

1903.  
QUEENSLAND.

REPORT OF THE SECRETARY FOR AGRICULTURE  
FOR THE YEAR 1902-1903.

Presented to both Houses of Parliament by Command.

TO HIS EXCELLENCY MAJOR-GENERAL SIR HERBERT CHARLES CHERMSIDE,  
G.C.M.G., C.B., GOVERNOR OF THE STATE OF QUEENSLAND AND ITS  
DEPENDENCIES IN THE COMMONWEALTH OF AUSTRALIA.

Brisbane, 1st October, 1903.

SIR,—I have the honour to lay before your Excellency the Report of this Department for the twelve months ending with the 30th June, 1903.

It should be explained that one portion of this Report has already been published—namely, the portion which deals with the administration of the Chief Inspector of Stock. The year reviewed in that officer's statement ends with the 31st of December, and it was decided to make that statement public as soon as the materials for compiling it were collected and arranged. It was impossible, however, to issue at the same time the General Report of the Department, for, as the departmental year begins and ends with the financial year, all the facts necessary for a complete Report were not available before the last day of September.

The following table gives the cost of the Department, not only for the year just closed, but for each of the three preceding years:—

	1899-1900.	1900-1901.	1901-1902.	1902-1903.
Gross expenditure ... ..	£66,995	£53,330	£46,295	£32,389
Revenue ... ..	5,540	6,829	7,321	7,007
Net cost ... ..	£61,455	£46,501	£38,974	£25,382

THE INSTITUTIONS OF THE DEPARTMENT.

THE AGRICULTURAL COLLEGE.

(Established July, 1897.)

	1899-1900.	1900-1901.	1901-1902.	1902-1903.
Gross expenditure ... ..	£8,599	£7,040	£6,262	£6,029
Revenue ... ..	1,823	2,940	2,934	2,281
Net cost ... ..	£6,776	£4,100	£3,328	£3,748

THE STATE FARMS.

WESTBROOK.

(Established March, 1897.)

	1899-1900.	1900-1901.	1901-1902.	1902-1903.
Gross expenditure ... ..	£1,026	£1,095	£1,055	£841
Revenue ... ..	87	121	408	159
Net cost ... ..	£939	£974	£647	£682

HERMITAGE.

(Established March, 1897.)

	1899-1900.	1900-1901.	1901-1902.	1902-1903.
Gross expenditure ... ..	£2,349	£911	£874	£873
Revenue ... ..	106	165	359	149
Net cost ... ..	£2,243	£746	£515	£724



## BIGGENDEN.

*(Established February, 1898.)*

	1899-1900.	1900-1901.	1901-1902.	1902-1903.
Gross expenditure ... ..	£750	£461	£443	£347
Revenue ... ..	43	6	15	30
Net cost ... ..	£707	£455	£428	£317

## GINDIE.

*(Established February, 1898.)*

	1899-1900.	1900-1901.	1901-1902.	1902-1903.
Gross expenditure ... ..	£2,587	£1,229	£1,818	£196
Revenue ... ..	247	94	59	69
Net cost ... ..	£2,340	£1,135	£1,759	£427

## STATE NURSERY, KAMERUNGA.

*(Established January, 1890.)*

	1899-1900.	1900-1901.	1901-1902.	1902-1903.
Gross expenditure ... ..	£781	£811	£733	£654
Revenue ... ..	Nil	9	5	28
Net cost ... ..	£781	£802	£728	£626

## TOBACCO FARM.

*(Established July, 1900.)*

	1900-1901.	1901-1902.	1902-1903.
Gross expenditure ... ..	£570	£537	£415
Revenue ... ..	Nil	Nil	497

## BOTANIC GARDENS AND GOVERNMENT DOMAIN.

	1899-1900.	1900-1901.	1901-1902.	1902-1903.
Gross expenditure ... ..	£2,692	£2,514	£2,460	£1,967
Revenue ... ..	72	72	74	173
Net cost ... ..	£2,620	£2,442	£2,386	£1,794

## EUROPEAN MARKETS.

While federation has afforded our producers a greatly enlarged market, there is reason to believe that in some important lines the requirements of the Commonwealth will be exceeded at no remote date, if the present rate of increase in production is maintained. For example, there seems to be a consensus among those engaged in pineapple-growing that they are within measurable distance of supplying Australian wants in that respect, and they are naturally desirous of ascertaining whether they cannot find in England a market for their products. This matter was inquired into some time ago by the Department, and it was then discovered that the English supply came mainly from the Azores; and our English advisers did not hold out much hope that the Queensland grower would be able to compete successfully with a rival living only seven or eight days' sail from England. Nor was the difference in freights the Queenslander's only disadvantage. It was learned that, without any elaborate precautions, the pineapples of the Azores can be placed on the London market perfect in appearance and flavour. On the other hand, though it is said that a small shipment of Queensland pineapples reached the Mediterranean in good condition, and that another shipment arrived in England thoroughly sound, in general the attempts at carrying this fruit so great a distance have failed. Obviously it does not stand the changes in temperature such a long voyage involves under ordinary circumstances. A uniform temperature is necessary, but it has not yet been established what that temperature should be, and experiments are now being conducted at Gatton College with the view of settling this problem. Among the other questions undergoing investigation are—"What kind of pineapple is best fitted for such lengthened transport?" "At what stage of growth should it be picked?" and "What method of packing it would give the most satisfactory results?" Meanwhile inquiries have been instituted in England concerning the demand for canned pineapple and for pineapple pulp, for both of which commodities a better market than can be found in the Commonwealth is desired.

It is probable that the experiments referred to will be successful, and that if a profitable market for Queensland pineapples does not exist it can be created. But there is another difficulty, the solution of which does not lie wholly with this Department. The matter, moreover, is one which concerns not only our fruitgrowers, but every Queensland producer whose success depends on the speed and regularity with which his wares can reach the English markets. As carriers of agricultural produce, the English mail steamers are invaluable to every Australian State except Queensland. To us they are, in that capacity, of little or no use, and will remain so until Brisbane is included in the ports of call. The Commonwealth Government, it is true, is not responsible for the present arrangements, but with it rests the question whether they are to be renewed or not; and their renewal would violate at least the spirit of the Constitution by giving five of the Australian States commercial advantages over the sixth. For some years the Queensland Government tried to place the Queensland dairy farmer on a footing of equality with his southern rival by subsidising a steamer connecting with the mail boats at Sydney, but the



venture was not conspicuously successful, and perhaps under no circumstances could it be made so. We have not, however, given up all hopes of securing weekly or fortnightly visits by the mail steamers, and at least it is some satisfaction to know that the owners of the Aberdeen line of steamers purpose establishing at an early date, between Brisbane and London, a service which will be regular if not so frequent as could be desired.

#### THE AGRICULTURAL CONFERENCE.

The latest of these Conferences, which are annually increasing in value and importance, was held at Maryborough early in July last. The subjects discussed were practical in character, and much useful information was elicited. Among the papers read was a very interesting one by the Hon. A. J. Thynne, favouring "the addition to the Department of Agriculture of a road inquiry branch, with a capable road officer to advise farmers and shire councils in farming districts." Mr. G. Fox, M.L.A., speaking on behalf of farmers who at present receive no benefits from the Agricultural Bank, asked the Government to adopt the amending Bill he had introduced the previous session. Mr. J. T. Bell, M.L.A., delivered an address on the utility of motor cars for conveying agricultural produce in the country districts, and met with very general support.

Valuable papers were read also by Mr. James Lindsay, on "Light Tramways for Agricultural Districts"; by Mr. C. Dallon, on "Improvement of Breed of Horses"; by Mr. J. McCartney, on "Roadmaking and Drainage"; by Mr. G. Turner, on "Tanning Material as a Profitable Crop"; by Mr. F. W. Peek, on "Agricultural Interests affecting the small Farmer and Producer"; by Mr. J. E. Dean, on "Bulls for Dairying Purposes"; by Mr. H. Sinclair, on "Dairying in Queensland"; by Mr. W. S. Palmer, on "What the Government might reasonably be expected to do in the way of encouraging Pigrearing in certain localities"; and by the Chairman (for Mr. W. R. Robinson) on "Angoras for Queensland." Among the papers not mentioned here were many which well deserve perusal and attention, and they are not particularised because it has been thought advisable to make special reference to such only as were dealt with by the Committee of Resolutions, were made the subject of specific motions by the Conference, and have to be taken into consideration by the Department.

#### DISEASES IN PLANTS ACT.

The manner in which this Act is carried out by the various inspectors entrusted with its administration is a proof no less of the vigilance than of the tact of those officers. They have often a most invidious duty to perform, and, though they perform it zealously, there is no record of any instance where one of them has exceeded his powers. This is especially true of those whose business it is to prevent plants, fruit, or vegetables which are diseased, or which come from infected countries, from entering this State. On the whole their labours have been successful, considering the magnitude of the work to be done and the smallness of the staff that has to do it. As regards the export trade, such precautions are adopted as can be devised against sending diseased or unsightly fruit to other States and thus injuring the reputation of Queensland. There are exporters, it is true, who do not need to be reminded of their duty in this respect. But there are also exporters who seem to overlook the fact that a single shipment of diseased fruit may shut southern ports against any fruit coming from Queensland. In this connection it should be stated that two of the shipping companies have recently erected cyaniding chambers on their Brisbane wharves, and that these chambers are supervised free of cost by an officer of the Department, though they are competing with the cyaniding chamber maintained and controlled by the Department.

#### THE CHAMBER OF AGRICULTURE.

The Chamber of Agriculture has completed the second year of its existence, and has, since its foundation, justified its title to a much ampler measure of public support than it receives. Out of about 150 societies only 18 have affiliated with it, though among these 18 are some of the best associations in the State. Geographically it is not unfairly representative of Queensland, for it is in a position to voice the opinions of agricultural organisations in Townsville, Bowen, Bundaberg, Beenleigh, and Roma. That the Chamber is but slowly adding to its membership is due partly to the depressing conditions which have existed during the last two years, but perhaps mainly to the disinclination to union and co-operation among our farmers which has been referred to at some length in a previous report of this Department. It ought to be pointed out to all the societies keeping aloof from it, that its executive includes men who have done, and are still doing, much to advance agriculture, and who are able to speak with authority on one or another of our primary industries. A glance at the Chamber's latest Annual Report will show how wide is the scope of its operations, and how diligently it is inquiring into the problems that beset the agriculturist; but it is clear that its influence for good would be enormously increased if it had the moral and material support of all, or at least the majority, of the Agricultural Societies of Queensland.

#### THE AGRICULTURAL JOURNAL.

It is satisfactory to know that the publication of *The Queensland Agricultural Journal* continues to be highly appreciated, not only by the agriculturists and pastoralists of Queensland, but also by many of those engaged in rural pursuits in the other States of the Commonwealth and in foreign countries. The Department is in receipt of many letters bearing testimony to the excellence of the articles, both original and selected, which appear in its monthly pages on a variety of subjects connected with rural life. In order to add still more to its value as a medium of information, the editor and artist have visited many parts of the State in the Far North, Central, Western, and South-western districts, and also the sugar districts from Nambour to Cairns. All these districts and the industries carried on therein have been faithfully described and illustrated in the pages of the *Journal*, and much useful information has thus been disseminated throughout the State, especially with respect to irrigation. The cost of producing and distributing the *Journal* in 1899-1900 was £2,102; in 1900-1901, £2,360; in 1901-1902, £1,945; and in 1902-1903, £1,363.







The districts in which irrigation plants of greater or less degree were installed during 1902 were—

	No. of Irrigators.		Acres Irrigated.		Crops Treated.	
Adavale ...	...	1	...	3	...	Fruit, vegetables
Allora ...	...	7	...	171	...	General crops
Beaudesert ...	...	1	...	4	...	Vegetables
Biggenden ...	...	1	...	1	...	Vegetables
Caboolture ...	...	1	...	1	...	Lucerne
Camooweal ...	...	1	...	1	...	Vegetables
Dalby ...	...	1	...	2	...	General crops
Dugandan ...	...	2	...	13	...	General crops
Gatton ...	...	8	...	174	...	General crops
Gayndah ...	...	1	...	1	...	Fruit
Gin Gin ...	...	2	...	6	...	Lucerne, vegetables
Harrisville ...	...	4	...	59	...	General crops
Highfields ...	...	1	...	5	...	General crops
Killarney ...	...	3	...	29	...	General crops
Maryborough ...	...	8	...	66	...	Fruit, vegetables
Nanango ...	...	1	...	2	...	Fruit
Nerang ...	...	6	...	29	...	General crops
Redcliffe ...	...	1	...	25	...	General crops
Rosewood... ..	...	2	...	23	...	Lucerne
Warwick ...	...	4	...	10	...	Vegetables
Woodford ...	...	4	...	18	...	General crops
Total... ..	...	60	...	663		

In those districts that contained irrigation plants prior to last year the alterations are—

District.	Increase.		Decrease.	
	From—	To—	From—	To—
	Acres.	Acres.	Acres.	Acres.
Aramac ... ..	...	4	17	
Ayr ... ..	3,896	4,070		
Banana ... ..	...	1	2	
Barcaldine ... ..	462	772		
Blackall ... ..	...	...	28	18
Bollon ... ..	...	...	9	8
Bowen ... ..	162	201		
Brisbane ... ..	7	28		
Bundaberg ... ..	210	2,906		
Cape River ... ..	...	...	39	18
Charleville ... ..	...	...	18	17
Charters Towers ... ..	...	...	47	35
Clermont ... ..	...	...	5	4
Cleveland ... ..	8	16		
Cook ... ..	...	...	15	11
Cunnamulla ... ..	263	3,200		
Esk ... ..	2	45		
Etheridge ... ..	5	8		
Gympie ... ..	...	...	48	25
Hughenden ... ..	...	...	156	54
Hungerford ... ..	115	136		
Ingham ... ..	...	...	80	70
Ipswich ... ..	10	44		
Isisford ... ..	...	...	2	1
Longreach ... ..	8	35		
Mackay ... ..	304	496		
Muttaburra ... ..	29	31		
Ravenswood ... ..	4	5		
Rockhampton ... ..	75	769		
Roma ... ..	30	34		
St. George ... ..	44	46		
South Brisbane ... ..	...	...	37	28
Stanthorpe ... ..	...	...	36	27
Toowoomba ... ..	15	168		
Townsville ... ..	225	273		

The districts of Cloncurry, Herberton, Surat, and Tiaro abandoned irrigation; and Burke, Cairns, Emerald, Norman, Taroom, and Thargomindah remained stationary as compared with 1901. Apart from irrigating sugar-cane, the water is used for all farm, garden, and orchard crops principally in small areas so far, but mention may be made of the operations in the Cunnamulla districts, where wheat, barley, oats, lucerne, artificial and natural grasses on 3,200 acres of land owned or occupied by but three persons are watered from a bore.

During the year a beginning has been made in prospecting for subterranean water in the coastal districts, and there is every reason to believe that the quest will have results beneficial to a large number of small settlers. The money required for the purpose has been provided by the Works Department, and the work of boring is under the direction of the Hydraulic Engineer.



*Sugar.*—This crop, like all others, suffered to a very great degree from the drought, as will at once be seen when the figures for this year are compared with those for the four preceding seasons, viz.:—

	Acres Crushed.	Average Yield of Sugar per Acre Crushed.
1898 ... ..	82,391	1.99 tons.
1899 ... ..	79,435	1.55 „
1900 ... ..	72,651	1.28 „
1901 ... ..	78,160	1.55 „
1902 ... ..	59,102	1.30 „

The total quantity of cane crushed was 641,927 tons as compared with 1,542,090 tons in 1898, 1,176,466 tons in 1899, 848,328 tons in 1900, and 1,180,091 tons in 1901. Some of this shrinkage is accounted for by the fact that owing to the shortage in other fodder in the State during 1902 about 15,000 acres of sugar-cane were used to supply the deficiency, whereas in 1901 only about 600 acres were so used. Thus, taking the average yield per acre at 10 tons, it will be seen that after deducting the average acreage usually consumed as fodder, the mills received about 140,000 tons of cane less than would otherwise have been available for crushing. In comparing the crop with that of the four preceding years, it will be observed that the actual tonnage for the past year would have very nearly reached that of 1900, which, however, was considerably the lowest during that period. The density of the juice in 1902, however, was the best obtained during the last five years, it only taking 8.38 tons of cane to make a ton of sugar, as compared with 9.42 tons in 1898, 9.54 in 1899, 9.44 in 1900, and 9.76 tons in 1901. If, therefore, the 140,000 odd tons used as fodder had been crushed and the average density maintained, the sugar produced would have slightly exceeded the production for 1900.

Of the 66 mills of various sizes in the State only 44 crushed last season, and in the case of those in the Central, Wide Bay, and Southern districts, the crushing was very small. The Northern mills, especially those in the Cairns and Port Douglas districts, had excellent crushings, which yielded almost all the sugar manufactured in the State. This, to a certain extent, was anticipated in the last Report, but owing to the continuance of the drought, extending as it did in the Southern and Central districts well into this year, the output from these districts was considerably less than had been expected, and thus reduced the general result to 76,626 tons.

