175 | 10,665,694 | 639,936 | 279,873 | 19,520,678 | 541,435 66 | 243,558 212 |
| 1906-1907. |  | 398,284 | 81,746 | 9,758 | 489,788 | 11,990 11 5 | 3,146 505 |
| 1907-1908 |  | 474,387 | 127,618 | 11,493 | 613,498 | 13,259 14 | 5,515 4 4 2 |
| 1908-1909 |  | 509,006 | 105,110 | 13,897 | 628,013 | 16,063 $16 \quad 4$ | 5,399 3 |
| 1 July, 1909, to 31 \} |  | 1,198,059 | 103,534 | 23,828 | 1,325,421 | 31,419 17 | 5,260 7 7 9 |
| 1911 ... .. .. |  | 708,501 | 40,055 | 21,508 | 770,064 | 18,657 $19 \quad 9$ | 5,887 1011 |
| 1912 |  | 912,795 | 43,267 | 23,743 | 979,805 | 25,340 8 8 7 | 6,271 16 16 |
| 1913 |  | 787,558 | 18,627 | 18,757 | 824,942 | 19,535 18 2 | 6,541 8 8 |
| 1914 |  | 433,325 | 9,044 | 21,061 | 463,430 | 15,665 46 | 3,467 $19 \quad 8$ |
| 1915 |  | 319,437 | 14,048 | 25,924 | 359,409 | 17,596 119 | 4,063 7 0 |
| 1916 |  | 202,612 | 5,330 | 26,525 | 234,467 | 17,143 3 3 8 | 3,596 5 6 |
| 1917 |  | 220,721 | 4,197 | 18,916 | 243,834 | 14,472 1110 | 3,223 19 |
| 1918 |  | 211,306 | 5,287 | 22,206 | 238,799 | 17,264 1910 | 3,450 18 |
| 1919 |  | 154,246 | 7,882 | 42,292 | 204,420 | 43,781 18 4 | $5,0000^{5}$ |
| 1920 |  | 129,980 | 35,215 | 52,333 | 217,528 | 54,721 1 | $5,000 \quad 0 \quad 0$ |
| Totals | 7,935,175 | 17,325,911 | 1,240,896 | 612,114 | 27,114,096 | $858,34814 \quad 0$ | £309,382 3 |

Appended is a table of operations of the various boards throughout the State for the year ended 31st December, 1920 :-

mod Appended are Reports from the Principal of the Queensland Agricultural College, the Agricultural Chemist, the Director of Fruit Culture, the Director of Agriculture, the Chief Dairy Expert, the Chief Inspector of Stock, the Government Bacteriologist, the Government Botanist, and the Curator of the Botanic Gardens.

With this Report also are statistics upon rural matters, compiled by the Government Statistician, and in them will be found much interesting and valuable information.

ERNEST G. SCRIVEN,
Under Secretary.




## ANNUAL REPORT ON THE QUEENSLAND AGRICULTURAL COLLEGE.

Sir,-I have the honour to present to you the Annual Report of the Queensland Agricultural College for the year ended 30th June, 1921.

In doing this it is pleasing to record that the past season, since May, 1920, in fact, has witnessed the break-up of the most prolonged drought the district has ever known. The winter crops of 1920 came on well and gave every promise of a splendid yield. Unfortunately caterpillars made their appearance and did great damage. We estimate that this pest was responsible for a loss of from one-fourth to one-third of the hay crop. The summer of 1920-21 was not altogether advantageous (see rainfall chart). The early plantings did fairly well, but the midseason and late plantings scarcely yielded payable crops. Nevertheless the past year has been good, and was the best since 1916, while the amount of fodder harvested was greater than in 1916-17. This is shown on comparative table on page 30. For the purposes of this report, this table has a definite significance.

General Review of the College Farm from 1915 to 1921. - I feel that it is advisable to give a review of the College farm for the past six

September, 1915, there has been a progressive and definite development of the farm. Accompanying this development, as will be seen by reference to the rainfall chart, there has been a continuity of drought conditions. This has prevented any true testing of the policy underlying the development. A brief reference to the tables showing the number of animals carried on the College farm, an area of only 1,686 acres, will indicate how heavily we are stocked. The main objective underlying the development of the farm during the past six years has been to provide adequate food for our high-class purebred stock. Much has been accomplished by subdivision of paddocks, but the chief thing was to grow a sufficiency of fodder, not only for the year's needs but also for conservation against droughts. That we have grown such a large quantity of fodder this year would seem to indicate that the scheme of development was likely to succeed.

Against this, however, one has to place the expenditure, and in this regard there are definite reasons for doubting ultimate success.

The following table shows the expenditure and receipts (to nearest £) since 1910:-


An examination of this table shows clearly that there is a general tendency towards an increased net expenditure-i.e., that the total expenditure is rising more rapidly than the receipts.

To appreciate the meaning of this, 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 does not, nor could it ever have been intended that it should, return an annual profit. In truth a considerable annual loss must be incurred, because the fees charged each student are so low that they do not even cover his 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 purebred stock of various breeds and pure seeds of various varieties are raised for the purpose of selling to farmers at reasonable rates. This section constitutes by far the greater part of the outside work of the College. Incidentally this section is utilised for the practical training of the students, but the magnitude of the work carried out is far in excess of the requirements for purely educational purposes.

As, in this section, we are dealing with wellknown quantities-i.e., recognised-breeds of stock and approved varieties of crops-there is no reason why receipts should not at least cover expenditure, or that this section should not be self-supporting. If a persistent loss is incurred, it can only be inferred that either the College is underselling the private breeder or else that the conditions of employment and work at the College render it impossible to compete with private men.

Reference to the above table certainly indicates that our field operations are not run at a profit, or even on a self-supporting basis. For net expenditure is rising, whereas receipts are remaining practically constant. Further, the table indicates that the main causes of this
failure is the rapid rise in wages paid (wages paid almost reached the amount of receipts last year), a rise due not to an increased number of employees but to an increased wage to each employee.

Under these circumstances it would seem advisable that the field operations of the College should be reduced to that minimum which is just sufficient to permit of practical training for the students. Failing some such reduction, we are accepting a very considerable annual loss which is debited against the cost of educating a student at the College, a cost which is obtained by merely dividing the net expenditure by the number of students in residence.

On the other hand, if the good done by our distribution of pure bred stock and seeds is considered of sufficient value to the State to warrant the loss incurred, then it would seem only right that the appropriation for the College should be divided into three sections-one for education and maintenance of students, another for experimental work, and a third for stud stock breeding.

The Teaching Staff. -The teaching staff of the College is inadequate. In making this statement there is absolutely no intention to in any way decry the ability of any of the present instructors, or to suggest that they fail to carry out their duties as far as in their power lies. All that it is intended to convey is that the number of instructors is insufficient to cover the whole ground in a proficient manner.

Perhaps a clearer conception of what is meant can be got by comparing the Agricultural College with a School of Medicine. In the latter no one would expect two or three professors or lecturers to adequately cover the numerous individual subjects associated with the complete study of medicine. Agriculture is entirely similar to medicine in this respect, except that in agriculture there are probably a greater number of individual subjects to be considered. I do not think this is generally fully recognised, and, in consequence, each instructor at the College is called on to cover too great a scope. It is not reasonable to expect one man to know all the details, say, from the growth of tropical plants to that of wheat. The same can be said with regard to the breeding and management of live stock and many other sections.

At the risk of repetition, I would stress the point that Agriculture is not a single subject, it is a big industry covering a multitude of subjects, and each of these subjects is a field for instruction and investigation. It cannot be expected that, in a new country, we could afford to have a separate investigator or instructor for each and every one of these subjects. Yet it remains an undoubted fact that we have not carried our subdivisions anywhere near far enough, and in this respect the College is certainly understaffed.

Situated as the College is, some 55 miles from Brisbane, the main centre and seat of the Department of Agriculture and University, I cannot see how this difficulty can be overcome. Much of the extra assistance required could be served by part-time instructors, yet it is impossible to think of visiting instructors when we consider that it takes a whole day to come from and return to Brisbane. Yet this strengthening of the College staff is imperative if true success is to be obtained.

The College and the University School of Agriculture.
The probable necessity of reducing the field operations of the College has been indicated. If such a reduction takes place we would no longer require so large a farm.

Again, the inadequacy of the teaching staff at the College has been pointed out, as well as the difficulty, due to our isolation in the country, of supplementing this staff by visiting lecturers.

Take these two points in conjunction with the generally expressed idea that a School of Agriculture should be established at our University, and the following is offered for earnest consideration, viz: -

To remove the instructional side of the College nearer to Brisbane, or even to a site in juxtaposition to what may be the future University grounds. If this action were taken, the effect would be threefold-
(1) Many "part time" or visiting instructors would be made available to strengthen the present College teaching.
(2) Sub-tropical Agriculture could be included in the practical work of the College, a section which cannot be included in our present locality.
(3) While there should be no necessity for the College to lose its identity as an institution for training boys for practical farming and stock raising, yet it could serve admirably as a nucleus around which the suggested University School could develop.

## Education.

The session ending 30th June, 1920, closed with thirty-three students on the rolls. Of these eight left at the end of the session, and two students joined, leaving a total of twenty-seven for July-December. After December, when the annual examinations are held, twelve students left, while seventeen new students joined at the beginning of the next session in January, 1921, giving a total for the second half of the year of thirty-two.

In July last there were twenty-six returned soldier students in residence. Of these twentytwo had left by December, while the remaining four completed the course of training before June, 1921.

Since the inception of the College the following have received direct instruction at the institution.

| College students | 648 |
| :---: | :---: |
| Returned soldiers | 139 |
| Attending teachers' schools | 506 |
| Attending farmers' winter schools | 175 |
| Dairy inspectors | 20 |
| Crown lands rangers | 12 |

This total does not include a number who have attended the College for short periods of instruction in special short courses, and of whom no record has been kept in the College register.

At the annual examinations held in December, 1920, the following results were obtained:-

Third Year in Agriculture.-Tait, J. A., obtained third year certificate and diploma in Agriculture.

Second Year in Agriculture.-Hall, D. S., McLuckie, A. W., and Straughan, W. R., took the seeond year certificate; de Stokar, O., failed in the year.

First Year in Agriculture.-Bonar, T. Y., Henderson, K. V., Land, J. D., Murphy, S. F., Tait, K. M., and Bray, A., took the first year certificate ; while Costello, R. E., Gillies, C. W., Paxton, W. O., and Wheeler, T. J. K., failed in the year.

Second Year in Dairying.-Black, N. A., Horneman, W. B., and Irwin, J. N., obtained the diploma in Dairying.

First Year in Dairying.-Ward, D. V., passed, obtaining the first year certificate. Clarkson, A. V., failed in the year.

The State Milk and Cream Testing Certificate was obtained by Hall, D. S., McLuckie, A. W., Straughan, W. R., Seymour, B. T., Clarkson, A. V., and Zillman, J. R. F.

The Third Class Engine Drivers' Certificate was obtained by Hall, D. S., McLuckie, A. W., Straughan, W. R., de Stokar, O., and Hodges, R. V.

The following attended short courses, mainly practical work, and either sat for no examinations or gained no certificates:-Belt, K., Dorman, M. D., Marshall, A. N., Graham, E. H., Milner, R. H.

Returned Soldiers.-This year saw the completion of the Commonwealth general scheme of vocational training for returned soldiers, and no new students of this class joined this year. All, except one, of these men have now left, after having had a training at the College for periods varying from three months to two years.

Since this training for returned soldiers was undertaken in 1917, a total of 139 have attended the College. The majority of these were well fitted for agriculture and should succeed. Some, as was to be expected, found farm life uncongenial. Generally the characters of the men approved to enter the College were good, and the Department of Repatriation is to be congratulated on the care they exercised in the selection of men for College training. There were some, however, who fell far short of the standard of conduct required. These were chiefly amongst the earliest students and gained admission before the scheme of training was properly in running order, and before the Department of Repatriation took over the selection of intending students.

Winter School for Farmers.-This year only sixteen farmers and farmers' sons took advantage of this school. This shows a very considerable falling off in numbers, and this can be attributed to one cause only, viz., that all railway concessions to those attending the school have been cancelled. Formerly a concession of onethird in the fares was allowed. In view of this year's small attendance, and the probability of similar small attendances in future years, the point is raised as to whether this Winter School should not be abandoned. Obviously, to run such a Winter School involves a certain amount of expenditure on the part of the College, an expenditure which is much the same whether there are few or many students. Therefore, the expenditure per student goes up as the number of students decreases. But a still more important objection is that the College staff are held up for a period of three weeks, and other instructors are engaged from Brisbane. It is a high wastage of vital energy when these officers find themselves committed to impart instruction to only a few farmers.

If railway concessions, at least as great as those which formerly obtained, carnot be re-established, then I must reluctantly recommend that the Winter Schools be discontinued. It may be possible to introduce some other system which will satisfy, in part, the demand for agricultural instruction which was met by the Winter Schools, and suggestions in this regard will be given in a separate report.

Agricultural Training at the Loclyer High School.-During the year a definite move was made to introduce an Agricultural Section into the Lockyer High School for the benefit of those scholars who might desire to take a High School training yet who wished to return to farm work.

This movement sprang from two distinct sources-(1) the committee of the College View School, a small primary school where the pupils are chiefly the sons and daughters of farmers, and (2) from the committee of the Lockyer High School, which school is situated in Gatton and serves a large and closely-settled farming district, extending from Toowoomba to Ipswich.

Each of these committees approached me to see if it would not be possible to utilise the Agricultural College for the purpose of giving the agricultural portion of the training to any pupils who might enter the agricultural section of the High School. In connection with this, it was pointed out that the Lockyer High School, which is situated in Gatton, was only 4 miles by rail from the College, also that the train service, which rendered Gatton the natural and convenient centre for a High School for a large district, served equally well for pupils to attend at the College on, say, one or two days per week. It was further pointed out that the College had all the equipment and necessary organisation to impart the special agricultural instruction, whereas it would be particularly difficult to establish such an equipment at the Lockyer High School.

The basic ideas underlying the movement were:-
(1) Many farmers would like their children to have the advantages of a High School training, but hesitated to allow them to attend for fear they would be weaned away from farm life, the feeling being that the trend of existing High School training was to fit the pupils for town occupations.
(2) Children attending the High School who intended to return to farm life would be better served if they could drop the, to them, unessential subjects of Latin, French, and pure Science (Physics or Chemistry) and devote the time thus rendered free to the study of Agricultural Science in various branches.
(3) The Agricultural College did not accept students until they were sixteen years of age, and then only accepted boys. On the other hand, very many children completed their primary school training-i.e., attained fifthclass standard -at the age of fourteen. The recognition of Agriculture in the High Schools was necessary, therefore, for the purpose of filling this gap between fourteen and sixteen, and permitting boys who intended to go to College to continue their school education at the High School without being alienated from Agriculture. But still another purpose would be served, inasmuch as girls intended for farm life would be given an opportunity of a training
more suitable for their future life. This latter need was not served by the Agricultural College.

That these ideas had a solid foundation in fact was amply borne out at the subsequent general meetings convened by the joint school committees. At these meetings many farmers spoke in favour of the movement, and, in all cases, voiced, more or less, exactly the ideas expressed above. Further, a promise was forthcoming of some twenty-five pupils who would enrol for the Agricultural section of the High School if it were established.
At last the proposal was reported on by Mr.
Riddell, Superintendent of Riddell, Superintendent of Technical Education, and myself. These reports were submitted to the Department of Public Instruction and the Department of Agriculture respectively. As a result, a trial of the scheme was approved. This approval of the proposed scheme was made before the last High School entrance examinations. For some reason, however, the inauguration of the scheme has been deferred. This delay is to be greatly regretted. There is no doubt but that the several public meetings convened by the joint school committees had worked up a keen enthusiasm, and pupils either entered or were prepared to enter the Lockyer High School to take the Agricultural course. With the delay, this enthusiasm is bound to wane, and, as in all such cases, it will be difficult to revive.
alir As Principal of the Agricultural College I iam entirely in agreement with the proposed seheme. Reference to my previous annual reports, extending from 1915 to date, will show that I have repeatedly pointed out the inadequate representation of Agriculture in our school train-
ing, and the isolation of the Agricultural College with reference to our general educational system. I consider the above scheme to be a big and most important move in the direction of correcting these two faults. The work done in the High Schools could not supersede the work done (1at the Agricultural College. At this College the whole of a student's time is devoted to the technique of Agriculture, while at the High School not more than two-thirds of the time could be given to Rural Science, the remainder would have to be devoted to the ordinary school subjects. Far from superseding the Agricultural College, therefore, the High School work in Agriculture would serve as a feeder to the College. It would bridge the gap between the ages of fourteen, when a boy normally reaches the fifth-class standard and is about to leave the State School, and sixteen, when he would be admitted to this College, a gap which exists at present and which is most disastrous to our organisation. Further, it would fill this gap without alienating the boys from Agriculture. In New South Wales, Agricultural High Schools have served this purpose with reference to the Hawkesbury Agricultural College. Surely they should serve the same purpose in Queensland. Certainly the above suggested scheme differs somewhat from the New South Wales organisation, but in these differences, I think, there lies a greater promise of far-reaching success.

Poultry Conferences.- The fourth annual conference of poultry breeders was convened by the College, and was held in September last. About 150 took advantage of the invitation to attend. At this meeting a general request was
end of March, which was the slack season for poultry breeders, whereas in September they were busy with incubation. Further, March would afford the opportunity of examining the birds in the egg-laying competition near the end of their year's laying, that is, at a time when all the faults in the breeding were likely to be evident. In compliance with this request, an interim conference was held on 19th March. This conference was somewhat hastily convened, and, unfortunately, clashed with several other
poultry functions. In consequence, the attendance was small-viz., sixty-eight.

I have to report that these conferences have steadily increased in importance and in the value of the discussions, and the time has arrived when it is necessary that an organising committee, together with a recording secretary, should be appointed. Certainly the deliberations of the conference should be published in full and placed on permanent record. Thus, two matters came forward last year.

The first dealt with the poultry tick. It was pointed out that this scourge of poultry breeders was prevalent in. Queensland and that it was spreading rapidly. It was asked that the Department of Agriculture take action-
(1) To make a survey of the State to see what area was infested.
(2) To investigate the best means of combating the pest.
(3) To devise means for the prevention of the spread of the tick from infested to clean districts. In this latter regard it was considered that the most active means for the spread of the tick was railway transport, and that some regulations were necessary insisting on the fumigation of trueks in which poultry crates had been
carried. carried.

The College considers the danger of invasion from this source so great that, in order to protect out stud poultry and the competition birds, We do not now accept any returned crates from those who purchase poultry from us.

The second point referred to egg-laying competitions. It was pointed out that these competitions, as at present constituted, had been in existence for the last eighteen years, yet an analysis of the results failed to show that they had effected any definite improvement in the average fecundity of our flocks. This is as would be expected, if the indications of scientific research are correct-viz, that the fecundity of the pullets is controlled mainly by the cock bird. Selection of hens for breeders on their egglaying record for the year could have little influence unless the cock bird mated with them transmitted high fecundity. To test this out, it was advorated that a cockerel test should be established at the College in connection with the egg-laying competition, the cockerel being placed under controlled mating, and being tested by the egg records of his pullets. The conditions for this test have been prepared, and it is hoped that a start will be made next April.

Visitors.-This year 867 visited the College. Included amongst them were His Excellency Sir Matthew Nathan, Governor of Queensland, Messrs. Wing, Professor of Animal Industry, Cornell University, U.S.A., Westropp, Secretary of the British Friesian Society, Dr. Valdez,

## RAINFALL CHART.

QUEENSLAND AGRICULTURAL COLLEGE


Direccao do Fomento, Timor, and the West Moreton and Lockyer Teachers' Association. The majority of the visitors were farmers and stock breeders who visited us for the express purpose of obtaining definite information.

## IMPROVEMENTS.

The reconstruction of the milking bails was practically completed. The old wooden framework and feed troughs have been entirely dispensed with, and replaced by galvanised iron pipe bails with swinging iron stanchions (see photograph). The floor has been relaid in concrete, the surface floated on so as to prevent the animals slipping, and the feed trough has been constructed in concrete. The whole floor, manure drain, and feed trough have been given such a slope that they are easily washed down, and dry evenly and quickly. The whole of the pipe bending and fitting and the making of the swinging stanchions was done at the College and in great part by the students.

These new bails are open and airy. They can be thoroughly cleaned both easily and rapidly. It is now hoped that arrangements can be made with the various firms concerned so that milking machines of at least half a dozen makes can be installed, thereby rendering these bails a complete training ground in the use of milking machinery.

## Experiment Plots.

Again this year only indefinite results were obtained from the field experiments. Many of the variety and manurial trials were vitiated by the inroads of caterpillars, while the rainfall from December on was insufficient to allow of satisfactory growth in the summer crops.

With fertilisers, the trials so far conducted seem to indicate that a dressing of from $\frac{1}{2}$ to 1 cwt. of superphosphate per acre ensures an increased yield of something approaching 20 per cent. over the unmanured areas. The tests, however, have not gone on long enough to show whether 1 cwt . of superphosphate is the maximum dressing, or whether superphosphate by itself is the best fertiliser. After this year's results, the full records of the manurial trials will be published in the Queensland Agricultural Journal. Another important section of this experiment work was commenced this year-viz., the field selection of seed of maize, pumpkins, and wheat; the testing of these selections by the ear to row method, with the intention of propagating pure or improved strains of higher productive value. It will require three or four years before any definite results can be expected from this important work.

## Electric Power Plant.

This section of the College is entirely unsatisfactory, and this has been stressed for the past five and a-half years. The College electric plant consists of a single unit which is kept in constant running and at an overload. Couple with this the fact that the lighting of the institution, the supply of water for domestic and stock purposes, the power for the dairy factory, and most of the power for chaffcutting, grinding grain, \&c., on the farm is dependent on this single overloaded power unit, and it is selfevident how great the inconvenience and how large the expense that must result.

When the lights fail, as they frequently do, the whole College is thrown into darkness, and. disorders amongst the students is invited. But when the power fails during the day, loss of money results in practically every department of the farm. Thus butter may be in the churn when the power fails. What should have been a first-grade butter comes out second-grade. The same thing applies to the butter held in our cool rooms. A breakdown at the power-house, and refrigeration stops, the cool rooms warm up, and butter stored as first-grade is reduced to secondgrade standard; while fresh meat in the meat room goes bad. Loss also results on the farm where half a dozen men on, say, chaffeutting are held up for an hour or so because of the failure of the power. The accumulated loss resulting from the inefficiency of the College power plant is large, and it is urgently needed that a second unit should be installed, the capacity of which should be at least double that of the existing unit.

## OUTDOOR DEPARTMENTS.

## The Farm.

The following is the table for the rainfall from April, 1921, to June, 1921, inclusive.

| Month. | Rainfall. | No, of Wet Days. |
| :---: | :---: | :---: |
| 1920. | Points. |  |
| April | 51 | 6 |
| May | 326 | 4 |
| June | 218 | 6 |
| July | 255 | 7 |
| August | 122 | 6 |
| September | 254 | 6 |
| October | 368 | 7 |
| November | 333 | 7 |
| December | 214 | 5 |
| 垁态 1921. |  |  |
| January | 234 | 10 |
| February | 107 | 3 |
| March | 364 | 12 |
| April | 190 | 10 |
| May | 111 | 6 |
| June | 608 | 7 |
| 3 Total | 3,755 | 102 |

I would refer to the graph showing the monthly rainfall at the College since April, 1915 , in comparison with the monthly average. In this graph April to April is taken as a season, and this seems justified because April marks the end of any summer planting, or, rather, a time by which we know whether our summer plantings are to be successful or not, and the commencement of the winter plantings.

Reference to this graph is of interest with regard to the past year. From the middle of January, 1918, until May, 1920, drought conditions held sway. During this protracted period of twenty-seven months the subsoils had dried out to great depths. Until these were properly wetted we could not consider that we were beyond the drought period, nor could it be expected that this moistening of the subsoils could be accomplished except as the result of several years of good rainfall. This was the condition under which we began the 1920-21 season, the subsoils proclaiming that a-state of partial drought would occur as soon as the rainfall was insufficient to keep the surface soil moist. Naturally the danger of such a recurrence would become increasingly less as any period of
beneficial rains became more protracted. It will be noted (see graph) that, with the single exception of August, the rainfall for each month from May to November, 1920, inclusive, was above the average. But for December, 1920, and January and February, 1921, the rainfall was below the average. The winter crops were excellent, and a record yield would have been obtained except for the damage done by caterpillars, a damage which we estimated at from one-fourth to one-third of the crop. On the other hand, the summer growth was poor, poorer even than the rainfall indicates, because of the dry subsoils.

The College Paddockis.-The growth of grass and weeds on the College paddocks also illustrates the peculiar nature of the year's rainfall in relation to the dry condition of the subsoils. By November very little grass had grown, nor was there sufficient subsequent rainfall to bring on a heavy growth. On the other hand, the heavy stocking (the College farm is heavily stocked) during the previous dry time had left the paddocks with much bare soil. This, coupled with the light surface rainfalls, was ideal for the development of weed growth, and we found Noogoora and Bathurst burr springing up all over: the property. A special chipping gang had to be put on to cope with this abnormal growth of noxious weeds, but, I regret, had to be disbandect in December, owing to the lack of funds, and before the work had been properly completed. I greatly fear that next spring will see a recur. rence of the weed nuisance, and will necessitate a repetition of last year's expenditure in this direction.

The Necessity for a Relief Paddock.-It has been mentioned above that the College is heavily stocked. In truth is is overstocked, yet it is practically impossible to reduce the number of animals kept, as long as we are required to run four distinct breeds of dairy cattle, to keep sheep for students' instruction, to have sufficient working horses to give adequate field training to students, and to work some 600 acres of cultivation, to breed Clydesdales and to accept outside mares for service. A considerable amount has been done, and might yet be done, by subdividing further the College paddocks and supplying water to each such paddock. The greatest relief, however, would be obtained by securing a relief paddock within a day's return trip of the College for the purpose of carrying the young stock and dry cows.

Farm Returns, 1st July, 1920, to 30\%h June, 1921.



Horses at College on 30th June, 1921.


Crops Harvested, Ist July to 30 Th June.



## The Dairy Factory.

During the past year the amount of cream supplied to the College Dairy Factory showed a marked increase. This has been due to the more favourable season chiefly, though there has been an increase of dairying through the district, with the result that we have a slightly greater number of suppliers.

This outside supply of cream has been of undoubted value to the training of the students in dairy factory managements and manufacture, though I think the work and equipment might be somewhat enlarged so as to enable us to handle first and second grade cream separately. Further; the output of the College Factory is not quite enough to allow of cheap transport by rail, as we are committed to engage a full truck for a comparatively small consignment.

## Balance-sheet.

Disbursements.
Purchases from outside cream suppliers
Supplied by College dairy herd
Total
Receipts.
Cash sales butter and cheese
Supplied to College dining hall
Skim and whole milk fed to calves .
Skim milk and buttermilk supplied piggery
Pefrigeration for butchery

## Total

$\begin{array}{lll}11,582 & 9 & 8\end{array}$
Showing a balance of $£ 9668 \mathrm{~s} .5 \mathrm{~d}$. to cover working expenses, salaries, \&c.

## Darry Herd.

With our dairy stock, particularly with the Ayrshires and Jerseys, we have reached a stage when it is imperative that every cow should be subjected to a strict 273 day test. It is useless for the College to be breeding pedigreed animals unless there is a guarantee of high production behind the pedigree. Theoretically, the College should be exceptionally well placed to carry out such tests; practically, we are very badly placed.

First.-Most of the milking is done by students, many of whom are mere beginners.

Second.-There is a constant change of milkers. This is necessitated by the organisation of the College, which requires that the students should be rotated, week by week, through the various branches of outside work.

Third.-We have four breeds to look after and consider, both as regards mating and feeding.

While the third point may not be exceptionally important, it is essential that the first two difficulties should be removed if it is intended to give the cows a fair show of proving their productive value. To meet this, I am recommending that extra paid assistance should be engaged for the milking, and next year it is hoped that we shall be able to record some high yields. Amongst the College stock there are some exceptionally fine producers, and they only require the opportunity to prove themselves.

During the year two additions were made to the herd by purchase. A young Friesian bull was obtained, through Mr. F. Brown, of Toogoolawah, from the famous Pabst herd of Wisconsin, U.S.A., and a Jersey bull was bought from Messrs. Carr Bros., of Indooroopilly.

Last year a number of our dairy stock were sent to the coast on agistment. This is the second occasion during the past six years that it has been necessary to send dairy stock away from the College. On each occasion they have gone to the coast, and the condition in which they returned has been exceedingly disappointing. Young stock have not grown, while grown stock have become impoverished. Stock off our country do not thrive when sent to the coast. In each of the abovementioned cases, we would undoubtedly have got better results had we had a relief paddock in our own district. I can only trust that this matter may be given earnest consideration during the year.

The returns from the dairy herd are shown below.

Sales of Cattle from lst July, 1920, to 30 th
June, 1921.


Stook at College, 30 Th June. 1921.


## Piggery.

In this section there has been an exceptional demand for stud animals, and both the numbers sent out and the receipts constitute a record. A comparative table since $1915-16$ is shown below.

| Year. |  | No. of Animals <br> sold for Stud <br> Purposes. | Receipts for <br> Stud Stock. |
| :---: | :---: | :---: | :---: | | Total |
| :---: |
| Receipts at |
| Piggery. |

This table shows clearly the effects of the drought. Our sales for stud purposes fell off during 1918-20, but the recovery in 1920-21 is exceptional. During the drought many farmers back-fatted and sold all their brood sows. Then the drought broke and skim milk and feed were available, but there was a scarcity of breeding pigs. This was reflected in our sales, which show that sows were in great demand. The College piggery was far from being able to fill all the orders sent to us, but it is worthy of record that ours was one of the few studs that could hold out through the prolonged drought, and it would be difficult to estimate the value to the State of the fact that the College was able to supply so
many stud animals at a time when there was an extreme scarcity of this class of pig throughout the whole Commonwealth. Undoubtedly the College has been of very considerable assistance in effecting a rapid recovery of the pig-raising industry.

During the year several additions were made to the College pig stock. Four Improved Berkshire sows were bought at the Royal Agricultural Show, Sydney. Later, a young Berkshire boar was secured. Three Tamworths were also bought, a boar and two sows. The latter have been introduced at the College to meet a small but persistent demand for this breed of pig. We feel that the demand is likely to develop rapidly when the value of the cross with either Berkshires or Middle Yorkshires is better recognised.

None of these young animals have bred yet, but if they prove satisfactory they should form an important addition to the stud.
The returns from the Piggery are shown below.

Sales of Pigs, 1st July, 1920, to 30th June, 1921.


| Pigs at College, 30 Th June, 1921. |
| :--- |

## Poultry Section

As with the Piggery, the sales for stud purposes have this year constituted a record for the College. This also applies to the total receipts. See table below.

| Year. | Receipts from Sales for Stud Purposes. | Total Receipts from College Poultry. | Total Receipts, including Egg-laying Competition. |
| :---: | :---: | :---: | :---: |
| 1915-1916 | $\stackrel{£}{269}$ | $355$ | $\begin{aligned} & £ \\ & 795 \end{aligned}$ |
| 1916-1917 | 362 | 394 | 864 |
| 1917-1918 | 311 | 360 | 824 |
| 1918-1919 | 414 | 452 | 1,112 |
| 1919-1920 | 327 | 430 | 955 |
| 1920-1921 | 500 | 546 | 1,253 |

In part our increased sales are probably due to the fact that poultry flocks became depleted during the drought, and that many are now desirous of starting again. I think, however, that the main reason for the increased sales is the high quality of the College poultry.

It is considered that the College poultry section has reached the limit of its usefulness in regard to the supply of settings of eggs and stud birds, as there are many well recognised breeders who should be able to cope with the State's demands, and it is not the function of the College to endeavour to act as a substitute for the private breeder. If there is any further development in this section, it should be in experiments in the feeding and breeding of poultry.

The returns for the poultry section are shown below.

Sales of College Poultry, 1st July, 1920, to 30 TH JUNE, 1921.


Poultry at College, 30th June, 1921.

| White Leghorns | 148 | head |
| :---: | :---: | :---: |
| Brown Leghorns | 74 | " |
| Black Orpingtons | 116 | " |
| Blue Orpingtons | 15 | , |
| White Orpingtons | 2 |  |
| Rhode Island Reds | 86 | " |
| Silver Wyandottes | 108 | , |
| Indian Game | 28 | , |
| Sundries | 17 | , |
| Ducks | 24 | " |
| Chickens, 1921 hatch | 500 | , |
| Total | ,118 | head |

Egg-laying Competition.
Statement of Receipts and Expenditure. Expenditure.

| Expenditure. |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Prize | £ | $s$. | d. |  | 8. |  |
| Food- |  |  |  |  |  |  |
| Wheat, 272 bushels | 126 | 14 | 0 |  |  |  |
| Pollard, 444 bushels | 49 | 19 | 0 |  |  |  |
| Bran, 202 bushels | 22 | 14 | 6 |  |  |  |
| Dried blood, 5 cwt. | 6 | 5 | 0 |  |  |  |
| Linseed meal, 400 lb . |  | 16 | 0 |  |  |  |
| Cracked corn, 500 lb . |  | 15 | 2 |  |  |  |
| Hulled oats, 155 lb . |  |  | 8 |  |  |  |
| Green lucerne, valued a | , | 0 | 0 |  |  |  |
| Soup meat, valued at | 3 | - | 0 |  |  |  |

Balance
$\begin{array}{lll}218 & 18 & 2 \\ 436 & 19 & 2\end{array}$
Total
Receipts.
Entry fees
Sales
State Prod. Agency, 2,854 doz. $207 \quad 3 \quad 9$
Defence Department 2,223 ", $241 \quad 710$
College dining hall, 1,844 " $160 \quad 3 \quad 4$
Sundry, $\quad 146 \frac{1}{2}, \ldots \quad 1210 \quad 5$
Totals

$$
\overline{6,867 \frac{1}{2} \text { doz. }}
$$

## Sheep Section.

Owing to the mild winter, the ewes came on lambing in good condition, with the result that very few deaths took place, and the lambing percentage was very satisfactory.

All the cld merino ewes were put on rape and fattened for killing and sale, ninety young ones being purchased to replace them for breeding crossbred lambs.

This year all Romney Marsh first cross ewes were fattened and sold, thus leaving only Lin-coln-Merino and Border Leicester-merino ewes as first cross breeders.

The Romney Marsh merino first cross ewes have proved satisfactory, but are somewhat confusing in the second cross, making too many grades with the restricted lambing that can be practised on the. College property. During the year two special crops were planted for the sheep, viz., silver beet and rape. Of these, silver beet is undoubtedly a good and useful crop, but, considering the costs, rape proved the more satisfactory. This latter crop has good fattening qualities, and, given a normal season, should provide feed from June to November.

Returns from sheep :-

| Returns from sheep :- |  |  | £ | s. | d. |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  |  |  |  |  |  |  |  |
| Sales of sheep |  | $\ldots$ | $\ldots$ |  | $\ldots$ | 194 | 13 |

Sheep at College, 30th June, 1921-


## Vegetable Garden and Orchard.

The weather during the year was most satisfactory for the production of vegetables, and good yields were in most cases obtained, although the later sowings of tomatoes were affected with blight, resulting in light crops. Stable manure was applied to different portions of the garden as required, with good results.

The present orchard has been planted for four years, and most of the trees in the orchard have made good growth, and light crops were harvested from paches, plums, figs, mandarins, oranges, and lemons-their first yield. All citrus trees have been mulched twice during the year and sprayed for scale. The land has been kept in a thorough state of cultivation, is free from weeds, and practically without nut grass. All trees are in a good, healthy condition.

In the early part of the year the vines were pruned, cleaned, and sprayed, with the result that they made a good growth in the spring and set a good crop. On the appearance of the downy mildew in September, vigorous steps were taken, all old leaves and tops being removed and Bordeaux mixture applied. As a result, a fair crop was gathered.

The work in the ornamental grounds has been confined to replanting and attention to the area around the buildings and along the Siding road, where the trees, shrubs, and palms have made a good growth during the year. A small area has been reserved for propagation purposes, and many hundreds of cuttings of privets and hibiscus have been planted here. A bushhouse in connection with this section would be an acquisition as well as an ornament.

Returns from Garden and Orchard.
£ s. d.
Cash sales of vegetables and fruit .. $\quad . \quad 4 \begin{array}{llll}42 & 3 & 2\end{array}$
Value of vegetables and fruit to dining-hall $\begin{array}{llll}114 & 8 & 3\end{array}$
Total .. .. .. .. £156 11 5

CUTHBERT POTTS,
Principal, Queensland Agricultural College,
Gatton.

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## REPORT OF THE AGRICULTURAL CHEMIST.

Sir,--I have the honour to submit to yorr herewith my Annual Report on the work of the Chemistry Division of your Department for the year ended 30th June, 1921.

## Staff.

In the beginning of March, Mr. V. S. Rawson resigned his position in order to take up a position as lecturer at the Broken Hill. Technical College, and Mr. W. G. McKechnie, who was appointed in his place, commenced his duties towards the end of May.

During the year extended leave of absence was granted to me for over twenty-four years of continuous service, and during my absence of a little over five months my chief assistant, Mr. Gurney, carried out my duties in a very creditable manner. I attended the Congress for the Advancement of Science in Melbourne, taking part in the work of the Agricultural Section, and reading a paper on "Digestibility of Fodders," the outcome of feeding experiments carried out by Mr. Rawson with sheep at the Yeerongpilly Stock Experiment Station. This work created considerable interest at the meeting, and the paper was recommended to be printed, but as no funds appeared to be available for printing except that of presidential addresses, the paper was published in the Queensland Agricultural Journal (May and June, 1921). The whole of the staff did very satisfactory work.

## Laboratory.

There was no improvement in the supply of glassware and chemicals, and many items ordered over a year ago have not been received. The actual cost of glassware and chemicals is still enormously high, and this, combined with very poor quality, makes the actual expenditure for these items alone at least four times higher than in pre-war time. On account of economy our actual allowance was reduced, and therefore no funds are available for purchase of apparatus to keep our laboratory well up to date, and this makes itself particularly felt with regard to any new research work in connection with soil investigations, in which a good Hydrogen Ion apparatus is quite indispensable.