The following table shows clearly to what extent the farmers endeavoured throughout the State to grow and harvest cane by white labour, and thus obtain the federal rebate:—

Rebate	Petty Sessions District.	Area Crushed for Sugar.	Weight of Cane Harvested.
		Acres.	Tons.
No. 1 at 5s. ... ..	Cairns and Douglas ... ..	501	6,643
	Ingham and Mourilyan ... ..	516	8,684
	Total ... ..	1,017	15,327
No. 2 at 4s. 8d. ... ..	Bowen ... ..	750	10,239
	Mackay ... ..	6,320	55,395
	Total ... ..	7,070	65,634
No. 3 at 4s. 4d. ... ..	Bundaberg and Gin Gin ... ..	2,077	8,661
	Childers, Maryborough, and Tiaro ... ..	736	4,531
	Total ... ..	2,813	13,192
No. 4 at 4s. ... ..	Logan ... ..	213	2,264
	Maroochy and Gympie ... ..	262	2,194
	Nerang ... ..	1	21
	Total ... ..	476	4,479
	Grand Total ... ..	11,376	98,632

The Mackay district, it may be of interest to note, produced more than half the cane thus grown. The actual rebate paid on returns obtained by the Customs Department, however, gives the total tonnage as 105,303 tons, or a little over 16 per cent. of the total cane crushed during the year. The total rebate paid was £24,509 8s. 11d.

Another interesting fact is that the greatest quantity of cane per acre was obtained in the Ayr district, where some 4,070 acres were irrigated out of a total of 4,344 acres cultivated for sugar during the year. This is the second succeeding year that this district, in producing the greatest tonnage per acre, has furnished indisputable evidence of the benefits to be derived from irrigation.

The prospects for this season (1903) are exceedingly bright, and it is expected that the general result will almost equal that of 1901. Indeed, given a continuance of the existing very favourable weather conditions, it may confidently be expected that the 1904 season will equal the output of 1898, the most prolific of former years.

When the current season's results are available they will, it is thought, furnish a striking example of the recuperative capacity of this State, and should be an encouragement of inestimable value to those engaged in the industry.

*Dairying.*—The export trade in 1902 was seriously affected by the almost entire absence of natural fodder throughout the greater part of the year, and by the high price of artificial feed. In 1901 the export of butter was larger than in any previous year, but during 1902 the volume of trade exceeded the relatively small output of 1897 by about one-third only. The statistics of the Board of



Agriculture show that during 1902 about 198,747 tons of butter were imported into Great Britain, of which New South Wales is credited with 881½ tons, Victoria with about 3,126 tons, South Australia with about 12 tons, and Queensland with 1 ton. Of the 244½ tons of butter, the produce of this State, exported during last year, about 157 tons went to New South Wales, Victoria, South Australia, and West Australia—the greater part to the two first-named. Of the remainder, 84¼ tons went to South Africa and the Mauritius, and the balance to Eastern ports. The total export figures for the past five years are—

								Tons.	Valued at.
1898	...	...	...	...	...	...	...	433	£37,286
1899	...	...	...	...	...	...	...	517	49,429
1900	...	...	...	...	...	...	...	620	51,662
1901	...	...	...	...	...	...	...	931¼	86,150
1902	...	...	...	...	...	...	...	246½	24,610

The quantity of milk dealt with for the manufacture of butter and cheese was 13,787,175 gallons as against 26,286,459 gallons in 1901, or, roughly speaking, a reduction of 50 per cent. The output of butter for the year, in comparison with 1901, shows a falling off in about the same proportion, the figures for the two years being 4,851,362 lb. and 9,741,882 lb. respectively. The cheese made fell from 2,436,912 lb. in 1901 to 952,013 lb. in 1902. The prospects for the dairying industry since the commencement of the present year have, so far as the supply of grass and water is concerned, been most hopeful, and it is expected before twelve months have passed that the export will have exceeded that of the record year 1901. The importance of the industry is shown by the fact that the value of the machinery and plant employed in butter and cheese factories in the driest year the industry has known was estimated at £51,809, and the value of the land and premises in which the machinery was used at £48,223. The manufacture of condensed milk is now carried on in these factories, and it is hoped that in due time the produce of the State in this direction will meet local demands, and obviate the necessity for importing this particular form of milk. That there is room for increased production is shown by the value of the imports, which in 1902 amounted to £44,478. Trustworthy statistics concerning cattle kept for dairying purposes are not yet available; but there are grounds for believing that the losses among such cattle are proportionately not so great as among stock generally; and of the dairy cattle that have succumbed to the drought it is thought that a large portion consisted of those which were least valuable. It is known also that in many cases the losses are being replaced by animals of a superior milking strain.

The production of bacon and hams diminished proportionately to the fall in the supply of milk, which is now essential in pig-farming. The loss in pigs in 1902 was 36·53 per cent., the decrease in the number of animals being from 121,641 in 1901 to 77,202 in 1902. In 1893 we had 68,066 pigs, and in 1894 89,677, so that at the present time our stock is, numerically, about the same as it was ten years ago. The number of pigs slaughtered in 1902 was 88,416, from which 329,564 lb. of fresh pork, 512,109 lb. of salt pork, and 6,512,952 lb. of bacon and hams were obtained. There were five factories for bacon and ham curing in operation during 1902, having a value in machinery, plant, and premises of £62,396. If this amount be added to the capital employed in the butter and cheese factories mentioned, it will be seen that no less a sum than £162,000 is embarked in this industry.

*Wheat.*—The statistics for some of the principal wheat-growing centres for 1902 sufficiently indicate the disastrous effect of the season upon this branch of farming.

The total area that returned a crop of grain in 1901 was 87,232 acres, but in 1902 a harvest was reaped from 1,880 acres only for a yield of 6,165 bushels, an average of 3·28 bushels to the acre, as against a return of 1,692,222 bushels on the former year, with an average of 19·40 bushels to the acre. In the last Report of the Department the Allora district was credited with 22,131 acres for grain in 1901, the Toowoomba district with 18,609 acres, and the Warwick district with 14,762 acres. In 1902 the Allora district was successful in reaping 1 acre only for a return of 24 bushels, and Toowoomba 2 acres for 40 bushels. The Warwick district, however, was more fortunate, for there the farmers were able to harvest 923 acres for a return of 3,433 bushels at the rate of 3·72 bushels to the acre.

The State being thus practically destitute of seed for next season's sowing, it was decided that the Department should take the matter in hand, and that the best seed available should be procured from South Australia and sold at cost price to the farmers, with 5 per cent. added where terms were given. As a preliminary step, the Agricultural Adviser visited all the wheat-growing districts, called meetings of the farmers, and, from the information gathered, formed conclusions upon which the decision as to the quantity and varieties to be purchased was based. That his estimate was well founded is shown by the fact that the quantity remaining on hand when the distribution ceased amounted to 1,400 bags only; and it can be said that this surplus would not have existed had not private traders introduced and sold seed wheat after the Department had made its purchase.

That the farmers might be satisfied that the best efforts would be made on their behalf to obtain seed of prime quality, Mr. W. D. Lamb, of Yangan, was asked to accompany the Agricultural Adviser, Mr. Peter McLean, to South Australia, in order to make a suitable selection. That this selection was suitable is proved, not only by the comments of individual farmers, but also by the following resolution passed at the recent Agricultural Conference at Maryborough:—"A vote of thanks be accorded to the Department of Agriculture for the supply of seed wheat, &c., to the farmers, and also for the care and energy its officers have displayed in its choice and distribution." The Department also made arrangements by which nearly the whole of the locally-grown wheat held by millers was made available for planting.

The locally-grown seed was distributed from Warwick and Toowoomba. The South Australian wheat was all distributed from Toowoomba, from the malting-house of Messrs. Redwood and Co., a place most convenient in every way for such a purpose, and well equipped with all the appliances for the work. An agreement was made under which Messrs. Redwood and Co. undertook to receive, screen, and despatch the seed at the fixed price of 4d. per bushel, the payment to include all charges,



including insurance. Arrangements were made with the Railway Department by which the freight on the seed was much more favourable to the farmers than if they had purchased it in the ordinary way of business and in a normal season. The quantity of wheat that has passed through the hands of the Department for distribution was  $63,926\frac{2}{80}$  bushels, and the amount of work devolving upon those connected with the distribution was very great.

The applications for seed numbered ... ..	1,636
The total number of bushels distributed was ... ..	$51,869\frac{4}{80}$
The average number of bushels to each farmer was ... ..	31.70

It may be of interest to include here a table giving the area under crop for grain in 1901, and the quantity of seed distributed by the Department:—

Petty Sessions District.	Acres Reaped for Grain in 1901.	Bushels of Seed Grain distributed by the Department in 1903.
Allora ... ..	22,131	8,757
Brisbane ... ..	nil.	4
Banana ... ..	4	
Beaudesert ... ..	1	
Biggenden ... ..	22	
Caboolure ... ..	1	
Clermont ... ..	35	
Condamine ... ..	142	26
Crow's Nest ... ..	642	314
Dalby ... ..	7,518	4,895
Dugandan ... ..	13	15
Emerald ... ..	75	
Gatton ... ..	116	25
Gayndah ... ..	9	
Gin Gin ... ..	10	
Gympie ... ..	2	
Harrisville ... ..	9	4
Highfields ... ..	3,378	976
Iglewood ... ..	512	223
Killarney ... ..	4,430	3,427
Laidley ... ..	1	62
Mitchell ... ..	2,318	1,957
Nanango ... ..	699	685
Nerang ... ..	2	
Rockhampton ... ..	2	68
Roma ... ..	8,798	7,483
St. George ... ..	9	23
Springsure ... ..	4	44
Stanthorpe ... ..	48	
Surat ... ..	25	
Townsville ... ..	2	
Texas ... ..	217	95
Tiaro ... ..	1	
Toowoomba ... ..	18,609	14,612
Warwick ... ..	14,762	7,778
Yeulba ... ..	2,685	396
Total	87,232	51,869

The names and quantities of the different varieties of seed purchased in South Australia are as follow:—

	Bags.		Bags.
Marshall's No. 3... ..	3,033	Warwick ... ..	1
Allora Spring ... ..	276	Leatherhead ... ..	151
Gluyas ... ..	378	Carmichael ... ..	106
Smart's Early ... ..	620	Australian Wonder ... ..	50
Dart's Imperial ... ..	4,524	Hamblyn's Prolific ... ..	94
Newman's ... ..	1,054	Silver King ... ..	44
Early Para ... ..	140	Marshall's No. 1 ... ..	24
Bluey ... ..	310	Fill Bag ... ..	59
Petatz ... ..	334	Baroota Wonder ... ..	8
Budd's Early ... ..	319	Steinwedel ... ..	300
White Tuscan ... ..	150		

Excepting Allora Spring, which was taken to South Australia from Queensland, and the White Tuscan, which is a universal wheat, all the varieties may be classed as South Australian, and were selected for their milling and marketable qualities and their suitability to the Queensland climate.

The financial side of this distribution may be summarised as follows:—

	£	s.	d.
Total first cost of wheat for distribution, in which is included milling wheat purchased to exchange for Queensland wheat ... ..	18,543	2	5
Amount paid to shipping and commission agents and other persons in connection with the purchase of seed ... ..	527	3	3
Amount paid for freight and other charges by sea and rail ... ..	2,448	0	3
Amount paid for receiving and distributing ... ..	1,256	8	11
Amount charged to farmers per bushel ... ..	0	7	6



The discrepancy between the total quantity handled for distribution and the quantity distributed is thus accounted for—

1. Seconds, the result of screening and not considered good enough for seed and sold at auction.
2. Refuse or chick wheat sold at auction.
3. Surplus milling wheat from distribution sold by tender after being offered to all the milling companies.

The action of the Department has made it possible, with a favourable season, for the farmers to recoup themselves for their losses last year, and it is anticipated, if conditions remain as at present, that the harvest for 1903 will far exceed that of 1901, in which, during the history of the State, the greatest number of acres of wheat were reaped for grain. It is thought, from the information gathered by the Agricultural Adviser, that at least 110,000 acres have been sown—possibly more—and it is estimated that the harvest we are now looking forward to will amount to nearly 2,000,000 bushels, which, if the estimate be a true one, will show a fair advance towards the supply within our borders of our own requirements. The proportion in 1901 was 48 per cent. of the consumption.

A feature that is worth remarking is the increased area that will be found for this year in the Nanango district, which is favourably situated as to climate and soil for the production of wheat grain. The farmers that have lately settled there have favoured this crop, and with the completion of the railway it is not beyond the bounds of a fair prophesy to say that before long this district will be a rival to the more well-known wheatgrowing regions.

*Malting Barley.*—The evident demand for seed of this cereal, and the scarcity of Queensland seed for sowing during the last planting, necessitated action being taken to replace the shortage, and arrangements to that end were made upon similar lines as regards distribution to those made for the seed wheat, but the purchase of the seed was planned in a different way. The produce from the crop of 6,818 acres in 1901 was 193,538 bushels, but in 1902 a crop of but 1,749 bushels was raised from 163 acres only. Seed was, therefore, needed as in the case of the wheatgrower, and to obtain it advantage was taken of an intended visit by Mr. Redwood to the Southern States and New Zealand, in connection with his business as a maltster, to purchase seed suitable to Queensland on behalf of the Department. Authority was given for the purchase of seed up to about 12,000 bushels, and the agreement was made with Mr. Redwood to the effect that if the applications for seed fell short of the quantity purchased he would take the balance from the Department at actual cost price. The seed was bought in New Zealand. The distribution was made from the malting-house at Toowoomba, the greater part being sent to farmers in the district bounded by Toowoomba, Warwick, and Allora. Brought to figures, the transaction may be summarised as follows:—

1. The number of farmers supplied was ... ..	485
2. The total number of bushels distributed was ... ..	9,365 bus. 2 lb.
3. The average number of bushels to each farmer was ... ..	19.31 bus.
	£ s. d.
4. Total first cost of barley for distribution ... ..	2,249 13 2
5. Amount paid to shipping and commission agents and other persons in connection with the purchase of the seed ... ..	75 15 9
6. Amount paid for freight and other charges by sea and rail ... ..	696 14 7
7. Amount paid for receiving and distributing ... ..	244 17 11
8. Amount paid for Customs duty ... ..	467 11 7
Amount charged to farmers per bushel ... ..	0 6 6
9. The total quantity handled by the Department was 12,436 bushels, of which 1,032 bushels were classed as seconds and unfit for seed, and the balance, after deducting the 9,365 bushels distributed to farmers, was purchased by Mr. Redwood at cost price.	

The districts in which the seed has been distributed are—

Petty Sessions Districts.	Bushels of Seed Barley Distributed.
Allora ... ..	2,171
Brisbane ... ..	4
Crow's Nest ... ..	135
Dalby ... ..	234
Dugandan ... ..	20
Highfields ... ..	173
Killarney ... ..	440
Laidley ... ..	48
Nanango ... ..	49
Roma ... ..	40
Toowoomba ... ..	4,503
Warwick ... ..	1,532
Yeulba ... ..	16
Total ... ..	9,365 bushels.



The season at present promises well for this crop, and it is estimated that at least 10,000 acres have been sown for grain, and, should hopes in this direction be realised, a yield of 350,000 bushels may be expected at the average of 35 bushels to the acre. The following table shows the steady growth the Queensland malting barley has made in the favour of the maltsters:—

MALT MADE IN QUEENSLAND.

						From Imported Barley.	From Queensland Barley.	Total Malt Made.
						Bushels.	Bushels.	Bushels.
1898	...	...	...	...	...	12,278	20,351	32,629
1899	...	...	...	...	...	42,851	19,420	62,271
1900	...	...	...	...	...	15,337	57,393	72,730
1901	...	...	...	...	...	1,000	69,000	70,000
1902	...	...	...	...	...	9,500	75,500	85,000

In addition to the malt made in this State 117,134 bushels of malt were imported for use in Queensland.

In addition to the wheat and barley procured for the farmers of the Darling Downs and the Maranoa, the Department was able to distribute about 4,000 bushels of Algerian and Tartar oats, chiefly in the Wide Bay and Burnett district.

A considerable quantity of cotton seed has also been supplied to localities where there seems to be a fair prospect of its being successfully cultivated.

*Tobacco.*—The experiment made in Texas to encourage the cultivation of tobacco has been so successful that an agreement upon favourable terms has been made with the Scottish Australian Investment Company for a further tenure of the farm upon which the operations have been carried out, and the engagement of Mr. Nevill, who has done so much to encourage the industry, has been renewed. The main objects in view are to prove that the cultivation of tobacco can be prosecuted at a profit, to teach the best methods of cultivating the crop, and of handling it in its different stages until it is ready to be placed on the market in a condition equal to that of the best imported leaf.