## Work Performed.

The amount of analytical work carried out during the year is practically the same as that of previous years, but being shorthanded for a long time a lot of work, like exhaustive sampling of fertilisers, margarines on the market, \&c., could not be performed.

|  | 1918-19. | 1919-20. | 1920-21. |
| :---: | :---: | :---: | :---: |
| Soils | 122 | 153 | 1327 |
| Waters | 95 | 153 | 65 |
| Dipping fluids? | 1,273 | 1,303 | 1,083 ํ |
| Dip concentrates | 17 | 21 | 1,08? |
| Milks and creams | 110 | 204 | 250 |
| Butters | 18 | 128 | 124. |
| Margarins Condensed milks | 4 | 29 | , |
| Condensed milks | 12 | 27 | 28 |
| Fertilizers | ${ }_{91}$ | 55 | 32 |
| Wheats and flour | 91 3 | 72 | 97 41 |


| - | 1918-19. | 1919-20. | 1920-21. |
| :---: | :---: | :---: | :---: |
| Seeds, grasses | 5 | 34 | 104 |
| Stock foods | 42 | 65 | 46 |
| L.eathers | 44 | 50 | 31 |
| Tanning materials | 8 | 1 | 6 |
| Viscera, stomach contents, \&c. | 37 | 42 | 56 |
| Sugars and molasses | 10 | 6 | 9 |
| Dairy salts and preservatives. . | 9 | 6 | 15 |
| Limestones, marls, \&c. | 37 | 13 | 15 |
| Rocks | 25 |  | 7 |
| Ashes | 4 | 3 | 2 |
| Jams and Preserves | 28 | 30 | 50 |
| Canned fruits |  | 15 | 68 |
| Sweet potatoes |  |  | 37 |
| Miscellaneous | 96 | 51 | 98 |
| Total | 2,093 | 2,461 | 2,403 |
| Dairy glassware tested.. | 6,574 | 3,275 | 6,244 |

## Soils

In my last annual report I drew attention to the remarkable depletion of some of the Atherton Tableland soils in mineral plantfoods. For further investigations samples of soils were obtained during the year from places as near as possible the same spots which were sampled in 1903 by the staff of the Sugar Experiment Station. The results confirm in an astonishing manner the results found last year, that a serious depletion in all the plantfoods has taken place during the thirteen years, and that the question of supplying the crops with complete fertilisers becomes a very serious one. A careful study of Table I., which gives the analyses of the various soils sampled side by side, will show that the amounts of potash have been seriously reduced, and as the insoluble residue contains practically no potash, no further amounts are available by the weathering of the soil. The potash is in highly available form, forming an exceptionally large proportion of the total amount, and for this reason crops are still doing well. Lime and phosphoric acid have also been seriously reduced, and this is rather remarkable in the case of phosphoric acid, which is present in a very insoluble form, probably in combination with iron and alumina. The soils are all distinctly acid, and therefore applications of crushed limestone or coral sand, in combination with fertilisers containing citrate soluble phosphates, like fine bonemeal, crushed rock phosphate, basic superphosphate, will be found beneficial. Potash must be supplied in form of sulphate ; the muriate would not be suitable, as the chlorine content of the soil must be kept down.

Following up these remarks made by studying the table of analyses of Queensland soils (Table II.) we find that the best of the Atherton and Tolga soils contain still more than $\frac{1}{2}$ ton of available potash per acre to a depth of 12 inches, and the poorer soils about 300 lb . As an average crop of corn removes from the soil about 50 lb . of potash, we find that even the poorest soil appears to have still another six years' supply, and the best soils up to twentyfive years' supply. The extremely porous nature of the soil, combined with a not-too-plentiful supply of humus, will lead to a great loss of soluble plantfoods through leaching out during the periods of heavy rainfall.' This factor is all
the more serious when we consider that the total amount of potash in the soils is very low, as compared with that found in other soils. Some of the soils in the Cairns district with not particularly high amounts of available potash show a total amount of potash up to 10 tons per acre.

## Dipping Fluids

The number of dipping fluids analysed is a little lower than that of previous years, probably due to the more extensive use of the portable dip tester by our inspectors. It must here be pointed out that the standard iodine solution does not keep too well, and gradually looses its strength after a few weeks of use, particularly if the bottles are half empty and exposed to light, and for this reason the stock inspectors should make it a practice to send in, from time to time, samples of dip, of which they made a test, to us for check analysis.

Experiments are being made to find out if small weighed out quantities of sodium arsenite would keep long enough to enable the stock inspectors to check their iodine solution in case of doubt.

## Analyses showed that-



The rate of oxidation is again practically the same, showing three-sevenths of the dipping fluids free from oxidation.


## Viscera and Stomach Contentis.

A large number of viscera and stomach contents were again submitted for analysis, and in twenty cases the cause of poisoning was ascertained.

## Testing of Dairy Glassware, \&c.

A greatly increased amount of glassware was tested.

|  |  |  |  | 岩 |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Milk flasks | 2,039 | 1,885 | 154 | 2 |  |
| Cream bottles | 2,985 | 2,845 | 136 | 10 | $4 \cdot 6$ |
| Pipettes, milk | 261 | 260 | 1 |  | $\cdot 4$ |
| Pipettes, cream | 430 | 427 | 3 | 1 | . 7 |
| Thermometers | 529 | 376 | 153 |  | 28.9 |
| Hydrometers, \&e. | 10 | 10 |  |  | $20 \cdot 9$ |
| Total | 6,254 | 5,797 | 447 | 13 | $7 \cdot 2$ |

We prepared 149 bottles N/10 alkali, 1 bottle N/ 10 acid, and $78 \frac{1}{2}$ pints of standard iodine solution.

## Fodder Crops, Grasses, \&c.

Of particular interest are the analyses of Sweet Potatoes carried out in connection with a complete collection and classification of all the sweet potato varieties, investigated by the Department of Agriculture. The samples analysed were all obtained from the stud plots on Alton Downs, in the Central district, and a few of the samples were barely ripe enough, and better samples could have been obtained from other plots, but for the sake of strict comparison it was thought advisable to test for the first all the varieties grown on one plot. It will be necessary to follow up the investigation and to ascertain if the great variations shown on table III. can be influenced by local conditions, so as to be able to pick out the most suitable variety for each district. As some of these sweet potatoes are very heavy yielders, and appear to be practically weevil resistant, this crop may form an important raw material for the manufacture of industrial alcohol. The average amount of starch is, perhaps, slightly lower than that of English potatoes, but the total amount of carbohydrates is considerably higher.

A complete ash analysis of the combined ashes obtained from all the samples was made with the results below, giving for comparison the average composition of English potato ash (Wolff) -


We find that sweet potatoes require, like English potatoes, a considerable amount of potash.

Several samples of Sugar Beet were also submitted for analysis, but the best sample of wellshaped beet contained only 13.8 per cent. of sucrose.

Analyses of Elephant Grass (Pennisetum. purpureum) were made, and the results reported in the "Agricultural Journal (July, 1921), from which we learn that only in its earliest stages of growth this grass has a good food value. It appears to be free from any hydrocyanic-acidyielding glucoside.

Soudan grass was repeatedly tested, and was found to contain, grown under varying conditions and various stages of growth, only small traces of hydrocyanic acid, whereas Saccaline, one of the extensively grown saccharine sorghums, appears to contain rather large amounts of hydrocyanic acid at all stages of growth, and must, therefore, be fed with caution.

The analysis of a sample of the tubers of Bulkuru (Helescharis sphacelate), one of the sedges (cyperacece), common in the Northern coastal swamps, and growing in brackish water containing upwards of 200 grains of salt per gallon, submitted by Instructor Pollock, is of interest. These bulbs have been used as food
by our natives, and form the chief food of wild pigs, which fatten quickly on it.

|  | Sample gi Bulkuru Bulbs. |  | Averace Analysis of Sweet Potatoes. |
| :---: | :---: | :---: | :---: |
|  | As received air dry. | Calculated to $71 \%$ Water. |  |
| Moisture | 12.44 |  |  |
| Crude protein | $5 \cdot 19$ | 1.7 | $\begin{gathered} 70.8 \\ 1.8 \end{gathered}$ |
| Carbohydrates | 67.24 | $22 \cdot 3$ | $25 \cdot 4$ |
| Crude fibre | 6.07 | 2.1 | -88888 |
| Crude fat | $0 \cdot 52$ | $0 \cdot 2$ | .$^{2}$ |
| Crude ash | 8.54 | $2 \cdot 8$ | 1.0 |
| (Containing salt) | $0 \cdot 80$ |  |  |

We find that the food value of this bulb closely approaches that of sweet potatoes, and, therefore, the plant may prove of economic value, as it can be grown on salty swampy lands, or with brackish irrigation water, which only few crops would tolerate. We have no evidence how long the plant takes to produce fairly-sized bulbs and if growing under cultivation would increase the yield, but experiments in this direction should be carried out.

The analysis of one of the introduced weeds Pepper cress, also called a mustard weed and wire weed (Lepidium ruderale) is of some interest, as this weed and prickly-pear were the main feed of herds in the Oakey district, where this plant is very prevalent, during the late periods of drought. The weed gives a bad taint to milk, but is otherwise a nutritious but rather rough fodder, and on account of its high fibre contents well deserves the name wire weed. The analysis of the air-dried fodder as received is given, as well as calculated for 50 per cent. of moisture, which is the average moisture content of our edible shrubs and herbs. At the same time I give the analysis of a sample of Noogoora Burr Meal, which was submitted and which closely resembles this weed in its food value, and could be used as a food for stock and poultry.

|  | Analysis of Pepper Cress, |  | Analysis of Noogoora Burr Meal. |
| :---: | :---: | :---: | :---: |
|  | Air Dry. | Green. |  |
| Moisture | $14 \cdot 27$ | $50 \cdot 0$ | $9 \cdot 0$ |
| Crude protein | 15.59 | $9 \cdot 1$ | 19.7 |
| Carbohydrates | 22.79 | $13 \cdot 3$ | $24 \cdot 4$ |
| Crude fibre | 2.46 38.25 | $1 \cdot 4$ | 11.6 |
| Crudo ash | 38.25 6.64 | $22 \cdot 3$ $3 \cdot 9$ | $30 \cdot 7$ 4.6 |

The work commenced some years back of regularly analysing grasses and fodder crops at various stages of growth, and grown in different localities, should again be seriously taken up, with the aid of our instructors in agriculture. Even if only a few varieties are thoroughly tested a year, gradually a good deal of information of the fodder value of our grasses would be collected. It is of utmost importance to ascertain which fodder crop is the most profitable in
each district.

A fuller investigation of some of our plants poisonous to stock is very desirable, is rather beyond the scope of our work, but would be splendid subjects for science students holding research scholarships in agriculture, if such scholarships were established. The granting of two or three research scholarships for periods of two or three years would be of much greater direct benefit to our State than the establishing of a chair of agriculture at our University.

## Stock Foods.

"The Stock Foods Act of 1919," which with "The Pure Seeds Act of 1913," is practically administered by Mr. F. F. Coleman and, his staff, is gradually becoming firmly established and its value more and more recognised. The forty-six samples analysed, recorded on Table IV., were chiefly submitted by vendors and manufacturers. The enforcement of the Act and its regulations can now be made more stringent all over the State, and it will be necessary in future to carry out the analysing of the samples submitted with registration, and also of samples purchased in the open market, which time did not permit us to make these tests last year.

Attention must be drawn to the great value of dried blood meal as a stock food, and the feeding experiments with sheep have clearly shown that only dried blood in finely powdered form should be used as food. The usual granular form hitherto sold is not only much less digestible but can actually do serious harm by causing severe inflammation of the lining of the stomach in contact with coarse granules.

## Weed Destruction.

The use of arsenical sprays for the destruction of weeds in banana plantations is gaining favour, particularly in localities where handweeding is difficult, on account of the stony nature of the soil. Samples of soil were obtained from a plantation where this method of weed destruction has been in use for several years. Only in the top 2 inches of the surface soil traces of arsenic, amounting to 0.01 per cent., could be detected, and the arsenic was in a very insoluble form.

It is quite apparent that any arsenical solution coming in contact with the soil soon loses its poisonous properties, on account of the arsenious acid forming insoluble compounds with the iron and alumina in the soil. The use of arsenical sprays for the destruction of weeds appears, therefore, to have no lasting detrimental effect on the crops generally.

## Fertilisers.

Under "The Fertilisers Act of 1914" seventy firms registered as dealers, registering 211 fertilisers. The usual sampling and analysing of fertilisers collected from the stock in hand of dealers could not be carried out during the year, but is being arranged for the coming season.
J. C. BRUNNICH, Agricultural Chemist,

$38$



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|  | Looality． | Deacriplion of |  | fotait kixyents ix mux zoit． |  |  |  |  |  |  |  |  |  |  |  |  |  | Total Mements，Lit per Aere， |  |  |  |  |  |  | 等 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | $\begin{aligned} & \text { 曾 } \\ & \hline \end{aligned}$ |  | $\begin{aligned} & \text { 音 } \\ & \frac{\text { but }}{} \end{aligned}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | － | 皆 | $\frac{\text { 隌 }}{}$ |  |  |  |  |  |  |  | 音 | 竞 |  | 名 | 茂 |  |
|  | South Kens |  |  | \％ | \％ | \％ | \％ | \％ | \％ | \％ | \％ |  | \％ | \％ | \％ | \％ | \％ |  |  |  |  |  |  |  |  |
| 204 | ters To | Black clayey soil | Alkaline | 4.72 | 41 | 7.59 | ． 010 | ． 088 | ． 04 | 1.50 | 1.61 | 31 | 67．94 | 0015 | 4140 | 0638 | 0108 | 3，002 | 1，349 | 50，592 | 10，456 | 51 | 3，960 | 3，643 | Nil |
| 470 | Delta | Dark－grey loam | Sl．acid | 1．41 | 3.81 | $4 \cdot 35$ | ． 010 | 077 | 14 | 1.63 | 78 | ． 19 | 87．23 | －027 | 0716 | 0175 | 0048 | 3，058 | 5，401 | 64，722 | 7，544 | 107 | 2，843 | 19 | 7.8 |
| 684 | Davenport | Marly soil | tral | 3．83 | ． 55 | 12．19 | ． 006 | 137 | ． 04 | 9.20 | 1.18 | 29 | 156．97 | 0006 | 6265 | 0551 | 0133 | 4，622 | 1，349 | 10，300 | 9，781 | 20 | 21，130 | 449 | Nil |
| 1206 | Carmilla | ${ }_{\substack{\text { Brown } \\ \text { loam }}}$ | Sl．acid | 70 | 75 | 4.25 | ． 050 | 076 | ． 05 | 55 | 32 | 50 | 79.50 | 0012 | 0728 | 0511 | 0035 | 2，625 | 1，727 | 19，000 | 17，272 | 41 | 2，515 | 121 | 53.9 |
| 1207 | Ditto | Blaeke clay | S1． | 88 | $2 \cdot 40$ | 5.06 | ． 017 | ． 154 | 13 | 1.57 | 57 | 21 | 4．85 | 063 | 1669 | 0406 | 09 | 5，4 | 4，597 | 55，520 | 7，426 | 223 | 5，902 | 339 | 55.7 |
| ${ }^{1208}$ | Ditto | Black clay | Sl．acid | 04 | 1.95 | 5.63 | ． 022 | 137 | 15 | 1.47 | 71 | ． 19 | 71－85 | ．0099 | 1501 | ． 0504 | 0021 | 4，584 | 5，019 | 49，185 | 6，357 | 331 | 5，022 | 70 | 64－1 |
| 1209 | Ditto | $\begin{gathered} \text { Black } \\ \text { loam } \end{gathered} \text { sandy }$ | St．acid | 98 | 1.95 | 3.91 | ． 06 | ． 092 | ． 09 | 1.21 | 36 | ${ }^{43}$ | 80．48 | ．0663 | ． 1103 | ． 0336 | ．0099 | 3，203 | 3，133 | 42，130 | 14，970 | 219 | 3，840 | 345 | 51.6 |
| 12 | LetchmardT－ <br> Leichhardt Downs | Black loam | Neutral | 6．12 | 2.01 | $4 \cdot 19$ | ． 018 | 148 | 01 | 92 | 30 | 63 | 72.85 | 0064 | 1895 | 066 | ．005 | 4，559 | 310 | 28，530 |  | 198 |  | 177 |  |
| 950 | Capella | ${ }_{\text {Dark－brown clay }}^{\text {deil }}$ | Sl．alka． | 8．54 | 1.29 | 8.78 | ． 028 | －063 | ${ }^{03}$ | 2.14 | 1.61 | 21 | 57. | ．0008 | 4480 | 1774 | 00 | 1，9 | 978 | 67，360 | 6，56 | 25 | 14，132 | 205 | Ni |
| 951 | Ditto | Dark－brown elay | $\begin{aligned} & \text { line } \\ & \text { alka- } \\ & \text { line } \end{aligned}$ | 48 | 1.36 | 9.56 | ． 020 | ． 066 | ． 03 | 1.99 | 1.46 | 2 | 51.92 | ． 0010 | 3297 | ．0567 | 0098 | 2，082 | 789 | 62，940 | 6，910 | 31 | 10，400 | 309 | Nil |
| 649 | Bajool <br> Pory Curtis－ Bajool | Grey clayey soil | Acid | ${ }^{89}$ | $1 \cdot 10$ | 1.91 | ． 050 | ． 073 | ． 03 | 0.18 | ． 04. | ． 03 | 91－42 | ．0019 | 0476 | 0228 | 0032 | 2，760 | 1，134 | 6，806 | 1，134 | 72 | 1，800 | 12 | 37.5 |
| 1204 | Tungamull | Groy sand | St．alka－ | 52 | 1.35 | 15 | －016 | ． 036 | ． 04 | 15 | 13. | －09 | 95．44 | 0058 | 0750 | 0153 | －024 | 1，4 | 1，610 | 6，039 | 3，623 | 233 | 3，019 | 97 | Nil |
| 1205 | Ditto | Red sandy loam | Sl．${ }^{\text {line }}$ acid | 1.88 | ． 45 | $4 \cdot 43$ | ． 025 | ．053 | ． 05 | 11 | 13 | ． 12 | 75.46 | 0005 | 0549 | 054 | 002 | 1，874 | 1，768 | 3，89 | 4，24 | 18 | 1，941 | 71 | 28.1 |
| 1210 | Woodend | $\begin{gathered} \text { Blaok } \\ \text { loam } \\ \text { lolayoy } \end{gathered}$ | SI．alks： | 38 | 1.75 | 6.49 | ． 004 | ． 182 | 13 | 2.94 | 1.11 |  |  | ． 0109 | 3416 | ． 0686 | 0034 | 6，188 | 4，420 | 99，880 | 8，500 | 371 | 11，650 | 115 | Nil |
| 26 | $\underset{\text { Beerburrum }}{\text { Wide Bay－}}$ | Grey sandy soil | － |  | －44 | ． 50 | ． 004 | ． 064 | .01 | 10 | 10 |  | 8.18 | ．0009 | 0342 | 0083 | Nil |  |  | 4，4 |  | 40 |  |  | 14.1 |
| 35 | Bauple | Grey loam | acid | 3.41 | 1.00 | $5 \cdot 34$ | ． 010 | 162 | ． 07 | 21 | 18 | ． 44 | 81.49 | ． 0016 | ． 1042 | －1000 | －0988 | 6，03 | 2，686 | 7，8 | 16，2 | 59 |  | 365 | 29. |
|  |  | Grey clayey loam | St． |  | ．95 | 5.25 | ． 011 | ． 145 | ． 06 | 24 | ． 20 |  | ［79．92］ | ．0023 | ． 0095 | ． 0370 | －． 0116 | ［5，324 | 2，203 | 8，813 | 12，117 | 84 | 348 | 426 | 35.2 |

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TABLE II，－ANALYSES OF QUEENSLAND SOILS－continued．

|  | Iocality． | Deseription ofSoils． |  | total mlements in the soil． |  |  |  |  |  |  |  |  |  | Available Plant Fooci <br> Soluble in 1 per cent．Citric Acid． |  |  |  | Total Elements，Lb．per Acre， |  |  |  | Available Plant Food， voluble in 1 per cent Citric Acid， <br> Lb．per Acre， $12^{\prime \prime}$ Deep |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  | $\begin{aligned} & \text { 㗭 } \\ & \frac{8}{8} \end{aligned}$ | 商 <br> 皆 | Soluble in Hydrochloric Acid， Sp．Gr． $1 \cdot 115$. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | 音 |  |  |  |  | 品 |  | $\begin{aligned} & \text { 言 } \\ & \text { 密 } \end{aligned}$ |  |  | 兑 |  | $\begin{aligned} & \text { 言感 } \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { 颜 } \\ & \text { 蔀 } \end{aligned}$ |  | 寝 | $$ |  | 音 |  |  |
|  |  |  |  | \％ | \％ | \％ | \％ | \％ | \％ | \％ | \％ | \％ | \％ | \％ | \％ | \％ | \％ |  |  |  |  |  |  |  |  |
| 84 | Childers－$\ldots$ ． | Reddish－brown | Neutral．． | 1．42 | $5 \cdot 10$ | $17 \cdot 40$ | ． 006 | ． 017 | ． 07 | $\cdot 63$ | ．75 |  | $62 \cdot 80$ | ． 0026 | －2441 | ． 0850 | ． 0040 | 527 | 3，203 | 19，530 | 155 | 80 | 7，568 | 1，240 | 31.2 |
| 857 | Landsborough | Dark loamy | Alkaline | 9.87 | 6.00 | 17.98 | ． 008 | 438 | $\cdot 14$ | 1－63 | $2 \cdot 38$ | $\cdot 25$ | 44．29 | ． 0359 | －5565 | ． 0049 | ． 0216 | 13，180 | 4，300 | 48，884 | 7，450 | 1，074 | 16，650 | 616 | Nil |
| 970 | Yandina | Grey greyish | SI．acid | 7.72 | 1－66 | ． 903 | ． 036 | $\cdot 171$ | ． 04 | $\cdot 18$ | －38 | ． 07 | 60.94 | ． 0010 | ． 0722 | ． 0136 | ． 0046 | 5，442 | 1，400 | 5，569 | 2，265 | 32 | 2，298 | 146 | 87.5 |
| 280 | Gootchie | Chocolate clayey | Neutral． | $5 \cdot 26$ | 1．66 | 7－16 | ． 020 | $\cdot 115$ | ． 04 | 25 | 11 | ． 06 | $75 \cdot 80$ | ． 0017 | ． 0984 | －0199 | ． 0084 | 3，785 | 1，333 | 8，064 | 1，974 | 55 | 3，238 | 276 | 35.2 |
| 1223 | Glass House Mts． | Reddish sand ．． | Neutral | 62 | 65 | 2.31 | ． 006 | ． 025 | ． 01 | 45 | ． 03 | ． 02 | 91－39 | ． 0010 | －1859 | ． 0193 | ．0046 | 945 | 378 | 17，013 | 756 | 38 | 7，028 | 174 | 12.5 |
| 1224 | Ditto | Grey sand | Acid | ． 58 | ． 60 | 1.78 | ． 006 | ． 034 | ． 01 | ． 06 | － 07 | ． 03 | $95 \cdot 10$ | ． 0005 | ． 0230 | － 0101 | －0008 | 1，378 | 405 | 243 | 1，216 | 20 | 932 | 32 | 27.9 |
| 1181 | Maryborough | Black clay soil． | Acid | 15.00 | 1.06 | $12 \cdot 10$ | ． 016 | ． 252 | ． 08 | 11 | ． 08 | 29 | $56 \cdot 25$ | ． 0109 | ． 0319 | ． 0308 | ． 0038 | 7，060 | 2，241 | 3，082 | 8，125 | 305 | 894 | 106 | $151 \cdot 4$ |
| 1182 | Ditto | Brownish clay | Si．acid | 1.00 | 3－25 | $\cdot 19$ | ． 011 | ．076 | ． 03 | 50 | $\cdot 17$ | $\cdot 16$ | 87.09 | ． 0025 | ． 0425 | ． 0268 | ． 0080 | 2，977 | 1，175 | 19，466 | 6，267 | 98 | 1，665 | 313 | 36.7 |
| 1240 | Eumundi | Grey sandy clay | Sl．alka－ line | $3 \cdot 82$ | 1．70 | $6 \cdot 46$ | ． 009 | ． 251 | $\cdot 10$ | 70 | 43 | ． 59 | 78.43 | ． 0250 | －3265 | ． 0474 | ． 0118 | 7，374 | 2，938 | 20，562 | 17，332 | 734 | 9，591 | 347 | 18.7 |
| 1241 | Ditto（Subsoil） | Light－grey sandy clay | St．acid | 2.88 | 45 | 3.79 | ． 010 | ． 062 | ． 03 | 24 | $\cdot 19$ |  | 81.64 |  |  |  |  | 2，125 | 1，028 | 8，226 | 31，185 |  |  |  |  |
| 1824 | Childers | Red clayey soil | Acid | $3 \cdot 84$ | 1.15 | 6．47 | ． 010 | $\cdot 137$ | ． 04 | $\cdot 13$ |  | ． 05 | 68．39 | ． 0018 | ． 0235 | 0404 | ． 0050 | 4，174 | 1，219 | 3，839 | 1，523 | 55 | 716 | 15 | $23 \cdot 4$ |
| 1328 | Maroochy River | Black loam | Acid | 4．56 | 7.50 | 8.92 | ． 020 | －165 | － 02 | 11 | 19 | $\cdot 11$ | 70.72 | ． 0054 | ． 0791 | ． 0184 | ． 0088 | 4，308 | 392 | 2，924 | 2，872 | 141 | 2，066 | 230 | 108．0 |
| 1280 | Kolan River | Brownish clayey | Acid | $8 \cdot 44$ | 1.70 | 6.00 | ． 005 | $\cdot 174$ | ． 06 | － 09 | ． 02 | 14 | 73.27 | ． 0033 | － 0224 | ． 0170 | ． 0052 | 5，016 | 1，730 | 2，595 | 4，036 | 95 | 646 | 150 | 68.7 |
| 1281 | Ditto | Brownish clayey | Acid | 8.62 | $2 \cdot 70$ | 4.20 | ． 006 | $\cdot 196$ | ． 09 | ． 09 | ． 08 | ． 09 | 78.63 | ． 0063 | ． 0213 | ． 0015 | ． 0043 | 5，544 | 2，546 | 2，546 | 2，546 | 178 | 602 | 121 | 67.9 |
| 37 | Moreton－ | Reddi | V．acid | 1．85 | ． 69 | $3 \cdot 77$ | ． 007 | ． 078 | ． 02 | $\cdot 20$ | ． 05 | $\cdot 12$ | 86－16 | ． 0003 | ． 0867 | ． 0041 | ． 0003 | 2，835 | 813 | 7，399 | 4，439 | 11 | 3，207 | 11 | 32.0 |
| 38 | Ditto（Subsoil） | Red sandy clay | V．acid | $2 \cdot 42$ | 36 | $4 \cdot 62$ | ． 006 | ． 073 | ．03 | $\cdot 14$ | ． 02 | $\cdot 15$ | 78．88 |  |  |  |  | 2，661 | 984 | 5，103 | 5，467 |  |  |  | Nil |
| 79 | Nundah | Light－grey loam | Acid | 6.55 | $3 \cdot 18$ | 9.98 | ． 001 | 249 | －18 | $\cdot 37$ | $\cdot 16$ | $\cdot 15$ | $73 \cdot 17$ | ． 0480 | $\cdot 1473$ | ． 0212 | ． 0081 | 7，112 | 5，056 | 10.568 | 4，227 | 1，371 | 4，205 | 145 | 49.0 |
| 80 | Ditto（Subsoil） | Light－grey clay | V．acid | 6.69 | 1.06 | 7.02 | ． 001 | ． 081 | 02 | 13 | $\cdot 23$ |  | $70 \cdot 43$ |  |  |  |  | 2，688 | 730 | 4，413 | 6，172 |  |  |  |  |
| 132 | Currumbin | Chocolate sandy | Acid | 17.54 | 5．10 | $13 \cdot 26$ | ． 006 | ． 287 | $\cdot 11$ | $\cdot 15$ | $\cdot 20$ | ． 05 | 30.75 | ． 0012 | －1029 | ． 0711 | ． 0048 | 7，651 | 2，932 | 3，999 | 1，333 | 32 | 2，743 | 128 | $110 \cdot 0$ |



TABLE III,-ANALYSES OF SWEET POTATOES.


TABLE IV.-ANALYSES OF STOCK FOODS.

|  | Deseription of Sample. | anailysis. |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Moisture. | ${ }_{\text {Protein. }}$ | Carbohydrates | Crude Fibre. | Crude Fat. | Total Ash. | Insoluble Ash. |
|  |  | \% | \% | \% | \% | \% | \% | \% |
| 712 | Bran (local) | 10.21 | 17.75 | 51.80 | $10 \cdot 23$ | $3 \cdot 84$ | $6 \cdot 17$ | $0 \cdot 10$ |
| 734 | Bran (local) | 10.65 | $17 \cdot 25$ | 54.04 | $9 \cdot 33$ | $3 \cdot 77$ | $4 \cdot 96$ | 0.08 |
| 738 | Bran (local) | 9.02 | 12.75 | $60 \cdot 68$ | $9 \cdot 97$ | 3.04 | 4.54 | 0.76 |
| 742 | Bran (local) | 10.84 | 14.69 | 54.88 | $9 \cdot 43$ | $3 \cdot 88$ | 6.28 | 0.08 |
| 743 1129 | Bran (local) Bran | $10 \cdot 41$ | 16.00 | 54.01 | $10 \cdot 20$ | $4 \cdot 04$ | $5 \cdot 34$ | 0.08 |
| 1129 1278 | Bran Bran | $12 \cdot 82$ | 14.94 | 54.87 | $9 \cdot 18$ | $3 \cdot 83$ | $4 \cdot 36$ | n.d. |
| 713 | Pollard | $12 \cdot 16$ 10.24 | 13.37 15.69 | 58.45 65.44 | 8.09 2.58 | 3.89 | 4.04 | n.d. |
| 735 | Pollard (local) | $10 \cdot 32$ | 16.87 | 60.85 | $5 \cdot 10$ | 3.68 | $3 \cdot 18$ | 0.02 0.06 |
| 736 | Pollard (local) | $10 \cdot 29$ | 15.94 | $60 \cdot 79$ | $5 \cdot 90$ | $3 \cdot 80$ | $3 \cdot 28$ | 0.08 |
| 737 | Pollard (local) | 10.00 | $16 \cdot 19$ | 60.69 | $6 \cdot 07$ | $3 \cdot 79$ | $3 \cdot 26$ | $0 \cdot 12$ |
| . 739 | Pollard (local) | 10.03 | 15.00 | $61 \cdot 64$ | 6.27 | $3 \cdot 96$ | $3 \cdot 10$ | 0.04 |
| 740 | Pollard (local) | $10 \cdot 21$ | $15 \cdot 19$ | $62 \cdot 39$ | $5 \cdot 13$ | $3 \cdot 84$ | $3 \cdot 24$ | 0.08 |
| 741 | Pollard (local) | $10 \cdot 60$ | 16.00 | $60 \cdot 28$ | $4 \cdot 61$ | $4 \cdot 41$ | $4 \cdot 10$ | 0.04 |
| 11279 | Pollard | 11.80 | 15.06 | 59.00 | $7 \cdot 39$ | $3 \cdot 80$ | $2 \cdot 95$ | n.d. |
| 1048 | Wheatmeal | 11.34 12.12 | 13.37 | 66.01 | 4.26 | 2.78 | $2 \cdot 24$ | n.d. |
| 1049 | Wheatmeal | 11.86 | 12.25 | $70 \cdot 57$ | $2 \cdot 20$ | $1 \cdot 63$ | 1.82 | n.d. |
| 1201 | Wheatmeal | 13.08 | 14.44 | $64 \cdot 89$ | 3.25 | 1.68 | $1 \cdot 80$ | n.d. |
| 1203 | Wheatmeal | 12.89 | 14.64 | 64.89 66.79 | 3.25 2.03 | 1.98 1.62 | $2 \cdot 36$ $2 \cdot 03$ | n.d. |
| 1202 | Crushed wheat | $13 \cdot 28$ | 14.88 | 65.06 | $2 \cdot 69$ | 1.89 | 2.03 2.20 | n.d. |
| 688 | Barley meal | 11.59 | $10 \cdot 00$ | $70 \cdot 36$ | $3 \cdot 90$ | $2 \cdot 00$ | $2 \cdot 15$ | n.d. |
| 689 | Malting barley | 11.24 | 14.25 | $65 \cdot 37$ | $4 \cdot 60$ | $2 \cdot 40$ | $2 \cdot 14$ | n.d. |
| 692 | Malting barley | 11.99 | 10.56 | 68.43 | $4 \cdot 53$ | $2 \cdot 53$ | 1.96 | n.d. |
| 690 | Cape barley | 12.03 | $7 \cdot 50$ | 69.78 | 8.27 | $2 \cdot 10$ | $2 \cdot 35$ | n.d. |
| 778 | Cape barley | 12.26 | 11.00 | 66.93 | 5.90 | 1.90 | 2.01 | n.d. |
| 1244 | Barley bran Rice maeal | 9.32 12.73 | 13.06 12.44 | 56.35 47.75 | 11.03 | $5 \cdot 45$ | $4 \cdot 79$ | 1.88 |
| 144 | Oil cake | 12.73 8.18 | $12 \cdot 44$ $20 \cdot 12$ | 47.75 42.92 | 6.00 11.43 | 13.78 | $7 \cdot 30$ | n.d. |
| 180 | Oil cake | 7.56 | $19 \cdot 25$ | $41 \cdot 23$ | 12.53 | 12.07 | $5 \cdot 28$ | 0.26 |
| 718 | Linseed meal | $8 \cdot 60$ | 29.50 | $34 \cdot 41$ | 8.33 | $13 \cdot 52$ | $5 \cdot 91$ | 0.49 |
| 821 | Linseed meal | $7 \cdot 15$ | 18.75 | 25.06 | 8.50 | 11.42 | $7 \cdot 74$ | 1.81 |
| 1024 | Poultry mash | 9.64 | 15.31 |  |  | 17.40 5.04 | $3 \cdot 14$ | 0.02 |
| 1025 | Poultry mash | $9 \cdot 35$ | 17.31 | 61.02 58.32 | 3.52 3.97 | $5 \cdot 04$ $4 \cdot 46$ | 5.47 6.59 | n.d. |
| 1276 | Calf food | 11.29 | $12 \cdot 68$ | 63.04 | $4 \cdot 51$ | 4.72 | 6.59 3.76 | n.d. |
| 52 | Dried blood | $10 \cdot 30$ | $78 \cdot 13$ | $3 \cdot$ |  |  | $6 \cdot 17$ | n.d. |
|  | Coarse dried blood Fine blood meal |  | *78.75 | $2 \cdot 35$ |  | 1.88 |  |  |
|  | Fine blood meal | . | †71.40 | 5.98 |  | $3 \cdot 39$ |  |  |

* Containing 47.1 and $\dagger 60.8$ true digestible protein.


## REPORT OF THE DIRECTOR OF FRUIT CULTURE.

The meteorological conditions experienced during the year ending 30th June, 1921, though somewhat erratic, have, on the whole, been more favourable to the fruit-growing industry in this State than those of recent years. Generally speaking, there has been an adequate rainfall well distributed throughout the year, but in some parts it has been excessive, especially during the recent autumn and early winter. Too much rain is, however, preferable to too little, as it does little harm to trees or plants growing in soils possessing good natural drainage and in which there is ho retention of stagnant water-in brief, to trees or plants growing on suitable soilsbut when these conditions do not exist, and there is no get-away for stagnant water, some damage has been done.

One result of the rainfall will probably be the return of normal seasons, and trees and plants will blossom and fruit at the right time of the year instead of during off seasons, as has occurred during the past few years, to the serious loss of the growers of citrus fruits. The regular spring blossoming and setting of these fruits did not take place, with the result that there was no regular crop; but a late blossoming took place which set a heavy crop that ripened during last autumn, when the weather conditions were very favourable for the development of the fruit fly, and as a result the bulk of this off-season crop was so badly infested by these insects as to be of very little value, and many growers lost heavily in consequence.

With respect to other fruit crops, the conditions were generally favourable, and, although pineapples only produced a very moderate summer crop, they have made good growth and are giving promise of a heavy crop of winter and spring fruit. Bananas have done well; the quality of the fruit has been good and the yield generally satisfactory. Vegetables and small fruits have done well, and, excepting for the prevalence of Irish blight in potatoes and tomatoes, for which the season has been very favourable, growers should have little to complain of. Grapes were of good quality where properly cared for, though a serious outbreak of downy mildew, which made its appearance in October, seriously injured the crop where spraying was neglected; and, what is of more importance, has in many cases seriously injured the vines themselves. The year under review has been an important one for our fruitgrowers, as in the first place the annual meeting of the Australasian Fruitgrowers' Association was held in Brisbane during the month of August, when many matters of importance to the fruitgrowing industry of Australasia were dealt with. Unfortunately, illness prevented my attendance, but this Department was well represented notwithstanding, and the visiting delegates expressed themselves as being very pleased with the reception given them by the Queensland Government and by the fruit merchants of Brisbane. A conference of local growers took place in Brisbane during April, as the result of which the Queensland Fruitgrowers' Federation was formed, and members of its executive submitted a request that "The Diseases in Plants Act of 1916 " be amended by the addition of clauses giving power to impose and collect a registration fee 8 n all
orchards, the income derived thereby to be devoted to the more efficient carrying out of the Act and for other purposes.

Owing to the prevalence of fruit fly in the early crop of citrus fruits, the Victorian Department saw fit to condemn any of such fruits as arrived in their State in an infested condition, and as it was considered that this action was unnecessarily severe, I was instructed to proceed to Melbourne and interview the authorities there. As the result of my visit the rigorous inspection has been modified and arrangements have been made whereby the grower, on giving a certificate to the effect that the fruit has been sweated for seven days prior to its being forwarded, will not have his fruit condemned outright, but if, on inspection, any of the fruit is diseased this diseased fruit will be picked out and destroyed, the balance of the fruit being allowed to go into consumption. This arrangement is considered satisfactory, and it will not entail any hardship on the Queensland grower.

During the year the trade in fruit, both inward and outward, shows a considerable increase over that of the previous year, the special fruit trains handling the bulk of the outward fruit. Much of the inward trade is sea-borne, but, at the same time, heavy consignments have come in by rail. There has been a considerable falling off in the import of potatoes, as the local supply has been able to meet the bulk of the local demand. This is satisfactory, as Queensland should always be able to supply all the potatoes required for local consumption excepting always during periods of protracted drought.

There has been a steady demand for the departmental publications dealing with the culture of the different commercial fruits and vines, as well as of the treatment of fruit and vegetable pests, and new editions have either been issued or are about to be issued in which the matter dealt with is brought up to date. A comprehensive pamphlet dealing with the culture of temperate fruits was also issted and should be of value to those who grow these fruits. In order to make this report as concise and complete as possible, I will, as last year, deal with the principal fruit crops separately.

## Bananas.

The cultivation of this fruit is steadily increasing in the Southern and Central parts of the State, and many plantations have been set out during the year on land and in situations that were previously considered so inaccessible as to be unprofitable to work. The fruit realised very high prices at the beginning of the year but sold for considerably less at the end of the year, despite the fact that the importation of Fiji-grown fruit ceased shortly before the end of the financial year. The recent fall in prices is due to the larger area now in bearing and to the increased production resulting from the exceptionally favourable season, and had the importation of Fiji fruit not ceased, the price would have been still lower and such as to leave little, if any, profit to the producer; as the cost of 'cases, freight, selling charges, and incidental expenses is so high that good prices must be obtained in the Southern markets to enable the producers to earn a living wage. The industry
is practically in the hands of white growers, as I know of only one Chinese firm of importance operating in the South and only one in the Central district. In the North bananas are still grown by Chinese for local consumption, but only 1,439 cases were sent outside the State. During the year a deputation of fruitgrowers interested in banana culture waited on the Hon. the Minister with the request that an entomologist be appointed to investigate the ravages caused by the beetle borer and to determine the best method of combating same. This request was acceded to, and Mr. Froggatt appointed to carry out the investigation.

Experiments have also been continued in manuring, and they confirm the results previously obtained, that the judicious use of a complete fertiliser rich in potash is a profitable investment, provided that the soil is well provided with humus, as in the absence of this substance no artificial fertiliser can be used to the best advantage.

The attention of the Department was drawn to the spread of bunchy top in the Queensland plantations close to the New South Wales border, and experiments were conducted at Currumbin, in which the Department had the assistance of a committee appointed by the local fruitgrowers' association. The experiments consisted of preparing, liming, and manuring a plantation in which bunchy top was present to such an extent that the profitable growing of bananas was not possible.

The land was deeply worked by means of a fork hoe and heavily limed, $1 \frac{1}{2}$ tons and 3 tons per acre of caustic lime being applied on two blocks of an acre each respectively. A complete fertiliser was given in addition. One row being left unmanured as a check.

Local suckers, as well as suckers obtained from the Central district, were planted so as to test whether suckers grown in a district free from bunchy top were less liable to it than those obtained locally.

The result of the experiments was disappointing, as bunchy top made its appearance all over the plot and was equally as bad on manured or unmanured land and in the suckers obtained from a distance as compared with those grown locally. Where manure was applied the growth was certainly more vigorous than in the unmanured row, but at the same time there was quite as much bunchy top present in the manured row as in the unmanured one.

As the plants are more or less infested by nematodes it has been decided not to attempt any further treatment of this plot but to see whether the plants now growing will have sufficient vigour to produce a crop of fruit. The affection is of a very obscure nature and one that demands a thorough scientific examination in an infested plantation, and it has therefore been decided that this be done, and that the Government Entomologist and Pathologist will carry out the work. In order to show the extention of the industry in Southern Queensland during the past twelve months, the exports of fruit during the year ending 30th June, 1920, amounted to 180,482 cases, whereas that of the year under review reached 259,266 cases, an
increase of 78,784 cases. Of the total exported during the year no less than 253,326 cases were sent by special fruit trains, thus showing what organisation can do in the marketing of fruit. Many banana-growers have, however, much to learn with respect to grading and packing the fruit, and fail to realise that a well-packed case, in which every fruit is sound, free from blemish, and of even size, fetches considerably more on the Southern markets than an ill-graded and slovenly packed case, as not only does the fruit show up to better advantage when the case is opened, but there is very much less loss by bruising.

## Pineapples

The area under this crop is steadily increasing, especially in the North Coast District, which includes the Returned Soldiers' Settlement at Beerburrum, where there is now about 1,000 acres planted; and the new area in other districts more than counterbalances any areas that have gone out of cultivation.

The plantations came through the winter weli, but only produced a medium summer crop, but since then they have made a remarkably good growth where properly looked after and are now showing a heavy crop of winter and early spring fruit. The mild winter is very favourable to this crop. as the plants in many plantations still have their summer colour and there is a general absence of the yellow tint that is the result of cold nights or strong westerly winds. There is also a freedom from "black heart" (always the result of cold) and of fruitlet core rot, the fruit being of exceptional quality for a winter crop and very suitable for canning, though requiring rather more sugar than the summer crop.

Previous to the ripening of the summer crop the growers approached the Federal Government for monetary assistance to enable the crop to be dealt with and were successful in their request, as the sum of $£ 20,000$ was made available as an advance against the output of canned fruit on certain conditions.

A meeting of growers and canners was then held, Mr. W. H. Austin Trade Commissioner, being in the chair, and an arrangement was arrived at whereby the canners agreed to pay a certain price to the growers for fruit that was up to a certain standard as regards size and ripeness, part of the price to be paid when the fruit was received and the balance, if any, when the canned product was finally disposed of, A further agreement was then made between the canners and the Commissioner, acting on behalf of the Federal Government, regarding the quality of the pack, which it was decided had to be equal to that of Hawaii. The onus of passing the pack was placed on myself, as, before anymoney was advanced against the pack, I had to certify that the fruit was up to the standard decided upon.

In addition to this, the Federal authorities required the fruit to be under constant supervision whilst being canned, and this work was carried out by officers of the Department of Agriculture. As the result of the careful handling of the fruit by the canners, and of its supervision during all stages of manufacture, I am pleased to say that the pack was by far the best ever put up in this State, and showed conclusively that we are capable of putting up a line
of canned pineapples that are a credit to Queensland; and I feel certain that when they are placed on oversea markets they will go far to undo the bad name we had obtained for exporting lines that were far from being a credit to our State.

The pack was standardised, every slice in a - given sized tin being of equal size and thickness and a syrup of standard density was used.

Sample tins were submitted from time to time to the Agricultural Chemist in order to see that the standard was maintained, that the right quantity of fruit was in the tin, and that the syrup was of the required density.

Four canneries availed themselves of the assistance of the Federal Government, and the sum of $£ 13,05212 \mathrm{~s} .6 \mathrm{~d}$. was advanced against 34,807 dozen tins of fruit.

In addition to these four private canneries, the State cannery put up a very good line in syrup of equal density to that used by them, so that the whole season's export pack is of high quality and up to the standard agreed upon.

For the first time in the history of the State special, up-to-date pineapple-canning machinery was used by both the State cannery and private canneries, and proved its suitability for dealing with our fruit, a point about which there was considerable difference of opinion, some canners considering that our fruit was not firm enough to stand sizing and coring by machinery. These fears have been proved groundless, as, when the fruit is gathered at the right state of ripeness, and is forwarded direct to the cannery and treated at once, the result is very satisfactory; but where the fruit is overripe, or has been kept for some days before it is treated, it is too soft and the product is only fit for pulp. Unfortunately the market for all canned fruits has been very bad for some months past, but the outlook is a little better now, so that it is hoped, with our improved methods of handling the fruit, and with the very great improvement in the finished article, that a good market at a satisfactory price will be obtained.

A large quantity of excellent pulp has also been made in addition to the canned fruit, some of which has been converted into a high-class jam, but the bulk is still in pulp form, as the jam market is far from satisfactory at present.

Well-made pineapple jam will, I believe, eventually meet with a good market overseas, as once its quality is known and appreciated it should become popular. Pineapple pulp put up in 10 to 14 lb . containers should also meet with a ready sale, as it can be used to advantage for pies, confectionery, \&c.

Considerable attention has been drawn to the possibility of drying pineapples and obtaining a satisfactory market for the dried product, and an endeavour is being made to erect a plant suitable for this purpose. If such a plant is erected and is proved capable of turning out a high-class marketable product at a reasonable cost, it will prove of the greatest value to our growers, provided, of course, that there is a good demand at a satisfactory price for the finished product, as it will provide a profitable outlet for any surplus and tend to regulate the price of the fresh fruit in the open market.

The experiments to determine the cause of the so-called pineapple disease have been con-
tinued during the year, and, as signs of the trouble made their appearance on the experimental plot at Palmwoods, the services of the Government Entomologist and Pathologist were called in and that gentleman made a very çareful examination, which showed that the extremities of the feeding roots of the affected plants were being destroyed by means of a species of mealy bug, which in this instance was undoubtedly the cause of the trouble.

Mr. Tryon suggested the application of sulphur to the roots of the affected plants, which was done with apparently benefcial results.

The plot has done remarkably well, having produced a good summer crop of fruit and is now carrying a winter crop of very good quality. This experiment has demonstrated the value of deep cultivation and the thorough preparation of the land prior to planting, combined with judicious manuring, as the roots of the plants are not confined to the surface or to the immediate surroundings of the plant itself, but have spread all through the land and are well below the reach of the ordinary implements of cultivation, so that they are not injured when the ground is worked. The deep rooting that is induced by deep cultivation prior to planting enables the plants to stand dry weather much better than they do when the roots are near the surface and the cultivation so necessary to retain moisture is either neglected or is a mere scratching of the surface that is of little value during a long dry spell. The manuring of this plot will be continued so as to note the effect of a well-balanced fertiliser as the plants get older.

## Citrus Fruits

As mentioned in the early part of this report, the erratic seasons of recent years have had the effect of interfering with the normal blossoming and ripening periods, with the result that last spring the trees were carrying a heavy crop of fruit that should have ripened by rights during the previous autumn and winter.

This off-season crop ripened at a time that was well suited for the rapid development and increase of the pestiferous Queensland fruit fly, and consequently it was so badly attacked by this pest that in many instances the bulk of the crop was destroyed, and even when apparently sound Iruit was sent to the Southern markets it was found to be so badly infested on its arrival that it was condemned. On account of the heavy off-season crop the trees only carried a medium main crop, and this was not a normal main crop, as the blossoming and consequent ripening of the fruit took place at different times, fully ripe ripe, partly ripe, and green fruit being on the tree at the one time. Unfortunately, the early main crop was affected by fly, but the later ripening fruit was practically free. The mildness of the autumn, combined with a good and regular rainfall, was in favour of the fly, as it prolonged its season, which generally ends at the first sign of cool weather. In addition to loss by fly growers have suffered heavily from their fruit specking-viz, by being attacked by mould fungus and the subsequent rotting of the fruit. This loss is largely due to the weather conditions, as in many cases it has not been possible for growers to dry the skin of the fruit prior to packing as it was so full of moisture
and the weather was so humid that there was little chance of getting rid of the surplus moisture in the skin. In good growing seasons coastal-grown citrus fruits have always more or less puffy, soft, sappy skins, that are very easily injured by bruising and when bruised are readily attacked by the spores of the mould fungus, and special care is necessary if loss is to be prevented. Many growers still pull their fruit, and in many cases the act of pulling plugs the fruitviz., injures the skin surrounding the stem or tears it away altogether. This is one of the best ways of causing the fruit to rot or speck, as the fungus spores find a ready entry into the fruit through the injured portion. Growers have been warned over and over again to handle their fruit more carefully and to remember that a bruised fruit is a spoilt fruit; but with little result, as when a season such as we have had occurs there is always a heavy loss, no matter what care is taken, but when the fruit is plugged and bruised it has very little chance, and the grower is apt to blame everything and everybody rather than his own carelessness.

With the return of normal seasons it is likely that citrus-fruit growers will continue to experience loss from specking, and the question therefore arises-as the specking is due to the injury of the skin when in a perfect condition to develop the fungus once the spore of the fungus has obtained entry, and this perfect condition is due to the large amount of moisture in the skin, is it not possible to extract the surplus moisture by subjecting the fruit in a properly constructed building to a process of drying, evaporating, or, as it is more usually called, dehydrating? I tested the artificial drying of citrus fruit years ago with good results, and am of the opinion that a machine capable of doing the work effectually can be constructed at a reasonable price and that such a machine, worked in conjunction with a central packing house, would be a success in districts where there is a sufficient cutput to warrant the expense. I am further of the opinion that a simpler drying arrangement could be designed that would meet the wants of an isolated grower or of a group of two or three growers who were too far away from a central packing house to make use of it.

One of the results of the war is the attention that has been given to fruitgrowing (including citrus fruits), as very large numbers of citrus trees have recently been planted in the Southerm States, largely in inland districts, where they are being grown by means of irrigation. This is bound eventually to bring about a congestion of citrus fruits in the Australian markets, and, unless some means are taken to dispose of the crop, to reduce the price to such an extent that their cultivation will no longer be profitable. Queensland has one advantage over the Southern States in that our earlier ripening varieties of citrus fruits can be placed on the market earlier than the southern-grown fruit, and also that, in the case of mandarins, the quality of our fruit is so superior that we can hold our own on the market. It is only the earliness of our oranges that saves them, as I am sorry to say that our coastal oranges, taken as a whole, are by no means equal in quality to the Southern fruit grown in hot and dry inland areas by irrigation. The only, oranges in Queensland that can hold
their own with these fruits are those that are grown under similar conditions here-viz., our Western-grown fruit, than which there is nothing better in the Commonwealth. Our growers will, therefore, have to leave no stone unturned if they want to retain a share of the Southern trade, as it will be useless for them to attempt to send inferior fruit, of bad colour, scale infested, bruised or specked, to compete against fruit that is placed on the market in the best of condition. When in Melbourne during May I was able to compare Southern-grown navel oranges with our Queensland fruit, and the comparison was not in our favour, and this was shown by the price asked by the best retail shops where good Southern-grown navels of medium size, but of good quality and appearance, were selling at 4 d . each.

The experiments that have been conducted at Montville on old trees that showed serious signs of exhaustion, and the roots of which were found on examination to be badly affected by a small borer, have been very successful with the majority of the trees treated, as the combined manuring, root treatment, and more favourable weather conditions have had the effect of encouraging a new and healthy root system and of producing a good growth of new wood, which has borne well this season. One or two trees that were too far gone at the time of treatment have not made any improvement, but the balance have made a good recovery. Adjacent trees that were not treated or manured are about in the same condition now as they were when the experiments started. These experiments show that citrus trees are very hardy, as even when very much neglected and more or less diseased they can be brought back into a healthy state, capable of growing good crops, by the exercise of care and attention in the matters of manuring, spraying, and cultivation.

The Assistant Instructor in Fruit Culture, who was specially appointed to give instruction in the pruning and general management of citrus orchards, has been employed throughout the year on this work, principally in the North Coast District, and he reports that there is a general improvement in the pruning of the trees and the cultivation of the land. This report is satisfactory, as a citrus orchard cannot be expected to yield a profitable return unless it is thoroughly well looked after.

## Other Semi-tropical or Tropical Fruits.

Custard Apples have still maintained their reputation as one of the best fruits we produce, and the area devoted to their cultivation is steadily extending. The Redlands district still produces the bulk of the fruit, but other districts are proving their suitability for its culture. The crop this season is not a very heavy one, but the fruit is of excellent quality and, generally speaking, the size is above the average. The Southern markets are taking more and more as the fruit becomes better known; but the retail price is usually still so high that it tends to restrict the consumption and thus limits the demand. With a bigger supply and better methods of distribution, I believe this fruit will become very popular in the South and, should I be correct in my belief, then we have an assured market for all we can produce.

Mangoes did not produce a heavy crop in most districts, but the trees have made a good growth, and if there is a dry time during the blossoming period they should set a heavy crop. Some very fine fruits were seen, and of these some were of excellent quality, but the majority of mangoes still met with are very inferior. This is unfortunate, as it is just as easy to grow a tree yielding good fruit as inferior, and a tree growing inferior fruit can be worked over with a superior variety. A good mango is undoubtedly one of the best of fruits, and a really bad mango is not far from being the worst; and that being so, the only way to build up a market for this fruit in the South is to send nothing that is not up to a high standard of quality. If this is done there is little doubt of the fruit being appreciated; but, on the other hand, should anyone be unfortunate enough to get a bad fruit for a start, the probability is that that person will not want to try another, and a prospective consumer will be lost.

Pawpaws have done well, and during the year I have seen some of the largest and best fruit and some of the heaviest crops I have ever come across anywhere. Like the custard apple, this fruit is steadily getting a footing in the Southern markets, and when the fruit has been carefully handled and properly packed, so that it has reached its destination in good order, very satisfactory prices have been realised. The pawpaw does well generally in Coastal Queensland, but to be grown to perfection it should be planted in a well-sheltered position free from frost and in a friable, naturally well drained loamy soil. It is one of the easiest fruits to grow under such conditions, and one of the most useful, as if used when green it makes an excellent vegetable, and when ripe it can be eaten by itself or with lemon juice, or it can be used as the basis of a fruit salad. No matter how it is used, it is an excellent and very wholesome article of diet.

Alligator Pear:-This very excellent fruit is not appreciated in this State as it should be, only those who have had an opportunity of becoming acquainted with it in other parts realising what a splendid fruit it is and what we miss by not having a good supply for local consumption. The tree thrives well in this State, and several of the trees I have known have borne well, but others have only been shy bearers. All the older trees have been raised from seed and the quality and size of the fruit vary in consequence. The total number of bearing trees in the State is very small indeed, and of this small number several that I have known have been cut down owing to the ignorance of their owners, who did not know what they were and considered them of no value. The Acclimatisation Society imported a few worked trees from the United States some few years since, and those are now in bearing, and the fruit I have seen is of the best quality, so that there is now no reason why a number of seedlings should not be raised by our nurserymen and worked with approved varieties which are regular croppers and come into bearing early. I have imported seeds from time to time and have distributed the young plants grown therefrom, but have not met with much success, as the majority of the young trees have been allowed to die out,

Now that we have worked trees in bearing from which to obtain scions, we should soon be able to work up a stock of trees, and another very desirable fruit would be thus added in commercial quantites to our present list.

Passion Fruit. - The cultivation of this excellent fruit is not increasing to any extent, despite the fact that the fruit brings good prices on our local markets, and, should there be a glut at any time, the jam-makers will always purchase, as there is a good market for the preserved pulp for use by confectioners or for making fruit salads.

Strawberries have been largely planted, and the favourable autumn weather has been responsible for a good growth, which gives promise of yielding a heavy winter crop. Quantities of berries ripened during May, and the fruit was very plentiful in June, the crop being the earliest to ripen as far as my knowledge of the State goes. In May, 1901, the Department managed to procure a few very early fruits for the visit of His Majesty, then Duke of York, to this State, but this year we could have supplied large quantities at the same period of the year without the slightest difficulty.

Another berry fruit which this State grows to perfection is the Cape gooseberry, but with the smaller areas of scrub that is being burnt off and planted with this fruit as a first crop, its production is becoming less and less.

Some very good fruit was sent to the factories during the spring and realised a good price for jam, but I am sorry to say that in one instance, at any rate, the producer was not content with a good price but loaded the vessels containing the fruit with added water so as to secure an extra profit. The fraud was discovered by a fruit inspector, and the jam manufacturer did not pay for the added water. The culture of this fruit is worth more attention than it receives, as the jam made from it is not only of very high quality but it meets with a ready sale.

## Temperate Fruits.

The commercial cultivation of these fruits is confined mainly to the granite belt, where the industry is making rapid progress and the area under crop is steadily increasing. A heavy planting, both at the soldiers' settlement and also generally throughout the district, took place last winter and early spring, and judging from the quantity of nursery stock now coming forward the planting will be equally as heavy during the coming season.

The year under review was not by any means a good one for the growers of temperate fruits, as the crop of both pip and stone fruits was very patchy and the granite belt suffered from hail, late frosts, fruit pests, and towards the end of the year excessive rainfall. There was a poor market for the early fruits and an attempt was made to conserve them locally in the form of pulp, as on account of the unsatisfactory state of the jam trade our local factories were only operating to a very small extent, and there was therefore no available market for jam fruits. The bulk of the early-ripening fruits, other than plums of the red American or damson type, are not very suitable for jam (apricots excepted), and of this fruit we do not grow
enough to supply the fresh fruit market. Early peaches have no substance so do not make a good jam, and further, the demand for peach jam is very limited. Early apples can be used for jelly making, but as they deteriorate very rapidly they must be made use of at once.

Midseason fruits are more suitable for jam, and firm, yellow-fleshed clingstone peaches are suitable for canning. The canning of yellow freestones has been discontinued for years in America, and very heavy packs of this fruit which have been put up in the Southern States are hard to dispose of. Midseason and late apples are probably the most suitable fruit to grow, and if the growers will arrange to cool store such fruits instead of rushing them all on to the market at once, and thus extend the marketing period, it is probable that better returns will be obtained. It frequently happens that excellent apples, which are far from ripe, are rushed on the market and sold for cooking; whereas had they been allowed to become fully developed and kept in cool storage they would have realised far better prices later in the season. Apples, such as Granny Smith, are frequently sold as cookers, that would fetch a fancy price as dessert fruit were they stored till they had developed their full flavour.

Unfortunately the fruit fly made its appearance early in the season, red cherry plums being badly infested, and from these the pest spread to apricots, plums (both European and Japanese), early and midseason peaches, apples and pears, and was present to a greater or less extent throughout the whole of the season.

Codling moth was also prevalent, and many other diseases, both insect and fungus, were seen, of which the black aphis of the peach and the woolly aphis of the apple were the worst insect pests and the brown rot of stone and pip fruits and the so-called die-back of various fruit trees the worst fungus pests. Demonstrations in pruning both fruit trees and vines were given and general instruction was given on all matters relating to fruit culture. The inspection of orchards was carried out as thoroughly as was possible with the limited staff that was available, and many growers were instructed to clean up their orchards, spray, \&c.; and in several instances orders were issued on growers ordering them to take certain action within a specified time. I realise that a more stringent inspection would be a protection to those growers who are endeavouring to keep their orchards clean, and am in hopes that an amendment of the Diseases in Plants Act will be passed that will not only provide for the registration of orchards but will impose a fee for such registration, and further, that it will give the Department the power to deal effectively with careless growers. The present method of procedure is too cumbersome and slow, especially in the case of pests such as the fruit fly, which must be dealt with promptly if any good is to result.

## Grapes.

Early in October downy mildew made its appearance in the vineyards of the Myrtletown district, and shortly afterwards diseased leaves were brought under the notice of the Government Entomologist and Pathologist, who, as soon as he had definitely diagnosed the disease as downy mildew, informed me of the outbreak.

The following morning we visited the district and gave advice respecting the methods to be adopted to save the crop. Many growers took the advice, but others simply ignored it. The former saved their crop and sold the fruit at a good price and the latter had nothing to sell. The disease had become disseminated over a considerable area from what was apparently the source of infection, and isolated outbreaks on individual vines were found generally throughout the district. Where the vines so attacked were sprayed at once with Bordeaux mixture the disease was kept from spreading and a good crop was obtained. Unfortunately, the outbreak had got beyond control before it was brought under the notice of the Department, as once the fungus causing the disease reaches the fruiting stage the spores are carried considerable distances by the wind, and should they come in contact with the leaves of a vine that are wet with rain or dew, especially if the weather is warm and muggy, they start to grow at once. The first sign of disease is a small brown spot in the upper surface of the leaf like an oil spot, and this is followed by a white downy growth on the under side of the leaf, by which the spores are produced. Spraying with Bordeaux mixture provides a protective covering over the surface of the leaf, as no spores of the fungus causing the disease can germinate on a leaf so protected. Owing to favourable weather conditions the disease spread to the North and South Coast districts as well as to the Downs and Stanthorpe, but did not extend to the Maranoa.

Like the Irish blight of the potato and tomato, which it closely resembles, it is a disease that is easier to prevent than to cure once it has made its appearance, consequently, if vignerons will take the necessary precautions recommended by the Department, this disease is not likely to cause serious loss at any time, and in the case of dry, hot districts it is not likely to get a start except there is a spell of moist weather.

The experiment vineyard at Coominya suffered severely and many of the vines have either been killed outright or are so severely injured that it will take at least two years to bring them round. The damage was due to injury caused by a very heavy hailstorm as well as by downy mildew. The phylloxera-resistant stocks suffered much less than the table and wine varieties, and, should any fresh plantings be made, all vines will be worked on such stocks. At the same time, the losses that have taken place show that, except in dry seasons, the culture of many varieties of grapes on or near the coast is uncertain, as when the weather conditions are favourable for the development of fungus diseases they are so liable to be attacked that it is too risky to attempt their culture commercially.

The culture of grapes in such districts should, therefore, be confined to those varieties that have been proved suitable, such as varieties of American origin and the few European grapes that are adapted to the local conditions, such as Black Hamburg, Royal Ascot, Sweetwater, \&c. The quality of the grapes sent to the local market during the year was good, both from the Pinkenbah and Stanthorpe districts, but the crop from the Coominya district was a complete failure, from the same-cause as that mentioned in the case of the experiment vineyard. In the Roma district the crop was made into wine.

## Fruit Fly Investigation.

In order to determine the value of the Harvey fruit fly lure, which had been placed under offer to the Government, this lure was tested by the Government Entomologist and myself in the presence of Mr. Harvey or his representative in citrus orchards in the North Coast fruit district, on deciduous fruit orchards at Toowoomba, and in similar orchards in the Stanthorpe district. A full report of these investigations has been submitted, which showed that the lure attracted large numbers of fruit flies, which, unfortunately, though very closely resembling them, were not the flies that cause the serious loss to our fruitgrowers both in the coast and inland, but a fruit fly that is especially connected with a species of solanum commonly known as wild tobacco, and which is very common in many parts. So far, the best means with which I am acquainted for dealing with the Queensland fruit fly are the use of trap trees, the fruit of which is a great attractant to the fly early in the season, such as the red American cherry plum, and allow the flies to deposit their eggs in the fruit, which should be gathered and destroyed before the maggots leave the fruit to burrow in the soil and turn into pupæ. Such trap trees provide a means of attracting large numbers of flies and of destroying the larvæ hatched from their eggs, thus materially diminishing the munber of mature insects and so protecting later ripening fruits. The gathering and destruction of all fallen fruit daily, carried out in conjunction with the use of trap trees, will do much to keep this pest in check. To obtain the best results, however, these remedies must be carried out by everyone, and this can only be done by making it compulsory and fining those heavily who neglect to carry it out.

Western Australia has brought in very stringent regulations to deal with the Mediterranean fly and has been successful in minimising the loss from this pest, and if it can be done in that State with this fly, there is no reason. why it cannot be done in Queensland with our own particular pest.

In order to deal effectively with this and similar pests our Diseases in Plants Act and the regulation thereunder require to be amended.


#### Abstract

\section*{Diseases in Plants Actr.}

The damage caused to our citrus and temperate fruit crops during the year by the Queensland fruit fly and other pests has been of so serious a nature that the amending of the Act so as to provide for the payment of an annual registration fee for all orchards in all fruit districts has been asked for by the growers themselves, as they realise that the only way by which pests can be dealt with successfully is not only to make their destruction compulsory, but to see that this compulsory destruction is properly carried out. To do this it is essential that the Department has the active assistance of the growers therselves, as Queensland is such a large State, and fruitgrowers even in the closest settled districts are frequently so far apart that departmental inspection, except at a very big cost, is impossible. Already several honorary inspectors have been appointed and many more will be appointed to see that the orchardists in their district keep their trees or fruit-producing plants clean and free from disease, as well as to see


that any citrus fruits sent from their district carry the certificate required by the. Victorian Department of Agriculture.

The present Act does not give the inspectors sufficient powers to enable them to deal promptly with such pests as fruit fly and codlin moth, and requires to be amended in this direction. The powers conferred by the Act in the case of the importation of fruits, trees, plants, and vegetables are, generally speaking, satisfactory, but could be improved by giving the power to return consignments of Southern-grown fruit trees that are found to be diseased to the sender, even though they may carry a certificate of fumigation. Diseased trees have been imported carrying such certificates and have been retreated on their arrival here; at the same time, the treatment (fumigation) is of no use in the case of many diseases, such as those of fungus origin, consequently there is a danger of introducing such diseases even though the trees are fumigated. As many of these diseases, especially those that are inside the tissue of the tree itself, cannot be successfully treated, it is therefore advisable that the consignment containing such trees is returned to the sender, as the dissemination of such trees is a danger to the fruit industry of this State. If diseased trees are planted in a young orchard it means that the orchardist is handicapped from the very start, and it is only right that he should be protected from such an eventuality.

## Vegetables.

The more favourable weather conditions have resulted in a considerable increase in the production of vegetables of all kinds and prices have fallen in consequence. In the case of potatoes the cost of seed was very high for the spring planting and the resultant crop left little margin of profit to the growers. The autumn crop, on the other hand, where free from blight, should have proved profitable, as the price for good lines has been a paying one. Irish blight has been present more or less throughout the greater portion of the year, and is always likely to be so when the weather conditions are favourable - viz., dull, moist, or muggy - as our growers evidently have no intention of spraying their potatoes whilst growing and thus protecting them from being attacked by Irish blight. Legislation is of very little good in dealing with a fungus pest, the spores of which are capable of being carried long distances by the wind or other agencies, and which reproduce the disease whenever they come in contact with a suitable hostplant under favourable conditions. Growers have been told many times that there is no remedy once the disease has made its appearance, and they have also been told that it can be prevented by the exercise of reasonable care. It is therefore questionable whether the inspection of potatoes for Irish blight is of much value unless growers take precautionary measures to protect the growing crop, as all the inspection in the world is not going to prevent an outbreak when the weather is favourable for the development of the disease.

There has been a considerable increase in the yield of potatoes during the year, and as a result there has been a decrease in importation amounting to 187,776 bags.

Tomatoes have been an unsatisfactory crop, and the price has been very erratic. Some growers did well, but I am sorry to say that the majority did badly. This is due to two causesfirst, the prevalence of Trish blight from our Southern border to the north of Gladstone, and secondly, the poor demand for tomato pulp for sauce-making.

At the time of writing the outlook is brighter and it is probable that the Bowen growers who have suffered so severely during recent years as the result of the disorganisation of the coastal shipping will meet with a good demand for their winter crop. It is interesting to note that some growers who have systematically sprayed their tomato crop for Irish blight have done well, whereas the majority of growers who have done nothing have lost their crop. As in the case of the potato, preventive treatment is the only remedy, as it is no use trying to fight the blight once it has got a fair hold.

The cultivation of peanuts has received more attention, but, unfortunately, the price has fallen to such an extent that the cultivation of this valuable crop cannot, in my opinion, be carried on profitably unless growers are equipped with up-to-date machinery for harvesting, picking the pods from the plants, hulling, and oilmaking. I do not wish to infer that every grower should possess a complete outfit, as that is out of the question, but that a number of growers in a given district should co-operate to establish an efficient plant. A start has been made on these lines in the Cooktown district, and I trust that it will be a financial success, as should it do so there is no reason why the cultivation of this crop should not become one of our staple industries, as there are large areas of land in this State suitable for its culture.

## Fruttgrowers' Organisations.

During the year the pioneer association, The Queensland Fruitgrowers' Industrial Trading Society, went into voluntary liquidation, as it had accomplished the work it set out to do some twenty years ago, and its place has been taken by the Southern Queensland Fruitgrowers' Association. During its existence the Q.F.I.T.S. has done very good work for the fruitgrowers of this State-as by finding markets for our surplus in the Southern States at profitable - rates and by organising a better system of distribution than that existing prior to the formation of the society they have been able to relieve the local markets and have been instrumental in materially benefiting their members. Many of our older orchardists have been connected with this society, and to them and their secretary the present-day growers are very largely indebted, as without their assistance the fruitgrowing industry of this State would not have made the progress it has. At the same time the industry has a long way to go before it can be considered to be on a sound business basis, where the grower gets a fair price for his products and the purchaser can obtain these products at a reasonable rate. The new society has made a good start, and has no less than sixty-two fruitgrowers' associations or societies affiliated with it. It controls practically the whole of the banana-
export trade and a large proportion of the pineapple and citrus trade, as the fruit trains that it has organised now carry the bulk of these fruits to the Southern markets.

In addition to this association an executive body known as the Queensland Fruitgrowers' Federation has been formed to watch over the interests of the fruitgrowers of the State as a whole, and to act as medium on their behalf on all matters relating to the industry. So far the work done has been of a purely preliminary nature, but I feel certain that the formation of this body is a step in the right direction, as it will be the means of communication between the growers and the Department, and if required to do so it can act in an advisory capacity to the Department.

## Quarantine Act and Commerce (Trade Descriptions Act).

The administration of the Quarantine Act and of the Commerce Act as far as they relate to fruits, plants, \&c., has occupied a large amount of my time as well as that of the inspectors under the Diseases in Plants Act. These Acts have not only occupied my time, but I have had to incur very heavy responsibilities, especially in fixing the standards of export fruit products, and deciding whether they are suitable for export or not. In this I have had to depend entirely on my own judgment, as no definite standards have been laid down. As already mentioned, in the case of the pineapple pack, where the Federal Government advanced money against the pack, I fixed a high standard, with the result that the fruit we have exported has been very superior to any previously sent out of this State. Already this fixing of a high standard is having a beneficial effect, and information is now to hand that the fruit has realised a satisfactory price. This is very good news, as it shows that we can obtain a market for this fruit product provided we turn out a high-class article, which we have shown we can do by handling the fruit properly, grading for quality, packing only one size and one colour of slice in a can, and using a heavy syrup, in a well-made can, which is labelled attractively. Other products of the pineapple, such as conserve and "tit-bits" are also in demand.

There is no market for inferior fruits or jams, but I believe if we keep up the standard set this year for pineapples and put up such lines as a high-class strawberry jam, a high-class marmalade, a good chutney, and a good tomato sauce, markets will be found for these products. We have been taught a lesson with respect to inferior goods and have learnt that there is now no market for such lines, whereas our latest advice is to the effect that high-class goods are in demand.

In conclusion, I beg to submit a statement showing the quantity of fruit, vegetables, and plants imported into and exported from this State to other parts of the Commonwealth, as well as a return of the imports and exports under the Quarantine and Customs Acts respectively.

Imports for Year ending 30th June, 1921.

| District. | Fruit. | Potatoes. | Onions. | Plant. | Turnips. | Vegetable and Seods. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Brisbane | $\begin{gathered} \text { Cases. } \\ 308,784 \end{gathered}$ | Bags. <br> 76,524 | Bags. <br> 41,914 | Packages. <br> 1,384 | Bags. <br> 2,748 | Packages. 627 |
| Wallangarra | 188,893 | 65,325 | 852 | 1,339 |  | 168 |
| Townsville | 37,727 | 28,911 | 12,286 | 3 |  |  |
| Cairns | 11,212 | 14,115 | 5,449 | 5 |  | 243 |
| Bowen | 348 | 1,128 | 437 | 3 |  |  |
| Rockhampton | 40 | 3,048 | 3,953 | 26 |  | $\cdots$ |
| Innisfail | 182 | 191 | 46 |  |  |  |
| Totals | 547,186 | 159,242 | 64,937 | 2,060 | 2,748 | 1,038 |

Exports for Year ending 30th June, 1921.

| District. | Bananas. | $\begin{aligned} & \text { Pine- } \\ & \text { apples. } \end{aligned}$ | Oranges. | $\begin{aligned} & \text { Tomatoes } \\ & \text { and } \\ & \text { Cucumbers. } \end{aligned}$ | Vegetables. | Mixed | Strawberries. | $\begin{gathered} \text { Potatoes } \\ \text { and } \\ \text { Pumpkins. } \end{gathered}$ | Canned <br> Pines and Jam. | Canary and Grass Seed |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Brisbane | Cases. $4,501$ | $\begin{gathered} \text { Cases. } \\ 19,649 \end{gathered}$ | $\begin{aligned} & \text { Cases. } \\ & 5,900 \end{aligned}$ | $\begin{gathered} \text { Cases. } \\ 15,086 \end{gathered}$ | $\begin{gathered} \text { Bags } \\ \text { and Cases. } \end{gathered}$ | $\begin{aligned} & \text { Cases. } \\ & 2,434 \end{aligned}$ | Trays. | Bags. $1 ; 373$ | Cases. 840 | Bags. 1,224 |
| Wallangarra | 253,326 | 110,289 | 19,226 | $\begin{array}{r} 44,252 \end{array}$ | $21,895$ | $10,368$ | 3,413 | 2,126 | .. |  |
| Innisfail |  |  |  | 816 | 933 |  |  | .. | . | . |
| Rockhampton |  |  | 250 |  |  | 4 |  |  |  |  |
| Bowen |  | 176 | 35 | 103,035 | 12,353 | 22 |  | 5,229 | $\cdots$ |  |
| Cairns | 1,439 | 9,746 | 6,240 |  |  |  |  |  |  |  |
|  | 259,266 | 139,860 | 31,651 | 163,216 | 35,181 | 12,828 | 3,413 | 8,728 | 840 | 1,224 |

Return showing the Total Imports under the Quarantine Act for the Year ending - 30 th June, 1920.


Return showing the Totar Exports Oversea Under the Commerce Adt for the Year ending 30 th June, 1921.

## Packages.

$8 ; 397$

ALBERT H. BENSON,
Director of Fruit Culture.

## REPORT OF THE DIRECTOR OF AGRICULTURE

The year ending 30th June marks an era in the development of several important rural industries-wheat, maize, cotton, and peanuts.

Taking the seasons from 1st July last year to date, they were generally favourable to production throughout the main agricultural districts. Certain exceptions are only to be expected where farming operations are carried on over such a wide range of country, practically from the Tweed to Cooktown.

Touching the chief cereal crops, wheat and maize, it is shown elsewhere that the former crop was the largest so far harvested. The excellent rains which contributed largely to the success of the wheat also exercised a beneficent effect on other crops grown during the same period. The good herbage season proved most favourable to stockowners, and was of particular benefit to dairymen.

In Southern and Central Queensland dry conditions during late January and February caused a portion of the maize crop to fail for grain; however, late sown crops were more successful, as they experienced the full benefit of the March rains. The Northern maize crop suffered damage through too much wet weather, particularly on the scrub lands, where much of the grain proved to be mouldy. Out of the first seventy days of the year, sixty-five were wet; damp conditions later on prevented the grain from drying out satisfactorily in the field.

In the vicinity of Rockhampton and in the Dawson Valley and contiguous districts a rather severe dry spell was experienced in the early part of this year. The cotton crop in the Dawson Valley proved to be more drought-resistant than maize, which, to set a full crop, requires rain about tasselling time.

## Wheat.

Wheatgrowing has always had its advocates, notwithstanding the number of setbacks experienced through dry seasons, and at times rust; but, with a persistence and will to win through in spite of difficulties, resembling in this respect the inherent characteristic of the wheat itself, growers have battled on until the present, which defines a period when Queensland actually produced more than its requirements in the way of grain. Viewed in the light of the vast areas of land capable of producing wheat, such a circumstance may seem of small account. However, the true perspective clearly shows the accomplishment of an immediate increase in production and wealth, and a better recognition of the factors which count for success in raising the crop. Too much emphasis cannot be placed on the fact that once the individual grower commences to farm intelligently, and to concentrate effort on the "trapping", and conservation of moisture, coupled with the use of rust-resisting and rustescaping varieties of wheat suited to seasonal and local conditions, much of the element of chance is eliminated. Rust-liable varieties and late and indifferently prepared land have accounted in the past for many disappointments, and given colour to the oft-repeated slogan that wheatgrowing is a gamble.

The formation of the Wheat Board-the first of its kind in Queensland-in which the men vitally interested have a say in the management of business affairs through their own elected representatives, is likely to be the forerunner of a larger and wider co-operative movement in the handling and marketing, not only of wheat, but of other primary products, a step destined to have far-reaching and beneficial results for the producer.

The prospect of an enhanced price under the 8s. per bushel Government guarantee, in conjunction with a good season, had an immediate effect in producing a more healthy tone and a greater optimism amongst growers, whose response was quickly expressed by a larger acreage put under crop. Cognisance should be taken, however, of other factors, which have placed the wheatgrower in a much better position to-day than formerly.