The possibility of a successful growth of the tobacco plant has never been in dispute, and the cultivation of it has not passed the ability of the farmer who understands his work; but the failure in the past, so far as the open market is concerned, has been in the production of an article that has been properly cured, a difficulty which has been experienced in other States of the Commonwealth, and it is to this point that the principal efforts of the Tobacco Expert have been directed in the operations at Texas. The success of his work is proved by the fact that, notwithstanding the almost total absence of rain, he was able to raise and place on the market 2 tons of tobacco, which, when offered at public auction, brought 11d. per lb., the highest price that has been obtained for Queensland-grown tobacco at a public competition. Since the establishment of the Commonwealth, the supply of tobacco grown in Australia has not exceeded the demand, and, providing that the material offered is of good quality, there will be a sufficient market for some years to come. It is estimated upon present prospects that the area to be sown during the coming planting time will exceed the area planted in 1902—viz., 722 acres—by 200 acres at least; and, if the average value of a crop to the farmer be taken at 6d. per lb., the returns from the harvest to be reaped about March next should, if the season is favourable, be not less than £25,816. In 1902 the area under this crop showed a decline of 46 acres, which is smaller decline relatively than that of other principal crops. In the Texas district there was an increase of 23 acres.

*Fruit.*—The total value of fruit bottled or tinned, dried or green, or pulped, imported last year was £136,076, and the export of similar items of Queensland produce and manufacture was £124,760—a difference against the State of £11,216. The imports of green fruit were valued at £73,875 and the exports at £119,954, and if these figures be taken from the totals before given it will be found that the imports were greater than the exports by £57,395. The exports of Queensland-made jams, jellies, and preserves of that kind in 1902 were of the value of £4,694; but the imports were worth £45,167—a difference in favour of the imports of £40,473. The figures taken for the last two years of the three principal fruit crops are—

		1901.	1902.	Decrease.
Bananas—Bunches	...	2,313,719	1,160,015	1,153,704
Pineapples—Dozens	...	359,717	260,444	99,273
Oranges—Dozens	...	1,880,264	1,191,242	689,022

The area under bananas decreased by 587 acres, for the greater part in the Cairns, Cleveland, and Logan districts. This was to some extent counterbalanced by an increase in area of 42 acres in the Brisbane district, 35 acres in Maroochy, and 37 acres in Redcliffe. Plantings of pineapples, on the other hand, exceeded the area under that crop in 1901 by 81 acres, the Brisbane district contributing 32 acres, the Logan 21, Maroochy 20, Maryborough 10, Caboolture 6, Cairns 9, and Cleveland 8. The districts amongst others which returned reduced areas were Cook, Mourilyan, Redcliffe, Rockhampton, and South Brisbane.

The area under oranges increased from 3,083 acres in 1901 to 3,141 acres in 1902, an addition of 58 acres. Of the area under crop last year 1,056 acres were not in bearing. The largest increases in area were—Maroochy 84 acres, Cairns 25 acres, Maryborough 19 acres, Nerang 15 acres, and South Brisbane 13 acres. The largest decrease consisted of 14 acres in the Logan district.

As might be expected, the crop of mangoes was reduced considerably, the falling off amounting to 79,789 dozens, but 37 acres of land were planted in addition to the 383 acres that were under crop in 1901. The area under apples increased from 278 acres to 353 acres, and the produce from 7,495 bushels to 9,165 bushels, an increase of 1,670 bushels. Of the essentially tropical fruits the increased yield of cocoanuts may be mentioned. Though the area estimated to be under cocoanut trees in 1901—667 acres—was not added to, the production increased from 8,757 dozen to 12,900 dozen. The cocoanuts are



growing for the greater part upon the islands off the coast, principally from Mackay northwards. Many of these trees were planted by this Department during the operations carried on some years ago for that purpose.

*Vegetables.*—A return of some of the principal vegetables grown here will show what has been done during the last two years, and the effect of the drought upon this kind of produce:—

	Acres—1901.		Acres—1902.	
Cabbages ... ..	672	269,630 doz.	286	100,920 doz.
Tomatoes ... ..	260	25,622 bush.	234	22,649 bush.
Cucumbers ... ..	198	100,887 doz.	183	44,485 doz.
Yams ... ..	81	61 tons.	88	74 tons.
Beans ... ..	56	5,458 bush.	58	4,872 bush.
Turnips ... ..	331	2,645 tons.	34	85 tons.
Peas ... ..	82	5,276 bush.	26	1,215 bush.
Onions ... ..	179	9,148 cwt.	22	1,036 cwt.

The imports of vegetables for 1902 were—

Vegetables, green, value ... ..	£6,782
„ preserved ... ..	5,970
„ dried or concentrated ... ..	3,506
„ preserved in liquid ... ..	285
	<hr/>
	£16,543

*Maize.*—This was probably one of the first crops planted in the Moreton Bay Settlement, and it has continued to be one of the principal crops cultivated, but of late years the area devoted to this grain has varied considerably, and the average produce per acre has risen and fallen. Setting aside the area used for green feed, the statistics for the last five years have been—

	Acres under Crop.	Yield.	Average per Acre. Bushels.
1898 ... ..	102,835	2,252,481	21·90
1899 ... ..	110,489	1,965,598	17·79
1900 ... ..	127,974	2,456,647	19·20
1901 ... ..	116,983	2,569,118	21·96
1902 ... ..	89,923	1,033,329	11·49

The imports for 1902 were of the value of £219,168, distributed as follows:—

Argentine ... ..	£133,656
New South Wales ... ..	42,350
Victoria ... ..	35,786
United States of America ... ..	3,684
New Zealand ... ..	3,680
British New Guinea ... ..	12

The failure of the crop last year is, of course, accountable for the heavy imports, but, apart from that cause, the fact remains that, notwithstanding the advantages we possess for the growth of this grain, the State does not produce sufficient for its own wants. The imports for the last four years have been—

	Bushels.	Value.	Bushels.	Value.	
1899 ... ..	501,179	£89,256	1901 ... ..	131,601	£23,307
1900 ... ..	247,449	42,388	1902 ... ..	1,133,371	219,168

Taking the net average of the quantity of maize imported during 1900 and 1901 (the exports were 16,972 bushels and 2,464 bushels respectively) as an example of the difference between our supply and the demand, it will be seen that at 20 bushels to the acre, which is about our average, there is yet room for the cultivation of about 9,000 acres with this grain in excess of the present area.

Of the districts that in 1902 had more than 1,000 acres under maize, four only increased the area as compared with 1901. The Herberton district advanced its area from 3,875 acres to 4,040 acres, an increase of 165 acres; Nerang, from 2,217 acres to 2,281 acres, an addition of 64 acres; and Nanango from 1,994 acres to 3,448 acres, an increase of 1,454 acres.

An increase of the area cut for green feed in 1902 was to be expected, the advance being from 10,501 acres in 1901 to 21,824 acres.

The proportions of the area under maize in the different divisions of the State to the whole area under this crop for grain were—

	Per cent.
Southern ... ..	88·85
Central ... ..	0·48
Northern ... ..	10·67

The efforts of Professor Shelton, when Instructor in Agriculture, to induce farmers to save cornstalks for use as a fodder in times of scarcity did not secure much interest when he brought the matter forward, but the scarcity and the high price of fodder last year have shown people that his teaching was sound. It is not too much to say that had the corn stover been saved instead of being burned, as is the general custom, the lives of many dairy cattle would have been saved and the expenditure for bulk food would have been materially diminished.

*Broom Millet.*—Queensland is well adapted for the cultivation of this crop, which supplies the raw material for a greater part of the brushware we use; but instead of utilising this opportunity of adding to the income of the farm, we are content to buy from outside the State about 75 per cent. of the



raw material. Of the total raw material used in Queensland in 1901, this State produced but 25 per cent. and in 1902 but 20 per cent.; the area under crop in the two years being 81 acres and 42 acres respectively, the yield being 50,746 lb. and 16,742 lb. The imports of raw material in 1902 were valued at £1,602, but in addition we require the manufactured article and found it necessary to bring in brushware to the value of £12,909. The statistics do not differentiate between the kinds of brushware, and no doubt a considerable portion of the value quoted included brushware made with hair; but, taking the imports from the other Australian States as representing the broom millet portion of the total imports of brushware, the value will be found to be £3,040. The margin for an addition to this crop before the supply equals the demand is not great, but instead of importing at all we should be exporting. The cultivation of this crop is practically confined to the districts of Laidley, Gatton, Dugandan, and the Logan, the firstnamed having the largest area under crop in 1902—viz., 15 acres. This plant has a value beyond that for broom-making, in so far that the seed is good for poultry; but buyers prefer to purchase with the seed on, because, unless care is exercised in stripping the seed, the marketable value of the millet is likely to be diminished.

*Coffee.*—The production of coffee in Queensland is only 45 per cent. of the consumption within the State, but notwithstanding this fact the area planted does not increase at the rate it should do.

From February, 1895, to 1901 the plantations steadily increased in size, the figures being—

				Acres.					Acres.
1895	...	...	...	60	1899	...	...	...	495
1896	...	...	...	138	1900	...	...	...	537
1897	...	...	...	311	1901	...	...	...	547
1898	...	...	...	432	1902	...	...	...	396

The decrease in 1902 may be set down to the extraordinary season all crops have recently had to encounter, and it is hoped that the better conditions now prevailing will result in an area being cultivated considerably in excess of that of 1901. There was no encouragement in the former year to plant fresh areas.

The divisions of the State contributed to the coffee crop in the following areas:—

				Bearing. Acres.					Not Bearing. Acres.
Southern	...	...	...	54	...	...	...	9	
Central	...	...	...	3	...	...	...	16	
North	...	...	...	257	...	...	...	57	

In 1901 the Herberton district obtained the highest yield—2,200 lb. of parchment coffee from 1 acre.

The average yield per acre and the total yield from the productive area since 1896 are—

		Average lb.	Total lb.			Average lb.	Total lb.
1896	...	373	9,707	1900	...	361	102,134
1897	...	453	81,614	1901	...	352	130,293
1898	...	284	56,552	1902	...	361	113,301
1899	...	470	104,981				

The records for 1895 are not given as in the table showing the area under coffee-trees, because the returns for that year did not discriminate between bearing and non-bearing trees.

The production for 1901 and for 1902 amounted to 130,293 lb. and 113,301 lb., respectively, a decrease for the latter year of 16,992 lb.

The imports of raw and roasted coffee for the past five years have been—

		Lb.	Valued at—			Lb.	Valued at—
1898	...	178,681	£7,302	1901	...	167,908	£6,153
1899	...	217,602	8,259	1902	...	164,044	5,884
1900	...	153,647	6,323				

*Viticulture.*—During the five years ending in 1902 the vignerons have experienced two seasons that have injuriously affected the crops to a considerable extent in one district or another. Last year conditions were so unfavourable that the quantity of grapes gathered fell from 4,063,109 lb. to 2,284,404 lb. The five principal districts in the State in which the cultivation of the grape vine is followed are Roma, Brisbane, Toowoomba, South Brisbane, and Warwick, and the average per acre for Queensland for the past five years has been—

				Lb.					Lb.
1898	...	...	...	2,383	1901	...	...	...	2,403
1899	...	...	...	1,850	1902	...	...	...	1,755
1900	...	...	...	2,096					

The total area under vines, which in 1901 was 1,990 acres, in 1902 fell to 1,559—a decrease of 431; of this diminished quantity 362 acres belonged to the Roma district, and are wholly accounted for by the drought. Vignerons there are not dismayed by their losses, however, and are now engaged in replenishing their vineyards. The demand this year for cuttings from the vineyards of the Department has been so large that it has been impossible to supply applications in their entirety, and it has been found necessary to rescind, for a limited period, the prohibition of the importation of grape vine cuttings from South Australia, and to permit vignerons to obtain cuttings from that State under conditions which preclude the introduction of vine diseases.

The district obtaining the highest yield in 1902 was Warwick with 3,431 lb. to the acre, followed by Toowoomba with 2,601 lb., and Brisbane with 2,536 lb. In 1901, Toowoomba was the most successful with 4,213 lb.; then came Warwick with 3,821 lb., and Brisbane with 3,002 lb. The quantities of wine made and of brandy distilled during the past five years have been—

		Wine Made. Gallons.	Brandy Distilled. Gallons.			Wine Made. Gallons.	Brandy Distilled. Gallons.
1898	...	134,334	1,115	1901	...	148,835	1,112
1899	...	131,045	615	1902	...	100,852	2,199
1900	...	132,489	1,055				



Excluding 1902, it will be noticed that the production has not varied much; but that there is considerable scope for increase in it is shown by the imports, which for 1902 were valued at £30,787. To this total New South Wales wine contributed £5,384, Victorian wine £9,860, and South Australian wine £6,671. The corresponding amounts for the preceding year were—New South Wales, £2,989; Victoria, £2,248; and South Australia, £5,277.

TABLE A.

STATEMENT showing the PERCENTAGE OF DECREASE of the PRINCIPAL CROPS during 1902 as compared with 1901.

Produce.	1901.	1902.	Decrease per cent.
Grain—			
Wheat ... ..	1,692,222 bush.	6,165 bush.	99·63
Oats ... ..	42,208 "	520 "	98·76
Barley—			
Malting ... ..	193,538 "	1,749 "	99·09
Other ... ..	83,499 "	1,846 "	97·66
Maize ... ..	2,569,118 "	1,033,329 "	59·77
Rye ... ..	5,000 "	238 "	95·24
Rice ... ..	5,222 "	1,093 "	79·06
Potatoes—			
English ... ..	22,402 tons	3,257 tons	85·46
Sweet ... ..	17,128 "	7,165 "	58·16
Sugar-cane... ..	1,180,091 "	641,927 "	45·60
Arrowroot (commercial)...	4,069 "	1,641 "	59·67
Tobacco (cured leaf) ... ..	5,848 cwt.	1,818 cwt.	68·91
Coffee ... ..	130,293 lb.	113,301 lb.	13·04
Pumpkins and Melons ... ..	56,297 tons	6,087 tons	89·18
Hay, Wheat	15,096 "	1,049 "	93·05
Oats ... ..	36,321 "	3,915 "	89·22
Barley ... ..	600 "	60 "	90·00
Rye ... ..	972 "	208 "	78·49
Lucerne ... ..	66,888 "	16,146 "	75·86
Panicum ... ..	2,102 "	1,714 "	18·45
Vines—			
Wine made ... ..	148,835 gals.	100,852 gals.	32·23
Grapes gathered ... ..	4,063,109 lb.	2,284,404 lb.	43·77
Bananas ... ..	2,313,719 bunches	1,160,015 bunches	49·86
Pineapples ... ..	359,717 doz.	260,444 doz.	27·59
Oranges ... ..	1,880,264 "	1,191,242 "	36·64

TABLE B.

STATEMENT showing the VALUE of AGRICULTURAL EXPORTS, the PRODUCE and MANUFACTURE of this STATE during the Years 1900, 1901, and 1902.

Exports.	Value.		
	1900.	1901.	1902.
	£	£	£
Sugar, molasses, and syrups ... ..	678,681	792,329	948,951
Grain ... ..	437	3,013	26,890
Hay and chaff ... ..	1,500	2,646	1,270
Dairy and auxiliary industries ... ..	101,269	129,724	67,921
Fruit ... ..	104,747	102,630	124,760
Produce of root crops ... ..	3,674	4,857	4,681
Vegetables ... ..	4,013	5,875	3,338
Other ... ..	9,840	13,878	49,670
Total ... ..	£904,161	£1,054,952	£1,227,481

TABLE C.

TABLE showing the RELATIVE VALUES of EXPORTS, the PRODUCE of the STATE during the Years 1900, 1901, and 1902.

	1900.		1901.		1902.	
	Value.	Percentage of Total.	Value.	Percentage of Total.	Value.	Percentage of Total.
	£		£		£	
Agricultural ... ..	904,171	9·67	1,054,952	11·71	1,227,481	14·06
Pastoral ... ..	5,248,785	56·11	4,750,353	52·72	3,934,171	45·05
Mineral ... ..	2,894,689	31·91	2,933,147	32·56	3,164,332	36·24
Other ... ..	217,044	2·31	271,244	3·01	406,071	4·65
Total ... ..	£9,534,689	100·00	£9,009,696	100·00	£8,732,058	100·00



Appended are Reports from—

The Principal of the Queensland Agricultural College.  
 Manager of the State Farm, Westbrook.  
 Manager of the State Farm, Hermitage.  
 Manager of the State Farm, Biggenden.  
 Manager of the State Farm, Gindie.  
 Manager of the State Nursery, Kamerunga.  
 The Inspector and Valuator under the Sugar Works Guarantee Acts.  
 The Instructor in Fruit Culture.  
 The Instructor in Coffee Culture.  
 The Tobacco Expert.  
 The Viticulturist.  
 The Colonial Botanist.  
 The Entomologist and Vegetable Pathologist.  
 Director of the Botanic Gardens and Government Domain.  
 Trustees of the Queensland Museum.  
 The Chemistry Division.  
 Secretary Meat and Dairy Board.  
 The Chief Inspector of Stock.

The Report required by "*The Sugar Experiment Stations Act of 1900*" is in course of preparation, and will be tabled in both Houses at an early date.

I have, &c.,

D. DENHAM,

Secretary for Agriculture.

#### REPORT OF THE PRINCIPAL OF THE QUEENSLAND AGRICULTURAL COLLEGE.

SIR,—I have the honour to submit the following Report on the work carried out at this institution during the year ending 30th June, 1903, together with extracts from reports submitted to me by the officers who preside over the different departments:—

I am pleased to say that no change has taken place in the teaching staff, with the exception that Mr. Quinn, of the Department of Public Works, and late mechanical master at this College, has been engaged to give lectures here on alternate weeks. Mr. Quinn's lectures on the construction of buildings, engine-driving, and other matters relating to buildings and machinery have been much appreciated, and are of very great value to students who intend going on the land.

There has been perfect harmony among the officers of the institution, and the work in every department has been carried on with exceptional vigour. It is pleasing to be able to report in this manner, because I have realised before now that want of *esprit de corps* among a teaching staff detracts considerably from successful progress in this and other similar institutions.

A careful perusal of the different sections of this report will, I think, convince anyone that the College is furnishing a liberal and thorough practical education to the students within its walls, and also disseminating by correspondence knowledge on various matters in connection with products raised from the soil, breeding, feeding, and raising live stock, &c., of inestimable value to this State. In fact, every branch of work in connection with the cultivation of the soil is receiving the best attention, and, it is thought, is being taught by competent officers. This includes agriculture in all its branches, both practical and theoretical, backed up by theoretical and practical chemistry, and experiments carried out on the farm, together with an up-to-date system of book-keeping. The horticultural department comes in for a large share of attention, included with which are fruit-growing and vine culture. Two hours per week are devoted to botany, and it may thus be seen that the students are made acquainted with the habits and growth of the different varieties of plant life. Dairying, in all its branches, is given the attention which I consider necessary to enable students to work their own dairies or to take the management of factories or creameries. The methods of breeding, feeding, and raising live stock are backed up by lectures and practical demonstrations by a qualified veterinary surgeon. Pig-raising, with bacon-curing, is also a branch of College work, and, being of very great importance, is given the necessary attention. Bee-keeping and poultry-raising are now carried on here on a reasonably large scale, or, at any rate, to such an extent as to enable students to acquire the necessary knowledge to undertake the business themselves. Sheep-breeding on a small scale is also a branch of College education. Blacksmithing, carpentry, and engineering are among the most popular branches of College work, and are given much consideration. English, arithmetic, mensuration and land surveying, and farm bookkeeping are given a good deal of attention. In fact, all matters from which young men going on the land are likely to derive benefit are carefully considered by myself and the teaching staff, and when a student has made rapid progress in class work, and has acquired a knowledge sufficient to fit him for a higher division, he is immediately transferred to a class in a more advanced part of the College teaching, and in which, by his careful study and energy, he has fitted himself to take part. There is no thought of turning out scientific men, but no effort is spared in aiding the development of men who will do credit to the institution as advanced agriculturists. This will be demonstrated by facts regarding the movements of ex-students, to be referred to later on in the report under the heading of "Progress made by ex-students."

In submitting this report, I propose to deal with each branch department separately. In reviewing the year's work, it is much to be regretted that, owing to the drought, I am unable to report favourably upon the results obtained from the labour bestowed upon the cultivation of the soil. Many crops were planted and never harvested, and the bright prospects, which were so promising in the early part of the year, were blighted by the continued drought, which detracted considerably from our success financially, and, also added considerably to the keeping up of the institution, not only as regards the cost of fodder for our live stock, but also in the case of meat, bread, and other necessaries of life. Had we not had the misfortune to lose our conserved fodder by fire (referred to in my last report), the cost of feeding our stock would have been nil.



STUDENTS IN ATTENDANCE.—The number of students attending the College was, notwithstanding the very trying time, most satisfactory. During the first term, we opened with 53 on the roll, and 55 were enrolled for the second term. Eighteen left at the end of the first, and 20 new students joined during the second term. We had several students from New South Wales, and one from England.

SPECIAL SUBJECTS.—A number of students, at the request of their parents, were allowed to take up special lines of practical work, combined with indoor technical lectures, to fit themselves for the various branches of agriculture which their inclinations and circumstances led them to follow. These students are young fellows, for the most part over twenty years of age, and may be termed short, or special, course students. The best results accrue from this system, but the number must be limited, otherwise the "full course" students must suffer through the crowding of a few of the most important departments.

During the first term of the year under review, there were seven specials—two gardening, two farm and dairy, two dairy, one gardening and dairy. In the second term there were thirteen—three farm, three dairy, two garden, four farm and dairy, one garden and dairy students. Another matter worthy of consideration with regard to adult short course students is that they are old enough to at once take up the responsibility of managing their own affairs, whereas in the case of a lad, seventeen or eighteen years of age, he will be hardly old enough to enable him to be entrusted with a big responsibility, notwithstanding the fact that he may have had a first-class training in every branch of agriculture.

The conduct of the students, both in the field and class-room, has been, I am pleased to be able to state, exceptionally good, and, when allowance has been made for buoyancy of spirits, I must confess that their conduct right through has been most creditable. Officers in charge of the various departments report favourably in this connection.

In addition to the College teaching staff we have had the services of the following visiting lecturers:—Dr. A. G. Macdonald, first aid; J. F. Bailey, botany; W. C. Quinell, veterinary science; Messrs. Voller and Rainford gave practical demonstrations in vine and fruit culture respectively; Mr. Quinn held classes in building construction, and engineering. The assistance rendered by these gentlemen is worthy of my best thanks. Their work was much appreciated, and formed a valuable addition to the College teaching. I think I am justified in saying that the College teaching staff is of a high standing; and, while we do not claim to turn out in such a short period of instruction all-round experts, we do claim to be turning out young men well fitted to be successful in any branch of agricultural industry to which their inclination or circumstances may lead them. The following are the grade-sheets for December and June respectively:—

QUEENSLAND AGRICULTURAL COLLEGE.

TERM GRADE SHEET.—DECEMBER, 1902.

Division.	Agriculture, Theory.	Arithmetic.	Botany.	Chemistry, Theory.	Chemistry, Practical.	Dairying, Theory.	Pig-raising and Bacon-curing.	Bookkeeping.	Elementary Science.	English.	Veterinary Science.	Animal Anatomy and Physiology.	Menstruation.	Horticulture, Theory.	Surveying.	Technical Drawing.	Building Construction.	Blacksmithing.	Carpentering.	Dairying, Practical.	Farming, Practical.	Gardening, Practical.	Conduct.	Diary.	
THIRD	H. G. Baker	61	...	48	56	81	52	...	...	...	60	...	...	...	25	20	18	60	60	60	90	77	90	52	
	W. Chataway	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
	D. Deighton	70	70	42	66	90	80	...	...	...	40	...	...	...	91	75	25	26	60	80	75	85	88	93	
	W. Eastgate	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
	L. McCready	50	...	83	76	60	50	...	...	...	...	...	...	...	...	...	...	60	80	...	75	80	75	61	
	T. Story	62	...	89	83	34	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
	A. Thynne	66	60	38	50	88	70	...	...	...	...	71	...	...	...	...	...	...	...	...	70	90	...	100	
	F. Walker	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	95	...	80	95	80	95	86
SECOND	G. Abraham	49	66	66	57	52	55	99	...	...	36	...	87	60	...	50	24	40	60	54	70	68	65	81	
	F. Boase	59	43	40	48	41	56	68	...	...	47	...	35	61	...	40	29	50	...	56	90	78	100	78	
	F. Butler	72	65	77	83	89	89	...	...	...	59	...	69	70	...	49	26	60	70	60	80	83	75	79	
	F. Calcino	61	79	66	64	51	61	94	...	...	74	...	65	62	...	...	23	53	60	60	70	77	90	78	
	J. Curtis	66	...	83	80	77	90	...	...	...	43	...	78	70	...	...	...	...	...	...	...	...	...	...	
	A. Davies	50	35	58	64	61	58	88	...	...	41	...	46	53	...	...	33	60	...	65	90	85	90	85	
	L. Fudge	62	69	51	26	59	55	97	...	...	35	...	79	63	...	...	25	70	80	75	90	78	73	85	
	D. McDonald	63	51	30	47	35	50	29	...	...	38	...	10	30	...	20	10	60	70	50	85	78	65	66	
	C. Myers	50	13	32	18	52	57	25	...	...	52	...	1	59	...	25	15	70	60	50	80	65	78	63	
	J. Nuttall	80	22	56	43	69	94	100	...	...	72	...	60	90	...	30	31	70	70	57	75	74	65	90	
	F. O'Connor	65	...	40	76	61	82	...	...	...	45	...	...	70	...	...	...	...	...	...	90	65	100	...	
	P. Price	60	65	43	49	71	64	85	...	...	46	...	27	63	...	20	16	60	70	54	90	77	90	71	
	J. Purcell	61	51	54	71	68	66	99	...	...	65	...	41	62	...	20	24	60	70	58	70	68	88	88	
	M. Shield	74	89	72	46	60	83	67	...	...	70	...	67	64	...	...	30	80	90	57	90	72	95	80	
	D. Shine	50	35	38	47	63	60	83	...	...	69	...	23	67	...	50	30	50	60	40	70	53	75	66	
	S. Smith	40	31	34	55	61	62	48	...	...	39	...	23	48	...	30	26	60	50	55	65	60	73	59	
	F. Stumm	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	L. Walters	40	...	13	40	48	69	66	49	...	...	67	...	12	39	...	20	11	50	53	65	68	70	79	
A. Webster	...	...	31	30	...	...	45	...	...	...	...	32	...	...	...	...	65	70	51	70	76	85	66		
H. Wolfe	63	...	39	58	69	60	26	...	...	...	...	43	...	...	30	11	50	60	44	70	55	71	72		
FIRST	L. Alcock	53	33	42	...	71	50	...	54	45	...	0	...	45	...	...	50	60	56	90	81	70	67		
	F. Clewett	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
	L. Corser	47	52	26	...	45	48	...	36	25	...	0	...	54	...	...	...	...	...	90	90	...	100	...	
	A. Cran	54	30	6	...	50	40	...	45	59	...	0	...	40	...	...	60	80	56	90	80	87	73	...	
	H. Dalrymple	75	25	66	...	50	71	...	59	69	...	20	...	64	...	...	50	70	60	85	74	75	55	...	
	J. Devereux	46	2	...	...	69	57	...	24	44	...	...	...	50	...	...	60	80	56	80	80	75	49	...	
	W. Donaldson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	80	90	56	90	80	95	58	...	
	O. Hardgrave	53	52	47	...	57	30	...	67	...	...	...	...	...	...	...	80	...	...	90	84	93	80	...	
	W. Mahony	42	33	20	...	60	40	...	45	66	...	0	...	35	...	...	58	60	50	80	71	87	76	...	
	D. Macansh	85	...	70	...	95	75	...	80	...	97	...	55	...	...	...	80	80	56	70	74	90	80	...	
	P. McLean	81	59	32	...	72	75	...	79	50	...	56	...	70	...	...	90	85	...	90	70	90	78	...	
	C. O'Connell	45	11	8	...	58	50	...	28	51	...	11	...	33	...	...	70	80	61	90	...	80	53	...	
	E. Peirce	35	8	0	...	45	30	...	23	67	...	16	...	45	...	...	50	60	...	60	51	83	67	...	
	E. Poulsen	76	78	48	...	93	58	...	74	55	...	35	...	60	...	...	60	85	58	70	68	88	75	...	
	A. Smart	78	94	40	...	88	54	...	63	87	...	15	...	35	...	...	60	70	54	70	62	90	79	...	
	L. Robinson	49	16	...	...	60	35	...	38	62	...	...	...	10	...	...	60	...	...	65	80	...	86	46	
	R. Scott	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	E. von Stieglitz	48	9	0	...	53	30	...	26	24	...	0	...	35	...	...	70	70	50	95	82	100	...	...	
	A. Tate	...	4	0	...	40	10	...	12	34	...	0	...	41	...	...	60	...	...	40	50	58	75	64	
	W. Taylor	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
A. Thorn	45	7	9	...	51	43	...	14	25	...	0	...	44	...	...	80	85	...	...	83	85	...	...		
G. Newman-Wilson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	70	...	55	85	80	100	...	...	



QUEENSLAND AGRICULTURAL COLLEGE.  
GRADE SHEET.—JUNE, 1903.

Division.																									
	Agriculture, Theory.	Arithmetic.	Botany.	Chemistry, Theory.	Chemistry, Practical.	Dairying, Theory.	Pig-raising and Bacon-curing.	Bookkeeping.	Elementary Science.	English.	Veterinary Science.	Animal Anatomy and Physiology.	Mensuration.	Physics.	Surveying.	Poultry Raising.	Horticulture, Theory.	Blacksmithing.	Carpentering.	Dairying, Practical.	Farming, Practical.	Gardening, Practical.	Conduct.	Diary.	
THIRD.	H. G. Baker	...	...	...	...	58	...	...	...	...	...	...	...	...	...	59	...	45	80	56	85	70	65	...	
	F. Calcino	80	...	71	56	68	68	50	...	...	35	...	...	...	...	50	64	45	...	78	80	80	94	74	
	W. Chataway	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	60	80	...	95	90	100	...	
	S. Corser	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	60	...	...	90	...	70	...	
	D. Deighton	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	55	90	90	90	...	100	...	
	W. Eastgate*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	60	70	58	85	70	50	0	...
SECOND.	G. Abraham	49	...	80	64	58	67	50	...	...	78	...	...	...	90	64	62	60	70	60	70	75	60	37	
	F. W. Butler	67	...	54	64	65	82	75	...	...	76	...	...	...	90	60	70	70	...	80	80	80	65	70	
	J. Curtis	64	...	40	74	66	75	80	...	...	75	...	...	...	90	64	85	70	90	80	85	80	85	77	
	A. Davies	65	...	42	37	42	55	84	...	...	28	...	...	...	64	71	40	60	50	...	60	65	60	71	
	J. Devereux	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	80	90	...	85	...	85	...	
	L. Fudge	49	...	69	32	40	60	40	...	...	50	...	...	...	72	66	58	80	90	...	90	...	90	80	
	D. McDonald	50	...	53	15	20	50	65	...	...	30	...	...	...	24	62	60	60	80	52	80	70	70	43	
	J. Nuttall	75	...	24	33	20	57	76	...	...	62	...	...	...	75	60	85	70	...	55	75	85	85	91	
	F. O'Connor	...	...	...	...	...	66	...	...	...	...	...	...	...	...	...	...	75	...	60	70	...	100	...	
	P. Price	70	...	44	30	38	64	53	...	...	80	...	...	...	18	56	53	70	80	...	80	80	65	53	
	J. Purcell	62	...	20	30	49	60	45	...	...	56	...	...	...	...	58	80	65	...	...	70	90	100	81	
	M. Shield	70	...	74	56	38	60	85	...	...	60	...	...	...	78	53	65	80	90	...	80	80	95	63	
	D. Shine	52	...	20	27	39	50	65	...	...	40	...	...	...	15	61	63	60	60	51	70	80	90	73	
	E. von Stieglitz†	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	H. Wolfe	43	...	46	27	37	48	45	...	...	33	...	...	...	27	51	50	45	40	40	50	60	45	25	
FIRST.	F. Alcock	56	73	40	57	...	65	58	79	...	0	66	...	...	57	...	60	...	...	80	90	80	0	...	
	R. Baker	40	32	25	22	...	56	55	44	...	0	34	...	...	40	...	65	...	48	74	65	100	81	...	
	R. Bentley	60	81	60	12	...	60	52	85	...	7	72	...	...	54	...	50	...	58	70	...	100	81	...	
	A. Blomfield	60	81	65	75	...	62	52	100	...	0	72	...	...	57	...	60	50	49	70	...	100	73	...	
	T. Butler	56	64	51	25	...	51	40	78	...	16	75	...	...	0	...	50	70	47	60	...	65	82	...	
	C. Cameron‡	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	P. Callaghan	40	6	...	0	...	32	25	41	...	0	13	...	...	30	...	60	50	46	65	68	65	33	...	
	H. Chambers	50	52	48	23	...	57	43	62	...	10	50	...	...	42	...	50	60	58	70	68	100	64	...	
	L. Corser	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	60	...	57	85	...	85	...	
	H. Dalrymple	65	48	46	50	...	70	80	52	...	19	44	...	...	59	...	65	90	60	80	85	85	0	...	
	M. Fahy	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	60	40	...	85	...	85	...	
	O. Hardgrave	62	77	60	42	...	53	35	38	...	14	65	...	...	58	...	60	...	42	75	65	65	76	...	
	W. Heness	40	...	7	0	...	33	35	...	...	0	...	...	...	35	...	45	40	38	60	70	90	60	60	
	H. Hillcoat	36	10	18	4	...	40	40	49	...	0	8	...	...	34	...	45	60	40	65	68	90	68	...	
	J. Laidlaw	52	25	24	11	...	56	38	41	...	0	30	...	...	46	...	55	...	59	80	80	90	32	...	
	H. Lamont	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	90	...	100	...	...	
	J. Macansh	80	63	63	76	...	84	70	65§	...	95	70	...	...	46	...	60	90	75	80	90	85	24	...	
	R. Macdonald	50	2	33	10	...	53	60	30	...	0	7	...	...	53	...	55	50	55	70	80	10	74	...	
	W. Mahony	39	52	66	45	...	57	40	43	...	18	8	...	...	56	...	60	60	50	70	70	80	76	...	
	P. McLean	68	89	...	80	...	75	75	84	...	abs.	57	...	...	59	...	80	90	65	85	...	90	77	...	
	J. Muir	50	...	...	...	...	56	...	...	...	...	...	...	...	59	...	70	...	60	80	80	100	...	...	
	C. O'Connell	54	4	...	...	...	48	50	33	...	0	8	...	...	51	...	60	...	...	70	70	70	29	...	
	E. O. Peirce	45	10	31	31	...	39	43	18	...	5	1	...	...	52	...	55	50	40	70	69	60	66	...	
	J. M-Prior	45	27	35	5	...	47	35	64	...	5	14	...	...	49	...	50	...	...	70	62	100	67	...	
	J. Proud†	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	R. B. Ralfe	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	G. Robertson	50	45	51	26	...	65	72	98§	...	12	12	...	...	70	...	50	40	59	75	75	94	83	...	
	R. Scott	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
A. Smart	71	91	59	65	...	63	60	79	...	32	64	...	...	60	...	60	80	57	70	72	70	45	...		
R. Smythe	78	44	40	43	...	56	45	68	...	51	31	...	...	80	...	60	80	...	65	70	95	80	...		
A. E. Tate	30	...	...	...	...	25	...	...	...	...	...	...	...	...	...	...	40	...	36	50	...	60	...		
W. E. Taylor	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	80	...	68	85	80	80	...		
A. Thorn	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	60	90	56	85	80	85	...		