Knowledge born of experience, the use of fertilisers, improved methods of cultivation, and better machinery, have all exercised an influence for the better, but the main factor has been the improvement wrought in the wheat itself by the painstaking, scientific and technical work of cross-fertilisation and selection of types by wellknown plant-breeders in the South to meet the many and varied conditions under which the cereal is being produced. New and more reliable varieties are taking the place of the old and often rust-suseeptible kinds. Good work is being done in this State, particularly at the Roma State Farm, in the production of varieties to suit Queensland conditions, and the tests carried out by the Field Branch as an extension of this work are contributing to the generally improved conditions existent in the wheat industry at the present time.

## Maize.

The inventive genius of a Queenslander, Mr. George Free, of Nobby, is successfully producing a machine to harvest a standing crop of maize in the field by effecting the picking, husking, sheiling, and bagging of the grain in one operation, is fraught with great possibilities, which must have a far-reaching effect in cheapening the cost of production of this all-important cereal, particularly in localities where climatic conditions admit of the grain thoroughly drying out in the field.

Maize, like all other primary products, is subjected to pronounced market vagaries in the matter of price; in this connection the abnormal conditions operating during 1919-20 had an immediate effect of forcing up prices beyond the value of the grain. This circumstance acted as a spur to the efforts of growers, who planted increased areas. With a return to a good season, and plentiful supplies of other grain being available, the maize market suffered accordingly, and the new season's grain dropped to 3 s . 6d. per bushel at country stations.

Growers in this State who are feeling the position acutely are the new soldier settlers near Atherton, who for the greater part put all their money and energies into maize as a sole crop, with very unpromising results. Limited as these growers are by their geographical position to
the Northern markets, which only absorb about one-third of their produce, and to the necessity of holding over much of their crop in expectation of marketing it to advantage in Southern Queensland and Southern States, it is gradually being forced upon them that the high steamer freights and other handling charges form an absolute economic bar whilst market rates remain even normal.

The position is one which calls for a prompt measure of relief, otherwise it will become intolerable. It was my privilege to visit the settlement in May with a view to explaining the system of drying, treatment, and storage of grain.

The outcome of inquiries, and of the study made of the whole matter, clearly showed that a modern plant is a necessity for properly handling the grain for the Northern trade (about a quarter of a million bushels); but the question of financing the scheme proved an insurmountable obstacle. Apart from several thousand acres cropped in the locality of the settlement, about 200 soldier settlers planted approximately 8,000 acres with maize.

Although the areas are small (about 60 acres), the soil is of a rich volcanic nature and the rainfall good, fully 70 in . per annum.

Obvionsly it would be unwise to continue to place dependence solely on one crop. Recommendations have been made with the object of developing the settlement on more common-sense lines-mixed farming, with dairying and pig raising. This reconstruction will involve additional expenditure, but such is warranted, in order to make for the success of the settlers and of the settlement scheme.

Moistrure-testing Machines.-The importation of two machines late this year for determining the moisture content of maize and other kindred grain and substances, will now enable the Department to supply valuable information on the subject of storage and transport of grain. Complaints, due to the excess moisture content particularly of Northern-grown grain and of new season's grain elsewhere, are made on occasion losses occur also in tanking grain from the same cause. The placing of one machine in the North at Kairi State Farm, and the other at Head Office (Pure Seeds Branch), will help to obviate difficulties of this character.

The Maize Position. - The maize-growing industry has reached a stage of development which warrants the provision of up-to-date facilities for drying, treatment, and storage. At the present time individuals have to suffer a considerable deterioration and loss through lack of proper facilities for handling and marketing their produce. There is ample scope for a large co-operative marketing scheme, which appears to be the only reasonable method of ensuring that the grower receives the full equivalent of his labour.

## Cotton.

The price guaranteed by the Government$5 \frac{1}{2} \mathrm{~d}$. per lb . for cotton in seed -has proved an excellent incentive to growers and the industry has taken a new lease of life. A strong forward move was made early in the season to put more land under crop, and a greater optimism prevails than heretofore. Whilst prices are assured
(up to 30th June, 1923), there is every reason to expect a very appreciable extension of the area under crop. Figures given elsewhere in this Department's report deal more fully with the present situation.

## Peanuts.

Very pronounced development of the pea-nut-growing industry has taken place during the year, notably on the Atherton Tableland and near Cooktown. At the former centre a Peanutgrowers' Association was formed, consisting for the most part of soldier settlers. At Cooktown, the recent development work has been carried out by The Cooktown Plantations Company, formed principally by Melbourne shareholders, who have acquired an area of 6,000 acres of land. In both instances labour-saving machinery has been imported to reduce the cost of threshing, grading, and brushing the nuts.

Prices for peanuts are much lower this year than last, notwithstanding the import duty. At the present time the principal distributing trade is in the hands of Chinese, who are also importers of peanuts. This industry calls also for co-operative effort to ensure remunerative returns to the growers.

## Miscellaneous Crops.

Crops for bird seed, principally canary seed and French millet, continue to find favour, particuarly the former. During the war period the net results to growers were excellent, but with a return to more normal conditions prices have receded. The outcome of the dissatisfaction due to this latter cause is the formation of a "Canary Seed Pool," the business control of which has been taken over by the present Wheat Board at Toowoomba. It was only a few seasons ago that the Department advocated the raising of both red and white French millet and distributed a quantity of seed. In some instances appreciable quantities of millet were grown. The crop deserves to be more largely cultivated; it thrives in the spring and summer, makes good fodder, particularly for grazing off, and is an excellent supplementary crop for canary seed growers. With two standard crops of this description there is ample scope for the extension of the bird-seed industry.

Flax.-Interest has been shown by farmers on the Downs in the initial arrangements made to form a co-operative company. A number have sown seed, and if the crop succeeds, it is more than probable that the outcome will be the establishment of a mill to treat the flax for the extraction of its fibre. Previous tests carried out by this Department indicate that in moist seasons the crop thrives well, but it is susceptible to any check in its growth due to dry weather. Regular winter rains are essential.

Barley.-A revival of the malting industry would do much to encourage the production of malting barley, provided a satisfactory price were assured. Barley of excellent quality is produced on the Downs, but at the present time there is only a limited market. Special encouragement is needed to resuscitate the industry.

The demand for Cape and skinless barley for raising green fodder for dairy stock has had an effect in extending the areas under these varieties. There is evidence, however, of much
neglect on the part of farmers to "pickle" their seed for smut, a circumstance which soon reacts to their detriment.

Arrowroot.-This product appreciated in price to such an extent during the war that an extension of the area under crop was made and a new factory was built at Redland Bay. Growers are now faced with the fact that prices have been subjected to a severe slump, and that they will, perforce, have to be content with reduced returns.

Fodder and Ensilage Crops.-Less ensilage was made this year than last. This may be accounted for by the improved season, and the fact that extensive areas of maize which failed to give a return for grain, by reason of the drought, were tiurned to account for ensilage.

Officers of the Field Branch have carried out demonstrations in ensilage-making in different districts, and taken steps also to establish several fodder demonstration plots, where a variety of green crops, singly, and in combination with field peas and vetches, are being grown. Excellent reports have been received respecting these trials, and dairymen are showing a good deal of interest; so much so, that an extension of the system of raising green crops to maintain milk yields will result.

English Potatoes.-Irish blight caused loss in some localities, instances having occurred where crops totally failed. A good deal of information and advice has been given on the subject, but it is very difficult to convince growers of the necessity of spraying their crops before the disease appears. Tomatoes have also suffered more or less from the same cause.

Sweet Potatoes.-The work undertaken in the Central district by the Instructor in Agriculture, Mr. G. B. Brooks, in connection with the classification of varieties in cultivation, has been continued, with good results. Comparative tests and demonstration plots were established in different localities, in connection with the work, and although a dry spring delayed planting operations, beneficial rains were experienced later.

Tobacco.-Large areas of excellent land exist which could be turned to profitable account for raising different classes of tobacco leaf, but the industry appears to be languishing for want of an experienced instructor, thoroughly familiar with modern methods of raising and curing the leaf. Growers are not realising the full value for their produce, largely on account of lack of knowledge and facilities for the proper preparation of the leaf for market. Importations of special varieties of pipe and cigar leaf seed were made from the tobacco-growing States in U.S.A., so that growers could secure supplies. A choice selection of seed of cigar varieties was obtained from Uruguay, and tested in the Bowen district, some proving to be of very promising quality.

Rice.-Expert opinion obtained on the quality of Tolga-grown rice indicates that excellent commercial samples can be grown. The industry is one which should offer a good medium of profit, as Upland rice can be sown and harvested with machinery.

An importation of seed of several varieties has been made from Japan, and tests will be carried out during the approaehing season.

[^1] a In this connection the past year has proved a very important one, as the services of the various officers in different parts of the StateNorth, Central, and South-have been largely availed of. It has been the aim, as far as possible, to link the instructional with experimental work, and to bring the different officers into direct touch with new settlers, and with estab. lished farmers seeking advice.

The appointment of three Assistant Agricultural Instructors has enabled the Department to more adequately cope with the work generally.

Special attention has been given in the North to trials with maize, sorghums, Sudan grass, potatoes, peanuts, tobacco, rice, cowpeas, lima beans, and hill taro; also with comparative tests of fodder for dairy cattle and pigs.

In the Central district experiment work was carried into a number of new localities and dealt principally with maize, sorghums, cotton, winter fodder crops, root crops, onions, and sweet potatoes, 92 acres being occupied by seventy-four plots. Eighty-six distinct crops were under test, embracing 1,476 individual tests. An interesting section of the work at this centre is in connection with the classification of sweet potato varieties in cultivation, and the carrying out of variety trials at twenty-four different centres on the coast and as far as Capella inland.

In the South special attention has been given to seed maize improvement and the raising of improved strains for sale to farmers. Four new varieties were imported from America and will be tested during the coming season.

Approximately thirty different varieties of grain sorghums imported from the Bureau of Plant Industry, U.S.A., and from the Sudan were under trial, but the latter kinds made exceptional growth of stalk under the altered climatic conditions here. The prospect of obtaining heavier-yielding grain sorghums than some of the acclimatised varieties seems remote.

The wheatbreeding work carried out at the Roma State Farm has been extended through the medium of the Field Branch into other wheatgrowing centres Jandowae, Bell, Allora, Milmerran, Gibinbell, Kooroongarra, Kurrumbul, and Inglewood-a total of approximately 90 acres being taken up with the trials.

The heaviest yield was obtained at Ingle-wood- $-37 \frac{1}{2}$ bushels per acre. This wheat was awarded first prize at the local show. Improvement is anticipated in the quality and yield of wheat in the respective districts when these new varieties are brought into general cultivation.

Seed-propagation plots were established with different varieties of cotton with a view to improving the types in cultivation.

Several winter fodder plots were sown with different cereals, singly, and in combination with peas and vetches, with the object of determining the most suitable kinds for certain districts, for the purpose of maintaining milk supplies on dairy farms at a timie when the natural grasses are not succulent. Food crops for pigs are also being tested in different localities to encourage the system of raising suitable maintenance crops, such as rape, kale, field carrots, cabbages, swedes, mangels, and sugar and silver beet.

Farmers have shown considerable interest in the seed-improvement and experiment plot work and give expression at times of their appreciation of what has been accomplished on their behalf.

In a recent instance a maizegrower advised that after using departmental seed for four years, and following out instructions respecting seed selection, he had increased his yield on the farm by 40 bushels per acre.

The high yielding capacity of a field crop of Improved Yellow Dent maize was demonstrated this year in the Gympie district, where 117 bushels of grain per acre were threshed, this excellent return being the direct result of using productive strains of departmental seed selected from "ear-to-row" tests.

Comparative tests of different crops for producing food supplies for dairy stock and pigs have also demonstrated the value of this particular section of the work to farmers, one of whom recently proved that so many additional cans weekly of cream were obtained by feeding the animals in his herd with suitable fodders from the plots, many of the fodder crops being entirely new to the locality.

Another example may be given in respect to the raising of new crops in a district. Two years ago at Atherton an experimental plot comprising an acre of peanuts brought in a gross return to the grower of $£ 6210$ s., when peanuts were selling at 6 d . per lb . Only a very limited area of peanuts was grown in the district at the time, but since then something over 200 acres have been put under crop.

## Corngrowing Competition.

One competition was concluded early in the year and another commenced. Stud seed was used, and several yields exceeded 100 bushels per acre.

## National Show.

A comprehensive display was made last August, added interest being imparted by the addition of Northern products, brought with the object of illustrating the possibilities of this rich section of the State.

## State Farms.

Kairi.-Considerable development has taken place during the year in the soldiers' settlement in the vicinity of the farm, from which about 500 acres were resumed to provide for additional soldiers' blocks. Two studs of cattle are now maintained at Kairi-Jerseys and Milking Shorthorns. The latter has been founded solely with Darbalara-bred stock-twenty-two females and two bulls. The Darbalara Stud (Gundagai, New South Wales) has established an excellent reputation for production and a world's record for the breed. The Kairi stock should exercise an influence later on in the quality of the herds on the Tableland. Animals from the farm exhibited at district shows were successful in winning a number of prizes.

The Berkshire stud is now well established and the demand for animals is keen.

Kikuyu grass imported from Rhodesia is giving great promise on the rich volcanic scrub soils, and should prove an acquisition to stockowners on the Tableland.

## Hill taro is also very promising.

The Badila cane plot, established for the purpose of supplying plant cane for the coastal sugar districts, has been drawn upon for the South Johnstone Sugar Experiment Station and other places, and it is expected that the system of raising plant cane on the Tableland will enable this variety to contimue to maintain its excellent qualities.

Warren.-Temporary changes rendered necessary pending the return of the Manager to his duties, after an unfortunate accident last year, caused some interruption in the continuity of work in the Field Branch. However, the Manager was fit enough to resume duty a few months ago. Considerable activity was shown during the year in farm operations and the growing principally of fodder and ensilage crops, and in experiment work. Fields along the creek frontage, damaged previously by floods, were worked up again and sown with lucerne. which seems to have established itself satisfactorily, notwithstanding a dry spell.

The Ayrshire stud is on a better footing, and the herd was subjected to the tuberculin test. Additions were made to the pig runs to provide much-needed accommodation for brood sows and young stock. The demand for stud stockcattle and pigs-was good, and the influence of the farm stock towards district herd improvement is pronounced. Pear destruction was continued by means of Roberts's improved pear poison applied with an atomiser.

Roma.-Excellent progress has been made in plant breeding. The Roma wheats have more than held their own in comparison with a number of kinds in cultivation, and several new wheats produced at the Farm have been tested, named, and brought into cultivation.

Attention has been given to the improvement of Sudan grass by the propagation of special strains for hay and fodder purposes, a class of work urgently needed to maintain the purity of commercial strains of this excellent plant, which is showing marked deterioration through crossfertilization with sorghums of different kinds. Co-operation with the Agricultural Chemist in the systematic sampling and despatch of specimens of second growth of plants for analyses has enabled this latter officer to make definite deductions respecting the amount of hydrocyanie acid present, which in every instance proved to be in negligible quantity, a circumstance of very considerable importance to stockowners.

Cross-fertilization of cowpeas, and the fixation of several new types, is another branch of plant breeding work effected during the year. Some of the new strains have shown a marked resistance to nematode, a root affection which is rather partial to this plant.

Hermitage.-Comparative tests were made under field conditions with a large number of wheats and other cereals to determine their adaptability to the heavier classes of soil of the Downs. Several acres were planted up with flax, with the object of giving this crop a thorough trial, in view of the possibility of the establishment of a mill on the Downs to treat the flax straw for its fibre. The season proved somewhat too dry for the development of the plant, but a light yield of linseed was harvested. Field
plots of grain sorghum and sassaline were established, and both plants made good growth under adverse circumstances.

The flock of crossbred sheep maintained at the Farm increased satisfactorily, and good prices were obtained for fat lambs.

Gindie.-The Beef Shorthorn stud, maintained for the purpose of breeding bulls to improve the standard of quality of district herds, has made excellent progress, and the care exercised in the classification and mating of the different family groups has resulted in the maintenance of a high standard of quality throughout.

The Gindie stock have been singularly successful at various shows. The reputation of the herd has extended, as a sale of ten young bulls was made to the Home and Territories Department. These will ultimately be shipped to Darwin.

A high-class young bull was purchased for the stud at the Yandilla dispersal sale, and after successfully passing the tuberculin test, was subjected to tick fever inoculation before being forwarded to the Farm.

Home Hill.-Early this year witnessed the completion of the clearing of 150 acres of land and the breaking up of a portion in preparation for the grading of several sections to be occupied by various crops. Good progress was made in this direction in anticipation of certain permanent ditch construction work designed for the purpose of carrying out cane irrigation experiments.

The sinking of two wells, as pumping sites, was completed by the Hydraulic Engineer's Department, and the subsequent tests proved that upwards of 50,000 gallons of water per hour could be raised from the respective wells.

A drainage shaft was also sunk to a depth of 20 odd feet and lined with concrete rings for the purpose of letting off surface water from a small swamp area into the underground supply, this system proving satisfactory.

A small cottage was built for the occupation of the Foreman and a storeroom was also erected.

A Manager was appointed in March.
H. C. QUODLING.

31st August, 1921.

I beg to submit herewith a report upon the dairying industry for the year 1920-1.

1 have to advise that the year recently terminated was markedly favourable for the production of dairy produce of every kind, and the satisfactory weather conditions which prevailed throughout the season, combined with the relatively high market value of dairy produce, provided ample encouragement for dairy farmers to devote comparatively more of their attention to the production of milk and cream, with the result that I am enabled to advise that record quantities of butter, cheese, and condensed milk were manufactured within the year. The capitalised value of the milk produced and the milk products manufactured therefrom within the year ranges between $£ 7,000,000$ and $£ 8,000,000$ sterling.

In order that a ready comparison may be made between the quantity of dairy produce manufactured during the year 1919-20 and that produced within the twelve months under review, the following particulars concerning the production of butter and cheese for the respective years are supplied:-


The aggregate monetary proceeds from the industry for the year exceed in value any former annual return made in the history of dairying in this State.

The standard of quality was generally well maintained throughout the season. In the butter factories the principle of neutralisation and pasteurisation of the cream, preparatory to manufacture into butter, is extending in practice, with beneficial results to the quality of the butter recovered from the cream so treated. There still remains, however, a tendency on the part of some factories to pay insufficient attention to what may be referred to as the details connected with the process of neutralisation and pasteurisation of cream, and by other manufacturers there is exhibited a weakness for the inclusion of creams which are of a quality that is unsuited for pasteurisation. As a consequence, the resultant butter fails to secure high points when classified by a grading officer.

Moderate improvement has been effected in the quality and general appearance of the cheese manufactured by factories, but it will not be until the pasteurisation. of the milk for cheese purposes is brought into general practice, and factories utilise a standard size of choese-hoop and
crate, that the cheese will be made to meet the requirements of the oversea markets in respect to quality, size, shape, and method of packing. It is confidently expected that the assistance and instruction rendered to manufacturers of cheese by Departmental officers, acting in conjunction with the provisions of "The Dairy Produce Act of $1920^{\prime \prime}$ " bearing on this matter, will together be efficacious in bringing about the desired result.

The development of the cheese industry in this State is of more recent origin than the founding of the butter branch of the dairying industry, and the cheese-manufacturing companies, although permanently established, have not yet reached as strong a position as has been attained by companies manufacturing butter, and because of this it frequently happens that cheese factories experience a difficulty in carrying out necessary improvements or extensions to premises and in making financial arrangements to allow of the installation of plant, and otherwise bringing the equipment of the factories up to date. It is manifestly clear, however, that the development of the cheese industry has reached the stage that any cessation in the manufacture of cheese would result in serious loss to those allied with cheese factories, and also deprive the State of a valuable asset, but it is to be recognised that the expenditure of further capital in the equipment of cheese factories is imperative in order to bring the factories up to a modern standard of efficiency, otherwise our cheeses will fail to command anything like top prices when offered on the world's markets in competition with the cheeses of other countries.

The pasteurisation of the milk which is to be utilised in the manufacture of cheddar cheese should be the main objective of every factory engaged in the exportation of cheese, and failure on the part of factories to recognise their responsibility in this respect must necessarily retard the progress of this branch of the industry and act detrimentally to the interests of those supplying the factories with milk, because it automatically follows that comparatively low realisations for cheese mean a proportionate reduction in the value of the milk from which the cheese is produced.

The pasteurisation of milk for cheese purposes has passed the experimental stages, and it has been in practice sufficiently long elsewhere to allow the value of the process to be gauged definitely. In the main, the pasteurisation of milk intended for cheesemaking has been found beneficial, and capable of effecting considerable improvement in the quality of the cheese made from it, and flavours in milk that are attributable to the milch cows partaking of herbage or rank pastures are to be either totally eliminated or appreciably reduced by the application of the process. This feature, of itself, is a material advantage in cheesemaking, particularly in parts of this State that are noted for the growth of various classes of rank vegetation. In its bearing upon cheese intended for exportation overseas, the pasteurisation of the milk has a further sphere of usefulness, and by the employment of such means the influence of foreign and harmful germ life in the milk is arrested, and as a consequence no abnormal development is likely to
take place within the cheese while it is maturing, or is held in cold storage awaiting shipment, or in transit overseas. The cheesemaker, because of the more complete control of the milk that is placed in his hands as the result of pasteurisation of the milk, is enabled to manufacture an article of comparatively greater uniformity in quality than is possible when the cheese is made in the einstomary manner from unpasteurised milk.

The volume of the export trade in cheese has assumed sufficiently large proportions to warrant the general adoption of the principle of pasteurisation of the milk supplied to cheese factories, and in the light of present-day knowledge there is no other way outside the pasteurisation of milk whereby the export trade in cheese may be placed on a satisfactory footing.

There is no doubt that the added stability of the cheese industry, together with the comparative increase in the proceeds derived from the sale of cheese that assuredly would follow in the wake of the general adoption of the principle of pasteurisation of milk for cheese purposes, would more than recompense companies manufacturing cheese for the expenditure involved in the installation and operation of the necessary plant and equipment.

Post-war conditions are slowly exercising an influence upon the industry, and naturally, in the market quotations for dairy produce in oversea markets, there is reflected the purchaser's views of the relative values of dairy foodstuffs. Chief amongst the changes which have been effected there is the manifest preference in value that is shown in the London markets at the present time in favour of dairy produce of firstclass quality, and the comparative disregard for either butter or cheese that is below first-grade quality. The line of demarcation between first and lower grades of dairy produce is to-day quite two to three fold greater than was formerly the case.

The oversea market quotations have a significance to us, as they are signalling in the most emphatic manner possible that dairy produce of inferior quality is not wanted in Great Britain. It would be injudicious for those controlling factories engaged in the manufacture of dairy produce to ignore the warning.

The satisfactory preparation and packing of both butter and cheese intended for the overseas markets demands the exercise of special attention to every detail connected therewith. The dairy produce must be of the finest quality, and must be packed in a manner which is in strict compliance with the requirements of the particular market in which the goods are to be disposed of. Our butter is consigned overseas chiefly in packages which are made of Queensland white pine, a timber which is to be accepted as providing a reasonably suitable box for the purpose, as it makes up into a package which is comparatively strong, light in weight, and of a white and attractive appearance. Before the Queensland pines were accepted as satisfactory for butterbox purposes, innumerable tests were made of the timber with the object of ascertaining the freedom of the timber from resinous taints and odours, and it was found that several varieties of indigenous pines, when used in the butter-boxes, did not impart harmful flavours or wood taints to the butter packed therein, and this condition of affairs applied equally in the instances where
butters were held in cold storage for comparatively lengthy periods. Nothing more seemed necessary to safeguard against wood taint beyond the precaution that the timber utilised was fairly well seasoned before use. Recently, however, it is frequently found that a great deal of the butter which has been subjected to cold storage thaws out with a characteristic wood taint flayour which has been imparted to the butter from the timber of which the butter-box is constructed. Whether this apparently increased property of the timber to impart a taint to butter is attributable to the use of comparatively unseasoned timber or to the employment of a younger growth of tree than was formerly used in connection with butter-box timber I am unable to advise, as it is impossible to procure full and reliable information upon these matters. It is very obvious, however, that the paraffining of butter-boxes should be carried out by all butter factories in order to overcome the tainting influence of the timber. Factories, generally, are aware of the seriousness of the injury to the butter that is oceasioned by wood-taint flavours, and several manufacturers of butter have gone as far as to pack the butter in boxes lined with double sheets of grease-proof paper parchment, hoping by this means to protect the butter from the wood taint; but this plan is not efficacious in remedying the trouble, and it adds somewhat to the cost of packing. The paraffining of the butter-boxes would be a much more effective means of combating the difficulty, and it would not materially increase the cost of packing over and above that when a double lining of paper is used, particularly as it follows that with a paraffined box a single layer of grease-proof paper is ample to protect the butter inside the boxes.

In addition, the coating of the inside surface of the timber of the box with paraffine is strongly recommended as being the most effectual and practical means of preventing butter from infection by mould growths from the box timber. Wood that has been kept in a moist condition, and is in a state of decay, provides a bountiful source of infection of movld-producing organisms, which, if afforded an opportunity, are capable of growing luxuriantly on the outer surface of the butter. It is known, however, that these moulds require oxygen in their growth, and they are consequently stifled on the sides of the boxes when a thin coating of paraffine wax is placed over them.

There exists a pressing need for attention to the incidence of both wood taint and mould growths in our butters. The paraffining of the boxes, as suggested as the remedy for these troubles, is a comparatively simple process; and, fortunately, the single remedy will be serviceable in combating the dual faults referred to.

There still remains much need for a better organisation of the cheese industry, particularly with regard to the submission of cheese for export. At present, cheeses arrive at cold stores under different and, it may be said, more or less unsatisfactory ways. In some instances a consignment of what are known as loose or uncrated cheeses is forwarded by the factory to an agent in Brisbane, who in turn arranges to pack the cheeses in crates and to carry out the necessary details in connection with the grading, cold storage, and ultimate oversea shipment of the cheeses.

Owing to the handling of the cheeses in transit from factory to the agent's premises, and the consequent obliteration of any distinguishing marks which may have been placed on the cheese for identifieation purposes, it becomes almost impossible, when crating the cheeses, to select cheeses of similar vat markings and quality for the purpose of packing, with the result that cheeses of varying age and, may be, quality are included in a common crate. Out of this practice there arises the first step in the confusion which carries throughout the whole of the subsequent dealings with cheeses so packed.

The cheeses customarily are packed two or four in a crate, according to size, and, as explained, cheeses of mixed dates of manufacture are placed frequently in the same crate, and in practice it often happens that cheeses of different quality are placed together in a crate. The officer grading the cheese is fully aware of the conditions pertaining to the packing of the cheese, and he feels obliged to draw a test plug from each of the cheeses in the crate for the purpose of examination and assessment of the quality of the product. This leads to an unnecessarily high percentage of the cheeses being punctured with the grader's trier, and in the event of one cheese of inferior quality being discovered in a crate, a correspondingly low grade mark has, of necessity, to be applied to the whole crate of cheeses, although the remaining cheeses in the crate may be of comparatively higher quality.

It is difficult to conceive of a more unbusinesslike method of setting about the preparation of cheese for submission for examination and exportation overseas, and while the existing methods obtain, it is positive that irregularity in the quality of cheeses in the same crate will be reported from time to time from overseas sources. It cannot well be otherwise until factories exercise greater care and pack the cheese manufactured in crates at the factory, and forward it direct to the cold store for examination preparatory to cold storage and exportation. The anomaly referred to is amongst the many matters which it is expected will be remedied by compliance with the requirements of "The Dairy Produce Act of 1920," particularly the provisions which relate to the vat marking and packing of cheese.

The quantity of butter and cheese available for exportation overseas was more than sufficient to tax the accommodation of the recognised cold storage premises in Brisbane. Fortunately for the welfare of the industry, arrangements were made for the temporary cold storage of dairy produce in the insulated chambers of meatworks which happened not to be operating at the time. In order to keep abreast of the expansion of the industry, and to cope with the increased volume of dairy produce which will require cold storage while awaiting shipment from time to time, it is imperative that additional cold storage accommodation shall be provided for dairy foodstuffs, otherwise serious loss will be occasioned to the industry, for it must be recognised that dairy foodstuffs are, for the greater part, comprised of highly perishable commodities, which suffer appreciably in quality if stored at natural atmospheric temperatures, and the degree of deterioration will be greatest during the warmer months of the year when production will be at its highest point.

The cold storage of dairy produce is to be regarded as the most satisfactory and practical means of conserving the quality of all classes of perishable dairy foodstuffs intended for exportation beyond the State. In reports of former years the inadequacy of the cold storage accommodation ordinarily available for dairy produce at this port was touched upon, and an attempt was made to emphasise the important bearing that cold storage exerts upon the export phase of the trade in dairy produce.

With a continuance of existing favourable weather conditions there is no reason to suspect other than that the industry will be developed further, and the tonnage of butter and cheese for cold storage and subsequent exportation overseas will be increased proportionately, and it is vital to the welfare of the industry that a proper balance should be maintained between production and the cold storage accommodation for containing the produce, pending exportation.

It is pleasing to be able to advise that a considerable improvement has taken place in the service of steamers fitted with refrigerated space that are plying between here and Great Britain, and, as a consequence, consignments of dairy produce have been removed from this port at close intervals, thereby avoiding the congestion of dairy produce in cold stores that ruled during and immediately following the period of the war.

In April last, regulations under "The Dairy Produce Act of 1920" were approved and gazetted, and thereupon had the force of law. The main objective of the Act is the betterment of the industry, and it is confidently anticipated that compliance with the provisions of the Act will assist materially towards uplifting the standard of quality of dairy produce raised in this State. The earlier legislative measure directly affecting the industry was an Act passed in the year 1904, and since that time the industry has been advanced considerably, as a result of increased experience and practice and the scientific knowledge that has been brought to bear upon it.

The present Act does not contain any provisions which may be classed as being of an experimental nature, and in principle it follows the paths of progress that have been traversed by countries which have been eminently successful in building up a splendid reputation for the production of dairy produce of finest quality. It must be borne in mind that the dairy produce of this State comes into competition with that of other countries in the world's markets, and, in order to win through, we cannot afford to do otherwise than keep closely in line with or ahead of our competitors in every step that is taken by them in raising the standards under which milk and other dairy produce is raised, manufactured, and marketed.

Owing to conditions imposed by the war, the manufacturers of margarine scored heavily over the producers of low-grade butters. The former benefited particularly by circumstances which allowed of margarine finding its way to the homes of many people who previously had shown a decided preference for butter and had ignored margarine. The position to-day is that there is a large body of people who are content to continue eating the comparatively cheaper margarine in preference to inferior butter. Under this changed order of affairs it is not difficult to realise that in future the market value
of butter of inferior quality must rest nearer to the market price of margarine than hitherto, and as butter is not to be produced profitably at a similar price to margarine, there is, consequently, only one way out for the dairymen, and that is to set out earnestly in the production of butter of superior quality, and thereby avoid the conflict with margarine.

The future of the industry appears to be wrapped up in the single word "quality," and unless there in co-operation between all parties concerned in the production of dairy produce, and a united effort made towards uplifting the general standard of quality, it seems fairly certain that the industry will recede speedily from its present comparatively flourishing position.

The submission of the dairy herds to a test for butter-fat is gradually growing in favour with dairymen, and, within the year, dairy cows totalling several thousands in number have been tested by the herd-testing officer attached to this Office, and the indications are that dairymen are now taking a more lively interest in ascertaining the capabilities of the individual cows in the herds as producers of butter-fat. Herd-testing is to be recognised as the only reliable method of authentically determining the value of a dairy animal as a producer of butter-fat, which, after all, is probably the chief consideration to the average dairyman.

The operations of the herd-testing officer practically extended throughout the dairy districts of the State, and the dairy farmers resident in the Burnett District contributed a large proportion of the total number of the cows submitted to a buiter-fat test. Immediately prior to the closing of the financial year an application came to hand from the dairymen of the Atherton Tableland requisitioning the services of the herdtesting officer to carry out the testing of something more than a thousand milch cows upon the farms in that locality, and the inference is that those engaged in dairying in the Northern part of this State intend to carry on along right lines, and collect evidence through the medium of the test results which will enable them to eliminate the less-productive and unprofitable cows from their dairy herds.

There are approximately 378,000 cows utilised in the production of milk, and of that number 43,600 cows are returned as "dry." If. herd-testing were taken up by dairymen with the enthusiasm which its importance undoubtedly warrants, the dairymen individually, and the industry generally, would benefit appreciably. The improvement of the productiveness of the dairy cows possible by herd-testing and careful and intelligently-carried-out selection is a positive source of increased revenue from dairying that practically remains unexploited by the dairy farmers in this State.

In the average milk yield of the cows employed for dairy purposes there is reflected a pressing need for improvement in this direction, for the average yield of milk per cow here stands at a figure much lower than that reached in many other countries, and Queensland suffers, too, in this regard when a comparison is made with the records of Southern States. The exercise of greater thought, and the adoption of more businesslike methods in the selection and management of the dairy herds, would lead speedily to an alteration, to our advantage, in the existing state of affairs.

Within the year an increased number of stud-book animals have been submitted to an official test for butter-fat by officers of the Department. The tests are carried out at the instigation of the Associations which control the operations of the distinctive breeds of dairy stock. Practically all the recognised breeds of dairy cattle are represented by their respective associations, and the volume of work arising out of the subjection of animals to a butter-fat test continues to increase year by year.

The conservation of fodder, in some of the accredited forms, on the dairy farms is growing slowly in favour, and each year claims converts to the principle; but the advancement made is more gradual than should be the case, when the value of ensilage as a feed for dairy stock is taken into consideration. The stack form of silage-making is most general in practice on the dairy farms, and, while this method of conserving fodder is not to be considered as ideal from all standpoints, it has economic features to commend it. In construction the stack is probably the least costly manner of making silage, and this, to a great measure, compensates for the relatively high percentage of wastage in the tonnage of cured ensilage, caused though mould, \&c., that customarily occurs in stack silage. It is gratifying to advise that in one district, which a few years ago was devoid of ensilage in stack or other form, there are now more than one hundred ensilage stacks; but, unfortunately, in other localities little interest is displayed in the conserving of fodder in the form of ensilage for the dairy herds. Taking the dairy community as a whole, not more than 5 per cent. of dairymen have adopted ensilage as a method of fodder conservation, and it cannot be conceded that there are many dairy farms situated in localities so favoured that ensilage would not be advantageous.

A legislative measure, passed a few years ago, contained a provision whereunder a loan could be obtained, upon application by a dairy farmer, from the Government on reasonably easy terms for the purpose of constructing a silo; but few dairy farmers to date have availed themselves of the monetary assistance on offer; consequently it seems that it is not altogether financial reasons which are retarding the expansion in silo construction. It rests with the dairy farmers to decide whether or not silos and ensilage are to be utilised generally throughout the State. If the dairy herds were capable of speech, their desires in the matter could be forecasted with safety. The need for, and advantages of, conserved fodder have been voiced from all sides, and in countries less favoured than our own splendid progress in dairying has been made, much of which is attributable to the utilisation of ensilage to tide the dairy herds over a dry spell or period of the year during which the customary pastures have been found inadequate to supply the feed necessary for the dairy herds. To instance a case in point, one need only refer to Canada, in which country there are more than 500,000 silos in commission. There is no logic in the argument frequently advanced that, with the prospects of a return of a series of bountiful seasons, the conservation of fodder is rendered unnecessary ; rather it is the case that the surfeit of fodders grown in the seasons of plenty should be conserved and held available for utilisation whenever occasion demands.
E. GRAHAM, Chief Dairy Expert.

## REPORT OF THE CHIEF INSPECTOR OF STOCK.

I have the honour to submit the following report for the year ended the 30th June, 1921:-

Throughout the Northern and far Western parts of the State the seasons were very propitious, but on the coastal belt, south from Mackay and the Darling Downs distriets, the summer rains were insufficient. However, the whole State has been benefited by unusually good winter rains, and the prospects for good lambings and wool clip are better than the average year.

## Stock Statistics.

The following figures, supplied by the Government Statistician, show an increase in the number of horses, cattle, and sheep:-

| 10. Year. | Horses. | Cattle. | Sheep. | Pigs. |
| :---: | :---: | :---: | :---: | :---: |
| 1920 | 731,705 | 5,940,433 | 17,379,332 | 99,593 |
| 1921 | 742,217 | 6,455,067 | 17,404,840 | 104,370 |
| Increase | 10,512 | 514,634 | 25,508 | 4,777 |

In 1890 there were $97,881,221$ sheep in the Commonwealth, of which number $18,007,234$ were in Queensland. At the present time we have 602,394 less sheep in the State than thirtyone years ago. The cause of this decrease in sheep is a subject for serious consideration, as since 1891 there has been considerable railway extension, and enormous areas of good grazing land have been made available for the sheep industry. The past five or six years should have been exceedingly profitable to the grazier, and the sheep and cattle industry should have received considerable impetus, but the results do not seem to have followed the apparent inducements. During the past year there has been a tremendous drop in the market value of all pastoral products, and it is difficult to forecast what the immediate future will be of this most important industry. The stringency of the wool market, combined with the fall in the export value of mutton, has caused great diminution in the revenue of sheepowners. Cattle owners have likewise suffered by reason of the reduction in the export value of beef. It can scarcely be realised that the low prices of meat have lessened the demand for store stock to such an extent, that their value has decreased by 60 per cent. to 70 per cent.

Great assistance would be rendered at periods such as have now arisen, towards the stabilization of the fat stock markets, if abattoirs were available, thus enabling butchers or stock raisers to compete with the meat exporters in building up a more favourable export trade. There would be keener competition for the purchase of surplus fat stock at the yards, thus preventing a fall to unprofitable prices which frequently occurs when the fat stock markets are slightly over supplied.

There has been a good demand for dairy stock, and the dairying industry has derived considerable impetus, by reason of the sales of produce under agreement with the British Government. The prospects are brighter for the dairy farmer than has been the case for some years past, provided co-operation is adhered to with regard to the marketing of their commodities. The seasonal outlook is promising, and will enable many difficulties to be overcome, if the cost of production can be decreased, or profitable markets can be maintained for farm products.

The loss of stock caused by dingoes is serious, and it appears imperative that stock owners should take more comprehensive measures to effectually deal with the pest.

## Prosecutions.



Two thousand three hundred and forty-two $(2,342)$ horses were exported overseas, of which seven hundred and seventy-eight (778) were mares.

## Examinations of Stallions.

Examinations were held at the following places:-Allora, Brisbane, Beenleigh, Bororen, Bundaberg, Boonah, Cairns, Caboolture, Crow's Nest, Dalby, Chinchilla, Gladstone, Rockhampton, Maryborough, Townsville, Toogoolawah, Gatton, Gympie, Stanthorpe, Toowoomba, Ips wich, Pomona, Warwick.

One hundred and three (103) stallions were examined, of which number twenty-one (21), or 20.37 per cent., were rejected.

Tabulated results of the examinations are as follow :-

## Analytical Examinations.

Fifty-six (56) samples of viscera and contents were submitted to the Agricultural Chemist for analysis, when in twenty (20) cases the cause of poisoning was ascertained. In North Queensland four (4) samples were analysed, one (1) of which gave a positive result.

## The Ticik Board.

The menace of the tick becomes increasingly evident as time progresses, and the financial and scientific resources of the State are heavily taxed to combat the pest, which is responsible for considerable economic loss to the pastoral industry.