\* Absent from examinations. † Withdrew at mid-term. ‡ Absent through illness during greater part of term. § Diploma paper.

AGRICULTURE—FIRST YEAR, JUNE, 1903.

Maximum, 100; Credit, 75; Pass, 50.

Time—2 hours.

- (a) What is the object of cultivation? (b) In what way does the mechanical texture of soils influence the growth of plants? (c) State how fertility may be increased by natural means? (d) How does cultivation of the surface soil prevent evaporation? (e) What are the sources of plant food?
- (a) Classify soils from an agriculturist's standpoint. (b) Describe what you would claim to be a first-class agricultural soil. (c) State indications of barrenness and fertility of soils from a casual inspection of same.
- (a) What is meant by a soil becoming exhausted, and how does this condition arise? (b) What is the difference between a naturally sterile soil and a soil exhausted by continuous cropping? (c) State how the inactive ingredients in soils become active. (d) How does fallowing improve the fertility of the soil? (e) What condition of the soil would induce you to adopt a system of green manuring?
- State the class of soil which you would consider suitable for the growth of—(a) wheat, (b) oats, (c) barley, (d) rye, (e) maize, (f) lucerne, (g) root crops.
- (a) State the method of cultivation you would adopt for the successful growth of cereal crops. (b) Treatment of seed before planting. (c) Quantity of seed per acre and method of cultivating after planting, and cost of same? (d) What is meant by a rotation of crops?
- State how you would be guided as to when cereal crops are ready for harvesting—(a) for grain, (b) for hay. (c) Give approximate cost of harvesting and stacking same. (d) What do you consider to be a good yield per acre for wheat, barley (malting), oats, and rye respectively? (e) What is considered to be a good yield of hay per acre from the following crops:—Wheat, oats, panicum, and lucerne respectively?
- (a) State the class of soil which you would select upon which to grow lucerne. (b) Method of preparing the land for growth of same. (c) Depth of planting, and quantity of seed per acre. (d) What is considered to be a good yield of lucerne hay per acre? (e) At what stage of growth should lucerne be cut for hay-making purposes?
- (a) State what you know about the class of soil suitable for the growth of root crops, and method of planting same. (b) What do you consider to be a good yield of potatoes, (c) Swede turnips, (d) carrots, (e) beets?
- (a) What is the object of drainage? (b) What class of soil needs drainage most? (c) Is it necessary to have the land well drained before adopting a system of irrigation? Why? (d) Write what you know about the methods of applying water on the garden and on the lucerne land. (e) Would you use any precaution regarding the application of water if the nature of the subsoil was unfavourable?
- State what you know about manures, and their application to different soils and various crops.



## AGRICULTURE—SECOND AND THIRD YEAR, JUNE, 1903.

- (a) What are soils? Of what do they consist? What form the inorganic and organic constituents of the soil? (b) Name the soils which you consider to be the most fertile. (c) What soils are best adapted for the absorption and retention of moisture?
- (a) In what way may soils be benefited by drainage? (b) What soils need drainage most? (c) State how you would be guided in laying out a system of drainage? (d) What effect has badly drained soil on plant life?
- (a) State the methods of cultivation you would adopt to enable you to obtain the best results? (b) Do you approve of deep cultivation? If so, why? (c) Do you recommend bringing a large quantity of the subsoil to the surface? State what you know about this matter. (d) State what you know about the nitrification of soils. By what means is it brought about?
- (a) What is gained by a rotation of crops? (b) State the lines on which you would carry out a system of rotation.
- (a) State what you know about barnyard manures and their value from the different sources. (b) Name methods you would adopt in saving same. (c) Methods of application to the land. (d) Write what you know about artificial manures. (e) How would you be guided as regards the requirements of manures for the various soils? (f) What condition of the soil would induce you to apply manures? (g) State the manures that are favourable to the growth of different crops.
- State briefly what you know about the methods of planting, and quantity of seed required per acre, for the following crops:—(a) Barley, wheat, oats, rye, maize. (b) Cowpea, field-peas, beans, lucerne. (c) Sorghum, amber-cane, broom millet, Hungarian millet, panicum. (d) Root crops, carrots, mangolds, Swede turnips, beets, potatoes, onions.
- State what you know about harvesting cereal crops (a) for grain, (b) for hay. (c) State what you know about harvesting and saving lucerne; also yield of hay per acre.
- (a) State what you know about the feeding and care of horses and cattle kept on the place. (b) Describe how you would tell the age of a horse, (c) a sheep, (d) horned cattle.
- (a) State what you know about the daily ration for a working horse, (b) a milch cow. (c) Does shelter cause a saving of food? If so, why? (d) Name the foods that are most suitable for milk production. (e) Name most economical food.
- (a) State what you know about the crops most suitable for ensilage. (b) Value of ensilage as a food for stock. (c) What chemical change takes place during the process of siloing? (d) Give brief description of a silo and methods of filling same.

## ARITHMETIC—FIRST YEAR, MAY, 1903.

- Divide 8·31183 by 23·05, and 8311·83 by 02305.
- Find the net return to a farmer who consigns 10 tons 16 cwt. 3 qr. 21 lbs. of chaff to an agent; the selling price of the chaff being £4 per ton; expenses paid by agent, £4 4s. 4d; and commission, 5 per cent.
- Check the computation of the value of the above consignment by decimal method.
- How many working hours will it take a mower with 4-feet cut, travelling at an average rate of  $1\frac{1}{2}$  miles per hour, to cut out a paddock of 16 acres?
- Which is the best dairy cow, judging by the following tests:—

a	{	Morning, 14 lbs. milk; Babcock test, 4·6;
	{	Evening, 12 lbs. milk; Babcock test, 4·9?
b	{	Morning, 13 lbs. milk; Babcock test, 5·3;
	{	Evening, 11 lbs. milk; Babcock test, 5·4?
c	{	Morning, 20 lbs. milk; Babcock test, 3·2;
	{	Evening, 17 lbs. milk; Babcock test, 3·6?

Give yield of commercial butter in each case.

- Find simple interest on £325 3s. 9d. for three years 73 days at  $3\frac{3}{4}$  per cent.
- Multiply £2 16s. 10·75d. by 144·33; and divide £4,753 14s. 7·95d. by 234·5.
- A bankrupt owes £9,632 6s. 3d.; his assets are £5,618 16s. 11 $\frac{3}{4}$ d; how much can he pay in the £?
- For what sum should a cargo, worth £5,263, be insured at  $7\frac{2}{3}$  per cent., so that in case of loss the owner may recover the value both of cargo and premium?
- Find compound interest on £3,750 at 5 per cent for 3 years.
- A man buys 5 tons 7 cwt. 2 qr. of potatoes at £1 per ton; his expenses on the same amount to £2 15s. He sells at 2s. per quarter. Find his total gain, and gain per cent.
- How many roots of *Paspalum dilatatum* grass will be required to plant an area of 4 acres 2 roods 15 perches, the roots being set 3 feet 6 inches apart each way?

## THEORETICAL CHEMISTRY—SECOND AND THIRD YEAR.

- Give the names and formulæ of the phosphates of lime used as manures, stating in what manures the different phosphates occur, their relative manurial merits, and their origin. Give equation representing the action of sulphuric acid upon bonedust?
- Compare the manurial values of excreta from cattle and horses. Make a comparison between the use of farmyard manure and artificial manures.
- You wish to apply to the land 40 lbs. nitrogen, 62 lb. potash ( $K_2O$ ), and 40 lbs. phosphoric acid ( $P_2O_5$ )—how much ammonium sulphate, potassium sulphate, and superphosphate must be used? Assume that the ammonium and potassium salts are pure, and that the superphosphate contains 28·01 per cent. of lime—  
H = 1, N = 14, O = 16, K = 39·1, S = 32, Ca = 40, P = 31.
- Name the principal constituents in a fodder, and state their functions. Calculate the value of the following feed:—1 lb. lucerne hay,  $\frac{1}{2}$ -lb. wheaten chaff,  $\frac{1}{4}$ -lb. molasses.

	Lucerne Hay.	Wheaten Chaff.	Molasses.
Dry R. Matter...	91·6	90·4	75·0
B. P. ...	14·3	3·4	...
C. ...	42·7	43·4	70·0
F. ...	2·2	1·3	...

- Mention some salts which at times render water unfit for irrigation. A water contains:—

Cl, grammes per 1,000 c.c.	1·0973
SO <sub>3</sub> , grammes per 1,000 c.c.	·1147
CaO, grammes per 1,000 c.c.	·0803
Na <sub>2</sub> O, grammes per 1,000 c.c.	·9495
K <sub>2</sub> O, grammes per 1,000 c.c.	·0785

What salts are probably present, and in what proportions? (Cl = 35·37.)



## PRACTICAL CHEMISTRY—SECOND AND THIRD YEAR.

*First portion.*

Determine qualitatively the bases and acids in the four given substances.

*Second portion.*

- A. Find the amount of ferrous iron in given solution. Describe the method of determination, giving the reactions which take place.  
 B. Determine volumetrically the chlorine in given sample of water (answer in grammes per 1,000 c.c.). Describe the method of determination, and give the reactions which take place.

## THEORETICAL CHEMISTRY—FIRST YEAR.

1. State what you can about oxygen. What is said to occur when it combines with other elements? Give some examples of such combinations.
2. Tell all you can about nitrogen. Describe the value of Nitrogen to a farmer, and by what means and in what substances it is made use of by him.
3. Explain the following terms, giving examples:—Element, compound, salt, acid, alkali.
4. What is the composition of water? State some means of decomposing water. Explain the term, "the point of maximum density of water." Why does water boil at lower temperatures at great heights? Give laboratory experiments illustrating this phenomenon.
5. What is the thermometer? Name and describe the two thermometers commonly used. Convert 50 degrees F. into degrees C., 25 degrees C. into degrees F.
6. State what you know about carbon dioxide, its properties, where it occurs. How can it be formed in the laboratory? Give equation.
7. What do you understand by plant foods? Name the four most important. Mention the substances containing these plant foods used by the farmer.
8. How many tons of limestone must be treated to form 5 tons of quicklime.  $\text{Ca. C, O}_3 = \text{CaO} + \text{CO}_2$   
 $\text{Ca} = 40, \text{C} = 12, \text{O} = 16$ .

## DAIRYING—SECOND AND THIRD YEAR.

1. State what precautions you would take in building up a dairy herd. Give a brief description of the points of a good dairy animal. What do you consider to be a good yield of milk per cow for a milking period of nine months?
2. State what you know about the feeding and rearing of calves, quantity of milk per day, age at which they should be weaned, results from neglect and bad rearing.
3. Give a brief description of the methods you would adopt in feeding dairy stock to enable you to obtain the best results. What are the most economical foods for milk production? State what ingredients a well-balanced ration should contain; what quantities of the different foods do you consider to be a daily ration?
4. Give constituents of fresh whole milk, with brief notes on each, and state how they are distributed in cheese-making.
5. Explain method of the pasteurisation of cream, and state how such treatment would benefit the industry in this State.
6. Give method of preparing pure lactic acid starter for cream-ripening; explain the use and benefits accruing therefrom.
7. Write an essay on cheese-making.
8. Write an essay on butter-making and packing for export.
9. Give composition of—(a) commercial butter, (b) cheese, (c) specific gravity of whole milk and of cream.
10. Would you advise the grading of cream received at factories? And, if so, give reasons and the characteristics of each grade.

## DAIRYING—FIRST YEAR STUDENTS, JUNE, 1903.

1. Write an essay on the proper method of milking.
2. Explain the treatment of milk after it has been drawn from the cow, and previous to its being forwarded to the factory or used for the manufacture of dairy products.
3. Give (a) composition of milk, (b) temperature of milk when drawn from the cow, (c) temperature suitable for separating.
4. Explain the principle of a cream separator.
5. Explain how you would treat the cream previous to churning, and your reasons for doing so.
6. Write an essay on churning.
7. The yield of milk and average test for the month of January last of the following cows being given, find the yield of commercial butter from each cow:—

"Rosebud,"	1,055 lbs. of milk,	testing 3.6 per cent. butter fat.
"Kit"	858 " " "	4.0 " "
"Ivy,"	622 " " "	4.8 " "

8. (a) State the lines you would follow in building up a dairy herd. (b) Name some of the breeds of cattle best adapted for milk production. (c) What means would you adopt to improve the present Queensland dairy herds? (d) Would you give any consideration in selecting cattle to be kept on various classes of country? (e) What means would you adopt to keep your herd free from disease?
9. (a) Explain briefly the most important points to be observed in selecting a dairy beast. (b) Would the good qualities of a show ring beast be a sufficient guide for you to make a purchase? (c) State the lines upon which you would rear calves, age at which they should be weaned, and other matters of importance in this connection.
10. (a) State what you know about feeding milch cows, and most suitable and economical foods, (b) a daily ration, (c) a well-balanced ration. (d) What crops are the best and most economical for the purpose of siloing? (e) What chemical change takes place in the saving of ensilage?

## PIG RAISING AND BACON CURING—SECOND AND THIRD YEAR STUDENTS, JUNE, 1903.

1. State what steps you would take in selecting and laying out a pig farm, including necessary buildings, &c.
2. What methods would you adopt to build up a herd of pigs? What breeds do you consider to be most profitable for bacon pigs?
3. (a) State what you know about the feeding and rearing of pigs. (b) At what age should pigs be weaned? (c) Castrated? (d) State age at which pigs should be fattened.



4. (a) What amount of flesh should a well-fed pig gain daily, *i.e.*, when the animal is well grown and first placed in the fattening pen? (b) What amount of food is a sufficient daily ration for a pig as above? (c) What is the difference between the live and dressed weight of a well-fed pig?

5. Write an article on bacon-curing?

BOOKKEEPING—FIRST YEAR, MAY, 1903.

1. Enter the following transactions in the ledger, close accounts, ascertain the amount of profit or loss, also capital, and make out the final balance-sheet:—

					£	s.	d.
July	1.—Value of land, stock, &c.	...	...	...	1,280	0	0
"	1.—Cash in hand...	...	...	...	8	15	6
"	1.—Cash in bank...	...	...	...	85	10	0
"	1.—Williams owes me	...	...	...	7	15	0
"	1.—Creamery Co. owes	...	...	...	25	7	0
"	1.—I owe Overell	...	...	...	3	15	0
"	1.—I owe Daniel...	...	...	...	1	19	0
"	3.—Creamery Co. settle last month's account.	...	...	...			
"	5.—Sell Daniel 5 fat bullocks at £6 each	...	...	...	30	0	0
"	6.—Settle Overell's account	...	...	...			
"	7.—Supplied Creamery Co. for week	...	...	...	5	19	0
"	8.—Sell Williams 4 tons 10 cwt. chaff at £3 per ton	...	...	...	13	10	0
"	10.—Sell for cash 5 weaner pigs at 12s. 6d. each	...	...	...	3	2	6
"	10.—Pay contractor for 20 chs. fencing at 10s. per chain	...	...	...	10	0	0
"	11.—Buy for cash single-furrow plough	...	...	...	5	0	0
"	14.—Supplied Creamery Co. for week	...	...	...	6	8	0
"	15.—Sell for cash Jersey bull	...	...	...	10	10	0
"	17.—Pay blacksmith for shoeing and repairs	...	...	...	2	8	0
"	19.—Sell Daniel 6 lambs at 10s. each	...	...	...	3	0	0
"	21.—Supplied Creamery Co. for week	...	...	...	6	7	0
"	22.—Sell Williams 40 bus. maize at 3s. per bus.	...	...	...	6	0	0
"	24.—Buy from Overell cornsheller	...	...	...	3	10	0
"	26.—Williams settles his account in full.	...	...	...			
"	28.—Supplied Creamery Co. for week	...	...	...	6	7	6
"	29.—Buy for cash draught mare	...	...	...	12	10	0
"	31.—Supplied Creamery Co. from 28th	...	...	...	3	15	0
"	31.—Owe Overell for groceries	...	...	...	3	8	0
"	31.—Owe Daniel for meat	...	...	...	2	1	0
"	31.—Owe Finney, Isles for drapery	...	...	...	5	15	0
"	31.—Personal expenses for month	...	...	...	2	11	0
"	31.—Paid for wages for month	...	...	...	7	10	0
"	31.—Value of land, stock, &c.	...	...	...	1,250	0	0

2. Into what three classes may accounts be divided? Under what headings will each of the accounts in the foregoing ledger be placed?

3. How would you enter the following transactions in ledger:—

July 8.—Sell Jones 80 bus. maize at 3s.	...	...	...	...	£12	0	0
" 10.—Jones pays for maize, less 5 per cent. discount.	...	...	...	...			

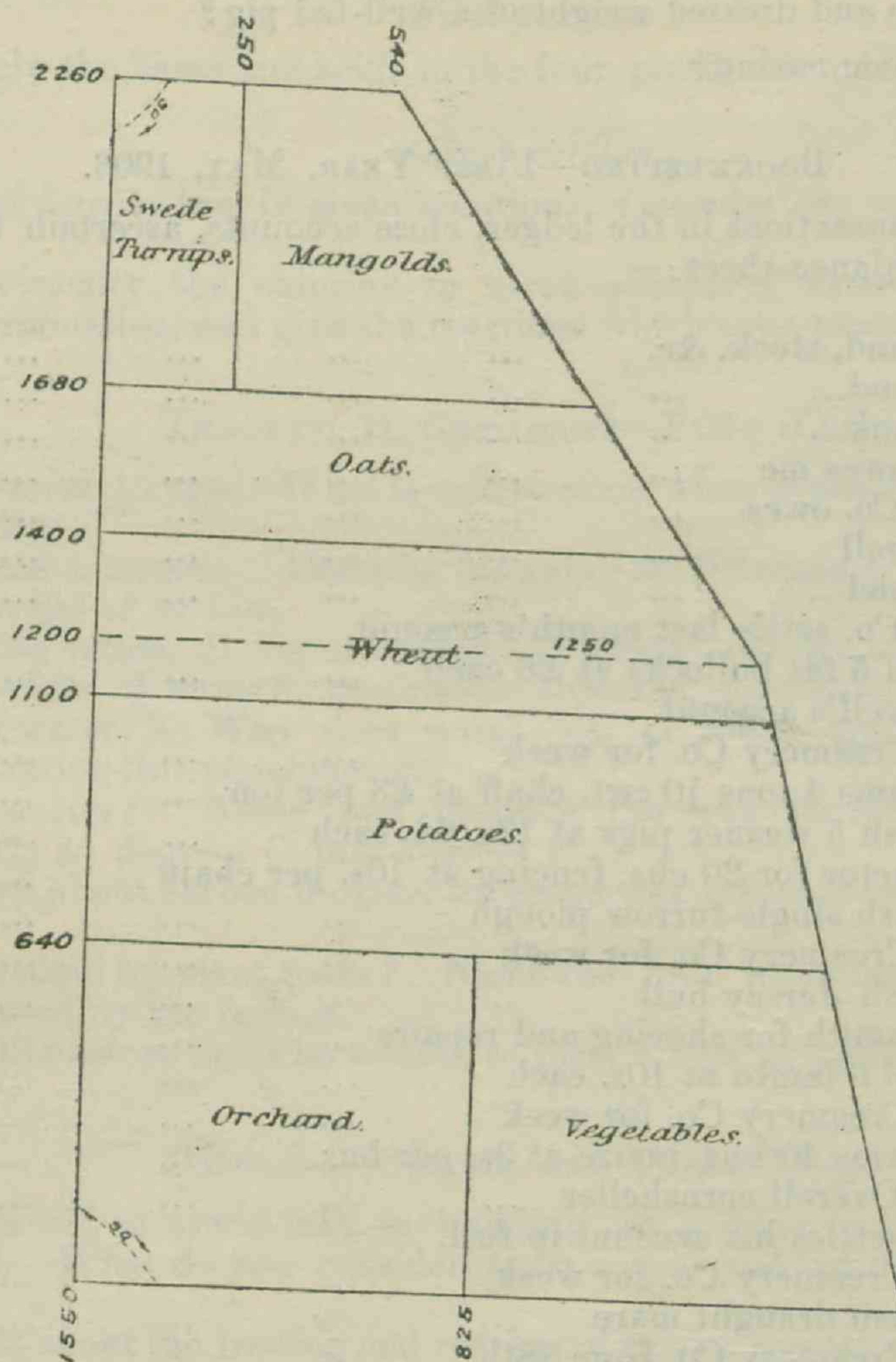
MENSURATION—FIRST YEAR, MAY, 1903.

1. From a rectangular paddock, the width of which is 1,523 links, it is required to fence off  $11\frac{1}{2}$  acres; what length will it be necessary to cut off?
2. In erecting the framework of a hayshed, 19 feet wide, to be roofed with 6-foot iron, what pitch must be given to the roof, allowing 1 foot on each side for overlap of iron and projection beyond eaves?
3. Calculate area of triangle the sides of which measure respectively 500, 530, and 600 links; and find value of the land at £6 10s. per acre.
4. Compute area from field-notes, and draw plan of land as nearly to scale as possible.

	△	
	1500	
	1320	360
280	1280	
	520	970
		0
	650	240
620	490	
	370	326
	△	



5. Make out field-notes for survey of block given below, compute area of each variety of crop, and check same by whole area.



SURVEYING.—SECOND YEAR, MAY, 1903.

1. In the following survey, compute omitted bearing and distance, close figure, and calculate area:—

Station	Bearing.	Distance.
	Deg. Min	
Station 1 to 2	87 30	1,500 links
" 2 to 3	165 21	2,800 "
" 3 to 4	288 50	500 "
" 4 to 5	00 12	1,000 "
" 5 to 1	Omitted	Omitted

2. From the following field-notes, compute rise, fall, and reduced level; also calculate quantity of earth in cubic yards to be removed to complete cutting:—

Back sight.	Intermediate.	Fore sight.	Distance.	Remarks.
13.90	...	...	0	Start of proposed cutting.
...	8.70	...	33 feet	
12.80	...	30	66 "	
...	5.20	...	99 "	
...	2.10	...	132 "	
2.40	...	5.80	165 "	
...	...	5.00	198 "	End of proposed cutting.

Width of roadway to be 15 feet, slope of sides 1 horizontal to 1 vertical.

POULTRY RAISING AND BEE-KEEPING—FIRST YEAR STUDENTS, JUNE, 1903.

1. State which are the best breeds for egg production; also whether they are sitters or non-sitters.
2. Which breeds are the best for all-round purposes, laying and table combined?
3. Which of the pure breeds make the best table birds?
4. What is the best food for egg production, and how many times per day should fowls be fed?
5. State which two pure breeds would produce the best cross-bred fowl—(a) considering early maturity and early laying, (b) a good market fowl.
6. State what you know about bee-keeping, naming the best kind of bees to keep for extracted or comb honey. How much honey would you expect from each hive in a year?

HORTICULTURE.

1. Give as fully as possible the necessary points to be considered when choosing the situation for a garden.
2. Describe the preparation of land for the cultivation of cabbages, cauliflowers, carrots, and beets; give distances to plant apart and thin out respectively; and name the kind of soil that suits them best.
3. What pests are troublesome to cabbages and cauliflowers, and how can they be checked? Give names and proportions of the various sprays.
4. What advantages are obtained by having level or slightly sloping land for a garden?
5. Describe the cultivation of land for a garden, giving the advantages of well-worked soil.
6. Is drilling or broadcasting most satisfactory in a garden? Give reasons for your opinion.
7. Give a full description, regarding preparation, of a seed bed from digging until the plants are fit for lifting.
8. Give a list of vegetables always sown in seed beds and afterwards transplanted, and a list of those that do best when drilled in.
9. How should young plants be treated when being removed from the seed bed? When is the most suitable time for transplanting?
10. What results are obtained from mulching? Give suitable material for same.



## PARTICULARS AS TO OCCUPATIONS OF NINETY-FIVE COLLEGE EX-STUDENTS.

- A. E. Anderson.—Assistant to Dr. Maxwell, Sugar Bureau, Bundaberg.
- P. M. Bayley.—During past three years has held the dual positions of manager and secretary of Pittsworth cheese factory. Handles 1,200 gallons of milk per day during a good season.
- C. H. Culpin.—Fruit-growing, Blackall Range, near Eumundi.
- A. E. Dyne.—Farming on the Maroochy River. Advises that he intends growing bananas on a large scale.
- H. Dyne.—Working with his brother (A. E. Dyne) until recently. At present in Brisbane temporarily, engineering works.
- A. E. Holcombe.—Farming on his own selection, Lockyer district.
- E. R. Isaacs.—Working a farm, the property of his father, seven miles from Murwillumbah.
- G. W. Jackson.—In charge of vegetable garden and orchards, Queensland Agricultural College.
- A. A. Nott.—Field manager and cane inspector, Windermere sugar plantation, Bundaberg.
- F. H. Palmer, W. Palmer, N. W. Philp.—Working a large farm in the Fassifern district. Are at present milking 48 cows. Had 30 cows in milk throughout the drought, losing one head only.
- J. H. Preston.—Practising as a dentist in North Queensland.
- R. Sigley.—Managing a large dairy farm, the property of Mr. E. J. Metcalfe, of Toowoomba, at Wyreema.
- H. C. Webb.—Employed at Willowburn butter factory, near Toowoomba, as manager.
- B. Whitehouse.—Engaged in mixed farming, in partnership with his brother, on 640 acres of land, on Laidley Creek.
- S. Wilson.—Clerk in firm of G. H. Wilson and Co., Ipswich.
- A. Conachan.—Pastoral pursuits, Kabra, Rockhampton.
- W. Mellwraith.—Lucerne-growing, Laidley. Secretary to the Lockyer Agricultural and Industrial Association.
- F. G. Johnson.—Managing farm for his brother at Ingham, North Queensland, with (his brother writes to say) every success. Has lately purchased 200 acres sugar land, which he intends to work on his own account, in conjunction with his brother's property.
- E. F. Youngman.—Engaged in fruit-growing at Montville, Blackall Range.
- W. R. Gillham.—Working father's farm at Eulaberg, Glen Innes, New South Wales.
- J. W. E. Henry.—No reply.
- L. C. Stupart.—Writes to say that he is on the Blackall Range on the lookout for a fruit farm. Advises that he will write later as to his success.
- F. B. Shine.—Learner in Post and Telegraph Department, Ipswich.
- W. C. Burn.—His mother advises that this student is now on the permanent staff of the Colonial Sugar Refinery Company, and is stationed on the Wai Levu Estate, Labasa, Fiji, in charge of the field work.
- F. L. Jones.—Farming 247 acres three miles from Childers, with his two brothers. Has 60 acres under cane and other crops; intends later to enter largely into the dairying industry.
- W. H. Mayne.—No reply.
- C. Barth.—Farming on a large scale near Clifton, on an area of 1,000 acres; has 300 acres under lucerne, 450 under wheat and barley; has lately purchased 3,000 store sheep in New South Wales for fattening purposes; is able, from knowledge gained at the College, to do all his own carpentering and blacksmithing.
- A. McKinnon.—Farming on his own account on selected land forming part of the Gowrie repurchase. States that by next month he will have 70 acres of wheat, 40 acres malting barley, and 5 acres mixed crops, and will be milking about 30 cows.
- J. Redmond and E. J. Redmond.—Farming near Bundaberg, principally growing lucerne and vegetables. Have installed an irrigation plant, which has proved most remunerative. Intend planting 40 acres cane.
- E. P. Noakes and B. Noakes.—Mr J. E. Noakes, the father of these ex-students, writes that they are working a farm at the Isis; have 25 acres under sugar-cane, besides maize, sweet potatoes, and other crops.
- F. Boase.—Mining pursuits, Gympie.
- M. R. Fox.—Fruit-growing, Cleveland. Is forming an orchard to consist of 18 acres. Has at present 2½ acres planted with pineapples, &c., and hopes to have the remainder planted out by next year.
- H. B. Corser.—Farming on his own account 1,000 acres of good agricultural and dairying land 23 miles from Degilbo. Has been busy fencing, erecting necessary buildings, clearing land for cultivation, &c. Has 60 head good milking cows, and has lately purchased an Ayrshire bull from the College. Has about 15 acres under cultivation, but intends to largely extend this area in the near future.
- H. Youngman.—With cousin, E. Youngman, fruit-growing, Montville.
- J. B. Anderson.—In company with his brothers has taken over his father's dairying property at Ashgrove, Waterworks road. Is doing well.
- F. Bray.—Until lately has been engaged in the dairying industry at Murwillumbah, New South Wales. Has now accepted an appointment from the Colonial Sugar Refinery Company, and gone to Fiji. Does not specify nature of new occupation.
- F. Butterworth.—Engaged in working a farm of 120 acres for his father near Toowoomba. Hopes shortly to be in a position to take up a larger place.
- J. W. Evans.—Farming near Rosewood, growing vegetables and fruit, besides other crops, on a large scale.
- A. W. Kibble.—No reply.
- Thos. Kidd.—Managing farm for his father at Grange Hill, in the Kolan district.
- F. F. Fifett.—Has formed a very successful fruit farm near Woombye, North Coast Railway. Has lately taken up a farm on the Darling Downs, near Meringandan, where he intends to follow mixed farming.
- W. P. Campbell.—Engaged in the engineering business in Brisbane.
- R. L. Armour.—Engaged in commercial pursuits, Hoffnung and Co., Brisbane.
- C. Atherton.—Engaged in pastoral pursuits, Nickavilla Station, Adavale.
- E. B. Bushnell.—Engaged in pastoral pursuits, Nanango district.
- D. Farmer and C. Farmer.—C. Farmer writes to say that his brother and himself are engaged in pastoral pursuits in the Port Curtis district, near Gladstone.
- H. P. Frederich.—Dairy-farming on a selection of 750 acres near Mudgeeraba. Milk from 50 to 75 cows. Has been very successful with pigs. Has about 100 acres under cultivation.
- A. G. Lorenz.—Engaged in farming with his father at Back Plains, Clifton.
- C. S. McClymont.—At present stock-riding for his uncle at Wyalla. Intends to select on his own account when suitable land available in the district.
- W. Rutkin.—Living with parents in Gympie. Was forced to give up farm work on account of bad health, but hopes to give it another trial in the near future.
- J. D. Ryan.—Dairying and farming (principally wheat-growing near Yeulba). Hopes to have 300 acres under wheat next season.
- T. S. Sommerville.—Member of firm of J. R. Smith and Co., auctioneers, Clifton; also farming Ercildeane, King's Creek.
- F. Harding.—Engaged in mixed farming in the Esk district, near Cressbrook. Being too far from the railway to supply cream to factories, he makes his own butter, and cannot supply the existing demand.
- F. Moloney and H. Moloney.—With their uncle in Western Australia, engaged in pastoral pursuits.



H. L. Noyes.—Was for some time engaged in engineering work in Messrs. Johnson and Sons' tannery, and also with Messrs. Traills, Ltd.

H. B. Radford.—No reply.

H. Schneider.—Assisting his father, farm and survey work, at Nerang.

C. W. Stumm and F. E. Stumm.—These ex-students advise that they, with another young fellow, are engaged in dairying and grazing on a selection of about 2,500 acres which they have purchased.

E. T. Watson.—No reply.

E. A. Byrne.—Was for some time trying to procure a suitable dairy or fruit farm, but abandoned the attempt on account of the drought then existing.

D. W. Dunlop.—Engaged in farming with his father at Biarra.

H. Lamond.—Working on sheep station, Maneroo, near Longreach. Writes a long description of the drought and its effects in his district.