Drastic restrictions, as a result of sporadic outbreaks are naturally not appreciated by stockowners, but necessity demands that active measures should be taken to prevent an incursion of the pest into hitherto clean areas, with resultant losses from tick fever.

Stockowners should, from a national standpoint, support the action of the Board in efforts made to check the spread of ticks, but in many cases difficulty is experienced with many owners and drovers, who subordinate this view to their individual interests. This is apparent in districts where the provision of dips for cleansing purposes is essential, and where, in spite of this obvious necessity, the indifference of those concerned reacts ultimately to their financial disadvantage.

It has been found necessary in some cases to, impose restrictions on movements of stock from certain areas until cleansing facilities are made available, and as a result a number of dips have been erected in infested areas, which have not only proved a benefit to the owners of stock in the district but have provided means for dealing effectively with tick-infested travelling stock.

During the period under review the proposal for the erection of a Government dip at Muttaburra was approved of, in order to deal with the tick pest on the direct route from Hughenden and Prairie to southern and western areas, vi $\hat{a}$ the centre referred to.

The dip is now in course of erection and when completed will, with the provision of a dip recently erected by the Rockwood Pastoral Company, provide some facilities for future action to cope with the pest in this area and give travelling stock freedom of access to one of the principal routes in the State.

An outbreak of redwater at Mount Cornish and amongst cattle depastured in areas adjoining the Muttaburra Reserve is, however, a disturbing factor.

The Donor's Hill dip, which was also erected by the Government, is now in full commission, and all stock from Gulf areas, and travelling towards the Queensland Northern Railway, are required to dip at this centre and thus insure their further passage towards the railway in a comparatively clean condition. The manager of Donor's Hill station has shown an admirable spirit in extending co-operation to the Board, and exercises efficient supervision over dipping operations at the dip in question.

To obviate delay on the arrival of stock at Julia Creek or other railway centres, a further dipping is recommended at Sedan or Taldora, as in the event of stock arriving in a tick-infested condition at the railway at least two further dippings are required, and the cattle must be found clean prior to further southerly movement.

To prevent congestion at Julia Creek, which is the most important crossing place on the Great Northern Railway, owners in their own interests are recommended to dip at a convenient centre, north of the line, and about seven to ten days' journey therefrom, thus obviating, under ordinary circumstances, the necessity for holding the stock up owing to tick infestation.

During the year large numbers of stock have travelled through Julia Creek and Winton to southern areas, and only on isolated occasions have ticks been found on the arrival of the cattle at Kynuna, where further dipping is insisted upon. The Kynuna-Winton route has been declared clean, and on close inspection of that portion of the route between Elderslie and Winton it is also considered free of the pest. The primitive facilities for dipping at Winton are to be deprecated, as in the event of an outbreak of ticks between Kynuna and Winton the route south of the latter centre would be closed until a suitable dip was available.

Close supervision is exercised in the Mackinlay area, and an officer is now stationed at Mackinlay. It is hoped as a result of the activities of the Board in that district that the few remaining infested properties on the Williams and Fullarton Rivers, south of the Queensland Northern Railway, will shortly be free from the pest.

Close attention has also been directed to the necessity for the entry of stock, free from tick infestation, into Queensland from the Northern Territory, and with that object in view two dippings within ten days are insisted upon, prior to the introduction of stock acioss the border, at Lake Nash. Carriers' horses intended for this State are also required to be inspected, and if necessary sprayed, at Austral Downs. The co-operation extended to the Board by the Northern Territory authorities is appreciated, and in this connection valued assistance has been rendered by Inspector Stretton of the Rankine River.

Operations in the cleansing areas have been attended with satisfactory results, and this specially applies to the work carried out in the Helidon and Miles-Chinchilla areas. Additional country in the Helidon area has been declared clean, and arrangements have been made for the extension of the area to include country around Ravensbourne and on Marmor Creek. The stockowners in the latter area have made repeated requests for action to be taken to declare at least a portion of that area clean, and it is proposed to shortly give effect to their wishes unless unforeseen circumstances arise. Unfortunately it will be impossible to declare free from ticks that portion of the area immediately east of Chinchilla, in view of the passing through that district during the early part of the present year of a mob of tick-infested cattle from Macalister South to Chinchilla. Close supervision will also be necessary in the north-western portion of the area adjoining the Range.

Successful operations have also been recorded in the South Burnett area, and the southern portion of the originally proclaimed area is now practically free from infestation.

An extension of operations was decided upon in the northern portion, and cleansing work is now in progress in the parishes of Peronne, Dangore, Ballogie, McEuen, Charlestown, and Johnstown. To effectively deal with this extension it was decided that an inspector should be stationed at Wondai.

A new cleansing area was proclaimed which takes in that portion of the South Coast area between the Logan River and the border of New South Wales and Queensland. Officers are gathering information preparatory to the initiation of active operations, but considerable financial outlay will be necessary if it is decided to deal with the whole of this area effectively.

The Coolangatta area is closely supervised, and, in view of the difficulty experienced in erecting a permanent fence to prevent the ingress of straying stock, it was found necessary to appoint a caretaker to prevent stock movements from the Tugun side into the area. Regular dippings have been carried out with satisfactory results, but the co-operation of the Coolangatta Shire Council will be necessary to provide an absolute safeguard against the introduction of infested stock straying on roads.

To prevent an extension of the tick pest into the Crow's Nest area an inspector has been stationed at Toogoolawah, to exercise supervision over stock movements in a westerly direction from the infested districts on the Upper Brisbane River to the Crow's Nest district, which forms a buffer area for the Darling Downs.

It is to be regretted that, notwithstanding the application of drastic restrictions on stock movements from infested areas to the Darling Downs, sporadic outbreaks have occurred in the Dalby, Pittsworth, Clifton, and Pratten areas. The Dalby outbreak was first discovered on Jimbour homestead, and further evidence of infestation was traced at Mocattas Corner, Irvingdale Scrub, and Mount Leinster. This was followed by an isolated outbreak at Taylor, on the Crow's Nest Line. Ticks were also discovered at Cloonacool, near Pittsworth, and at Harrow Station, and on properties adjoining Clifton. The latter outbreak was directly attributable to the irregular movement of stock from the Brisbane district on a permit issued by a Shire Clerk. Recently investigations proved that ticks were also present on a farm in the Pratten district. Quarantine restrictions were immediately im-
posed in all these centres, with very satisfactory results. With the exception of isolated portions of the Dalby district, the outbreaks have to all appearances been stamped out, but unfortunately a definite decision cannot be given until after the next wet season. The eradication of the pest in the Dalby district is attended with some difficulty, but with the co-operation of the Wambo Shire Council it is hoped that success will attend the efforts made to clean up this area.

A conference consisting of representatives of the Chamber of Commerce at Tweed Heads, the Coolangatta Shire Council, the Chief Inspector of Stock, Queensland, and a representative of the Stock Department of New South Wales, was held at Tweed Heads in May last, to discuss the proposal to remove the present tick fence at that centre into Queensland territory. This was opposed by the Queensland representatives, on the grounds that it was unfair to impose restrictions on the Queensland side of the border, as the natural barrier created by the Tweed River was preferable to any artificial barrier. No finality was reached, but a motion was carried that greater facilities should be afforded for crossing at the present fence.

The disinfection of trucks has been carried out in a satisfactory manner by the Railway Department, but the establishment of central depôts would considerably facilitate the work.

It is necessary to exercise special vigilance in the case of trucks used for the conveyance of stock from tick-infested to clean areas.

During the past year consignments of tickinfested cattle have from time to time arrived at the Newmarket yards, and it has been decided that in future action will be taken to prevent the arrival of infested stock at the sale yards. It will devolve upon owners to take special precautions to free their stock from infestation, prior to removal from their pastures.

## Helidon Cleansing Area.

Cleansing operations were retarded considerably during the year, owing to unfavourable weather conditions. A drought prevailed during the first half of the year, and too much wet weather during the latter half. Inspector McNeill, who is in charge of these operations, reports that the original area is now nearly clean, and that he hopes during the coming year, that Murphy's Creek and Hampton Divisions will also be clean.

| Holdings visited | $\ldots$ | $\ldots$ | $\ldots$ | 3,619 |
| :--- | :--- | :--- | :--- | ---: |
| Stock inspected | $\ldots$ | $\ldots$ | $\ldots$ | 130,117 |
| Infested holdings | $\ldots$ | $\ldots$ | .. | 464 |

Stock Movements.


## South Burnett Area.

The southern portion of this area, comprising about 1,280 holdings, aggregating 220,000 acres, is now considered clean, and operations are being extended to the northern portion. The stockowners in the clean area realise the benefits
of having clean herds, but, as many of them introduce stock from infested areas, some inconvenience is caused by the necessary dippings prior to introduction. With proper supervision and the assistance of stockowners, it is considered there is little risk of the clean portion becoming reinfested, as the dips at Burrandowan, Stuart

River, Wooroolin, Wondai, Charlestown, and Wyalla form an effective barrier.
Holdings visited 493 in southern area.
Stock inspected 98 in extended area.
Infested holdings 15 in southern area.

Of the 15 infested holdings in the southern portion of the cleansing area, 13 were on the eastern boundary adjoining tick-infested country. In each case only slight infestation occurred, and after a few dippings the ticks disappeared.

Stook Movements.

| Entered district. |  |  | REMOVED from distriot. |  |  | movements in district. |  |  | stogk dipped. |  | Stock sprayed. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Horses. | Cattle. | Sheep. | Horses. | Cattle. | Sheep. | Horses. | Cattle. | Sheep. | Horses. | Cattle. | Horses. | Cattle. |
| 1,004 | 18,858 | 315 | 2,439 | 33,272 | 67 | 11,737 | 220,518 | 425 | 390 | 79,289 | 41 | 55 |

## Miles-Chinchilla Area.

The north-western boundary of this area has been altered, thus reducing the original area. The boundary as it now exists, north of the Main Range, is all fenced, making cleansing operations much more effective. Although no tick-infested
cattle have been found, movements are not permitted from the portion north of the Range to clean country without a close crush inspection.

| Holdings visited | $\ldots$ | $\ldots$ | $\ldots$ | 1,162 |
| :--- | :--- | :--- | :--- | ---: |
| Stock inspected | $\ldots$ | $\ldots$ | $\ldots$ | 73,458 |
| Infested holdings | . | $\ldots$ | .. | 0 |

Stock Movements.

| entered distriot. |  |  | Removed from district. |  |  | movèments in distriot. |  |  | Stock dipped. |  | Stook sprayed. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Horses. | Cattle. | Sheep. | Horses. | Cattle. | Sheep. | Horses. | Cattle | Sheep. | Horses. | Cattle. | Horses. | Cattle. |
| 2,263 | 45,809 | 14,754 | 3,351 | 56,910 | 24,463 | 5,652 | 146,191 | 36,933 | 519 | 32,400 | 193 | 69 |

## South Coast Area.

The Tallebudgera area has been enlarged to include all the country south of the Logan River, as will be noticed by the following description of the boundaries :-

Commencing at Point Danger, and bounded thence by the southern boundary of the State south-westerly to a point south from the south-east corner of portion 26, parish of Palen, by a line north thereto, by the south and west boundaries of that portion to the Logan River, by that river downwards to the sea-coast; and thence by the sea-coast south-easterly to the point of commencement; inclusive of adjacent islands.

By the addition of this country, a much larger and more suitable buffer area will be afforded New South Wales; but owing to the number of inspectors required, it will not be possible to operate on the whole of the area for
some considerable time. In the Coolangatta area, regular dippings were carried out every three weeks. Ticks were found on one occasion, as a result of one cow entering the area contrary to regulations. There is every reason to suspect that this animal was wilfully driven into the clean area, but sufficient evidence could not be obtained to warrant a prosecution. The lower portion of the tick fence-viz., from the high water to low water mark-has again been rendered useless, owing to rough weather which caused it to become covered with sand; but, as a result of the great vigilance of the caretaker, straying stock were prevented from entering the area.

| Holdings visited | . | .. | .. | 519 |
| :--- | :--- | :--- | :--- | ---: |
| Stock inspected | . | $\ldots$ | .. | 17,727 |
| Infested holding | . | .. | .. | 316 |

Stook Movements.

| entered distriot. |  |  | removed hrom district. |  |  | movements in district. |  |  | Stook dipped. |  | stook sprayed. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Horses. | Cattle. | Sheep. | Horses. | Cattle. | Sheep. | Horses. | Cattle. | Sheep. | Horses. | Cattle. | Horses. | Cattle. |
| 356 | 2,173 | 70 | 359 | 2,605 |  | 161 | 3,170 |  | 36 | 960 | 20 | 3 |

## DIPS.

The number of dips registered in the State totals 3,976, as compared with 3,795 last year. Particulars of dips registered in the various stock districts are as follows :-

| District. | Number. |
| :---: | :---: |
| Barcaldine | 3 |
| Bowen | 188 |
| Brisbane | 1,012 |
| Cairns | 187 |
| Clermont | 48 |
| Cloncurry | 27 |
| Cooktown | 36 |


| District. | Number |
| :---: | :---: |
| Gladstone | 323 |
| Hughenden | 34 |
| Maryborough | 1,220 |
| Normanton | 26 |
| Rockhampton | 446 |
| Roma | 43 |
| Springsure | 58 |
| Toowoomba | 91 |
| Townsville | 199 |
| Warwick | 33 |
| Winton | 2 |
| Total | 3,976 |

## Dipping Fluids.

Particulars concerning the analyses of these fluids in Southern and Central Queensland will be found in the report of the Agricultural Chemist, and those for North Queensland in the report of the Director of the Stock Experiment Station, Townsville. It will be seen that the number analysed is somewhat lower than in previous years. This may be partly due (as is pointed out by the Agricultural Chemist) to the portable dip testers which are in use, also to the fact that the regulation making it compulsory for dip owners to send in samples at least twice annually is not being enforced. The regulation is now only enforced in cleansing areas, and in cases where dips are recognised by the Department for the dipping of stock prior to removal to other centres.

## Diseases in Stock.

During the year the veterinary staff has made 468 visits to 108 various centres in Southern and Central Queensland. The work in Northern Queensland is dealt with in a report by the Director of the Stock Experiment Station, Townsville. In many cases investigation proved that animals were suffering from non-infective diseases. The following affections were noted:-Pleuro-pneumonia contagiosa, blackleg, actinomycosis, strangles, tuberculosis, contagious abortion, tetanus, tick fever, mammitis, lung and stomach worms, vegetable and mineral poisoning. In addition to the above the veterinary staff made 56 visits to butcher shops and 178 to the bacon factories.

## Walk-about Disease.

In February it was reported that horses were dying from this disease on Strathmore Station, North Queensland. Arrangements were made for Veterinary Surgeon Legg, of Townsville, to visit, but no further cases occurred after his arrival. Mr. McIver, of Chadshunt, Gilbert River, forwarded to Mr. Pollock (Northern Instructor in Agriculture) various specimens of grasses, \&c., for identification. Feeding experiments will be carried out, if practicable, during the next wet season. Veterinary Surgeon Legg reports on the 14th March as follows:-

I remained on the station for ten days during which time I inspected the area-i.e., the home paddocks on the bank of the Gilbert River-where the disease has been reported to be occurring; but, although all animals in the area where the disease has been occurring were inspected daily, not one case of the disease was found during my stay there. This was extremely unfortunate, as several good cases had occurred the previous week, which cases would have been seen had someone proceeded when your instructions were first received. I regret that I have been unable to obtain any useful information concerning the disease. It appears that it is confined to certain areas of country, but the layman cannot always be relied on to recognise the disase, and I think it possible that the disease may 1 ppear in other forms than the one presenting the typical walk-about symptoms. I am inclined to this belief, because on the Saturday night I arrived at Strathmore a horse was reported to have died at the mustering camp 12 miles away, but not showing typical symptoms, and hence not considered to be suffering from walk-about.

Another sick horse sent in from the musterers' camp was found in a comatose condition in the paddock on Monday morning and obviously on the point of death. Nothing definite was found on post-mortem, except that the animal was found grossly infested with a small nematode worm of the strongyle variety.

I cannot say whether these have any connection with the death of the animal, but I think it probable. These parasites are similar to those found recently in connection with the death of horses in the Cloncurry district, and I am forwarding specimens to Melbourne for expert opinion on them.

It is almost useless, I think, attempting the elucidation of this disease by paying an occasional visit to the area, as in such circumstances one might stumble across the causal agent by accident only. The disease requires the presence of a bacteriologist who could remain on the spot, and then it would be with some difficulty that he would have to work. Arrangements would have to be made beforehand and the whole question worked out in a scientific manner.

As I have already pointed out not even the history or distribution of the disease is known, for no two people have the same opinion as to the distribution; and as for the period of time the disease has existed, all that can be said is that the disease apparently has existed as long as settlers have been on the Gilbert. The disease appears to attack animals of all ages at grass whether working or not, and it is usually the horses in high condition-this being about the only information of value that can be ascertained. The course of the disease, whether acute or chronic, is practically unknown. As for any information concerning symptoms-except the habit of walking forward in a straight line or going in circles, which I think is merely a symptom of cerebral irritation and common to other diseases-lesions and post-mortem appearances information is wanting.

Nothing is even known concerning the infectiousness of the disease-i.e., of the blood or the natural discharges-which question could quickly be settled by a bacteriologist on the spot, as also many other points in connection with the disease. As I have intimated, however, these questions can never be settled unless arrangements are made beforehand for experiments, and owing to the manner in which the disease suddenly appears and then dies out again, thus indicating probably a peculiar climatic incidence, one would have to be on the spot when the disease commenced.

The only suggestion that might be of any value which I can make is that horses in paddocks on the river be removed off the Gilbert in December and not returned until the following March. As the disease apparently only appears in the river paddocks, this suggestion certainly warrants a trial, and it would be very interesting to ascertain whether the disease would appear in any animals so moved.

## Pleuro-Pneumonia Contagiosa.

Sixty-six (66) cases have been reported, as compared with sixty-two (62) cases last year. It is probable that many outbreaks oceur which do not come under our notice, although the law provides that all infective diseases shall be
reported to the nearest inspector. Many cattleowners in the North and West make a practice of annual inoculation, as the disease is always more or less prevalent. It is particularly noticeable when stock are driven long distances during which period latent cases frequently become
active. From reports received the "natural virus" appears to be far more effective in immunising cattle than that artificially prepared.

The following tabulated list shows number of outbreaks in the various stock districts:-


## Cattle Disease in Central Queensland.

In January, Inspector Hawthorn, who is in charge of the Barcaldine District, reported that some cattle on a certain holding were suffering from swellings about the jaws and brisket. The inspector formed the opinion that the cause of the trouble was due to the cattle eating tobacco plant and caustic weed, which had been very prevalent on the desert country for some months. He further stated that he was confident the disease did not occur on good country, therefore a change of country was recommended. As other cases were reported Veterinary Surgeon McGown proceeded to the district on the 31st January and advised as follows:-"I examined a number of cattle which exhibited the following antemortem symptoms:-Edematous swelling in the head, which first starts with a slight swelling in the submaxillary space, which gradually increases until the head is enormously swollen. The swelling next spreads down the neek into the dewlap, from there into the subcutaneous tissue of the fore limbs, along the abdomen, and in a number of cases into the hind limbs. The affected animals eat and drink as if in a normal state, but show an emaciated condition. On making a post-mortem examination the subcutaneous tissues were full of a dropsical fluid. Extreme hydro-thorax was present, which accounts for the animals dying from suffocation. The lungs were perfectly healthy, as were all the other organs of the body except the liver, which was pale blue in colour and easily broken down, resembling cloudy swelling. In one case, upon which a post-mortem was held, slight gastritis was present, but so slight that I do not attach any importance to it. Upon making inquiries I was informed that animals would be attacked in one paddock, but when removed to another they showed signs of improvement. In other cases I was advised that black diarrheea was
sometimes present. This disease resembles a petechial fever of cattle described by Law as having shown itself in Canada and elsewhere, and which he attributes to a poison in the soil. I have, therefore, made arrangements to have samples of soil and water forwarded for analysis. I may add that this trouble has been going on since September last, and only made its appearance after the very wet season. A specimen of affected liver was brought by me, and is being forwarded to the Government Bacteriologist for examination."

The Government Bacteriologist reported that his examination of the liver revealed the presence of micro-organisms morphologically like bacteria of Septicamia Hemorrhagica.

As further cases were reported early in March Veterinary Surgeon McGown, in company with the Government Bacteriologist, again visited the district, and a post-mortem examination of an affected animal was held; specimens were obtained for microscopic examination, and inoculation on various artificial culture media direct from the affected animal were made.

In connection with this case the Government Bacteriologist reported that he detected small bi-polar staining bacteria in the blood extravasations, and serous fluids along the thorax and brisket. Samples of the soil and water on the property where the disease was prevalent were taken. From these, plate cultures were made, but no organisms having morphological characters similar to those found in the animal extravasations were detected. Subsequent experimental work has given negative results.

In May Inspector Hawthorn reported that the disease had practically disappeared, the majority of the affected animals having recovered. The number of deaths reported on the six affected holdings were 60 head. No conclusive proof of the bacterial origin of the disease
has been established. The fact that affected animals when moved to fresh pastures immediately showed signs of improvement would point to a probable dietetic origin.

## Tuberculosis.

During the year the tuberculin test was applied to 280 cows, as compared with 160 during the previous year. The number of positive reactions was 27 , whilst 8 were considered doubtful and will be retested. The percentage of reactions is higher than in previous years. Two factors have influenced this result-viz., the larger number of privately owned cows tested, and the clinical examination by the veterinary staff of the dairy herds supplying milk for human consumption. One thousand eight hundred and thirty-four privately owned cows were examined, 16 of which exhibited clinical symptoms of tuberculosis and were destroyed. Ten were found suspicious and the tuberculin test applied, when 4 animals gave a positive reaction. Owing to the absence of members of the veterinary staff on active service for some years, the examination of dairy herds was impossible, but the results of this year's examinations warrant the systematic inspection of all dairy herds supplying milk for human consumption. As pointed out in previous reports, the percentage of animals in Queensland suffering from this disease is small compared with those in colder climates, where housing of stock is essential during the winter months. Still the number affected could be materially reduced if owners would realise that a diseased animal in the herd is a serious menace to the health of others; and that in all cases where animals show suspicious symptoms they should be either destroyed or placed in strict quarantine. This disease in pigs must, to a large extent, be attributed to the supply of milk from tubercular cows. The veterinary staff is available, free of cost, for dealing with tuberculosis in dairy herds, and owners should, in their own interests, avail themselves of their services.

## The Blow-fly Pest.

The blow-fly trouble has been very acute during the last twelve months and is still much in evidence. There was practically no respite for sheepowners during the whole period under review. Districts that previously had only been occasionally attacked now have continuous trouble, and in the Central-West and South-West it has been the worst period known. In most instances losses of at least 10 per cent. have been sustained, and had it not been for the relief obtained from jetting they would have been far greater. The continuous wet season and abnormal growth of herbage are responsible for the increased losses, which are accentuated by the great difficulty experienced in mustering and working sheep in wet weather, which delay jetting operations.

In the Central and Central-West districts the attacks have been practically continuous. and the delay in shearing as a result of rain will cause further losses. In Northern Queensland, reports are to hand showing that similar trouble had been experienced, which necessitates continuous work and worry for the stockowners.

The experiments under the Commonwealth Institute of Science and Industry have been con-
tinued at Dalmally with good results, and the use of arsenic and soda ash in solution by jetting has undoubtedly been the means of saving the graziers an immense amount of money. After the operation of jetting there are no live infestations on the sheep, and the animals can feed and recover. The immunity given varies according to the weather conditions. At the present time the Blow-fly Committee is dealing with the question of fixing the arsenic in the wool, to prevent reinfestation, and with promise of excellent results. Mr. W. A. Russell, of Dalmally, who has been an indefatigable worker in connection with all the experiments, reports that he has found a cheap and effective mixture, and that when the mixture has been proved quite safe for use full information will be given to the public.

A leaflet was issued some time ago by the committee, which contains most useful information. The following is an extract dealing with the jetting of sheep with an arsenical solution :-

The Orion Downs method of jetting a poisonous solution into the breach of the sheep has been found very effective up to two and a-half to three months. This was proved at Gindie, where the Orion Downs formula of four packets of poisonous dip to 100 gallons of water was used. But it was evident that the sulphur was in excess in that proportion of dip, and as it appeared to us that it was the arsenical content of the various dips which was the chief factor in poisoning the wool, it was decided to use only one-fourth quantity of the Orion Downs formula to 100 gallons of water, supplemented by the addition of 4 lb . of arsenic dissolved by 8 lb . of carbonate of soda, boiled for three-quarters of an hour in a sufficient amount of water, say 5 gallons. This formula was used at Dalmally in April, 1920, in the form of a jet at 100 lb . pressure. Not one sheep in about 3,000 ewes was struck until July, the flies being very active everywhere, thus putting the ewes over lambing without any trouble. Mr. Linton, of Mount Abundance, had a similar experience with 12,000 full-woolled hoggets. He despaired of getting his sheep shorn without serious losses. He wrote Dalmally, and Mr. Russell gave him the formula as above. He had only three sheep struck in six weeks. Other cases are known to this Committee quite as convincing, so we say positively - the use of the above method will save serious losses if applied in time, and it may be repeated at intervals of, say, two and a-half months without injury to fleece or health of sheep. The cost, labour included, runs to about one farthing per head. One gallon will jet about eight sheep if carefully used. We believe that the cleansing effect of a strong jet is a big factor in the protection given.

This method of jetting at the above strength only protects the breach of the sheep. The Committee know from experience that dipping in a poisonous solution will give a certain amount of protection. It was found in the Gindie experiments that three dippings at intervals of Gindie experiments that three dippings at intervals of
three months minimised fly attack. The Committee is three months minimised fly attack. The Committee is the whole body of the animal as has been accomplished by jetting for the breach. To that end Mr. W. A. Russell, of Dalmally, has erected a shower dip and a $50-\mathrm{ft}$. swim dip to try and discover some method which will protect the animal from the fly without injuring the health or the fleece.

## Swine Fever.

In November it was reported that a case of swine fever had occurred on the Atherton Tableland. A quarantine area was immediately established, which embraced a three-mile radius from the centre of infection. All pigs in the area were regularly inspected, but no further outbreaks occurred. The quarantine was maintained until April. This is the third outbreak reported from this district within the past three years, but as a result of prompt application of quarantine regulations the trouble was apparently restricted. As pigs are now rarely introduced into the district from outside sources, it would appear that the infection exists within the district. Owners
of pigs should be particularly observant in order to detect any suspicious sickness or deaths, and in the event of their discovery it should be immediately reported to the district inspector of stock. By these means only will the disease be speedily eradicated.

## "The Slaughtering Act of 1898."

The inspectors under this Act have worked energetically to improve the general standard of butcher shops and slaughter-yards, and an improvement is noticeable. However, in many cases, shops, yards, and vehicles are not maintained up to the desired standard. It is anticipated that an amendment of the Act, together with new regulations, will considerably assist in effecting an improvement.

A marked activity has been noticed in the butchering trade during the last six months. It is largely accounted for by the fact that owners have not known what to do with their surplus stock, owing to the sudden drop in value. To avoid further losses many have built shops and slaughter-houses to treat at least some of the surplus. Additional slaughter-yards entail further duties for the inspection staff, and until abattoirs are erected the inspection of meat can only be fragmentary.

Illegal practices have been resorted to by some stockowners to evade the regulations, whilst irregular practices are reported to be rampant.

Police officers appointed under this Act have in many cases rendered great assistance to the permanent inspectors.

The Senior Slaughtering Inspector reports having visited the following centres in connection with his duties:-Rockhampton, Longreach, Bogantungan, Ruby Vale, Capella, Clermont, Blair Athol, Emerald, Springsure, Maryborough, Baralaba, Mount Morgan, Mount Perry, Bundaberg, Marlborough, Kingaroy, Kumbia, Cooinda, Wondai, Mondure, Murgon, Goomeri, Cushnie, Nambour, North Arm, Eumundi, Eudlo, Mooloolah, Beerwah, Caboolture, Toombul, Marysmoke, Woodford, Kilcoy, Miles, Taroom, Surat, Yeulba, St. George, Thallon, Dirranbandi, Stanthorpe, Warwick, Dalveen, Killarney, and Crystal Mount. Seventy-nine new slaughter-yards were erected during the year, 9 were renovated, and 18 are now under construction. Eleven yards were condemned as insanitary. Fifty-two new shops were completed-viz., 5 State shops and 47 in private ownership. In addition a number of other premises were reconstructed to comply with the regulations. During the last six years 325 new slaughter-houses and 69 shops have been erected, whilst 39 slaughter-houses were reconstructed.

The following table shows the number of stock slaughtered, but is incomplete owing to returns not being available from many small country centres where there are no permanent inspectors.

| Description of Stock. | Number of Stock Slaughtered. | Carcasses and Portions Condemned. | Disease. | $\begin{aligned} & \text { Per- } \\ & \text { centage. } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: |
| Bullocks | 62,570 | 86 carcasses | Tuberculosis | -138 |
|  |  | 144 forequarters | Tuberculosis | -115 |
|  |  | 18 hindquarters | Tuberculosis | . 014 |
|  |  | 293 heads | Tuberculosis | -468 |
|  |  | 7 carcasses 3 carcasses | Emaciation | . 011 |
|  |  | 2 carcasses | Bruised | . 003 |
|  |  | 15 forequarters | Bruised | . 012 |
|  |  | 1 carcass | Septicæmia | . 001 |
|  |  | 11 carcasses | Pleuro-pneumonia | . 017 |
|  |  | $1 \begin{aligned} & 1 \text { carcass } \\ & 1 \text { carcass }\end{aligned}$ | Actinomycosis | . 0001 |
|  |  | 1 forequarter | Gangrene | . 0007 |
|  |  | 13 forequarters | Abscess | . 002 |
|  |  | 16 heads 1 carcass | Abscess Rickets | . 0001 |
| Cows | 15,605 | 87 forequarters | Tuberculosis | - 278 |
|  |  | 163 hindquarter | Tuberculosis | .006 1.076 |
|  |  | 11 carcasses | Emaciation | -070 |
|  |  | 1 carcass | Malignant growth | -006 |
|  |  | 1 carcass | Bruised | . 044 |
|  |  | 4 forequarters | Bruised | -012 |
|  |  | 3 carcasses | Redwater | . 019 |
|  |  | 1 carcass | Gangrene Gangrene | . 0006 |
|  |  | 2 carcasses | Poverty | -012 |
|  |  | 7 heads | Abscess | -014 |
| Calves | 21,345 | 274 carcasses | Unfit | 1.286 |
| Pigs | 149,108 | 997 careasses | Tuberculosis | -668 |
|  |  | 8,947 heads 2 carcasses | Tuberculosis | 6.0 |
|  |  | 6 carcasses | Skin cisease | . 001 |
|  |  | 113 heads | Abscesses | . 075 |
| Sheep | 377,820 | 70 carcasses | Poverty | . 018 |

The following is a tabulated list showing the particulars of pigs slaughtered and condemned at bacon factories:-

|  | Descrintion of Stock. | No. of Pigs Slaughtered. | Carcasses and Portions Condemned. | Disease. | $\begin{aligned} & \text { Per- } \\ & \text { centage. } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Pigs | .. | 131,783 | 954 carcasses 8,408 heads | Tuberculosis Tuberculosis | $\begin{array}{r} .723 \\ 6.456 \end{array}$ |



The following table shows stock movements for the various stock districts:-

| distriot. | Entered district. |  |  | removed from district. |  |  | movemments in district. |  |  | Stock dipped. |  | Stock sprayed ${ }^{\text {d }}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Horses. | Cattle. | Sheep. | Horses | Cattle. | Sheep. | Horses. | Cattle. | Sheep. | Hors s. | Cattle. | Horses. | Cattle. |
| Barcaldine | 1,554 | 8,518 | 56,620 | 2,549 | 25,707 | 819,585 | 3,212 | 31,751 | 466,236 | 432 | 2,518 | 2,503 | 68 |
| Bowen. | 438 | 8,514 | 823 | 2,244 | 12,165 | 79 | 6,406 | 19,299 | 11 |  | 54 |  |  |
| Brisbane | 7,171 | 295,869 | 235,436 | 2,520 | 28,003 | 34,444 | 10,381 | 86,560 | 48,037 | 697 | 30,594 | 751 | 290 |
| Cairns | 477 | 1,873 | 4,842 | 1,395 | 7,473 | 175 | 5,034 | 11,659 | 4,772 | 208 | 13,021 |  | 2,990 |
| Charleville | 4,193 | 81,959 | 319,765 | 9,422 | 118,967 | 660,511 | 10,429 | 65,389 | 498,015 |  |  |  |  |
| Clermont | 535 | 5,575 | 2,066 | 2,629 | 57,295 | 102,820 | 3,805 | 34,942 | 47,541 | 556 | 37,221 | 115 |  |
| Cloncurry | 4,724 | 107,427 | 6,699 | 10,414 | 212,147 | 163,473 | 10,402 | 66,535 | 79,953 | 2,443 | 298,311 | 254 |  |
| Cunnamulla | 4,785 | 70,953 | 322,814 | 11,500 | 117,149 | 703,506 | 6,753 | 15,707 | 184,946 |  |  |  |  |
| Gladstone | 1,995 | 30,786 | 490 | 3,296 | 29,976 | 20 | 2,842 | 40,852 |  | 464 | 13,230 | 1,314 |  |
| Helidon | 1,182 | 14,998 | 1,406 | 2,478 | 23,006 | , 300 | 2,481 | 54,119 | 14 | 1,396 | 70,882 | 176 | 47 |
| Hughenden | 2,132 | 26,891 | 48,163 | 4,812 | 48,126 | 281,788 | 3,153 | 11,482 | 242,614 | 4,400 | 27,943 |  |  |
| Longreach | 928 | 21,106 | 160,974 | 4,731 | 33,105 | 777,314 | 5,701 | 2,970 | 464,372 |  |  | 2,437 | 800 |
| Maryborough | 2,272 | 27,195 | 3,854 | 6,230 | 78,028 | 197 | 8,266 | 153,907 | 592 | 2,926 | 154,719 | 115 | 493 |
| Normanton . | 771 | 4,332 | 170 | 1,552 | 32,632 |  | 1,771 | 7,036 | 120 |  | 1,753 |  |  |
| Rockhampton | 1,210 | 16,027 | 99,375 | 3,664 | 54,195 | 53,250 | 11,127 | 125,703 | 25,614 | 592 | 15,656 | 190 | 50 |
| Roma . | 3,455 | 44,631 | 297,124 | 12,280 | 156,332 | 1,080,672 | 10,771 | 152,634 | 358,901 | 154 | 40,758 | 360 | 17 |
| South Burnett | 1,004 | 18,858 | 315 | 2,439 | 33,272 | 67 | 11,737 | 220,518 | 425 | 390 | 79,289 | 41 | 55 |
| Springsure | 1,488 | 16,734 | 31,896 | 5,868 | 56,642 | 100,231 | 5,951 | 14,806 | 73,072 | 7,338 | 26,835 | 339 |  |
| Talle budgera | 356 | 2,173 | 70 | 359 | 2,605 |  | 161 | 3,170 |  | 36 | 960 | 20 | 3 |
| Toowoomba | 12,635 | 191,553 | 97,823 | 18,997 | 253,982 | 366,883 | 42,621 | 572,958 | 39,684 | 3,844 | 180,059 | 1,591 | 3,241 |
| Townsville | 525 | 34,029 | 23,931 | 6,011 | 9,739 | 16,838 | 11.823 | 45,127 | 1,230 | 1,845 | 1,856 | 197 | 30 |
| Winton | 39 | 3,000 | 33,218 | 2,333 | 32,846 | 337,795 | 1,339 | 47,701 | 243,755 |  | 6,583 |  | .. |

ARTHUR H. CORY, M.R.C.V.S,
Chief Inspector of Stock.

## APPENDIX 1.

REPORT OF THE DIRECTOR OF THE STOCK EXPERIMENT STATION, TOWNSVILLE.

I have the honour to submit the following report for the year ended 30th June, 1921:-

During the period under review the season has been excellent except in small areas, and consequently disease amongst live stock has been at a minimum.

Several visits have been paid into country districts, but frequently it is found that owing to the long distances and difficulty of travel no information of a positive character can be obtained. This happened on two of the longest trips undertaken-i.e., to Cloncurry district late last year, when an attempt was made to reach Herbert Downs, but was abandoned owing to weather conditions; and to the Gilbert River district in February, to investigate walkabout disease. where I arrived after the disease had naturally abated. Circumstances like these are to be regretted, but they are unavoidable.

Stock Experiment Station.
The work carried on here has been largely that of inoculation of cattle against bovine piroplasmosis. Very little other work has been attempted. The building of a laboratory has been commenced and should soon be completed. This will facilitate easier working for all concerned.

The number of stud animals received for inoculation purposes for the year ended 30th June is 191. A number of these animals have only recently arrived and will be inoculated in due course. Of those animals which have passed through the station so far we have not heard of any deaths and have reason to believe that all animals have resisted successfully the natural disease on tick-infested country.

Several interesting points in connection with the disease have been studied, and there
are several other points in connection with the pathology of bovine piroplasmosis which require elucidation and which will be mentioned.

It usually happens that the incubation period of the disease when artificially produced is three to twelve days. The following shows the very lengthy period of incubation which may occur when some samples of blood are used:-

Bull No. 21, 2-year-old Shorthorn.-Inoculated 10 ce. citrated blood 12th April, 1921; reinoculated 20 ce. citrated blood 28th April, 1921.

The first inoculation produced no result in sixteen days, but after the second inoculation, which was of blood from a different animal, a reaction commenced on the nineteenth day. On the evening of the eighteenth day the temperature rose to 101.4 degrees, but on the morning of the nineteenth was 106.3 degrees, when piroplasms were fairly numerous in the blood. The following day the temperature fluctuated between 104 degrees and 105 degrees, when organisms were again numerous. On the twentyfirst day the temperature was normal again and organisms had disappeared. The temperature remained about normal for a week, when the animal was turned out.

- Bull No. 24, 2 -year-old Shorthorn.-Inoculated in the same manner and on the same dates as Bull No. 21. On the nineteenth day after inoculation the morning temperature was 99.4 degrees, when a few piroplasms appeared in the blood. On the morning of the twentieth day 100.4 degrees, when piroplasms were again seen. The same evening the temperature suddenly rose to 106.4 degrees, but fell the next morning to 100.5 degrees, when organisms could not be detected.

Bull No. 25, 2-year-old Shorthorn.-Inoculated in the same manner and on the same dates as Bull No. 21. On the morning of the nineteenth day the temperature rose to 104 degrees, when piroplasms were fairly numerous. The following day the temperature fluctuated between 104 degrees and 105 degrees, when piroplasms were again numerous. On the twentyfirst day the temperature had fallen to normal, and piroplasms were absent. The temperature remained normal for a week following, when the animal was turned out to grass.