W. D. North.—Engaged in commercial pursuits, with the Australian Estates and Mortgage Company, Brisbane.

H. Cullinane.—Assisting father in business (drapery), Bundaberg.

C. Rowland.—Cane-farming and dairying, Burnett Heads, Bundaberg.

C. Alford.—Clerk in Bank of New South Wales, Ipswich.

L. Alford.—Dairying and gardening with brother at Bororen, North Coast Railway.

F. Cockerill.—Working with father at Old Jumna Station (cattle), Burnett district.

V. Field.—Mixed farming. Managing farm belonging to a Mr. Godtfredson, near Bowen.

A. Fountain.—Working on his father's farm (fruit) on Buderim Mountain. Advises that he hopes soon to be on a farm of his own.

R. Robinson.—Managing dairy farm for Mr. Long, of Habana, milking 45 cows.

G. Thaler.—Fruit-growing and mixed farming on Scrubby Creek, near Charters Towers. Advises that, by means of irrigation, he realised large profit from citrus fruits during drought.

G. P. Jenkins.—Was for some time in charge of refrigerating plant at Moree, New South Wales. Has since been travelling to introduce a new calf food, "lactofarina."

L. McCready.—Engaged under Dr. Maxwell, Chief Sugar Bureau, Bundaberg.

A. J. Thynne.—Engaged in dairying and citrus fruit-growing on the Blackall Range, near Landsborough.

F. Walker.—Dairying in Tweed River district, New South Wales.

F. T. Bowler.—Dairying pursuits, near Bangalow, Lismore, New South Wales.

G. Myers.—No reply.

S. Smith.—Dairying pursuits near Marburg.

A. Webster.—No reply.

F. Clewett.—Now at Talgai West, with a view to gain further knowledge of stock-raising and dairying.

A. Cran.—Engaged in mixed farming on his father's farm at Iindah, Maryborough.

E. Poulsen.—Writes that he is getting together cattle for his father's farm on the Mary River, near Gympie. It is his intention to manage the farm (1,000 acres) for his father.

G. Newman Wilson.—Writes that he is purchasing a block of land at Mapleton, on the Blackall Range, where he intends to grow fruit.

M. B. Marley.—Advises that he is starting an orchard at Ballandean, and has 5 acres of land ready for planting this season. His residence has just been completed.

L. Robinson.—In company with his brother has leased 100 acres of land on Telemon Station, near Beaudesert. He has lately been hard at work clearing, has 40 acres cleared, of which 20 acres are planted with oats.

J. Proud.—Is now manager of a large butter factory at Korumburra, Gippsland, Victoria. He advises that 30 hands are employed in the factory and cream wagons; 100 cans of cream are received daily by rail in the season, in addition to what the wagons bring. He further states that he gained the position, for which there were 45 applicants, largely through his College diploma.

P. Cusack.—Engaged in mining, Ravenswood Gold Field.

Summarised, the present occupations of the 95 students concerning whom inquiries were made are—

General farming	...	...	...	...	...	...	...	...	...	...	33
Dairying	...	...	...	...	...	...	...	...	...	...	18
Grazing pursuits	...	...	...	...	...	...	...	...	...	...	11
Horticulture	...	...	...	...	...	...	...	...	...	...	10
Other pursuits	...	...	...	...	...	...	...	...	...	...	13
Number who did not reply or did not state the occupation followed	...	...	...	...	...	...	...	...	...	...	10
Total	...	...	...	...	...	...	...	...	...	...	95

Mr. P. M. Pitt, English and Mathematical Master and Secretary, in his report states that during the year under review 24 students were examined by him in Arithmetic for Entrance Examination, and, as usual, the results obtained in this subject were most unsatisfactory, 7 only gaining 50 per cent and upwards of the marks. Mr. Pitt further states that, judging from the students who join this institution, very little attention appears to be paid in the majority of schools to a thorough grounding in this subject. As regards College work, Mr. Pitt reports: "During the period under review I have taken classes in English, Arithmetic, Mensuration, Surveying, and Bookkeeping.

ENGLISH.—This is the most unsatisfactory subject with which I have to deal, and I regret to say that I cannot report good progress. As many of those who join us cannot spell correctly, and have a very vague knowledge of the meanings and uses of words in common use, it may therefore be seen that it is absolutely impossible to effect much improvement in the short time at my disposal. Moreover, it has been found that, however much they need it, lads over the age of fifteen years consider such elementary work as spelling, &c., to be "beneath their dignity," and no force or encouragement that may be brought to bear upon them will effect much improvement. I do not see, considering the number of subjects of a more practical nature with which we have to deal, and the limited time at our disposal, how more time can be devoted to the subject of English, nor do I consider it fair to ask us to take up elementary work which should have been taught elsewhere.

ARITHMETIC.—Although the backwardness and want of grounding in the case of many students necessitate a large amount of elementary work in this subject, good progress has been made, and I think I may safely say that a decided improvement has taken place. This subject is taught for a period of twelve months, and the time allotted to it averages two and three-quarter hours during the first, and two hours per week during the second term.

MENSURATION.—The course for this subject extends over two terms. During the first, students are taught to calculate the areas of regular and irregular figures by means of measurement only, and the method of keeping field notes. Two and a-half hours per week are given to this subject, and good progress has been made. During the second term, students are taught to use angles (computed without instruments) as a factor in the calculation of areas; also, the computation of the volumes of solids; average time, three hours per week.



**SURVEYING.**—This work is taken during twelve months. In the first term, three and a-half hours per week are allotted to this subject; in the second, two and a-half hours. Students are taught the use of the theodolite and level, and the simpler calculations arising from data obtained by means of these instruments. Much interest has been taken by students in this branch of the work.

**BOOKKEEPING.**—This subject is taught throughout two terms; average time, two and a-quarter hours per week for each class. In this work, students have been taught a simple system of book-keeping suitable for a farm. No attempt has been made to give instruction in the more complicated methods in use in large commercial institutions. Reference is frequently made to the College books as a practical instance of a system likely to be of use to a farmer. Very good work has been done, and this is a most popular subject.

**CHEMISTRY.**—This subject receives more attention in the class-room than any other taught at the College. An average of eleven and a-quarter hours, out of a total of twenty-seven and a-half hours per week of class work, is devoted to chemistry. At the same time I wish it to be clearly understood that, while we aim to turn out young men possessed of a good knowledge of the chemistry of the soil, and the products they may be called upon to produce therefrom, also to enable them to take a leading part in advanced agriculture, we do not pretend in the slightest degree to turn out men fully equipped with a knowledge sufficient to enable them to follow the calling of an agricultural chemist. The principal matters dealt with in connection with this subject are soils, water, manures, fodder plants, grains, milk, butter and cheese. The chemist, Mr. Gurney, reports as follows:—"During the first term of the year the preparatory class received instruction in elementary scientific principles which were explained and illustrated for their benefit. This included an explanation of the common properties of matter, thermometer, barometer, common and air pumps, syphon, of specific gravity, centre of gravity, &c. The value of this preparatory work is evidenced by the better results obtained in the work of the next term by students who have passed through it. In the second term the class is taught theoretical chemistry, in which they study some of the general principles of chemistry and the properties and reactions of some of the typical elements and their compounds. The second and third year classes are taught the mechanical and chemical conditions of soils, the classification and composition of manures, the plant food requirements of the different crops, the composition and functions of the different constituents of fodders, properties of flour, &c. In practical chemistry, study was made of the reactions and qualitative determinations of bases and acids commonly occurring in agricultural products. The quantitative work comprised the gravimetric determination of the ingredients of simple salts, the analysis of manures, milk, &c. In all this work particular importance was attached to the principles which had a direct bearing upon the farm work of the students. It may be said that the conduct of the students in the class-room was exceptionally good, and it may be said that the progress of the classes upon the whole is thought to be satisfactory, but owing to the very diverse educational training of the students who enter the College, the general advance in chemical knowledge has been somewhat slower than in Universities and institutions where the classes are composed of young men of higher educational attainments." In addition to College work, Mr. Gurney performed the following analytical work for your Department:—Guano (five samples); soils (five samples); water (six samples). Samples of flour from various milling companies of Brisbane were also procured for the purpose of analysis, with the view of illustrating to students the quality of the flour from the various samples. Of the five samples analysed, the colour ranged from very good to excellent, the strength was up to that of flour from the southern States, but the gluten was somewhat low. Our farm soils were also analysed.

**BOTANY.**—A great deal of interest has been taken in the practical teaching of this subject, and also in the theoretical work, especially by those of the students who are enabled to grasp the technicalities. It may be seen from Mr. Bailey's report that he is working on the right lines to show good results from his teachings, because of his demonstrations in the field and his selection of plants with which to demonstrate his lectures in the class-room. Mr. Bailey reports as follows:—"I have paid weekly visits to the College and lectured on botany, and, from the attention the students have given to the subject, I am led to believe that the knowledge they have gained regarding plant life will be of service to them in their future work on the land. Seeing that it would be out of the question for a student, with the time at his disposal, to gain more than a moderate knowledge of the subject, I have confined my teaching to what will be of practical use to him. By reference to the examination papers, it will be seen that the results on the whole have been satisfactory."

**VETERINARY SCIENCE.**—The practical branch of this work is very popular, and much attention has been given to the practical demonstrations given by the teacher, whereas the theoretical, or class work does not receive the attention or appreciation that it deserves. The practical work is devoted principally to the preparation of drugs, blisters, drenches, ointment for wounds, and also, when animals are slaughtered on the place, demonstrations are given on the anatomy of the carcass, including cases where diseases were to be found. Class work has been confined chiefly to the anatomy of the human being and various animals. The castration of animals, and instruction in the methods of doing so, are carried out by myself or by some person deputed by me to carry out the work.

**MECHANICS.**—Besides the permanent officers, a blacksmith and a carpenter, Mr. Quinn, of the Public Works Department, lectures and gives demonstrations on this important subject. His work in this respect is much appreciated, and excellent progress has been made all round. Mr. Quinn's method of teaching commands the greatest attention, both in the class-room and where practical lectures are given amongst the machinery, &c. Students take much interest in mechanical work in all its branches, and I am quite safe in stating that 60 per cent. of them are quite competent to take charge of engines, boilers, steam pumps, &c., up to 12-h.p. The following is the report of the work performed by Mr. Quinn for the year:—"During the first term the class numbered 20, and the time was devoted to the study of architectural drawing and building construction. These subjects being entirely new to the students, and requiring very close application and facility in the manipulation of mathematical instruments, rapid progress was not made, but, considering the initial difficulties, satisfactory results were attained. During the second term the class increased to 28, and the time was devoted to mechanical engineering, with special regard to the students being prepared to pass the examination for "Boiler Attendants' Certificates" under the Shops and Factories Act. Although it was late in the term when the class commenced work, the enthusiasm displayed by the students and the close attention given to lectures and demonstrations enabled them to make excellent progress, and, in the test examination at the end of May, 24 students passed out of the 26 who sat for examination."

Encouragement to students deficient in educational attainments.—I may mention that here every encouragement and help is given to those students who may be found backward, through want of previous education, in all class work; but if, after six months' probation, they are found to be unable to cope with the scientific work, they are either requested to withdraw from the College, or take up practical work only, at the same time attending all lectures in connection with agriculture, dairying, the breeding and feeding of animals. I have no doubt that many of these lads will make successful practical farmers, and they should be encouraged as much as possible, especially when they in no way detract from the success of the more learned lads in acquiring the full benefit of the knowledge imparted.

**FARM.**—As mentioned in the earlier part of this Report, the drought detracted considerably from all-round progress. Experimental crops were almost a complete failure, but, notwithstanding the dry time in the earlier part of the year, a great deal of useful educational work was carried out. An area of 60 acres was cleared of its timber, ploughed twice, and planted with maize, wheat, oats, amber cane, sorghum, and potatoes; 73 chains of fencing were erected; 70 chains of drain were made in the fields adjoining the Tarampa road; 51 acres were



subsoiled to a depth of 15 inches, preparatory to planting lucerne and root crops. Barnyard manure: 120 tons was applied to the land on which root crops are now growing. Road-making, and the clearing of pasture land of stumps and fallen trees, were resorted to. Students, in their turn, took part in all the above work, and it may be said that the knowledge acquired in this respect will be of great benefit to those who may happen to select land where clearing, fencing, subsoiling, road-making, &c., are necessary. Space will not permit of my dealing with each crop separately, but the following is a correct list of the crops planted, harvested, and the yield from same:—

CROPS STANDING AND IN GROUND 30TH JUNE, 1902.

	A.	R.	P.		A.	R.	P.
Orchard ... ..	5	1	21				
Vineyard ... ..	2	2	17				
Vegetables ... ..	5	0	18				
<i>Paspalum dilatatum</i> ... ..	8	3	17				
Lucerne ... ..	94	2	9	...	failed	...	24 1 7
Potatoes ... ..	5	0	0				
Wheat ... ..	9	0	31	...	failed.		
Barley ... ..	40	1	17	...	failed.		
Oats ... ..	29	2	32	...	failed.		
Cowpea ... ..	5	0	0				
Kafir corn ... ..	5	0	0				
Rye ... ..	5	0	0	...	failed.		
Under crop ... ..	215	3	2				
Fallow ... ..	101	3	30				
Total area cultivated..	316	2	32				

CROPS REMOVED, JULY, 1902—JUNE, 1903.

Section.	A.	R.	P.	Yield.
1. Cowpea—farm paddock ... ..	5	0	0	Ensilage 2 tons
4. Potatoes ... ..	5	0	0	2 tons
8. Kafir corn ... ..	5	0	0	Green fodder, 44 tons
9. Maize ... ..	5	0	0	Ensilage, 17 tons
3. Maize ... ..	5	0	0	20 bushels
4. Maize ... ..	5	0	0	45 bushels
5. Maize ... ..	5	0	0	Ensilage, 23 tons 18 cwt.
6. Maize ... ..	5	0	0	Dry cornstalks, 7 tons 3 cwt.
12. Maize ... ..	8	3	17	Ensilage, 31½ tons
2. Maize and pumpkins ... ..	5	0	0	{ Ensilage, 17 tons Pumpkins, 10½ tons
7. Maize and pumpkins ... ..	5	0	0	{ Green maize, 19½ tons Pumpkins, 5½ tons
1. Cowpea (second crop) ... ..	5	0	0	Hay, 7½ tons
2. (Creek paddock) panicum ... ..	17	1	6	Hay, 47 tons 2 cwt.
1. (Calf paddock) panicum ... ..	4	3	22	Hay, 7 tons 15 cwt.
7. (Garden paddock) panicum ... ..	1	0	3	Hay, 2 tons 7 cwt.
1. (Sheep paddock) panicum ... ..	10	0	0	Destroyed by rain
10. (Farm paddock) broom millet ... ..	2	4	0	
Total ... ..	100	0	8	

CROPS FAILED, JULY, 1902—JUNE, 1903.

	A.	R.	P.
Wheat ... ..	9	0	31
Barley ... ..	40	1	17
Oats ... ..	29	2	32
Rye ... ..	5	0	0
Lucerne ... ..	24	1	7
Maize ... ..	10	0	0
Potatoes ... ..	1	0	0
Total ... ..	119	2	7

CROPS ON FARM, 30TH JUNE, 1903.

Farm Paddock.				Creek Paddock, No. 1.					
Section.	A.	R.	P.	Section.	A.	R.	P.		
1.	5	0	0	Experimental: Wheat, 1½ acres ; Rye, 3½ acres.	38	2	26	Malting Barley, 15 acres ; Baltic Wheat, 12 acres 2 roods ; Oats, 9 acres ; Fallow, 3 acres 26 perches.	
2.	5	0	0	Fallow.					
3.	5	0	0	Pumpkins.					
4.	5	0	0	"					
5.	5	0	0	Fallow.					
6.	5	0	0	Carrots, 3 acres ; Mangolds, 1½ acres ; Swedes, ½ acre.	1.	12	0	34	Lucerne.
7.	5	0	0	Fallow.	2.	17	1	6	Lucerne and Wheat (mixed).
8.	5	0	0	Kafir Corn.					
9.	5	0	0	Mangolds, 2¼ acres ; Swedes, 2¼ acres ; Carrots, ½ acre.					
10.	5	0	0	Fallow, 2½ acres ; Sorghum, 1 acre.	1.	3	1	6	Potatoes.
	3	0	0	Amber Cane, ¾ acre ; Kafir Corn, ¾ acre.	2.	14	0	0	Wheat.
11.	13	1	30	Lucerne.	3.	7	0	0	Oats.
11a.	2	0	0		4.	6	0	0	Fallow.
12.	3	3	17	Cape Barley.					
13.	39	2	13	Lucerne.					
14.	1	2	21	Experimental plots.	1.	9	2	34	<i>Paspalum</i> .
15.	0	0	23	<i>Paspalum dilatatum</i> .	2.	8	1	38	Fallow.
					3.	17	2	0	Experimental Wheats.
	115	2	24			35	2	32	



*Garden Paddock.*

Section.	A.	R.	P.	
1.	1	2	31	Experimental plots.
2.	14	1	35	Lucerne.
3.	8	0	31	Fallow.
4.	0	2	17	Vineyard.
5.	2	3	11	Orchard.
6.	4	2	18	Vegetables.
7.	5	2	0	Fallow.
8.	1	0	3	Fallow.
	38	3	26	

*Calf Paddock.*

1.	0	2	0	Cocksfoot Grass.
2.	0	2	0	Rye Grass.
3.	7	3	30	Fallow.
	8	3	30	

*Sheep Paddock.*

Section.	A.	R.	P.	
1.	1	1	38	Field Peas.
2.	9	0	0	Oats.
3.	5	0	0	Cape Barley.
	15	1	38	

*Gatton Paddock.*

1.	23	0	0	Maize and Pumpkins.
2.	7	0	0	Amber Cane.
	30	0	0	

*Cultivation on Hill.*

1.	2	2	10	Orchard.
2.	2	0	0	Vineyard.
	4	2	10	

The following experimental and small plots have been planted in connection with the farm area:—

Sunflower	Clover—	Mangolds—
Cabbage—	English Red	Prize Long Red
Cattle	White	Sorghum
Golden Savoy	Cow	Radish, Improved Long Chatters
Early Spring	Bokhara	Carrots, English Shorthorn
Large Vertus Savoy	Red	Lettuce—
Etampes	Guinea Grass	Mixed
Drumhead Savoy	Flax	California Cream Butter
Rock Red Pickling	Cauliflower	Turnip—
Beans—	Beet—	Extra Early Model
Soja	Long Smooth Blood Red	Favourite
Canadian Wonder	Covent Garden	Extra Early Milan
Broccoli, Late White	Mangolds—	Kohl Rabi
Artichoke, Green Globe	Half Sugar	Onions
Clover—	Red Globe	Rib Grass
Crimson	Giant Yellow	Perennial Rye Grass.