There are many points in connection with the pathology of bovine piroplasmosis which have a practical bearing on the subject, and which require elucidation in Queensland, and it is a wonder that some attempt has not been made to thoroughly investigate them.

For instance, it was usually held that the rods and rings which appear during the late stage of the disease were a stage in the life history of the piroplasm bigeminum; but since Theiler's work in South Africa some doubt has been cast on this view, and it was proved by him that so far as South Africa was concerned the rods and rings constitute a different species of parasite, which he named the Piroplasma mutans. Dodd made an attempt to settle the question in Queensland, but it is not yet known for certain whether we have one or more species of piroplasm in Queensland.

There is a further question that requires elucidation, and that is the possibility of blood from an animal used for bleeding purposes rapidly losing its infectivity after being drawn
from the amimal. The urgency of this will be recognised when it is remembered that many hundreds of doses of blood are sent out annually from Government institutions for inoculation purposes. When it is further remembered that blood may be some days old before it is used, and the fact that frequently stockowners consider their animals immune and can be placed with impunity upon tick-infested country when once inoculated, the possibility of such blood having become avirulent becomes significant. It is well known that some samples of blood may produce a reaction some considerable time after being drawn from the animal, but it cannot be held that all samples of blood remain virulent for an equal period of time, any more than it can be held that all samples of blood are of an equal degree of infectivity. That there are "mild" and "strong" bleeders has long been, recognised, but whether the blood of a "strong" bleeder remains virulent for a longer period than that of a "mild" bleeder when once drawn from the animal is unknown.

A further point on which we have recently obtained experimental evidence is the possibility of the blood of recovered animals losing its infectivity when such animals were kept on "tick free" country. At one time it was held that animals which had once passed through a reaction were immune to the disease for the rest of their lives when kept free from ticks. The view at present is that the blood of most animals does lose its infectivity and the animal its immunity when kept free from ticks for a year or two. This, however, does not happen in all cases. Such a contention is also borne out by practical experience, for it is well known that cattle "which have been "dipped clean" for some two or three years, when turned out into tickinfested country frequently die of redwater.

The history of Bleeder $R$ illustrates this point. This animal had been used for many years at the Experiment Station and had been tested on many animals. While at the Experiment Station the animal was never infested with ticks, as the country there is clean. The last time this animal was placed on tick-infester country is believed to be somewhere in 1918.

After taking over the Experiment Station the blood of this animal was tested on the following susceptible animals :-
Animal No. A. $-30-3-1920$. No reaction.
$\begin{array}{llll}" & " & \text { A. }-13-5-1920 . & \text { No reaction. } \\ " \# & \text { " } & 67 .-23-4-1920 . & \text { Temperature reaction. Or- } \\ \text { ganisms present. }\end{array}$
Apparently this animal's blood had now a very low degree of infectivity, and before the animal was again tested, in June, 1921, it was placed on tick-infested country for three weeks in May and allowed to become grossly tickinfested. It was dipped and returned to the Experimental Station and its blood inoculated in doses 5 ce. into each of the following six-months-old calves, with the result as indicated:No. 62.-21-6-1921. ) In each a typical temperature re., 63.-21-6-1921. action was produced, together with ,". 64.-21-6-1921. $\}$ the presence of the piroplasm bige" 65.-21-6-1921. minum in the blood of each animal ", 66.-21-6-1921. during the height of the reaction.

The conclusion to be drawn is that the infectivity of the blood of Bleeder $R$ had con-
siderably lessened in degree owing to the animal being kept free of ticks. This infectivity was restored when the animal was allowed to become tick-infested.

The analytical work carried out by the Chemist attached to the staff of the Experimental Station is given below in brief.

During the year 378 samples of dipping fluid were examined, with the following results:-
$\left.\begin{array}{l}5 \text { dip samples or } 3.1 \% \text { contained less than } 2 \mathrm{lb} \text {.) } \\ 3 \text { dip samples or } \\ 1.9 \% \text { contained from } 2 \text { to } \\ 41 \mathrm{~b}\end{array}\right)$ 3 dip samples or $1.9 \%$ contained from 2 to 4 lb . 马ु 63 dip samples or $16.6 \%$ eontained from 6 to 71 b 83 dip samples or $16.6 \%$ contained from 6 to 7 lb . 80 dip samples or $21 \cdot 1 \%$ contained from 7 to 8 lb .
77 dip samples or $20.3 \%$ contained from 8 to
9 lb . 77 dip samples or $20.3 \%$ contained from 8 to 9 lb . 42 dip samples or $11 \cdot 1 \%$ contained from 9 to 10 lb . 49 dip samples or $13.0 \%$ contained 10 lb . and over of which-
18 dip samples or $4.7 \%$ contained over 4 lb .
5 dip samples or $1 \cdot 3 \%$ contained from 3 to 4 lb .
13 dip samples or $3.4 \%$ contained from 2 to 3 lb .
15 dp samples or $4 \cdot 1 \%$ contained from 1 to 2 lb .
5 dip samples or $1 \cdot 3 \%$ contained up to 1 lb .
322 dip samples or $85 \cdot 2 \%$ that were free or con-

In addition there were also analysed:-
Limestone and deposits (mostly qualitatively) - 12 .
Waters-5. (One extraordinary amount of salt $1,633.8$ grains per gal.).
Viscera-4. (Arsenic positive in 1 case).
Suspected plants-2.
Dip concentrate- 1 .
Arsenic sample-1.
making a total of 403 samples, involving 507 determinations.

Ten (10) pints iodine were also standardised, mostly for the use of Inspectors.


Allowing two samples only per year the average number analysed (1917-20) should be yearly 1,256 as against 378 submitted, or only 30 per cent., which number includes samples from Experiment Station (10) and Inspectors' check samples.

The following diseased conditions have been met with during the ordinary routine work and are of sufficient rarity and importance to warrant inclusion here.

## Salt Poisoning in Pigs.

It is known that salt poisoning occurs in pigs frequently by saline solutions being allowed to run from creameries and factories into the buttermilk, which subsequently is used as pig feed. One instance of salt poisoning occurred here in the North which is of peculiar interest. The pigs had been running loose close to the coast but had not been allowed near sea water. Owing to some of the very high tides in February bringing the salt water some miles inland to where the pigs were running it probably happened that the animals commenced drinking the sea water and kept on when they found their thirst was not relieved. The symptoms shown were diarrhœa and tenesmus, together with symptoms of nervous irritation. Death took place rapidly in some of the smaller animals and post-mortem showed congestion of the alimentary tract, which contained a high percentage of common salt. In all ten pigs died.

## Salt Poisoning in Sheep.

In one instance sheep were reported as having died after having drunk from a certain trough. Death took place rapidly among those sheep which drank first, and although the other sheep drank afterwards these were found to be only slightly affected. Analysis of the first water taken from the trough showed a high percentage of salt. What had happened was that the trough had probably been refilled several times with water of small salt content previously to the sheep drinking, and had been constantly emptied by evaporation, then refilled again, and so on, until the concentration of the salt became sufficiently high to cause death in animals drinking such water as was left in the trough.

## Bacterial Necrosis in Pigs.

A disease simulating in some respects swine fever, and caused by the necrosis bacillus, has been known to exist in certain parts of the world for many years. So far as I know it has not been reported in Queensland. From descriptions given and from specimens shown me I believe this condition exists in the north. It is not a disease associated with a very high mortality, but causes some losses wherever found. The most important point is that it is frequently very similar to swine fever in the bowel lesions which it produces. Owing to various circumstances no bacteriological investigation has been made into the condition, but it appears so like the disease as described in other parts of the world as to make probability almost a certainty.

## Stomach Worms in Cattle.

This condition has been reported in some of the wetter districts. It has been found frequently in small calves running on swampy country, and may cause rapid emaciation and weakness of the animal, ending in death from exhaustion. It is a somewhat difficult condition to treat by means of medicinal agents, although copper sulphate and lysol have been largely tried.

## Parasitic Mange in Pigs.

In the last annual report mention was made of this condition as occurring in wild pigs in and around Townsville. Several fresh cases have been seen this year in both wild and domesticated pigs. The disease is due to a degenerate arachnid, known as Demodex folliculorum. It is found in small pustules in the region of the eyes and lips.

## Swine Fever.

This disease has been reported from the Atherton Tableland on more than one occasion, although investigation has not given anything very definite. As swine fever has occurred in the past in this area, and at that time it appears certain individuals sold or killed off their animals, no doubt fresh cases have occurred. It is difficult to locate this disease, as farmers frequently have a habit of hiding their losses to prevent their farms from being quarantined and animals destroyed. This, of course, makes it difficult for the person investigating. In matters like this it is necessary to have the co-operation of all concerned as the losses are likely to be smaller in the long run.

JOHN LEGG, B.V.Sc., M.R.C.V.S.,
Government Veterinary Surgeon.

## REPORT OF THE GOVERNMENT BACTERIOLOGIST.

## Fees and Moneys Received.

The total amount of money for work performed, bleeders, blackleg vaccine, pleuro virus, and other laboratory products supplied, and the inoculation of stud animals, was as follows :-

|  | £ $s$. |
| :---: | :---: |
| Inoculating and stalling of stud animals | 88013 |
| Bleeders supplied | 3500 |
| Tick fever blood | 17510 |
| Blackleg vaccine | $210 \quad 4$ |
| Pleuro virus | 720 |
| Lactic cultures | 3119 |
|  | £1,720 |

Immunisation of Stud Cattle for Tick Fever.
During the year 149 stud cattle were received to be immunised against tick fever. These animals comprised different breeds of bulls and heifers as follows :-


During the inoculation fever period one Jersey heifer died from exhaustion. Two bulls also died, and on post-mortem examination one of these bulls was found to have lesions of tuberculosis and pneumonia, while the other bull only revealed the presence of tick fever lesions.

In addition to the above a total of 851 head of cattle were inoculated on their own pastures at the following places:-Morven, Warwick, Ipswich, Rosewood, Allora, Clifton, Caboolture, Petrie, Moggill, Goodna, Samson Vale, and Toowoomba.

Many of these were stud animals, and after recovery from the inoculation fever were consigned to the Central and Northern parts of the State.

The quantity of blood drawn from specially prepared bleeders amounted to 7,020 doses, and was largely used for the inoculation of ordinary station and farmers cattle.

## Supply of Bleeders.

Twenty-five specially prepared bleeders were supplied to stockowners. Each of these animals was carefully tested by injecting its blood into healthy susceptible cattle, which was followed by a reaction, and the detection by microscopical examination of the piroplasma organism in the blood smears.

These bleeders were also tested for tuberculosis, vaccinated against blackleg, and inoculated for pleuro-pneumonia.

## Samples of Water for Bacteriological Examination.

Two samples.-No indol or gas production, and no injurious bacteria. Water considered suitable for butter washing purposes.

Two samples from butter factory.-Contained numerous gas-producing organisms, and also a positive indol test. Condemned for the washing of butter and dairying utensils.

Two samples from butter factory.-Bacilli coli present, and indol reaction, gas-producing organisms in glucose agar.

Sample from butter factory.-Gas production, and slight indol reaction.

Two samples from butter factory.-One contained Bacilli coli, produced gas, and gave an indol reaction; the other gave negative results.

Sample.-Few bacteria and slight indol reaction.

Sample ordinary water. $-154,000$ bacteria per cc.

Sample filtered water. $-174,000$ bacteria per ce.

Both samples produced gas and gave indol reaction.

Investigations into the Contamination of
Condensed Milk with Mould Fungi.
Nearly all brands of condensed milk are liable to have some cans showing evidence of contamination with mould fungi.

The principal trouble is in the form of what are popularly known as buttons, which are firm, light-brownish round lumps of semi-solid matter occurring on the surface of sweetened condensed milk.

For some considerable time past numbers of these contaminated cans of condensed milk have been submitted for examination.

On microscopical examination and by means of culture tests these lumps are found to be caused by the growth of an Aspergillus, and sometimes other mould fungi, on the surface of the condensed milk after the can is hermetically sealed.

The size of the button, which is really a colony of mycelium, is restricted by the exhaustion of the oxygen (which is necessary for their development) and finally leads to the death of these micro-fungi within fourteen days after the closing or sealing of the can.

The button is made by the hardening of the casein, probably caused by the action of the excretory products (enzymes), and continues to develop sometimes after the mould colony has ceased to grow.

As mould fungi are readily destroyed in the process of condensing the milk, the contamination must occur after the milk leaves the cooling pans, and before the cans are sealed.

In view of these facts, careful attention should be directed to the hygienic conditions of the whole of the condensing plant.

Probably the most effective method of dealing with an outbreak of this button trouble is to protect the can, at the time of filling, against dust and a mould-laden atmosphere.

This can be done by sealing the cans under a partial vaccum, as these mould fungi will not grow in an atmosphere deficient in oxygen.

As a result of the adoption of this vacuumsealing process, buttons on condensed milk are practically unknown in the United States of America.

Microscopical Examination of Pathological Tissues, Etc.
Growth from abdomen of bull.-Fibroma.
Heart of ox.-Pericarditis.
Udder of cow, suspected tubercle.-Negative.
Discharge from cow's udder.-Pyogenic cocei present.

Pus from abscess on bull.-No tuberculosis or actinomycosis detected. Pyogenic organism present.

Specimen of blood.-Tick fever organism present.

Portion of cow's lung.-Typical pleuropneumonia.

Serum from horse, suspected tetanus.-No tetanus bacilli detected.

Nodular growth from ribs of cow.Onchocerca Gibsoni detected.

Specimen of blood from pig.-Diplococci detected.

Spleen of pig.-Tubercule bacilli detected.
Lung of ox.-Marked lesions of pleuropneumonia.

Blood smears, suspected tick fever.-Negative.

Lung of cow.-Pleuro-pneumonia lesions present.

Smears from heart and spleen of cow and young steer.-All contained bacilli resembling bacilli hemorrhagic septicemia.

Pus from horse.-Staphylococcus Aureus present.

Lung of bullock,-Typical pleuro-pneumonia.

Three smears of blood, suspected malignant Oedema.-No micro-organisms detected.

Two specimens of cerebro-spinal fluid.-No bacteria detected.

Two specimens from ribs of bullock.-Both contained the nodule-producing parasite Onchocerca Gibsoni.

Blood from pig.-Diplococci present.
Five specimens of blood.-Septic bacteria present.

Specimen from vertebrae of horse.Melanosis.

Lung of bullock.-Tuberele bacilli detected.
Blood, suspected tick fever.-Piroplasma detected.

Pus from horse, suspected strangles.Streptococci detected, and vaccine prepared.

Nodular growth from intestine of sheep.Contained parasite worm. (Oesophagostoma columbianum).

Blood smears from calf, suspected blackleg. -No bacilli detected.

## Suspected Infected Milk.

Seventeen specimens of milk were received from suspected cases of contagious mammitis, and in twelve cases the Streptococous and pus cells were detected, while five cases were negative.

Six samples of milk from cases of suspected tubrculosis of the udder gave negative results.

## Pleuro Virus.

Every facility is offered to stockowners to enable them to have pleuro virus collected by them examined bacteriologically to determine its suitability or otherwise for protective inoculation purposes.

Specimens of virus from sixty-five cases of pleuro-pneumonia were submitted. Fifty-five of these were found free from any contamination, and were recommended as being suitable for inoculation, while specimens from ten cases were condemned, nine of the latter containing septic organisms, and one containing tubercle bacilli.

## Samples of Brine from Bacon Factories.

No. 1.-Old brine, contained considerable quantity of albumin and blood pigment, and was grossly contaminated with different bacteria.

No. 2.-Old brine recently boiled, contained practically no albumin and very few bacteria.

No. 3.-Brine, contained very little albumin and not many micro-organisms.

No. 4.-Old brine, considerable quantity of albumin present and bacteria numerous.

No. 5.-Brine, small quantity of albumin present; bacteria fairly numerous.

The total number of specimens examined was two hundred and fifty-four.

## Pleuro-Pneumonia Virus Supplied.

Owing to the long spell of wet weather during the greater part of the winter season the resisting power of cattle was so lowered as to render them more susceptible to various affections of the lungs, including pleuro-pneumonia; consequently there was a greater demand for pleuro virus, of which this institution supplied sufficient for the inoculation of 18,220 head of cattle distributed in the following districts:Cunnamulla, Lowmead, Rockhampton, Adavale, Windorah, Morven, Wondai, Killarney Eidsvolr, Moore, Quilpie, Murgon, Mitchell, Injune, Kilcoy, Esk, Helidon, Bowen, Many Peaks, Logan, and Gatton.

## Blackleg and the Supply of Vaccine.

Outbreaks of blackleg were reported from the following localities:-Woodford, Nerang, Kilkivan, Gympie, Purga, Philpott Creek, Humphery, Eumundi, Rosewood, Goomeri, Maleny, Crawford, Murgon, Wondai, Kingaroy, Crow's Nest, Bell, Jandowae, Bororen, Eidsvold, Coominya, Jimbour, Gayndah, Toogoolawah, Boonah, Yangan, Logan, Rockhampton, Gooroolba, Woolooga, Esk, Kalbar, Acland, Bromfleet, Greenmount, Nambour, Wyreema, Doongal, Taroom, and Beerwah.

Owing to the fact that the spores of the blackleg bacilli are so extremely tenacious-i.e., they can survive very high temperature and
prolonged desiccation-and that in certain districts its natural habitat is the soil, it is difficult to foresee that this disease can ever be stamped out altogether.

As the disease is of such short duration, the animal succumbing often a few hours after the typical acute symptoms are recognised, curative methods cannot be resorted to.

It therefore behoves every stockowner having cattle in a suspected blackleg district to protect all the young calves against blackleg by vaccinating them at least twice a year with a standardised double vaccine.

This protective vaccination if properly conducted is without danger, and, at least as far as has yet been observed, does not even oceasionally demand a victim (as in the case of a closely allied disease, anthrax) ; and as, further, the immunity produced is apparently so enduring and reliable, the vaccination of young cattle with the Departmental double vaccine is unconditionally recommended.

During the past year vaccine was supplied for the treatment of 10,515 calves.

## Lectures and Demonstrations.

During the Farmer's Winter Course I attended the Agricultural College, Gatton, and delivered several lectures and gave some demonstrations on various subjects, including tick fever and preventive inoculation, methods of tick eradication, tuberculosis and the tuberculin test, also Bang's method of eradicating tuberculosis from a dairy herd, blackleg and its prevention by vaccination, the application of practieal bacteriology in the manufacture of butter and cheese and the supply of other dairy products, and the nature and use of disinfectants on the farm, station, and in the home, with special reference to those disinfectants made from coaltar, which include hycol, cyllin, kerol, M.O.H., C.N., \&e.

Lectures and demonstrations on specially selected subjects were also delivered at the following places:-Nerang, Beaudesert, Wynnum, North Pine, Burpengary, Jericho, Townsville, Bowen, Gympie, Rockhampton, Ipswich, and Toowoomba.
C. J. POUND,

Government Bacteriologist.

## REPORT OF THE GOVERNMENT BOTANIST.

Sir,-I have the honour to present herewith a report on the work of the Botanical Division for the year ended 30th June, 1921.

## GENERAL.

Correspondence and personal interviews with farmers, pastoralists, \&e., take up a considerable amount of time. The inquiries extended over a wide range of subjects dealing with various phases of plant life. The major portion deal with plants sent in for identification and report as to their fodder value, poisonous properties, \&c., and in this field 2,660 specimens were examined and reported on during the past twelve months.

## FIELD WORK.

For the purpose of general botanical collecting visits were paid to Bribie Island, Stradbroke Island, Mistake Range, and the Laidley Valley.

During May and June, Professor E. H. Wilson, of the Arnold Arboretum, Harvard University, and one of the leading dendrologists of the world, paid a visit to Queensland, and visits in company with him were made to Imbil, Fraser, Bribie, and Stradbroke Islands, and Benarkin. On all of these occasions a considerable amount of general collecting was accom-- plished and some interesting botanical information about our native trees obtained.

## EXHIBITIONS.

In the Department's Court at the August National Show a comprehensive collection of native grasses was staged, each specimen being labelled with its name (both botanical and local) and information as to its fodder value. A collection of edible trees and shrubs was also staged, particular attention being directed to those not generally known to be of considerable value as fodder plants. The willingness of this Division to name and report on specimens of weeds, grasses, trees, \&c., for farmers and others was brought under public notice.

## HERBARIUM.

As in previous years, many of the most valuable additions to the herbarium have been from correspondents in various parts of the State forwarding specimens for determination.

Exchanges of material were carried out as follows :-

Received.-From Botanic Gardens, Sydney, 100 sheets of New South Wales and Lord Howe Island plants. From Bureau of Science, Manilla, P.I., 807 sheets of Philippine Island plants. From Botanic Gardens, Singapore, 110 sheets of Malayan plants. From National Herbarium, Melbourne, a few valuable tropical Australian species.

Dispatched.-To Botanic Gardens, Sydney, 200 sheets Queensland plants. To Botanic Gardehs, Singapore, 100 sheets of Queensland plants. To Botanic Gardens, Berlin, 100 sheets of Queensland plants.

During my annual vacation in January, when on a visit to the southern States, I made a collection of the native flora and (f plants in
cultivation in public gardens. These specimens were kindly named for me by local botanists and make a valuable addition to our herbarium collections. I also spent some time at the National Herbarium, South Yarra, Melbourne, Victoria, for the purpose of studying the sheets of some rare tropical Australian species in their collections, and obtained a few duplicates and made some notes on rare or doubtful species.

The present herbarium accommodation is now stocked up to its utmost capacity and it is very necessary that additional cabinets should be secured. The possession of a good herbarium collection is an absolute necessity for the proper carrying out of the duties of this office.

## LIBRARY.

The additions to the library, with the exception of a few periodicals, have been mostly exchanges with correspondents and institutions in various other parts of the world.

## BOTANICAL MUSEUM.

Additions to the Botanical Museuna have not been very numerous. The carpological and timber collections have been added to from time to time. A collection of seed vessels, representing one or two of each kind usually referred to in botanical text-books, was supplied to the Girls' State School, Fortitude Valley, for the use of the teachers in their botany lessons.

## EDUCATIONAL AND LECTURES.

Lectures were delivered on the following subjects:-Trees and Tree Planting-before the Manly Progress Association. Scrub Treesbefore the Field Naturalists' Club. Floras of Queensland National Parks-before a public meeting convened by the Field Naturalists' Club. On Bird Day (22nd October) in the Queensland schools. I visited the State schools at West End and Fortitude Valley and gave lecturettes on the relationship between birds and plants.

On Arbor Day (6th May) at the Fortitude Valley school I gave the children talks on trees and shrubs, illustrated by specimens growing within the school grounds.

On 9th May I visited the seaside camp of the Eidsvold State school and gave the children a morning in the surrounding bush, where talks were delivered on Australian plants, illustrated by the local specimens.

In the June number of the "Queensland School Paper", I contributed an article on "Grass Trees," the first of a series of nature study lessons dealing with typical Australian plants. I intend to follow it up with popular articles suitable for school children on the eucalypts, wattles, and other Australian types.

## FORESTRY.

Owing to the increased interest being taken in forestry in Australia, considerable attention has been directed by this Division to the botany of our forest timbers.

The compilation of an illustrated "Forest Flora" of Queensland is a matter that is receiving attention, and arrangements have now been made that should enable us to bring the work
out at a very reasonable price. For the purpose of obtaining information and good photographs of barrels and whole trees of some of our "scrub" species, my assistant (Mr. W. D. Francis) in October made a ten days' stay at the Forest Survey camp in the Macpherson Range, where a good collection of photographs and specimens was obtained.

For the past three years in my spare time I have been engaged on the compilation of a "Text Book of Australian Elementary Forest Botany" for the use of Australian forestry students, and the first volume, I hope, will be available for sale before the end of the year. It should fill a distinct want in Australian botanical literature and should command a ready sale. It is being published by the New South Wales Forestry Commission by kind permission of the Queensland Government.

Quite a large number of the specimens received for identification during the year were of forest trees sent in by various correspondents, and in this connection 304 specimens were determined for the Queensland Forest Service.

## PUBLICATIONS.

The following publications were issued during the year:-

White, C. T.: The following in the "Queensland Agricultural Journal":-Illustrated Notes on the Weeds of Queensland, Nos. 17-21; The White Cedar (Melia Azedarach, var. Australasica) ; a Plant Poisonous to Pigs (September) ; Note on Variation in the Bark of Two Common Eucalypts (August) ; On Two Species of Kurrajong (Brachychiton) Occurring in Queensland (December); The Pongamia Tree (Pongamia glabra) ; A Useful Fodder Tree (January) ; A Wild Cotton (May) ; The Carob and Algaroba Beans (June).

In the "Queensland Naturalist":-Two Interesting Fungi (July) ; A Rare and Beautiful Native Tecoma (October); Botany of Stradbroke Island (April).

In "Queensland School Paper" (June):Grass Trees.

White, C. T. and Francis, W. D.-Botany Bulletin XXII.-Contributions to the Flora of Queensland. (Issued 6th August, 1920.) In the "Queensland Agricultural Journal":Queensland Trees, Nos. 1-3 (April, May and June).

White, C. T. and Smith, F. B.-Peach-leaf Poison Bush (Trema aspera), its Occasional Toxicity (Proceedings Royal Society of Queensland, Vol. XXXII., pp. 132-134).

White, C. T. and Rogers, R. S.-Contributions to the Orchidaceous Flora of Queensland, No. 1 (Proceedings of Royal Society of Queensland, Vol. XXXII., pp. 117-124). Contributions to the Orchidaceous Flora of Queensland, No. 2. -A Revised Account of the Queensland Species of Habenaria with a Key to the Australian Members of the Gemus. (Proceedings of Royal Society of Queensland, Vol. XXXII., pp. 135143.) A Contribution to the Orchidaceous Flora of Papua (British New Guinea). (Transactions Royal Society of South Australia, Vol. XLIV., pp. 110-119.) Plates 5-8.

Francis, W. D.-The Hoop Pine and Its Allies (Queensland Naturalist, Vol. II., pp. 114117). The Origin of Black Coatings of Iron and Manganese Oxides on Rocks (Proceedings Royal Society of Queensland, Vol. XXXII., pp. 110-116). Plate 1.

## POISONOUS PLANTS.

Owing to the good season experienced during the past year not quite so many specimens of weeds and scrub undergrowth suspected of poisoning stock were received. An account of those sent in follows herewith, not only as (in last year's report) a record, but also as a slight contribution to our knowledge of a subject which, though of the greatest importance to the stock industry, is one, nevertheless, in which definite knowledge in many cases is quite lacking. The problem of plants poisonous to live stock is one of the most difficult to deal with that comes under the notice of the botanist, chemist, and veterinarian alike.

MENISPERMACEE.
Stephania hernandicefolia (Tape Vine).Inspector J. II. MeCarthy forwarded seeds and leaves of this plant taken from stomachs of prime bullocks that had died on the farm of Mr. F. Tilley, Knapp's Creek, Beaudesert, and expressed his opinion that the vine was responsible for a number of deaths of cattle in his district. Specimens were brought in by J. McGown, M.R.C.V.S., who stated that on a visit to the farm of Mr. A. M. Jackson, Greenbank, viâ Logan Village, where losses among cattle had occurred, he noticed that the vine was freely eaten by stock and that he found leaves and stems of it present in the stomachs of dead beasts. Later (26th April, 1921) Mr. Jackson wrote to the Department as follows:- "In reference to the Tape Vine as a poisonous plant, most people round here seem to think it was not the Tape Vine that was killing my cattle, so a neighbour (Mr. Loder) offered me a mumpy cow to experiment with. I shut her in a yard for three days and fed her with the Tape Vine, both old and young shoots. In all she ate a sugarbag full. I left her a week after the last feed and she showed no signs whatever."

As two poisonous principles, however, have been isolated from the plant-a picrotoxin and an alkaloid-I think the evidence of the plant being commonly responsible for the deaths of cattle in "scrub" areas is fairly well established. It is quite possible, however, that they have to eat considerable quantities of it to affect them, and it may also be more or less cumulative.

## CARYOPHYLLACEA.

Saponaria Vaccaria (Soapwort).-Brought in from a farm at Wellington Point and thought to be possible cause of death of horses in the district-stock were not noticed to touch it, nor were bees seen to visit the flowers.

## MALVACEA.

Hibiscus rhodopetalus.-Reported to cause death of cows in milk, Mount Larcom.

## GERANIACEA.

Oxalis corniculata (Wood Sorrel).Received from Murgon Shire Council as responsible for death of animals which had died from poisoning in the Murgon district.

## LEGUMINOSÆ.

Sesbania aculeata.-Reputed cause of sickness among horses at Veresdale, in the Beaudesert district.

Melilotus parviflora (Hexham Scent or Melilot).-Brought in by Mr. R. S. Maynard, Editor "Live Stock Bulletin," with the following note:- "A great crop this year on the Darling Downs, standing nearly six feet high, cattle are feeding freely on it, blowing badly, and several deaths from hoven have resulted in consequence."

Crotalaria striata.-Suspected of causing death of calves at Burpengary; brought in Mr. P. O'Brien, who stated that the weed was common about Caboolture and was looked upon as a weed poisonous to stock.

Indigofera hirsuta.-Received from G. B. Brooks, Instructor in Agriculture, Rockhampton, as a weed gaining ground in his district and suspected of being poisonous.

Castanospermum australe (Bean Tree, Black Bean, or Moreton Bay Chestnut). - Under date 7th October, 1920, Inspector G. S. Birkbeck wrote to the effect that eleven horses belonging to a team at Imbil had taken sick and that four had died. He forwarded the stomach contents, samples of chaff on which the horses had been feeding, seed of a chestnut, and a weed suspected poisonous.

The stomach contents examined by the Agricultural Chemist yielded no traces of arsenical or cyanide poisoning. The chaff examined by me revealed no seeds or other parts of plants poisonous to stock. The weed forwarded was Polygonum hydropiper. It would, therefore, seem in this case that the trouble was due to the seeds of the "chestnut" or "Bean Tree" (Castanospermum australe). Stock Inspector Birkbeck gave the symptoms as "Twitching of the tail, lopping of ears, staggering in hind legs, stiffness of the neek, twitching of shoulder muscles, eagnerness for water; and later blindness, madness, and final collapse."

## LYTHRARIEAE.

Ammannia pentandra.- Sent in as possible cause of sickness and death among dairy cattle at Oatlands, Degilbo.

## ONAGRARIEA.

Jussicea suffiuticosa.-Received from Oatlands, Degilbo, and Malanda, N.Q., as a suspected poisonous plant.

## PASSIFLORACEAE

Passiflora aurantia ("A Wild Passion Vine").-Mr. P. Reynolds, Palen Creek, Rathdowney, wrote:- 'I am sending you by to-day's mail a plant which I think is poisoning my eattle. Almost every morning some of my cows are swollen terribly. They only seem to ${ }^{\circ}$ last half an hour from the time I notice them getting sick. By using the trocar I have saved a good few, but I have also lost a lot. The vine sent seems the only dangerous plant I have on my property."

As species of Passiflora are known to be strongly cyanogenetic, the specimens were examined by the Assistant Agricultural Chemist
(Mr. E. H. Gurney), who reported as follows:"Obtained strong hydrocyanic test from both the fruit and the stem, but the leaves gave a negative test."

Passiflora foetida.-Received among a parcel of plants from Mr. Blank, Rockhampton, on whose property losses had occurred. (See also note on Senecio lautus.)

## CAPRIFOLIACEAE.

Sambucus Gaudichaudii.-Writing from Grandchester 8th June, 1921, Mr. P. J. Noonan stated:-"I am forwarding a plant that has been growing for some years on deep flats along the creek bank in my paddocks, and on several oceasions during the past four or five years I have had cattle suffering severely with symptoms as if they had been poisoned. I have searched for a likely weed, but have been unable to find any other that appears to me in any way suspicious, and this is the only one I can blame for the trouble." As the English elder is known to possess a cyanogenetic glucoside (sambunigrin) and an alkaloid (sambucine), and to be therefore poisonous, specimens of Sambucus Gaudichaudii were handed over to the Agricultural Chemist (Mr. J. C. Brünnich), who reported: "Could not detect presence of cyanogenetic glucoside."

## COMPOSITA.

Senecio lautus.-An outbreak of disease on the property of Mr. H. E. Blank, Alton Downs, viâ Rockhampton, was diagnosed by Mr. H. O'Boyle, M.R.C.V.S., as "cirrhosis of the liver." A collection of plants subsequently forwarded by Mr . Blank contained specimens of Senecio lautus. The plant is a variable one, and the specimen submitted represented a yam common in the Central district, particularly in the brigalow scrubs. The matter would seem worth going further into to find out definitely if our plant is capable of causing cirrhosis of the liver, as several extra-Australian species are known to do.

## GOODENOVIEÆ.

Goodenia glanca.-Received as a suspected poisonous plant from the Roma district.

## CAMPANULACEÆ.

Pratia erecta (Milk Weed).-In September my assistant (Mr. W. D. Francis) visited the Rosewood district, where losses among calves had occurred. A large amount of milk weed was noticed in all places where losses had occurred.

A visit to Veresdale (Beaudesert district) by me to farms where losses among calves had occurred also showed the pasture to carry a fair amount of milk weed. In both cases this was the only plant that in our present knowledge could be blamed as the cause of the trouble. It is one of those plants worth carrying out further investigations with.

## PRIMULACEE.

Anagallis arvensis (Pimpernel).-Writing from Buderim Mountain on 7th October, 1920, Mr. W. T. Nye stated:-"A few days ago I had a cow suddenly taken sick; in fact, it was in the afternoon when I noticed her unwell, and intending to give her medicine in the morning, when to my surprise she was found dead. On opening her intestines, in the first stomach was found a
lot of seeds as near as we can tell from the enclosed weed. She was blown out with wind as well. I should mention we could see nothing else in the stomach but grass and possibly a pint of the above-mentioned seeds." Mr. Nye's remarks are interesting, for, though the weed is known to be poisonous, stock rarely seem to touch it, and his note is the first definite record that has come under my notice in Queensland of the plant proving poisonous to stock.

BORAGINEAE.
Lithospermum arvense (Corn Gromwell).Received from Kulpi as suspected of causing losses among stock.

## LABIATERE.

Stachys arvensis (Stagger Weed or Hedge Nettle).-Mr. W. T. Chandler, Eight-mile Plains (Brisbane district), forwarded specimens of this weed with the statement that he had lost a horse that had eaten freely of it; the horse shivered and staggered badly when driven, though before being worked seemed in the best of health. The plant was also received from Kulpi and from Prisons' Reserve, Brisbane, to know if poisonous.

Lamium amplexicaule (Henbit or Dead Nettle).-Received from Pratten as suspected cause of death of dairy cows. This weed has since been the subject of seientific inquiry, and results of feeding tests carried out in New South Wales definitely showed the plant to be capable of producing staggers or shivers in stock. (See paper by Max Henry and Sydney Dodd in "Agricultural Gazette of New South Wales" for May, 1921.)

Mentha satureioides (Wild Pennyroyal).Specimens of this herb were received for the Government Analyst as reputed being illegally used as an abortifacient.

## EUPHORLIACEA.

Phyllanthus sp.-An undescribed species of Phyllanthus was received from Balfe's Creek as the reputed causes of losses among cattle in the district.

Excacaria agallocha (Milky Mangrove).Received from St. Helena (Moreton Bay) as a plant suspected of poisoning cattle.

## GRAMINEE.

## Grasses.

Eleusine indica (Button Grass).-Received from Barcarolle, Jundah, as cause of death of sheep. A note on the subject will be found in the "Queensland Agricultural Journal" for July, 1921.

## RESEARCH WORK.

In addition to the work listed under publications, a considerable amount of other work in the field of systematic botany is being accomplished.

In conjunction with Dr. R. S. Rogers, M.A., Adelaide, the leading authority on Orchidaceæ in Australia, the critical examination of the orchid specimens in the Queensland Herbarium is being continued, and we have in hand at present a study of the genus Liparis and some of the Dendrobes.

With Mr. F. Smith, B.S., F.I.C., a continuation of our phytochemical investigations is being carried on, and we are now at work on an examination of the Queensland flora for the occurrence of saponins. These bodies are of considerable importance economically as poisons or industrially as heading matters for beers and soft drinks.

My assistant (Mr. W. D. Francis) has been at work on miscellaneous collections, and we have now finished the descriptions of several Queensland plants new to science, either from specimens recently collected or from a critical examination of specimens in the Queensland Herbarium. I have finished a critical examination of the species of Flindersia and have prepared a revision of the genus for publication. The examination of the Papuan material collected by me in 1918 is nearing completion, and I hope to have my account of it ready for pubiication early in 1922. This should materially increase our knowledge of the flora of the Territory of Papua.

A number of specimens of Queensland grasses and some other critical families have been submitted to specialists for examination, and the results of the examination of the material submitted is looked forward to with interest.

In concluding my report, I might state that a great deal of collecting and critical botanical work is necessary before a knowledge of the flora of this State is in anyaway near complete, and it is a matter of great satisfaction to be able to state that arrangements have now been made that should enable us to prosecute this work This work, largely purely scientific, nevertheless forms the basis on which we are able to answer nany of the inquiries of an economic character made of this Division.

## C. T. WHITE,

Government Botanist.

## REPORT OF THE CURATOR

Sir,-I have the honour to submit the following report of the work of the Botanic Gardens for the year ending 30th June, 1921.

## Weather.

The year has been a remarkable one for regular rainfall that was consistent throughout, ranging between 873 points in March (highest) to 82 points in May (lowest). The number of days on which rain fell also was high (153), thus showing an even distribution. The regular rainfall naturally kept all vegetation in good growth, and gave many of the older trees and shrubs that had suffered severely during the two previous bad years a new start. The grass on lawns also kept in better condition than usual, and the mild, moist winter experienced kept it growing throughout, there being practically no resting period, as the machines were kept going up to the end of June. As showing the mildness of the winter it may be mentioned that Allamandas, Crotons, Acalyphas, and Hibiscns all kept in growth also to the end of June. A sharp cyclonic storm that passed over the gardens at the end of October did a lot of damage in about 15 minutes. Four trees were uprooted and numerous others suffered severely, particularly the very large Jacaranda near entrance to bushhouse, that had several large branches blown off. The large ficus nitida in centre of gardens, where a former kiosk was burnt down, was also considerably damaged, and a Kauri Pine adjoining lost its top. Thousands of small branches, chiefly from the Bunyas, littered the ground along the river drive, but ten days' work practically removed all traces of the storm. Two of the electric light standards were broken off, and others and wires were damaged.

Grass temperatures were taken during the winter months. Frost was registered on a few oceasions, the lowest readings being 29.3 degrees and 29.0 degrees on the 10 th and 13th of July respectively. Following is a list of the rainfall registered, the amount for the corresponding month of the previous year being in paren-thesis:-

July, 226 (20) ; October, 221 (87) ; January, 467 (1,335) ; April, 764 (243); August, 114 (74) ; November, 561 (48) ; February, 120 (121) ; May, 82 (210) ; September, 285 (22) ; December, 217 (188) ; March, 873 (183) ; June, 830 (324). Total, 4,760 ( 2,855 ).
The contrast with the previous year is a striking one as nearly one-half of the previous year's total fell in one month-viz., 1,335 points in January, 1920, out of a total of 2,855 for the year.

## Visit of, H.R.H. The Prince of Wales.

His Royal Highness attended a children's demonstration in the Domain on the 26 th of July, the day of his arrival in Brisbane, also the citizens' reception in the Botanic Gardens on Friday, 30th July, when from a dais erected in front of the kiosk, he received a hearty welcome from the many thousands of citizens who had been marshalled in a queue, and passed by four deep. The Gardens were crowded with

OF THE BOTANIC GARDENS.
thousands of enthusiastic people on both of above occasions and the functions passed off most successfully.

## General Improvements.

The entrance to Gardens through University grounds has been improved by widening the roadway to permit of vehicular traffic. This is a great convenience to the upper bushhouse, and also useful as an additional road into Domain. It was used by the procession on the occasion of the visit of H.R.H. the Prince of Wales to the children's demonstration in the Domain. The rose beds on slope in front of kiosk have all been rearranged, trenched, manured, and replanted to a circular design. The beds are now 16 ft . in width. This permits all plants and their names to be readily seen. The old beds in many instances were found to be far too large to allow visitors to see the plants conveniently. The growing of climbing roses on single balloon trellises has been adhered to by their being planted in the centre of a 20 ft . strip of grass between the beds, and a complete circle of them around the outside. A large number of climbing roses have been added to the collection, and the system adopted permits each variety being inspected all round. The rose beds during the flowering season are made great use of by interested visitors, who take down the names of the varieties they fancy, with a view of procuring plants. About 300 new plants have been put in, many of them of the latest kinds, thus considerably adding to the collection of roses.

The animal and bird enclosure is now receiving attention. During the heavy rains in March the greater portion of enclosure, including nearly all of the old tennis courts, was under water. This was remedied by the construction of a new $9-\mathrm{in}$. drain connected to the Alice street sewer. As the old fence needed repairing on the Alice street side, the opportunity of grading down the steep bank was taken, with a view of putting the fence on top of the bank instead of at base as previously. This will give the birds and animals a high, dry bank, that will be a great improvement upon the wet, cold flat that hitherto existed in winter time. About 1,200 cubic yards of material has been used for filling up. This was obtained from excavations for new buildings adjacent to the Gardens, and topped off with street sweepings, the whole being supplied free of cost.

The fence alongside the pond on Alice street side will also be moved back to outside of bamboos, giving more room. The material for the new fence is in stock and the work will be put in hand shortly. The removal of all dead and small bamboo from the clumps on this side will also be put in hand, enabling a clearer view of ponds.

The roadway connecting the river road and George street walk has been tarred on surface of the steep slope. This is a great improvement, as previously heavy showers of rain washed out deep gutters on both sides. The lower portion towards the river bank has been raised at the low-lying part and the sides filled with soil. This was rendered necessary owing to the filling up of old cricket ground. Two extra flower beds
were formed on the newly filled area during the year and a fine display of dahlias was made during the summer months, particularly a large bed of seedling paeony dahlias grown from seed forwarded by Mr. J. Cronin, Curator, Botanic Gardens, Melbourne. These attracted a lot of attention and admiration from interested visitors.

## Liawns.

Paspalum dilatatum is still very much in evidence in the lawns; a good deal of cutting out and top-dressing has been done, and work in this direction is still going on. The street sweepings received from the City Council, when decayed and cleared of stones and rubbish, prove admirable top-dressing material.

## Garden Seats

These have been kept in repair by the addition of new battens where required, but they all require painting. This work is urgent and would add years of usefulness to the seats, besides the greatly improved appearance that would be given.

## Plant Naming.

The naming of plants is still being carried on, and a large number of the cast white metal name plates have been placed in position. They are a great improvement on those formerly used, and unless deliberately destroyed will last a lifetime. Most of the large trees have been dealt with. Where possible the common or vernacular name has been given in addition to the botanical or systematic one. Many plants have no common names; in these the natural order is added. Although these labels are fastened to the trees with strong No. 12 -gauge wire, I regret to report that some have been removed, by hoodlums, and probably thrown in the river.

## Grass Plots.

The grasses planted last season did very well and a number were distributed, chiefly the Elephant and the KikфuyW grasses. The former is very strong in growth, from 10 ft . to 15 ft . if allowed. When cut down the new growth provides a lot of succulent feed. The Kikouya received from South Africa by the Director of Agriculture promises very well, it being very quick in growth, of a trailing habit, producing large quantities of excellent feed. So far it has not seeded, but it is easy of propagation from runners. Seeds of five grasses received by the Principal of the Agricultural College, Gatton, were also handed to me for trial, and two of them promise well. I am indebted also to the Department of Agriculture of New South Wales for nine grasses and clovers, that will be tried during the coming season. Assistance was given to the Royal National Association by providing a number of grasses for experimental plots in the Exhibition grounds, but the work was undertaken rather late for this year's show. Twentyfive kinds were planted, some of which did very well. The Association proposes to provide a larger number of plots for next year's Exhibition, and they should prove of considerable interest and educational value to farmers and graziers.

## Plant Distribution.

As usual, a busy year has been experienced in the propagating department. The number of plants sent out shows a slight decrease, owing chiefly to the lesser number required by local authorities and country institutions for street, park, and memorial planting. Plants for State schools had a large increase. There were also far more schools supplied, owing probably to the good season experienced. Several schools received more than one consignment of plants, and as each application is counted as a separate school the number of schools given below is rather in excess of the actual individual number. Plants were distributed as follows:-415 State schools received 2,302 plants, other Government departments and institutions 877, local authorities 318 , churches, convents, and cemeteries 268 , progress associations 156 , hospitals 183 , botanie gardens 187, general exchanges 956. Total 5,247 (5,684 last year).

## Exchanges.

These have been well maintained. A large quantity of seeds of native plants was collected and despatched to correspondents abroad. In return we have received many seeds of a useful nature. I am indebted to correspondents for consignments of seeds from India, Java, Singapore, Japan, France, Egypt, South Africa, and Cuba. I desire to specially mention the fine collection of palm seeds received from time to time from the Director of Botanic Gardens, Buitenzorg, Batavia, and those from the Director of Singapore Botanic Gardens. Southern, local, and Queensland exchanges have also been well maintained, and I desire to record my thanks and appreciation of the assistance rendered.

## VISITORS.

The Gardens have been well patronised by local visitors throughout the year, and by many Southern and oversea visitors, chiefly during the winter months, many of whom were keenly interested in our collection of plants. A notable visitor was Professor E. H. Wilson, Assistant Director, Arnold Arboretum, Harvard University, Boston, U.S.A. Professor Wilson is one of the foremost botanical collectors of the world, and the author of many popular works dealing with the flora of China, Japan, Tibet, Formosa, and Corea. He was particularly interested in the trees of the Brisbane Botanic Gardens. His visit will, I feel sure, be of benefit, as he will be of great assistance in enlarging our correspondents abroad, by personally bringing our Gardens under the notice of the directors of the many gardens he will visit before returning to America.

## CORRESPONDENCE.

This has again been heavy. Numerous inquiries on horticultural subjects were dealt with, and those dealing with the requirements and despatch of plants amount to a very large number of letters outwards.

## Electric Lighting of Gardens.

The lighting system worked satisfactorily during the year. The storm at end of October broke two iron poles and injured two others. This was owing to these particular lamps being
served with overhead wires, that were struck with large branches of trees blown against them. In each case the pole snapped off where it had been screwed into the reducing socket. They were repaired and re-erected soon afterwards. Several lamps were also broken, but the whole damage was comparatively slight. Three new lamps of 100 c.p. were erected between the office and the kiosk, near the University fence. This lights up what was a very dark corner. Three lights were also installed in the office and herbarium, and a number in the cottage. They have proved a great convenience both to office and cottage. The work was carried out by J. Chalk, electrician in charge, assisted by a member of the Gardens staff, at cost of the material necessary. The Gardens were opened for eight nights during Exhibition week for the benefit of country visitors, and from the first Sunday in October until the end of June on Saturday and Sunday nights. The attendance on week nights was again very small, only about 20 to 30 being present, but large crowds attend on Sunday nights during the warm weather.

## Band Concerts.

Band concerts have been held regularly throughout the year on Sunday afternoons, and on Sunday nights when the Gardens are open. They are undoubtedly popular, as large crowds assemble on Sunday afternoons and evenings during the warm weather. In May at night concerts there is a noticeable falling off of the attendance owing to the cooler nights and the wet grass caused by heavy dews. Vocal solos have been introduced by some of the bands, and judging by the applause they are very popular items.

## Zoological Collection.

The collection has not received many additions during the year, and we had the misfortune to lose both peacocks, one through an argument with an emu and the other with a cassowary. Both casualties occurred during the moulting season. Peacocks at this time appear to be particularly quarrelsome and aggressive. The old cassowary laid two eggs that were secured sound and handed over to the Queensland Museum. All eggs laid previously were broken by the bird. Several wallabies, two kangaroos, and some waterfowl were received as gifts, and I desire to thank the donors of same.

Domain.
The sports ground has been largely used during the football season. Many clubs use it during the week for training purposes and for matches on Saturdays, in the morning by junior school teams and in the afternoons by senior teams. The wicket laid down by the Government Printing Office Cricket Club was again used by them during the cricket season, and the University Cricket Club made use of a practice wicket.

## Children's Playground.

The children's playground is still largely patronised during week ends and school holidays. Some vandalism has taken place by the destruction of three trees that were planted outside the fence. The damage done was of a nature that could hardly be accomplished by children.

## E. W. BICK,

Curator.

## INDEX

## REPORT OF THE REGISTRAR-GENERAL ON LIVE STOCK FOR THE YEAR 1920.






## REPORT OF THE REGISTRAR-GENERAL ON LIVE STOCK FOR THE YEAR 1920.

## LIVE STOCK.

A.


A $a$.
Showing the Number of Horbes, Catrle, Sheep, and Swime in the Stath-Return for Ten Years.

| Year. |  |  |  |  | Horsos. | Oattle. | Sheep. | swine. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1911 |  |  |  | ... | 618,954 | 5,073,201 | 20,740,981 | 173,902 |
| 1912 | $\ldots$ | $\ldots$.... | $\ldots$ | $\ldots$ | 674,573 | 5,210,891 | 20,310,036 | 143,695 |
| 1913 | $\ldots$ | ... ... | ... | ... | 707,265 | 5,3こ2,033 | 21,786,600 | 140,045 |
| 1914 | ... |  | ... | ... | 743,059 | 5,455,943 | 23,129,919 | 166,638 |
| 1915 | ... | .. |  | ... | 686,871 | 4,780,893 | 15,950,154 | 117,787 |
| 1916 | ... |  |  |  | 697,517 | 4,765,657 | 15,524,293 | 129,733 |
| 1917 | ... |  |  |  | 733,014 | 5,316,558 | 17,204,268 | 172,699 |
| 1918 | ... | $\cdots$ | $\ldots$ | $\ldots$ | 759,726 | 5,786,744 | 18,220,985 | 140,966 |
| 1919 | ... | ... ... | ... | $\ldots$ | 731,705 | 5,940,433 | 17,379,332 | 99,593 |
| 1920 |  |  |  | $\ldots$ | 742,217 | 6,455,067 | 17,404,840 | 104,370 |

$A$ b.


[^2]Ac.
In Convertine Horses and Cattle to Terms of Sheep, Ten Head of Sheep are Taken as Equal to One
Horse or Head of Catip


The following table shows, from the latest information available, the live stock density in various

## countries:-



A d.
Aetura showing Number of Hories, Cattlis, Sheep, and Swine in the Southern, Oentral, and Northbren
Drvisions of the State for the Year 1920 .


Hовงะ.
A ${ }^{\circ}$.


A f.


Cattle.
A g .
Sizes of Herds of Cattle.

| 1 to 100. |  | 101 to 300. |  | 301 to 1,000. |  | 1,001 and Upwards. |  | Totals. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Owners. | Cattle. | Owners. | Cattle. | Owners. | Cattle. | Owners. | Cattle. | -owners. | Cattie. |
| 39,203 | 1,107,774 | 4,431 | 741,056 | 1,682 | 888,702 | 916 | 3,717,035 | 46,232 | 6,455,067 |

N.B.--For details of Sizes of Herds of Cattle in Pastoral Distriets, see Appendix Table No. V

A h.


Senemp.
A j.

| 1 to 500. |  | 501 to 1,000. |  | 1,001 to 2,000 . |  | 2,001 to 5,000 . |  | 5,001 to 10,000 . |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| owners. | Sheep. | Owners. | Sheep. | Owners. | Sheep. |  |  |  |  |
|  |  |  |  |  |  | Owners. | Sheep. | Owners. | Sheep. |
| 1,934 | 199,542 | 371 | 251,689 | 390 | 574,129 | 571 | 1,825,882 | 35 |  |
| 10,001 to 20,000 . |  | 20,001 to 50,000 , |  | 50,001 to 100,000 . |  | 100,001 and Upwards. |  | Totals. |  |
| Owners. | Sheop. | Owners. | Sheep. |  |  |  |  |  |  |  |
|  |  | (wners. |  | Owners. | Sheep. | Owners. | Sheep. | Owners: | Sheep. |
| 198 | 2,841,774 | 159 | 4,884,2 24 | 46 | 3,215,847 | 9 | 1,056,869 | 4,036 | 17,404,840 |



A 1.


> A m.

Exported, less number imported alive Oreruea


[^3]An.


* Interstate Coastwise Traffic no longer available.

A 0.

| Kind of Establishment. | Number. | Number of Hands Employed. | Value of Machinery and Plant. | Value of Land and Premises. | Value of Output. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Bacon Curing | 6 | 402 | $\stackrel{\mathfrak{E}}{60,627}$ | $\begin{gathered} \underset{101,431}{\mathbb{E}} \end{gathered}$ | $\stackrel{\underset{\sim}{2}}{1,257,556}$ |
| Meat Preserving | 13 | 3,378 | 852,731 | 1,467,101 | 3,983,767 |
| Totels | 19 | 3,780 | 913,358 | 1,568,532 | 5,241,323 |

A p.


## W00E.

| Production of Wool. | 1911. | 1912. | 1913: | 1914. | 1915. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Number of sheep shorn | 20,037,491 | 19,969,378 | 20,289,124 | $22,059,015$ | 19,558,810 |
| Result off Shears only, 1b. netGreasy wool | 92,698,078 | 89,390,788 | 106,570,719 | 114,585,709 | 89,231,347 |
| Scoured wool ... . $\therefore$ | 21,051,636 | 19,816,854 | 19,699,752 | 17,159,546 | 17,671,445 |
| Above expressed as "Greasy" | 134,801,350 | 129,02 $\downarrow, 496$ | 145,971,861 | 148,904,801. | 124,574,237 |
| Average weight, lb.Per Greasy bale .. | 360 | 367 | 362 | 361 | 357 |
| Per Scoured bale | 232 | 226 | 227 | 224 | 219 |
| Per Fleece in the Grease | 6.73 | 6.46 | $7 \cdot 19$ | 6.75 | 6.37 |
| Total wool production (Greasy), including quantity fellmongered, exported on skins, and utilized Ib . | 142.882,269 | 136,878,270 | 154,183,114 | 155,478,740 | 130,788,977 |
| * Estimated value of production | £5,580,000 | $£ 5,561,000$ | $£ 6,296,000$ | $£ 6,707,000$ | £5,122,000 |
| Production of Wool. | 1916. | 1917. | 1918. | 1919. | 1920. |
| Number of sheep shorn | 13,798,462 | 11,920,074 | 17,290,116 | $17,210,372$ | 15,709,426 |
| Result off Shears only, 1b, net Greasy wool | $67,114,101$ | 67,772,382 | 83,997,850 | 88,450,759 | 89,215,429 |
| Scoured wool | 14,717,559 | 7,310,368 | 12,475,776 | 12,476,486 | 10,648,967 |
| Above expressed as "Greasy" | 96,549,219 | 82,393,118 | 108,949,402 | 113,403,731 | $110,513,363$ |
| Average weight, lb . Per Greasy bale | 365 | 365 | 353 | 356 | 368 |
| Per Scoured bale | 238 | 239 | 235 | 226 | 235 |
| Per Fleece in the Grease | $7 \cdot 00$ | 6.91 | $6 \cdot 30$ | 659 | 7.03 |
| Total wool production (Greasy), including quantity fellmongered, exported on skins, and utilized lb. | 102,220,125 | 87,425,558 | 113, \% \% ${ }^{\text {\% }}$, 2\%2 | 118,035,461 | 114,809,968 |
| *Estimated value of production | £4,898,000 | £5, 646,317 | $£ 8,177,741$ | $£ 8,606,747$ | £8,371, 660 |

* Based on Oversea Export value.

Ar.

| Average Export Price of Wool. | 1911.* | 1912.* | 1913.* | 1914.* | 1915.** | 1916.* | 1917.* | 1918.* | 1919.* | 1920.* |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Greasy wool Scoured wool | $\begin{aligned} & \text { Per lb. } \\ & 9 \frac{2}{5} \mathrm{~d} \\ & 16 \frac{4}{5} \mathrm{~d} . \end{aligned}$ | $\begin{aligned} & \text { Per } 1 \mathrm{bb}, \\ & 9 \frac{3}{4} \mathrm{~d} . \\ & 18 \frac{1}{4} \mathrm{~d} . \end{aligned}$ | $\begin{aligned} & \text { Perib. } \\ & 9 \frac{1}{2} \mathrm{~d} . \\ & 18 \frac{1}{2} \mathrm{~d} . \end{aligned}$ | Per 1 h. $10 \frac{1}{2} \mathrm{~d}$. 19 d. | $\begin{array}{r} \text { Per } 1 \mathrm{~b} . \\ 9{ }_{5}^{2} \mathrm{~d} . \\ 18_{5}^{1} \mathrm{~d} . \end{array}$ | $\begin{aligned} & \text { Per } 1 \mathrm{~b} . \\ & 11 \frac{1}{2} \mathrm{~d} . \\ & 20 \frac{3}{4} \mathrm{~d} . \end{aligned}$ | $\begin{aligned} & \text { Per } 1 \mathrm{~b} \text {. } \\ & 15 \frac{1}{2} \mathrm{~d} \text {. } \\ & 28 \frac{1}{2} \mathrm{l} \end{aligned}$ | Per ib. $17 \frac{1}{4} \mathrm{~d}$. 27 d . | Per Ib $17 \frac{1}{2} \mathrm{~d}$. 28 d . | $\begin{aligned} & \text { Per } 1 \mathrm{~b} . \\ & 17 \frac{1}{2} \mathrm{~d} . \end{aligned}$ $29 \frac{1}{4} \mathrm{~d} .$ |


| Exports of Wool. |  | Quantity. |  |  | valies. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Interstate. | Oversen. | Total. | Interstate. | Oversea. | Total |
| Greasy | $\left\{\begin{array}{l}1915-1916 \ldots \\ 1916-1917 \\ 1917-1918 \\ 1918-1919 \\ 1919-1920\end{array}\right.$ | Lb. gross. | Lb. gross. 52,620,768 | Lb. gross. | ${ }_{*}^{*}$ | 2,511.322 | $\varepsilon$. |
|  |  | * | 51,906,001 | * | * | 3,382,793 | * |
|  |  | * | -36,666,969 | * | * | 2,529,684 | * |
|  |  | * | 92,835,718 | * | * | $4,14,183$ $6,730,813$ | * |
| Scoured | $\left\{\begin{array}{l}1915-1916 \ldots \\ 1916-1917 \\ 1917-1918 \\ 1918-1919 \\ 1919-1920\end{array}\right.$ | * | 16,268,471 | * | * | 1,410,708 | * |
|  |  | \% | 16,901,805 | * |  | 2,019,060 | * |
|  |  | * | 8,972,507 | , | * | 1,011,748 | , |
|  |  |  | 20,019,683 | * | * | 2,651,034 | * |

[^4]At.

| Quantity Wool used in Manufacture. | 1911. | 1912. | 1913. | 1914. | 1915. | 1916. | 1917. | 1918. | 1818. | 1920. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 3 coured wool | $\stackrel{\text { Lb. }}{168,243}$ | $\stackrel{\mathrm{Lb}}{\mathrm{Lb}}$ | $\left\lvert\, \begin{gathered} \mathrm{Lb} . \\ 203,415 \end{gathered}\right.$ | $\begin{gathered} \text { Ib. } \\ 160,449 \end{gathered}$ | $\frac{\text { Lb. }}{202,262}$ | $\frac{\mathrm{Lb} .}{241,600}$ | $\stackrel{\mathrm{Lb},}{223,695}$ | $\stackrel{\text { Lb. }}{262,393}$ | $\left\lvert\, \begin{gathered} \text { Lb. } \\ 122,814 \end{gathered}\right.$ | ${\underset{268,787}{\mathrm{Lb}}}^{2}$ |

A.

Exports Ofersea, Qumensland.

A. v .

Exports Oversea, Queensland.


* Exclusive of Bacon, Ponltry, \&ece, these being treated as products of Agriculture.


Angora Goats.
Ax.


Camers.

|  |  | A y. |  |  |  |  |  |  |
| ---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | ---: |
| Year. |  | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 1,023 |  |
| 1911 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 888 |  |
| 1912 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 751 |  |
| 1913 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 977 |  |
| 1914 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 855 |  |
| 1915 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 829 |  |
| 1916 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 874 |  |
| 1917 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 660 |  |
| 1918 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 379 |  |
| 1919 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 740 |  |

## Ostricues.

A z .

| Year. |  |  |  |  | Number. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1911 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 31 |
| 1912 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 35 |
| 1913 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 29 |
| 1914 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 32 |
| 1915 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 24 |
| 1916 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 18 |
| 1917 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 15 |
| 1918 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 3 |
| 1919 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 5 |
| 1020 |  |  |  |  |  |  | 1 |

## Mules.

Aza.

| Year. |  | Aza. |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | ---: |
| 1911 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 801 |
| 1912 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 742 |
| 1913 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 703 |
| 1914 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 800 |
| 1915 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 873 |
| 1916 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 1,009 |
| 1917 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 1,037 |
| 1918 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 1,094 |
| 1919 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 1,379 |
| 1920 | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 1,175 |

Number of Calives Returned as Branded.
$A z b$.


Table No. I.
Return of thi Numbzr of Horsys, Oattle, Sherp, and Swine in the various Petty Sessions Distrions of the State, together


Table No. I.-continued.


Table No. II.
Number of Calves Remurned as Brandid during the Year 1920.


Table No. III.
Return of the Number of Horses, Cattle, Sheep, and Swine in the various Pastoral Districts of the State for the Years 1919 and 1920, together with the Numerical and Centestmal Inorease or Decrease in the Latter Year.


## Table No. IV.

DISTRIBUTION OF LIVE STOCK IN THE STATE-RETURN FOR TEN YEARS.
(In Converting Horske and Cattle to Thrms of Shebp, Ten Huad of Shemp are Taken as Equal to One Horse or Head of Cattib.)

| Year. | Horsms. |  |  | Cattle. |  |  | Sheep. |  |  | Ait Kinds in Terms of Shekr |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Acres per Hend. |  | $\begin{gathered} \text { Number } \\ \text { per Capita } \\ \text { Popula- } \\ \text { tion. } \end{gathered}$ | $\begin{aligned} & \text { Acres } \\ & \text { per } \\ & \text { Head. } \end{aligned}$ |  | Number per Capita Population. | Acres per Head. |  | Number per Capita Yopulation. | Acres per Head. |  | Number per Capita PopulaPopula tion. |
| 1911 | 693 | 0.92 | $0 \cdot 99$ | 85 | 7.75 | $8 \cdot 15$ | 21 | 30.93 | 33.34 | 5.53 | 115.83 |  |
| 1912 | 636 | 1.01 | $1 \cdot 06$ | 82 | $7 \cdot 77$ | $8 \cdot 19$ | 21 | $30 \cdot 29$ | 31.91 | $5 \cdot 42$ | 118.07 | $124 \cdot 39$ |
| 1913. | 607 | $1 \cdot 05$ | 1.07 | 81 | $7 \cdot 94$ | 8.06 | 20 | 32-49 | $33 \cdot 00$ | $5 \cdot 23$ | $122 \cdot 42$ | $124 \cdot 33$ |
| 1914. | 577 | 1.11 | $1 \cdot 10$ | 79 | $8 \cdot 14$ | 8.06 | 19 | 34:50 | $34 \cdot 18$ | $5 \cdot 04$ | 126.95 | 125.79 |
| 1915... | 625 | 1.02 | $1 \cdot 00$ | 90 | $7 \cdot 13$ | $6 \cdot 96$ | 27 | $23 \cdot 79$ | $23 \cdot 22$ | 6.08 | $105 \cdot 34$ | $102 \cdot 80$ |
| 1916... | 615 | 1.04 | 1.04 | 90 | $7 \cdot 11$ | $7 \cdot 12$ | 28 | $23 \cdot 15$ | $23 \cdot 19$ | $6 \cdot 12$ | 104.63 | 104:78 |
| 1917... | 585 | 1.09 | 1.06 | 81 | $7 \cdot 92$ | $7 \cdot 72$ | , 25 | 25.66 | $24 \cdot 99$ | $5 \cdot 52$ | 115.88 | 112.85 |
| 1918... | 565 | $1 \cdot 13$ | 1.09 | 74 | $8 \cdot 63$ | $8 \cdot 33$ | 24 | $27 \cdot 17$ | 26.24 | $5 \cdot 13$ | 124•81 | 120.51 |
| 1919... | 586 | 1.09 | 1.01 | 72 | $8 \cdot 86$ | $8 \cdot 20$ | 25 | 25.92 | 23.96 | $5 \cdot 10$ | $125 \cdot 43$ | $115 \cdot 97$ |
| 1920... | 578 | 1.11 | 1.01 | 66 | $9 \cdot 63$ | 8.74 | 25 | $25 \cdot 96$ | 23.57 | $4 \cdot 80$ | $133 \cdot 30$ | 121.04 |

lationsoter

Table No. V.
Showing Sizes and Distribution of Hreds of Cattle in Pastoral Districts.


Pastoral and Petty Sessions Districts.

Showing Sizes and Distribution of Flocks of Shege in Pastoral Districts.

Table No. VII.


## Table No. VIII.



Table No. X.
Return showing Number of Sheep Shorn and Quantity of Wool Produced, together with the Classification of Sheep and Valde of Machinery on Holdinge for the Year ended 31st December, 1920


Table No. XI.
Refurn showing the Results of Lambing, Losses, Killed for Food on Holdings, \&C., in the severat
Pastoral Distriots of the State for the Year 1920.


## Canses included in "Other"-

a Bogged, cancer, crows, eaglehawks, killed for baits, missing, a
b Eaglehawiss, foxes, poisonous weed, snakebite, worms;
rain at shearing, poisonous weed, prickly-pear, strayed, tetanus, worms;
$d$ Cancer. killed for baits killed on railway line, poison, worms ; weeds, stolence, while droving:
e Missing, poisonous bish:
f Accident, dogs, eaglehawks, foxes, grass seed, missing, tetanus,
I Accident, blown on wheat, bogged. cancer, cold rain at shearing worms;
$I_{\text {Cancer, droving, eaglehawks, exposure after shearing, loxes, }}^{6}$
grass seed, hawks, killed for skins, missing, poisonous weed, tetanus, while droving, worms.
$i$ Cancer, foxes, hawks, poisonous weed, serub ticks, worms;
j Grass seeds, ticks, worms;
k. Spear grass, stolen, worms;
$l$ Eaglehawks, poisoned, stolen:
$m$ Accident, cancer, -eaglehawks, foxes, heavy raiu at shearing
killed for baits, killed for skin=
$n$ Scrub ticks, worms.

## REPORT OF THE REGISTRAR-GENERAL ON AGRICULTURAL PRODUCTION FOR THE YEAR 1920.

## DAIRYING

B.

Table Showing the Progress of the Datrying Industry since the Year 1909.


* Estimated.

B a.
Details of the Princtpal Datrying Divisions for the Year 1920.

$b 1,086,429$ gallons of this were sent from the Moreton Division to New South Wales.
a 881,62 gallo's of this were sent from the Moreton Division to New South Wales.
a 821,162 gallo-s of this were sent from the Moreton Division to New South Wales.
B b.
BUTTER
Quantity Exported for Five Years.


[^5]
CONDENSED MILK MANUFACTURED.
1916 1917

584,272
$9,40.4,059$
$9,4,09,059$
$6,845,610$
$\begin{array}{llllllllll}1918 & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & 6,845,610 \\ 1919 & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & 9,170,034\end{array}$
192
$13,362,464$
POULTRY.
Bd.
Detalls Respeoting Principal Districts, 1920


N,B,-Brisbane (B) refers to South Brisbane,

## APIARIES

Be.

N.B.-Brisbane (B) refers to South Brishane
C.

Return showing Progress of Holdings and Area Cultivated.--Return for 10 Years.

| Year. | Number of Holdings Returned. | Increase per cent. on Previous Yıar. | Increase per cent. on Figures of 1904. | Area under culti- vation. | Increase per cent. on Previous Year. | Increase per cent. on Figures for 1914. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1911 ... | 22,276 | $1 \cdot 1$ | $24 \cdot 8$ | 779,800 | $-189$ | $34 \cdot 94$ |
| 1912 ... | 22,976 | $3 \cdot 1$ | 28.7 | 814,420 | 8.29 | 46•12 |
| 1913 | 23,472 | $2 \cdot 2$ | 31.5 | 920,010 | 8.95 | $59 \cdot 20$ |
| 1914 ... | 24,553 | 4.6 | 37.5 | 981,218 | $6 \cdot 65$ | 69.79 |
| 1915 ... | 24,828 | $1 \cdot 11$ | 39.06 | 1,059,401 | $7 \cdot 97$ | $83 \cdot 32$ |
| 1916 ... | 25,713 | 356 | 44.02 | 1,077,342 | 1.69 | $86 \cdot 42$ |
| 1917 ... | 25,872 | $0 \cdot 62$ | $44 \cdot 91$ | 998,036 | $-7.36$ | 72.70 |
| 1918 ... | 26,011 | $0 \cdot 65$ | 45.86 | 982,066 | $-1.60$ | 69.94 |
| 1919 ... | 26,713 | 2.58 | $49 \cdot 62$ | 988,54.1 | 0.66 | 71.06 |
| 1920 ... | 26,921 | 0.78 | 50.78 | 1.018,444 | 3.02 | 76.23 |

C a.
Return showing Labour Employed and the Capital Invesied in Farming Machinery, Etc.


[^6]
## C b.

Summary of Land Treated for Cultivation, Etc., 192?.

|  | $\ldots$ |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |

* See Ce. for details of areas and owners.
C.

Land Selected Destined to become Freefold, -Return for 10 Years.


C d.
Value of Agricultural Crops.

|  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |

The minus sign ( - ) jndicates a decrease

Area under Cultivation.

N.B.-Brisbane (B) refers to south Brisbane.

See summary 0 b .
D.

Irrigation.-Return for 10 Years.


WHEAT (GRAIN).
Return for Ten Years.


Ea.
WHEAT.
Average Yield per Acre Each State.-Return for 10 Yfars.

|  |  |  | Average Produce per Acre-Bushels. |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | 1911. | 1812. | 1913. | 1911. | 1915. | 1916. | 1917. | 1918. | 1919. | 1920. | Mean for 10 Years ending 1920. |
| Queensland |  | .. | 6.6 | 1581 | $13 \% 34$ | $12 \cdot 48$ | 4.42 | $10 \cdot 81$ | $8 \cdot 10$ | $4 \cdot 83$ | 6.71 | 20.91 | $10 \cdot 40$ |
| New South Wales | $\ldots$ | $\ldots$ | $10 \cdot 6$ | 14.56 | 11.86 | 4.65 | 15.94 | 961 | 11.71 | 7.60 | $2 \cdot 96$ | $17 \cdot 19$ | $10 \cdot 67$ |
| Victoria ... . |  | .. | $9 \cdot 7$ | 12.5 | 12.81 | $1 \cdot 38$ | 15.90 | $16 \cdot 37$ | 1403 | 11.40 | 7.75 | $17 \cdot 19$ | 11.91 |
| South Australia Western Australia |  | .. | $9 \cdot 1$ | $10 \cdot 34$ | $7 \cdot 47$ | 1.41 | 12.46 | $16 \cdot 46$ | $12 \cdot 18$ | 10.49 | $7 \cdot 78$ | 15.82 | $10 \cdot 35$ |
| Tasmania ... ... |  | $\ldots$ | 7.1 18.8 | 11.56 24.99 | $12 \cdot 15$ | 1.91 16.10 | 10.52 | $10 \cdot 28$ | $7 \cdot 41$ | 77.72 | 10.77 | $9 \cdot 60$ | 8.91 |
|  | $\ldots$ |  | 188 | 24.99 | 18.97 | 16.10 | 2043 | 12.53 | 11 อ\% | 15.66 | 18.58 | $19 \cdot 00$ | $17 \cdot 66$ |

- Eb.

Wheat for Grain.-Return for Two Years.

E.

Table showing Quantity of Wheat Treated in Queensland, 1920.

| District. | $\begin{gathered} \text { Number } \\ \text { of } \\ \text { Establish } \\ \text { ments. } \end{gathered}$ | Numberof Hands ployed | Pairs of Stones. | Sets of Rollers. | Wheat Treated. | flocr made. |  | mfal made. |  | bran and pollard. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | Tons. | Value. | Tons. | Value. | Bushels. | Talue. |
| $\left.\begin{array}{l}\text { Metropolitan } \\ \text { Elsewhere }\end{array}\right\} 1920\{$ | $\left.{ }_{9}^{2}\right\}$ | 259 | Pairs. $7$ | Sets. 98 | $\begin{array}{r} \text { Bushels. } \\ 2,720,018 \end{array}$ | 54,383 | $\begin{gathered} \mathbf{e} \\ 1,118,314 \end{gathered}$ | 305 | ع 5,994 | 2,594,856 | $\begin{gathered} \mathcal{L} \\ 234, \check{2} 68 \end{gathered}$ |
| Total, 1919 | 10 | 259 | 7 | 80 | 2,443,413 | 49,360 | 653,715 | 263 | 3,391 | 2,002,992 | 190,566 |

> S114
> F.
> BARLEY.
> Showing how C op was Dealt with.



Fb.
BARLEY.
Result of Crop, Distinguishing between Malting and Other Varieties.


Fe.
MALT.
Quantity Mada and How Dealt With.- Ieeturn for 10 Years.

|  | Year. |  | Made from Imported Barley | Made from Queensland Barley. | Total Malt Made. | Beer (including Waste). | Malt used in Breweries as returned to Excise. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Bushels. | Bushels. | Bushels. | Gallons. | Bushels. |
| 1911 | $\ldots$.... | $\ldots$ |  | 155,087 | 155,087 | 6,375,228 | 208,766 |
| 1912 | ... ... | $\ldots$ | 197,160 | 4.735 | 201,895 | 6,809,405 | 224,852 |
| 1913 | ... ... | $\ldots$ | 65,830 | 85,769 | 151,599 | 6,248,304 | 203,564 |
| 1914 | $\ldots$ | .. | 46,545 | 73,398 | 119,943 | 6,2 24,462 | 194,031 |
| 1915 |  | $\ldots$ |  | 34,204 | 34,204 | 5,821,397 | 177,323 |
| 1916 |  | ... | 47,730 |  | 47.730 | 5,586,940 | 161,764 |
| 1917 | ... ... | $\ldots$ |  | 70,117 | 70,117 | 6,167,638 | 181,067 |
| 1918 | ... ... | $\ldots$ |  | 58,1:39 | 58.139 | 6,889,707 | 206.992 |
| 1919 | $\ldots$.... | $\ldots$ | 66,119 | 1.270 | 67,389 | 8,466,242 | 256,658 |
| 1920 | $\ldots$... | ... | 43,400 | 24,898 | 68,298 | 8,902,429 | 261,992 |

MAIZE.
Summary for Five Years.

| Year. |  |  |  |  |  |  |  | Grain. |  |  | Average per Acre. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  | Acres. |  | Bushels. | Bushels. |
| 1916 | ... | $\cdots$ | ... | ... | $\cdots$ | ... | $\ldots$ | 181,405 |  | 3,018,934 | 16.64 |
| 1917 | ... | ... | ... | ... | ... | ... | ... | 165,124 |  | 4,188,536 | $25 \cdot 37$ |
| 1918 | ... | ... | ... | $\ldots$ | $\ldots$ | ... | ... | 149,505 |  | 4,105,974 | $27 \cdot 46$ |
| 1919 | ... | ... |  | ... |  | ... | ... | 105,260 |  | 1,830,664 | $17 \cdot 39$ |
| 1920 | ... |  |  |  |  |  | ... | 115,805 |  | 2,012,864 | $17 \cdot 38$ |

Ga.
MAIZE (GRATN).
Production in Each Division of the State.

| Division or Group. |  |  |  |  | Acres. | Preduce. | Average. | Propurtion of Divisional Area to Total Area of Maize for Grain. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | Bushels. | Bushels. |  |
| Moreton | ... | $\ldots$ | . | $\ldots$ | 39,052 | 580,955 | 14.88 | $33: 72$ |
| Wide Bay ... | ... | ... | $\ldots$ | $\ldots$ | 35,327 | 400,371 | 11.33 | 30.18 |
| Port Curtis | $\ldots$ | ... | $\cdots$ | ... | 2,529 | 29,327 17,212 | 11.60 | $\stackrel{18}{ } 0$ |
| Edgecumbe | $\ldots$ | ... | ... | $\ldots$ | 814 | 17,212 | 21.14 | 1365 |
| Rockingham | $\ldots$ | $\ldots$ | $\cdots$ | $\ldots$ | 15,802 | 673,677 | 42.63 | 1365 0.05 |
| York Peninsula | $\ldots$ | ... | ... | $\ldots$ | 57 101 | 1,226 360 | $\begin{array}{r} 21.51 \\ 3.56 \end{array}$ | 0.09 |
| Carpentaria | $\cdots$ | ... | ... |  | 101 |  |  | $0 \cdot 09$ |
| Central Western | ... | :.. | $\ldots$ |  | ... | ... | ... | ... |
| South Western | $\ldots$ | ... | ... | ... |  |  |  | $0 \cdot 04$ |
| $\begin{array}{ll}\text { Central } \\ \text { Maranoa } & \text {... }\end{array}$ | ... |  | $\ldots$ | $\ldots$ | 255 | 2,694 | 10.56 | $0 \cdot 22$ |
| Downs |  |  |  | $\ldots$ | 21,823 | 306,533 | 14.05 | 18.84 |
| Total | ... | ... | ... | .. | 115,805 | 2,012,864 | $17 \cdot 38$ | $100 \cdot 00$ |

Gb.
MAIZE.
Area and Produce in Eagh Principal Distriot for Two Yiears.

H.

OATS.
Table showing how Crop was Dealt with for Five Years,


Ha.
OATS.
Result of the Grain Crop for Two Years.

J.

RYE.
Area and Produce of the Grain Crop for Five Years,


## J a.

## POTATOES

Area and Yield for Five Years.
Potatoes (English).

| Potatoes (English). |  |  |  |
| :---: | :---: | :---: | :---: |
| 1916 | 8,908 | Tons: | Value. |
| 1917 | 10,738 | 19,457 | £218,891 |
| 1918 | 6,434 | 22,139 | £196,484 |
| 1919 | 4,432 | 11,083 | £102,241 |
| 1920 | 8,770 | 7,844 19,068 | £183,942 |
|  | 8,70 | 19,068 | £329,876 |

K.

COTTON
Result for the Past Two Years.

4.

SUGAR.
Number of Plantations, Etc.

I. a.

Summary for Five Years


The consumption per capita is estimated at 133 lb . of raw sugar
Lb.
Percentages of Yields for Five Years.


Le.
Details of Crops, Each Division, 1920.

| Division and District. | Area for Plants. | Area Stand-over or Unproductive. | $\begin{aligned} & \text { Area } \\ & \text { Crushed for } \\ & \text { Sugar. } \end{aligned}$ | Total Area for sugar. | Weight of | $\underset{94 \text { N.T }}{\text { Sugar, }}$ | Molasses Returned. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rockingham and York PeninsulaCairns and Douglas Ingham and Mourilyan.. | $\begin{gathered} \text { Acres. } \\ 809 \\ 1,660 \end{gathered}$ | $\begin{gathered} \text { Acres. } \\ 4,979 \\ 10,169 \end{gathered}$ | $\begin{aligned} & \text { Acres. } \\ & 18,835 \\ & 24,284 \end{aligned}$ | $\begin{gathered} \text { Acres. } \\ 24,623 \\ 36,113 \end{gathered}$ | Tons. <br> 340,202 <br> 463,181 | Tons. <br> 40,854 <br> 60,011 | Gallons. $1,698,700$ $2,143,465$ |
| Tntal | 2,469 | 15,148 | 43,119 | 60,736 | 803,383 | 100,865 | 3,842,165 |
| Edgecumbe- <br> Ayr and Townsville Proserpine and Bowen Mackay | $\begin{array}{r} 896 \\ 106 \\ 1,282 \end{array}$ | $\begin{array}{r} 10,277 \\ 1,961 \\ 17,417 \end{array}$ | $\begin{array}{r} 9,178 \\ 2,831 \\ 21,390 \end{array}$ | $\begin{array}{r} 20,351 \\ 4,898 \\ 40,089 \end{array}$ | $\begin{array}{r} 161,701 \\ 32,609 \\ 209,559 \end{array}$ | $\begin{array}{r} 22,859 \\ 4,171 \\ 25,947 \end{array}$ | $\begin{array}{r} 446,700 \\ 147,500 \\ 1,030,420 \end{array}$ |
| Total | 2,284 | 29,655 | 33,399 | 65,338 | 403,869 | 52,970 | 1,624,620 |
| Wide Bay- <br> Bundaberg, Gin Gin, \&c. <br> Bigzenden, Childers, Maryborough, Tiaro,* \&c. <br> Gympie* | 403 251 | $\begin{array}{r} 13,049 \\ 8,645 \\ 25 \end{array}$ | 6,341 5,051 2 | $\begin{array}{r} 19,793 \\ 13,9 \cdot 4 \\ 27 \end{array}$ | $\begin{array}{r} 62,093 \\ 46,945 \\ 22 \end{array}$ | 6,730 4,466 | 280,160 268,902 |
| Total | 654 | 21,719 | 11,394 | 33,767 | 109,060 | 11,196 | 549,062 |
| Port CurtisGladstone ... St Lawrence $\dagger$ | 10 | $\begin{aligned} & 10 \\ & 31 \end{aligned}$ | 42 | $\begin{aligned} & 10 \\ & 83 \end{aligned}$ | 896 | $\ldots$ | $\ldots$ |
| Moreton- <br> Logan Marburg Maroochy, \&c. | 4 20 | $\begin{array}{r} 299 \\ 47 \\ 1,127 \end{array}$ | $\begin{array}{r} 263 \\ 4 \\ 921 \end{array}$ | $\begin{array}{r} 566 \\ 51 \\ 2,068 \end{array}$ | $\begin{array}{r} 5,547 \\ 11 \\ 16,689 \end{array}$ | $\begin{array}{r}5: 32 \\ \ldots \\ \hline 1,838\end{array}$ | 14,400 145,620 |
| Total | 24 | 1,473 | 1,188 | 2,685 | 22,247 | 2,370 | 160,020 |
| Total of State | 5,441 | 68,035 | 89,142 | $\ddagger 162,6: 9$ | 1,339,455 | 167,401 | 6,175, 867 |

[^7]I. d.

Sugar Averages, 1920.

| Divisions or Groups and Districts. | Tons of Cane per Acre Orushed. | Tons of Sugar per Acre Crushed. | Tons of Cane per Ton of Sugar. |
| :---: | :---: | :---: | :---: |
|  |  |  |  |
| Cairns and Douglas <br> Ingham and Mourilyan | 18.06 |  |  |
| - ... ... ... ... | 19.07 | ${ }_{2} 47$ | 8.33 7.72 |
| Edgecumbe- <br> Ayr and Townsville | 18.63 | $2 \cdot 34$ | $7 \cdot 96$ |
| Ayr and Townsville <br> Bowen and Proserpine | $17 \cdot 62$ | $2 \cdot 49$ |  |
|  | 11.52 9.80 | $1 \cdot 47$ | 7.08 7.82 |
| Wide Bay- <br> Bundaberg, Gin Gin, \&c. ... <br> $\underset{\text { Gyignenden, }}{\substack{\text { Bigen }}}$ Gympie* | 12.09 | 1 |  |
|  |  | 1.58 | 7.64 |
|  | 979 9.99 11.00 | 1.06 0.88 | 9.23 |
|  |  | ... |  |
| Port Curtis- <br> Gladstone | $9 \cdot 57$ | 0.98 | 9.74 |
| St. Lawrence $\dagger$ | 21.33 |  | $\ldots$ |
| Moreton- ${ }^{\text {a }}$ |  |  |  |
|  | 21.09 2.75 | $2 \cdot 02$ | $10 \cdot 43$ |
| Maroochy, dc. ... ... | 18.12 | 1.99 | $9 \cdot 10$ |
| Total ... | 18.73 | 1•99 | $9 \cdot 40$ |
| , Total State | 15.03 |  |  |
| ファ. ${ }^{\text {a Crushed in Maroochy. }}$ |  |  |  |

Ire.
In Each Division of the State-Two Years,

| Division | area under cultivation. |  |  | PRODUCTION. |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1919. | 1920. | $\begin{aligned} & \text { Increase } \\ & \text { or } \\ & \text {-Deerease } \end{aligned}$ | 1919. |  | 1920. |  | $\begin{gathered} \text { Increase or } \\ \text { - Decrease in } 1920 . \end{gathered}$ |  |
|  |  |  |  | Area Crushed. | Sugar. | Area Orushed. | Sugar. | A rea Crushed. | Sugar. |
| Rockingham and York Peninsula | Acres. 60,048 | Acres. 60,736 | Acres, | Acres. | Tons. | Acres. | Tons. | Acres. |  |
| Edgecumbe ... ... ... | 57,423 | 60,736 65,338 | 688 7,915 | 41,680 32,737 | 101,351 | 43,119 | 100,865 | 1,439 | Tons. ${ }^{\text {a }}$ |
| Port Curtis* ... ... | ¢7, 82 | 65,838 93 | 7,915 11 | 32,737 17 | 51,688 | 33,399 | 52,970 | 662 | 1,282 |
| Wide Bay $\dagger$ | $28,490$ | 33,767 | 5,277 | 8,80? |  | 42 11.394 |  | ${ }^{25}$ |  |
| Moreton ... ... ... | $2,426$ | 32,685 | 5,277 259 | 8,809 1,634 | 5,651 3,446 | 11,394 1,188 | 11,196 | 2,585 | 5,545 |
| Total ... ... ... | 148,469 | 162,619 | 14,150 |  |  |  |  | 446 |  |
|  |  |  | 11,150 | 84,877 | 2,136 | 89,142 | 167,401 | 4,265 | 5,265 |

* Orushed in Edgecumbe.

The cane grown in Gympie was crushed in the Moreton Division.
If.
Percentages in Each Division of the State--Two Year?.


* Included in Edgecumbe.
$\mathrm{L} g$.
Prodution in Australia, 1920


Lh.
Mills in Queensland.


Now - In addition, 6 mills closed durng the year had machinery and plant valued at $£ 35,460$, and lan 1 and premises vaiued at $£ 5,033$.

## Li

Sugar Mills.

1. Number of Sugar Mill Companies to which advances have been made underThe Sugar Works Guarantee Acts
$\cdots \quad . . \quad . . \quad 13$
"The Sugar Workes Act of 1911 " (Babinda and Sonth Johnstone) ... ... ... 2
From Consolidated Revenue (North Et on and Racecourse) ... ... ... ... 2 From General Loan Fund
2. Number of Tramway Companies to which advances hare been made underThe Sugar Works Guarantee Acts (Double Peak)
... None
Under other conditions
... ... ... ...
3. Total amount of advances made to 31st December, 1920, under the Sugar Works Guarantee Acts-


Under "The Sugar Works Act of 1911"-
Babinda Mill ... ... ... ... ... ... .. ... $371,088 \quad 15$ 3
South Johnstone ... ... ... ... ... ... ... 547,525 0 9
From Consolidated Revenue-
North Eton Mill ... ... ... .. ... ... ... 26,000 0 0
$\begin{array}{lllllllllll}\text { Racecourse } & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & 26,000 & 0 \\ 0\end{array}$
From General Loan Fund-
North Eton Mill ... ... ... ... ... ... ... 62,965 18 4 4
$\begin{array}{lllllllllrl}\text { Mount Bauple } & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & 62,065 & 18 & 4 \\ \text { Min } & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & 8,500 & 0 & 0\end{array}$
Gin Gin ...
… $2,0,30 \quad 0 \quad 0$
$\begin{array}{llllllllllll}\text { Proserpine } & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & 17,765 & 9 & 4\end{array}$

Mossman
$119,653 \quad 18$
4. Indebtedness at 31st December, 1920, under the Sugar Works Guarantee Acts -

| Mount Bauple Mill | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 23,604 | 2 | 7 |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | ---: | ---: | ---: |
| Nerang Mill | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 30,973 | 14 | 10 |
| Gin Gin Mill | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 11,933 | 19 | 9 |
| Plane Creek Mill $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 4,197 | 16 | 4 |  |
| Proserpine Mill $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 15,171 | 7 | 9 |  |
| Mulgrave Mill $\ldots$. | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 9,243 | 14 | 5 |  |
| Isis Mill $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 3,516 | 0 | 5 |
| Mossman Mill | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 15,778 | 0 | 8 |
| Johnstone Mill | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 740 | 7 | 8 |
| North Eton Mill $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | $\ldots$ | 7,503 | 6 | 5 |  |

$122,664 \quad 1010$
'Under " The Sugar Works Act of 1911"-
Babinda Mill
... 346,429 $8 \quad 1$
South Johnstone
. $547,525 \quad 0 \quad 9$

Under Consolidated Revenue-North Eton Mill
Under General Loan Fund--
North Eton Mill
Mount Bauple Mill
Proserpine Mill
$\begin{array}{lll}\ldots & \ldots & \ldots \\ \ldots & \ldots & \ldots \\ \ldots & \cdots & \cdots\end{array}$
$893,954 \quad 810$
$\begin{array}{llllllllll}\text { Mossman Mill } & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & \ldots & 3,014 \\ 8 & 8 & 11\end{array}$
M.

ARROWROOT.
Districts where Cultivated and Produotion-Two Years.


Ma.
ARROWROOT.
Details of Manufacture.

N.

TOBACCO.
Districts where Cultivated and Yield-Two Years.

o.

COFFEE.
Districts where Culltivated and Yield - Two Yeare.

| Division and Petty SessionsDistrict. | Not Bearing. |  | Bearing. |  |  |  | Average per Acre (Bearing). |  |  | 1920. <br> ncrease or Decrease in Produce. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1919. | 1920. |  | 1919. |  | 1930. | 1919. | 1920. |  |  |
| MoretonMaroochy | Acres. <br> 3 | Acres. | Acres. | $\frac{\text { Lb. }}{\text { (Parchment.) }}$ 7,489 | Acres. $11$ | $\begin{gathered} \begin{array}{c} \text { Lb, } \\ \text { (Parchment.) } \\ 5,360 \end{array} \end{gathered}$ | Lb. $441$ | Lb. <br> 487 | Acres. $-6$ | $\begin{gathered} \text { Lb. } \\ -2,129 \end{gathered}$ |
| Wide Bu"Bundaberg Mary borough | 2 | $\ldots$ | 3 | 3,000 | 3 | 1,000 | 1,000 | 333 | $\ldots$ | $-\dddot{2,000}$ |
| Edgecumbe- <br> Mackay ... <br> Proserpine | 1 | 2 | 1 | 112 | 1 | 160 | 112 | 160 | $\ldots$ | 48 |
| Total Edgecumbe | 1 | 2 | 1 | 112 | 1 | 160 | 112 | 160 | ... | 48 |
| Rockinghum-Cairns A therton | $\ldots$ | 9 | 3 | 5,500 | $\cdots$ | 5,600 | 1,833 | 1,867 | ... | 100 |
| Total Rockingham ... | ... | 9 | 3 | 5,500 | 3 | 5,600 | 1,833 | 1,867 |  | 100 |
| Totals | 6 | 11 | 24 | 16,101 | 18 | 12,12) | 671 | 673 | -6 | - 3,981 |

Q.

VINES.
Summahy or Area and Yield-Two Years.

| Year. |  | vinetard. |  |  | Grapes Gathered. | Average per Acre (Berring). |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Acres Bearing. | Acres not Bearing. | Total. |  |  |
| 1919 | . | 1,096 | 107 | 1,203 | $\stackrel{\text { Lb. }}{\text { L. }}$ 2,194,320 | $\stackrel{\text { Lb. }}{\text { Lb }}$ |
| 1920 | ... | 1,110 | 146 | 1,256 | 2,566,815 | 2,312 |

Qa.
Details of Principal Districts-Two Years.

| Petty Sessions District. |  |  | area under vinfs. |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | 1919. |  |  | 1920. |  |  | $\begin{gathered} \text { Increase } \\ \text { or } \\ \text { Decrease-. } \end{gathered}$ |  | $\begin{gathered} 1920 . \\ \begin{array}{c} \text { Grapes } \\ \text { Gathered. } \end{array} \end{gathered}$ |
|  |  |  | Bearing. | $\begin{aligned} & \text { Not } \\ & \text { Bearing. } \end{aligned}$ | Total Area. | Bearing. | $\begin{aligned} & \text { Not } \\ & \text { Bearing. } \end{aligned}$ | Total Area. |  |  |  |
| Brisbane (A) |  |  | Acres. 283 | Acres. | Acres. 291 | Acres. $285$ | Acres. 13 | $\begin{gathered} \text { Acres. } \\ 298 \end{gathered}$ | Acres. 7 | $\begin{aligned} & \text { Lb. } \\ & 582,686 \end{aligned}$ | $\stackrel{{ }_{559}^{\mathrm{Lb}} .}{ }$ |
| Brisbane (B) |  | .. | 15 |  | 15 | 9 |  | 9 | -6 | 31,485 | 22,204 |
| Bundaberg | ... | ... | 13 |  | 13 | 13 |  | 13 |  | 8,949 | 9,984 |
| Clifton |  |  | 5 |  | 5 | 2 |  | 2 | - 3 | 3,824 | 4.626 |
| Gatton | $\ldots$ | $\ldots$ | 4 | 2 | 6 | 5 | 1 | 6 |  | 3,432 | 2,460 |
| Gympie | $\ldots$ | ... | 7 | 2 | 9 | 6 |  | 6 | -3 | 8.480 | 14,122 |
| Laidley | ... | ... | 5 |  | 5 | 3 | 1 | 4 | -1 | 7,851 | 1,400 |
| Logan |  | ... | 11 |  | 12 | 7 |  | 7 | - 5 | 22,700 | 19,040 |
| Lowood |  | .. | 90 | 1 | 91 | 75 | 7 | 82 | -9 | 244,030 | 140,700 |
| Marburg |  |  | 9 | ... | 9 | 9 | ... | 9 |  | 1,787 | 345 |
| Maryborough |  | ... | 25 | 4 | 29 | 16 | 6 | 22 | - 7 | 25,530 | 23,773 |
| Redcliffe |  | . | 4 | ... | 4 | 3 | 2 | 5 | 1 | 12,905 | 5.651 |
| Rockhampton |  | $\ldots$ | 22 | 1 | 23 | 21 | 1 | 22 | -1 | 27,731 | 37,526 |
| Roma |  | ... | 285 | 17 | 302 | 289 | 24 | 313 | 11 | 631,606 | 812,952 |
| Stanthorpe |  | ... | 117 | 63 | 180 | 138 | 80 | 218 | 38 | 244,235 | 409,456 |
| Toowuomba |  | ... | 29 | 1 | 30 | 27 | 1 | 28 | -2 | 45,57.3 | 45,146 |
| Warwick |  | $\ldots$ | 40 |  | 40 | 71 |  | 71 | 31 | 39,136 | 42,463 |
| Wynnum |  |  | 16 | 2 | 18 | 20 | 1 | 21 | 3 | 60.025 | 53,492 |
| All other Districts | $\ldots$ | $\ldots$ | 116 | 5 | 121 | 111 | 9 | 120 | - 1 | 192,355 | 362,200 |
| Totals |  |  | 1.096 | 107 | 1203 | 1.110 | 116 | 1256 | 53 | 2.194 .320 | 2,566,815 |

Qb.
VINES.


Makers, Wine Made, and Wine Spirit Distilled-Five Years.


N.B.-Brisbane (B) refers to Soutin Brisbane.
R.

BANANAS
Details in Principal Districts-Two Years.


R a.
BANANAS.
Yield per Acre in Principal Distriots.

S.

PINEAPPLES.
Details in Principal Distriots-Two Years.

N. B.-Brisbane (B) refers to South Brisbane.

## T.

ORANGES.
Details in Principal Distriots-Two Years


N,B.-Brisbane (B) refers to South Brisbane.

## U.

MANGOES.
Details in Prinotpal Districts-Two Years.

V.

STRAWBERRIES.
Details in Principal Districts-Two Years.

N.B.-Brisbane (B) refers to South Brisbane.
w.

APPLES.
Details in Principal Distriots-Two Years.

| Petty Sessions District. |
| :--- |

Wa.
OTHER FRUITS.

X.

OTHER VEGETABLES.
Return for Two Yeabs.

| Other Vegetubles. | 1919. |  | 1920. |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Acres. | Produce. | Acres. | Produce. |
| Pulse $\left\{\begin{array}{l}\text { Beans ... ... }\end{array}\right.$ | 56 | 1,238 bushels | 44 | 967 bushels |
| Pulse \{ Peas ... | 102 | 1,814 bushels | 45 | 1,620 bushels |
| Green $\left\{\begin{array}{l}\text { Beans ... } \\ \text { Peas }\end{array}\right.$ | 153 | 12,806 bushels | 268 | 21,466 bushels |
| Cabbages and Cauliflowers | 139 | 8,042 bushels | 244 | 15,909 bushels |
| Cucumbers ... ... | 145 | 147,390 dozen 49,244 dozen | 181 | 188,320 dozen |
| Onions ... | 194 | 3,618 cwt. | 290 | 24.952 cwt . |
| Tomatoes | 1,580 | 159,713 bushels | 2,154 | $220.04: 3$ bushels |
| Turnips ... | 236 | 1,415 tons | 256 | 1,216 tons |
| Carrots ... | 103 | 11,031 bushels | 3 | 121 cwt . |
| Marrows | 15 | 24 tons | 10 | 34 tons |

X a.
PRINCIPAL OTHER CROPS.
Return for Two Years.


X b.
PASTURAGE-FIVE YEARS.

Y.

HAY-TWO YEARS.


ARTIFICIALLY GROWN PASTURE-TWO YEARS.

| Perty Sessions District. |  |  |  |  |  | 1919. | 192. | Increase, 1920. | Decrese 192 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | Acres. | Acres. | Acres. | Acres. |
| Atherton | .. |  |  |  |  | 37,096 | 39,051 | 1,955 | - |
| Beaudesert | ... | $\ldots$ | ... | $\ldots$ | ... | 5,125 | 4,769 |  | 356 |
| Biggenden ... | ... | ... | ... | $\ldots$ | ... | 14,554. | 17,115 | 2,561 |  |
| Caboolture ... | ... | ... | ... |  |  | 1,293 |  |  | 1,293 |
| Dalby ... | ... | $\ldots$ | ... |  | $\ldots$ | 29,240 | 33,019 | 3,779 |  |
| Dugandan | ... | $\ldots$ | $\ldots$ |  | ... | 3,443 | 3,139 |  | 304 |
| Eidsvold | ... | ... | ... | ... | ... | 1,612 | 1,979 | 367 | ... |
| Esk | ... | ... | $\ldots$ | ... | ... | 2,258 | 2,941 | 683 |  |
| Gatton | ... | ... | ... |  | ... | 4,561 | 4,619 | 58 |  |
| Gayndah | ... | ... | ... |  | ... | 21,651 | 20,081 |  | 1,570 |
| Gladstone . ... | ... |  | ... |  | ... | 9,312 | 11,680 | 2,368 |  |
| Goondiwindi . | $\ldots$ | ... | $\ldots$ |  | ... | 7,414 | 628 |  | 6,786 |
| Gympie | ... |  | ... |  | $\ldots$ | 83,721 | 87,078 | 3,357 |  |
| Helidon | ... | ... | $\ldots$ |  | ... | 3,233 | 1,999 | ... | 1,234 |
| Maroochy | ... | ... | ... | ... | ... | 50,141 | 48,112 |  | 2.029 |
| Nanango ... | ... | ... | $\ldots$ |  | ... | 33.851 | 29,814 |  | 4,937 |
| Nerang ${ }^{\text {Pittsw }}$... | ... | ... | ... |  | ... | 22,240 | 22,372 | 132 |  |
| Pittsworth Redeliffe | $\cdots$ | ... | ... |  | $\ldots$ | 9,255 | 9,088 |  | 167 |
| Redcliffe ${ }_{\text {Rockhampton }}$... | . | ... |  |  | $\ldots$ | 1,431 | 1,049 |  | 382 |
| Rockhampton | $\ldots$ | ... |  |  | ... | 25,714 3,985 | 28,124 3,527 | 2,380 |  |
| Tiaro <br> Wienholt |  |  |  |  |  | 3,985 50,258 | 3,527 50,303 |  | 458 |
| Wienholt Woodford |  | $\ldots$ |  |  | ... | 50,258 10,387 | 50,303 11,013 |  | - |
| All other Districts | .. | $\ldots$ | $\ldots$ | ... | $\ldots$ | 10,387 17,214 | 11,013 19,280 | 626 2,066 | $\ldots$ |
| All other Districts | $\ldots$ | $\cdots$ | ... |  | $\cdots$ | 17,214 | 19,280 | 2,066 |  |
| Totals | ... | $\ldots$ |  | ... | $\ldots$ | 449,019 | 450,780 | 1,761 | ... |

Za.
ENSILAGE-TWO YEARS.

Table No. I.
Return Showing the Resolits of the Dairying Industay for the Year ended 31st Decrmber, 1920.

\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multirow[t]{2}{*}{District.} \& \multirow[t]{2}{*}{\[
\begin{gathered}
\text { Totul } \\
\text { Motalk } \\
\text { otained. }
\end{gathered}
\]} \& \multicolumn{7}{|l|}{How utiliski.} \& \multicolumn{3}{|l|}{establishanats.} \& \multicolumn{2}{|l|}{darry cattie.} \& \multicolumn{3}{|l|}{buttrr madr.} \& \multicolumn{3}{|l|}{chbeskr madr.} \\
\hline \& \& \(\underset{\substack{\text { For Butter } \\ \text { on Parms }}}{ }\) \& Yor Cheese \& \[
\left\lvert\, \begin{gathered}
\text { For } \\
\text { Domestic } \\
\text { Purposes by } \\
\text { Producer. }
\end{gathered}\right.
\] \& \({ }_{\text {Separated for }}^{\text {Sile. }}\) \& \[
\begin{gathered}
\text { Sola for } \\
\text { Corsump- } \\
\text { tion as } \\
\text { Milk. }
\end{gathered}
\] \& \[
\left\lvert\, \begin{gathered}
\text { Sold to od } \\
\text { Condensed } \\
\text { Milk } \\
\text { Factories. }
\end{gathered}\right.
\] \&  \& Dairying. \& \({ }_{\text {Buther }}^{\text {Buctories. }}\) \& Cheese
Factories. \& In Milk. \& Dry. \& \(\stackrel{\text { At }}{\text { Factories. }}\) \& \(\mathrm{c}_{\text {carmers. }}^{\text {By }}\) \& Total. \& \({ }_{\text {Factories. }}{ }^{\text {at }}\) \& \(\underset{\text { Farmers. }}{\text { By }}\) \& Total. \\
\hline \begin{tabular}{l}
Moreton. \\
Brisbane (A \\
Beaudesert \\
Caboolture \\
Coovar \\
Crow's Nes \\
Dugandan \\
Gatton \\
Goodna. \\
Helidon \\
Ipswich \\
Laidley : \\
\(\stackrel{\text { Logan }}{\text { Lowood }}\) \\
Marburg \\
Nerang \\
Rosewood \\
Southport
Woodford \\
Wynnum
\end{tabular} \&  \& \begin{tabular}{l}
Gallons. 24,571
100,308
1 16,651 \begin{tabular}{c}
33,201 \\
95,575 \\
\hline
\end{tabular} \(\underset{\substack{123,668 \\ 98,413}}{\substack{1,2, \\ \hline}}\) 104, 8,86 \\
 40,64 \begin{tabular}{c}
74,066 \\
91,165 \\
\hline 105
\end{tabular} \\
 \begin{tabular}{c}
188,720 \\
\(11,2,0\) \\
\hline
\end{tabular} \\
 \(\underset{\substack{2,880 \\ 7,591}}{\substack{8,188 \\ \hline}}\)
\end{tabular} \& Gallons. \& Gallons. 41,641 16,474 20,403
79,352 166,269
111,517 \(\begin{array}{r}130,247 \\ 31,984 \\ \hline\end{array}\) 73,131
51,734
48,587 88,177
97,527 \({ }_{39,704}^{56.115}\) 222,822
88,424
70,431 70,431
57,376
7 7,297
42,006
20,691 \& Gallons. 59,118 2,733,825 524,267
\(1,258,265\) \(2,800,858\)
\(-1,313414\)
\(2,285,916\) 44,824
\(2,028,527\) 1,659,178 2,384,254 911,385
\(1,036,843\) \(\begin{array}{r}3,008,930 \\ 3,765.178 \\ \hline\end{array}\) \(2,154,367\)
\(1,365,669\) 266,468
\(1,220,079\) \&  \& \begin{tabular}{l}
Gallons. \\
\(\ldots\) \\
\(\ldots\) \\
\(1,6{ }^{2} 0,384\) \(\qquad\) 10,380 \\
383,036 \(\qquad\)
\end{tabular} \& \begin{tabular}{l}
Gallons. \\
... \\
… \\
10.521 \\
5,689 \\
\({ }^{319,165}\) 48,886 52,150
\end{tabular} \&  \&  \& \[
\begin{aligned}
\& \cdots \\
\& 1 \\
\& \ldots \\
\& \cdots \\
\& \cdots \\
\& \cdots \\
\& \cdots \\
\& \cdots \\
\& \cdots \\
\& \cdots \\
\& \cdots \\
\& \cdots \\
\& 1 \\
\& \cdots \\
\& 1 \\
\& \cdots
\end{aligned}
\] \&  \&  \& \begin{tabular}{l}
Lb. \\
\(\underset{2,138,719}{1.291,704}\) \\
\(62 . .745\) \\
\(2.15 \cdot 105\) \\
\({ }_{1,280,724}^{3+24}\) \\
2,700.437 \\
995,182 \\
3,198,692 \\
32,000
935,087 \\
538,739 \\
519,821
\end{tabular} \&  \&  \& \begin{tabular}{l}
Lb \(\qquad\) \\
... \\
1,500 \(\qquad\)
\(\qquad\)
\(\qquad\)
\(\qquad\) 369500 64,747 46,950
\end{tabular} \& Lb. \& Lb.
\(\ldots\)
\(\ldots\)
\(\ldots\)
\(\ldots\)
\(\ldots\)
\(\ldots\)
1,500
\(\ldots\)
\(\ldots\)
\(\cdots\)
\(\ldots\)
\(\ldots\)
\(\ldots\)
369.500
1,800
61,747
46,959 \\
\hline Total Moreton \& 44,100,482 \& 1,677,755 \& 2,000 \& 2,02, 983 \& 34,966,832 \& 2,944,671 \& ,043,800 \& 412 \& 7,43 \& 16 \& 6 \& 134,271 \& 37,395 \& \(\underline{16,755,8}\) \& 737,72 \& 17,433,60 \& 482,697 \& 1,80 \& 484,4 \\
\hline \begin{tabular}{l}
Biggenden \\
Child rs \\
Eidsvold \\
Gayndah
Gin Gin \\
Gympie .. \\
Maryborough \\
Mount Perry \\
Tanang \\
Wienholt
\end{tabular} \&  \&  \& 500 \&  \&  \&  \&  \& \begin{tabular}{l}
… \\
357,303 \\
\begin{tabular}{l}
.... \\
\(\ldots\) \\
\hline\(\ldots\)
\end{tabular} \\
146,635 \\
24,655
\end{tabular} \&  \& \[
\begin{aligned}
\& { }_{1}^{1} \\
\& \cdots \cdots \\
\& \cdots{ }_{2}^{2} \\
\& \cdots{ }^{1} \\
\& \cdots 1_{1} \\
\& \cdots{ }_{2}^{1} \\
\& \hline
\end{aligned}
\] \&  \&  \&  \& \(\begin{array}{r}716,730 \\ \delta 54,342 \\ 0 \\ 1,069,072 \\ 4,109,760 \\ 824,078 \\ 2,187,063 \\ 1,976,096 \\ \hline\end{array}\) \&  \&  \& \begin{tabular}{l}
161,803 \\
348,711 \\
… \\
103,100 \\
29,405
\end{tabular} \& 500 \& \begin{tabular}{l}
161,803 \\
348,711 \\
\(\ldots\)
\(\ldots\)
\(\ldots\)
\(\ldots\)
103,100
500
29,405
\end{tabular} \\
\hline Total Wide Bay \& 26.523309 \& 1,342,992 \& 500 \& 1,24,929 \& 22,984,656 \& 266,39 \& \& 6881,810 \& 4,719 \& 12 \& 8 \& \({ }^{\text {90,4 }}\) \& 30,390 \& 11,437,141 \& 6 69,380 \& 12,096.52 \& \({ }^{643,01}\) \& 500 \& \({ }^{643,519}\) \\
\hline Bunana... Gladstone Mount Morgan 8t. Lawrence .. ... \&  \&  \&  \&  \&  \& \[
\begin{gathered}
8,955 \\
371,050 \\
278,290
\end{gathered}
\] \& \(\cdots\) \&  \& \[
\begin{aligned}
\& 25 \\
\& 286 \\
\& 286 \\
\& 583 \\
\& \hline 83 \\
\& \hline
\end{aligned}
\] \& …
\(\times 1\)

2 \&  \& $$
\begin{array}{r}
131 \\
5.631 \\
\text { 408 } \\
10,94 \\
10,74 \\
\hline
\end{array}
$$ \& \[

$$
\begin{gathered}
89 \\
\substack{899 \\
\hline, 796 \\
\hline, 359 \\
\hline, 50}
\end{gathered}
$$
\] \& 828,642

691,813 \&  \&  \& $\cdots$ \&  \& $\cdots$ <br>
\hline Total Port Curtis \& 4,045,288 \& 407,193 \& \& 202,439 \& 3,117,422 \& 318,214 \& \& \& ${ }^{930}$ \& 3 \& ... \& 17,200 \& 5,32 \& 1,520,455 \& 129,687 \& 1,650, 142 \& \& \& <br>
\hline
\end{tabular}

Table No. I.-continued.
Return Showing the Results of the Datring Industry for the Year ended 31st Degember, 1920-continued

| District. | $\begin{gathered} \text { Totala } \\ \text { Obtatiked } \\ \text { obtaine. } \end{gathered}$ | how vituskd. |  |  |  |  |  |  | Establishanats. |  |  | datry cattu |  | buttre made. |  |  | chaise mave. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | For Butter on Farms. | For Cheese <br> on Farms | $\left\lvert\, \begin{gathered} \text { For } \\ \text { Pomestic } \\ \text { Purposes by } \\ \text { Producer. } \end{gathered}\right.$ | Separated for Sale. | $\begin{array}{\|c} \text { Solid for } \\ \text { Consump. } \\ \text { oionas. } \\ \text { Milk. } \end{array}$ | $\left\lvert\, \begin{gathered} \text { sold to } \\ \text { Condensed } \\ \text { Manik } \\ \text { Factories. } \end{gathered}\right.$ | $\begin{gathered} \text { Sold to } \\ \text { Cheese } \\ \text { Factories } \end{gathered}$ | Dairying. | Butter Factories | Cheese Factories. | In Milk. | Dry. | At ${ }_{\text {At }}^{\text {At }}$ ( |  | Total. | $\stackrel{\text { ate }}{\text { atories. }}$ | $\begin{gathered} \mathrm{By} \\ \text { Farmers. } \end{gathered}$ | Total. |
|  | Gallons. $1,677.690$877.276 <br> 4.198 .282954.700 $1,00 \div .865$ 263.801$1,447.582$$2,709,755$ <br> $3,671,0+2$ 99,086159.729 $2,22,8789$$1.774,481$ | Gallons. <br> 94,753 123,673 <br> 18,495 194,61 <br> 31,200 <br> 13,733 50,813 <br> 31,268 43,297 93,327 <br> 93,556 <br> 44,1653 38,320 <br> 83,780 241,410 | Gallons. <br> 350 <br> . ... $\ldots$ <br> $\ldots$ $\ldots$ $\ldots$ <br> ... $\ldots$ $\ldots$ <br> ... <br> $\ldots$ $\ldots$ $\ldots$ | Gallons. 71,768 138,303 28,701 197,911 14,700 19,111 31,520 50,210 57,448 76,234 96,122 161,107 161,102 54,256 14,713 185.736 188,260 |  |  | Gallons. <br> $\cdots$ $\cdots$ $\cdots$ <br> ... <br> $\ldots$ <br> $\ldots$ <br> 229,123 <br> 334,781 <br> 753,180 |  | No. <br> 257 448 48 <br> $\begin{array}{r}151 \\ 153 \\ \hline 78 \\ \hline\end{array}$ <br> 137 90 <br> 200 <br> 109 <br> -255 <br> 189 <br> 188 421 <br> 24. <br> 476 |  | No. <br> 14 <br> 7 3 1 3 1 10 1 6 14 14 <br> … 8 |  |  |  | Lb.35,751 <br> 49,450 6,36487,8828 $15,60^{2}$ <br>  16,463 43,175 19,223 17,850 $\begin{array}{r}\begin{array}{r}3,394 \\ 40,023 \\ 101,176\end{array} \\ \hline\end{array}$ |  |  |  |  |
| Total Downs ... | 24,570,607 | 1,204,581 | 350 | 1,366,129 | 12,265,520 | 249,375 | 1,317,024 | $8,167,688$ | 4,967 | 13 | 75 | 72,646 | 23,33 | 6.947 .83 | 519,406 | 7,467,238 | 0,330,216 | 200 | 30, |
| Oiher Districts | 5,419,818 | 659.184 |  | 733,867 | 3,606,828 | 359,472 |  | 60,487 | 2,423 | 3 | 3 | 20,433 | 12,967 | 1,803,558 | 210,308 | 2,043,866 | 53.8 |  | 53,830 |
| Grand Total, 1920 | $\begin{gathered} 102,659,984 \\ 71,856,038 \\ \hline \end{gathered}$ | $\begin{aligned} & 5,291,655 \\ & 4,039,884 \end{aligned}$ | $\begin{aligned} & 2,850,047 \\ & 9,0 \end{aligned}$ | $5,5,5,27$ <br> $4,951,+18$ | $\begin{gathered} 76,96,308 \\ 49,721,943 \end{gathered}$ | $\begin{aligned} & 4,136,124 \\ & 3,651,212 \end{aligned}$ | $3,360,824$ <br> $2,228,942$ | $9,352,366$ $-229,992$ | $\begin{aligned} & 20,457 \\ & 18,952 \end{aligned}$ | 42 | ${ }_{85}^{92}$ | $\begin{array}{r} 335,026 \\ 211,331 \\ \hline \end{array}$ | $\begin{gathered} 13,6188 \\ 161,815 \end{gathered}$ | $\begin{aligned} & 38,464,870 \\ & 24,528,657 \\ & \hline \end{aligned}$ | $\begin{aligned} & 2,286,53 \\ & 1,68,857 \end{aligned}$ |  | $\begin{array}{r} 11,509: 762 \\ 8,287,030 \\ \hline \end{array}$ | ${ }_{\text {2, }}^{\substack{2,500 \\ 9,288}}$ |  |
| Increase, 1920 Decrease, 1920 | 32,803,446 | 1,251.801 | 6,197 | 602,909 | 27,239,365 | 154,912 | 1,131,882 | 2,128,774 | 1,505 | 5 | 7 | 123,695 | 49,207 | 13,936,213 | 601,646 | 14,537,859 | 3,222,732 | 6,788 | 3,215,9 |

Table No. II.

Table No. II.-contimeed.



133
Table No. III.
Return showing the Gross Produce of Pbincipal Orops Raised in the several Petty Sessions Districts of the State during the Ybar ended 31st December, 1920.

Table No. III.--continued.

Table No. III.-continued.



Table No. VII.
Return showing the Arba and Produer obtained during the Yrar 1920 from Orbtain Other Cbops, details of which are not included in the Grnbral Table.


Table No. VIII.
Raturn showing the Total Extent of Land Culitvated for Hay, together with the Yibld of Hay, and the Averaar Yield per Acre in each of the several Petty Sessions Districts of the State during the Year 1920


Table No. IX.
Rifurn showing the Total Extent of Land Cultivated for Green Crops in each of the several Petty Sessions Districts of the State during the Year 1920.


THy -orif alder


Table No, XI.
Area, Yield, and Value of Crops, 1920.

G. PORTER,

Acting Registrar-General.

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RH：．

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$\qquad$
$\square$
Thise


[^0]:    

[^1]:    羂
    13

[^2]:    - Decrease.

[^3]:    .-- This Table does not include Interstate Traffe by Sea in live animals; this is unsscertainable, but insignifleant in number:

[^4]:    * Not available.

[^5]:    Nofr.-Butser sent to other states not included in above,

[^6]:    N. B.--Bisbane (B) refers to South Brisbane.

[^7]:    * Crushed in Maroochy. $\quad$ Crushed in Mackay. $\ddagger$ Area exclusive of 1,389 acres cut for fodder