*Experimental Wheats.*

Baroota Wonder	Carmichael	Smart's Early
Hamlyn's Prolific	Fill Bag	Petatz's Surprise
Leather Head	Newmans	Marshall's No. 3
Dart's Imperial	Australian Wonder	Defiance
Marshall's No. 1	Steinwedel	Gluyas
Early Para	White Tuscan	Unnamed (from Warwick).
Silver King		

## SUMMARY OF CROPS, 30TH JUNE, 1903.

	A.	R.	P.		A.	R.	P.
Orchard	...	...	...	...	5	1	21
Vineyard	...	...	...	...	2	2	17
Vegetables	...	...	...	...	4	2	18
<i>Paspalum dilatatum</i>	...	...	...	...	11	3	17
Lucerne	...	...	...	...	79	2	32
Lucerne and wheat	...	...	...	...	17	1	6
Wheat (experimental plots)	...	...	...	...	19	0	0
Wheat	...	...	...	...	25	2	0
Oats	...	...	...	...	25	0	0
Cape barley	...	...	...	...	13	3	17
Malting barley	...	...	...	...	15	0	0
Rye	...	...	...	...	3	2	0
Potatoes	...	...	...	...	3	1	6
Maize and pumpkins	...	...	...	...	23	0	0
Pumpkins	...	...	...	...	10	0	0
Kafir corn	...	...	...	...	5	3	0
Amber cane	...	...	...	...	7	3	0
Sorghum	...	...	...	...	1	0	0
Carrots	...	...	...	...	3	2	0
Mangolds	...	...	...	...	4	1	0
Swedes	...	...	...	...	2	1	0
Field peas	...	...	...	...	1	1	38
Cocksfoot grass	...	...	...	...	0	2	0
Rye grass	...	...	...	...	0	2	0
Experimental plots	...	...	...	...	3	1	12
Total area under crop	...	...	...	...	289	3	24
Fallow	...	...	...	...	57	3	8
Total area cultivated	...	...	...	...	347	2	32

## RAINFALL FOR YEAR.

1902.	Inches.	1903.	Inches.
July	04	January	3.68
August	64	February	3.81
September	73	March	2.60
October	2.41	April	0.79
November	3.72	May	7.55
December	5.14	June	1.17

Total rainfall for year ... 31.28 inches.

A good system of bookkeeping has been adopted. The farm has been laid off into sections, each plot or section being named and numbered. A correct record is kept of the methods of cultivation, cost, crops produced, weight, &c. The produce supplied from one department to another is credited or debited, as the case may be. A reasonable sum is allowed for student labour which, together with the amount paid for hired labour, enables us to determine the exact cost of producing the various crops. Students are made acquainted with these facts, so that they may be in a position to say which crops are the most profitable, and also that which involves the greatest amount of labour to grow. The total area under cultivation is 347 acres, and three men are employed to do the work in connection therewith. It is thought that this area is too large for the hands available, but the object is to have many of the fields laid down with artificial grasses later on; this cannot successfully be done until the land has had a good preparation.



**SEEDS.**—All seeds are carefully tested, both for quality and germinating power, before planting in order to enable us to determine what quantity is required.

**PLANTING SEED.**—Various methods of planting are adopted, with the seed drill, and broadcast, at various depths, and also different quantities of seed per acre.

**ROTATION OF CROPS.**—A system of rotation of crops is carried out as far as practicable. It is intended during the coming year to work on more defined lines in this connection.

**MANURES.**—The method of saving, preparing, and applying barnyard manures is carried out. The value of the different fertilisers, especially those best suited to the requirements of the different crops, receive attention.

**DEEP CULTIVATION.**—Deep cultivation, the methods, and the benefits to be derived therefrom, receive the best attention, both by means of practical demonstration in the field and lectures in the class-room.

**DRAINAGE AND IRRIGATION.**—The importance of the drainage, and the soils which require it, receive most serious consideration. An additional system of irrigation, on a small scale, has been established. Twenty-four acres of lucerne were irrigated during the dry weather, and with good results. The lines upon which I carried out this work have already been published in the *Agricultural Journal*, and therefore need no further comment. During the year two students, Baker and Fudge, competed in the youths' class at the Lockyer Agricultural Society's ploughing match, and, as usual, were successful in carrying off the first and second prizes respectively.

#### ANALYSIS OF SOILS FROM COLLEGE FARM.

	No. I.	No. II.	No. III.
Nature of soil ... ..	Loam	Loam	Loam
Reaction of soil ... ..	Neutral	Neutral	Neutral
Capacity for water ... ..	Per cent. 49·6	Per cent. 46·9	Per cent. 50·8
Mechanical analysis—			
Root fibres ... ..	·10	·08	·05
Stones ... ..	·00	·00	·00
Coarse gravel ... ..	·00	·00	·00
Fine gravel ... ..	·10	·28	·08
Fine soil—			
Sand ... ..	35·30	36·51	36·05
Impalpable matter—chiefly			
clay ... ..	57·86	56·38	53·72
Organic matter ... ..	6·64	6·75	10·10
Moisture ... ..	6·146	5·091	7·359
Fertilising substances of fine soil, soluble in hot hydrochloric acid—			
Lime (CaO) ... ..	·991	·581	·783
Potash (K <sub>2</sub> O) ... ..	·261	·242	·312
Phosphoric acid (P <sub>2</sub> O <sub>5</sub> ) ... ..	·291	·346	·398
Nitrogen ... ..	·185	·185	·269
(equal to ammonia) ... ..	·224	·224	·326

The soils from which the above analyses were made are characteristic of the soils upon which the various crops were raised. Sample No. III. has had one crop of *Panicum* grown upon it, and may, therefore, be classed as soil almost in its virgin state.

**PREPARATION AND SAVING OF FODDER CROPS.**—The value and methods of preserving fodder crops were practically demonstrated during the year. The crops most suitable for ensilage purposes, time and method of saving same, also corn stover and its preparation, were dealt with in a practical manner. Material was held over for the purpose of demonstrating to the farmers in a practical way the different methods of handling and saving fodder crops. The effects of the drought caused many people to travel long distances in search of information regarding this matter. Samples of prepared fodder were exhibited at the Toowoomba Show, and, I am led to believe from members of the association, commanded favourable criticism. The maize and sorghums, which are in the silos in the form of ensilage, have been tested and found to be in a perfect state of preservation. Experiments were made regarding the suitability or otherwise of bush grass for silage purposes, and, I regret to say, the experiment ended in disaster, inasmuch as the silo and the top portion of the ensilage were destroyed by fire, caused by spontaneous combustion. In dealing with this matter I wish to state, and without fear of contradiction, that no person, other than those who have had practical experience in dealing with the grasses which were available for use here, can form even the remotest idea of their suitability for silage purposes. These grasses, when they reach the stage at which they can be cut down with the mowing machine—namely, the seeding or flowering stage—are, because of their want of succulence, of but little value for pasturage purposes. They may, however, be saved as bush-grass hay, which I consider a good standby in time of droughts, but, owing to their want of moisture, when they reach the stage of growth above mentioned, they cannot be successfully converted into ensilage, unless mixed in small quantities with a fodder of a more succulent nature. This is proved by the fact that the grasses, *Andropogon Intermedius* and *A. Pertusus*, which were treated by us, contained at the flowering stage not more than 50 per cent. of moisture, whereas lucerne, maize, and other good silage crops contain at least 80 per cent. of moisture. The want of succulence in the grasses now referred to causes a want of pressure, with the result that greater fermentation and heat are evolved, which must bring about a fire-fanged material to such an extent that spontaneous combustion must in consequence occur. The above facts are fully proved by the conditions which existed during the burning of the silo here. The bottom part of the silage, which contained about half lucerne mixed with the grass, was as sound and palatable as on the day when it was placed in the silo, whereas that on the top, consisting of grass alone, was fire-fanged, and, where not actually burning in a flame, was quite hot enough to cause a blaze when brought into contact with dry material. Then, again, the great heat in the centre of the silo caused the surface stuff to become dry; this afterwards fell into the smouldering material and ignited. This statement is borne out by the fact that when the fire was first noticed by Mr. Watt, the farm foreman, a few



minutes after it had taken place, the blaze was confined to the top of the silo within the building, and immediately afterwards rapidly spread over the tarred timber of which the silo was constructed. I may further mention that there was no possible chance of any person entering the silo, unless by means of a ladder, and this was not procurable in the vicinity of the place. From this report inference may be drawn that the Principal knew that the material siloed was unsuitable for the purpose. In this respect I may state that, when filling the silo, I did express my doubts about it, but so much has been said of the value of Queensland grasses for ensilage purposes, that I was, I regret to say, induced to give them a trial. In concluding my remarks upon the subject, I wish to point out that the fire originated through spontaneous combustion, notwithstanding anything that may be said to the contrary. I have witnessed similar cases of fire that have occurred in lucerne stacks which consisted of badly saved hay.

GRASSES AND CLOVERS.—All grasses and clovers, with the exception of the Guinea grass which failed, are doing well. It has been found in the past that the rye grasses and clovers do not withstand the dry weather. Particulars of the different varieties now growing at the College may be found from the list of crops embodied in this report. The *Paspalum dilatatum* grass continues to grow well with us, and, notwithstanding the severe drought, it existed and responded in growth to the slightest shower of rain. I am now depasturing our dairy cattle upon it, by which means the seeds are carried and spread in the various fields, and small patches are now to be seen growing in all classes of soil. I find that this grass makes a first class hay, and when chaffed is much relished by all animals kept on the place. Its value is now too well known to require further comment. During the year we distributed 129,040 roots, sent to all parts of the State, and for which we received £85 12s. 8d. : also, 156 lb. of seed for a sum of £11 5s. We have had no complaints about the roots, although parcels have been forwarded as far as Cooktown. The greatest care is exercised in selecting plants so that no objectionable seeds or weeds may be distributed. All crops now growing on the farm are looking remarkably well and promise good yields. As regards the merits or demerits of the various wheats which are planted in acre plots, the time is inopportune to make any comment, but, so far, rapid growth has taken place. The same may be said about the oats, barley, and rye. As regards root crops, high yields from the early planting are assured. The methods of planting and cultivating all the above crops have appeared in the *Agricultural Journal* from time to time, no detailed report is therefore necessary. A crop of flax is, up to the present time, equal to anything that I have seen in countries where climatic conditions are considered more favourable.

In concluding my report on this branch of the College work, I wish to state that much credit is due to the farm foreman, Mr. Watt, and his assistant, Mr. Jordan, for the successful work that has been carried out. These gentlemen worked hard from daylight until dark, and used their utmost endeavours to bring about the successful results which may justly be claimed. Both report good progress from an educational point of view, and also good behaviour on the part of the students.

DAIRY WORK.—This branch of the College teaching has always been found to be most popular, and good progress has at all times been made, not only in the dairy and classroom, but also as regards the methods of breeding, feeding, and raising live stock. From a commercial point of view, the remuneration for the labour bestowed in carrying out the work has not been so great during the past year, this being attributable to the extreme dryness of the season. From an educational point of view, I consider that the good reputation gained has been fully maintained in every part of the work. Mr. McGrath, who presides over the dairy department, has worked hard in the interests of the students and the College generally, and I am pleased to be able to say that his work has met with considerable success. The practical work in the factory comprises the care and manipulation of milk, manufacture of butter and cheese, the methods of applying the acid test, working the machinery, including refrigerator, engine, boiler, and pumps. The practical work is backed up by lectures on the handling and manipulation of milk, by Mr. McGrath; and by myself on the lines on which stock should be judged, also the selection, breeding, and feeding of stock. Instruction is imparted in this connection in the fields amongst the herds, and in the classroom. Experimental work in feeding, with a view to ascertain the value of the various foods, was limited, owing to the scarcity of fodders. The use of prickly pear as a fodder in drought-stricken districts led to experiments being carried out here, and I must confess that the results were anything but satisfactory. The following are the particulars of the experiments :—Eight head of milk cows, at different periods of lactation, were chosen. The cows were fed on steamed oaten chaff for five days previous to the use of the prickly pear, and were allowed 40 lb. each of chaff per day. The chaff ration was gradually reduced, and prickly pear fed in its place. It was found advisable at first to feed but a small quantity of the pear, as the cows showed a disinclination to consume it, and also because of the scouring effect it had on the animals when fed liberally. During the second period of five days, 8 lb. of prickly pear, with 14 lb. of steamed oaten chaff, were fed daily night and morning. By gradually increasing the pear ration, it was found that a large quantity could be consumed at one time by the animals without causing any scouring. The pear was, previous to feeding, treated in the following manner :—It was singed on a quick fire to destroy the large thorns, and was then boiled from twelve to fifteen hours. After cooling sufficiently to allow of its being handled, it was run through a chaffcutter. Such treatment was considered advisable, as it was found that, while the small prickles were rendered harmless by boiling, the larger thorns found on the stalks remained hard and stiff enough to penetrate the tongue or jaw of an animal when chewing. Moreover, after boiling, if a well-matured leaf and a portion of the stalk be taken, and the pulp removed, the fibre which remains will be found to be tough and hard, and seemingly difficult to digest. When cut into small pieces, it could more readily pass through the digestive organs of animals.

The following set of tables gives the amount of food consumed and results obtained, and are numbered from 1 to 5, each table covering a period of five days :—

TABLE I.

Cow, No.	Period of Duration.	FOOD CONSUMED.		Milk Yield.	Per cent. Butter Fat.	Butter Fat.	Commercial Butter.
		Prickly Pear.	Chaff, Oaten.				
			lb.	lb.		lb.	lb.
1	5 days	...	200	56	3.6	2.016	2.257
2	5 "	...	195	64	3.8	2.432	2.723
3	5 "	...	200	62	4.0	2.480	2.777
4	5 "	...	200	58	3.8	2.204	2.468
5	5 "	...	190	72	3.6	2.592	2.903
6	5 "	...	200	84	3.4	2.856	3.198
7	5 "	...	200	66	3.7	2.442	2.735
8	5 "	...	200	97	3.5	3.395	3.802
		...	1,585	559	...	20.417	22.863



TABLE II.

Cow, No.	Period of Experiment.	FOOD CONSUMED.		Milk Yield.	Per cent. Butter Fat.	Butter Fat.	Commercial Butter.
		Prickly Pear.	Chaff, Oaten.				
		lb.	lb.	lb.		lb.	lb.
1	5 days	80	140	56	3.7	2.072	2.320
2	5 "	80	140	66	3.6	2.376	2.661
3	5 "	76	140	61	3.8	2.318	2.596
4	5 "	80	140	55.5	4.0	2.220	2.486
5	5 "	60	130	69	3.4	2.346	2.627
6	5 "	80	125	85	3.3	2.805	3.141
7	5 "	62	140	62	3.9	2.418	2.708
8	5 "	80	140	95	3.3	3.135	3.511
		598	1,095	549.5		19.690	21.050

TABLE III.

Cow, No.	Period of Experiment.	FOOD CONSUMED.		Milk Yield.	Per cent. Butter Fat.	Butter Fat.	Commercial Butter.
		Prickly Pear.	Chaff, Oaten.				
		lb.	lb.	lb.		lb.	lb.
1	5 days	100	120	54	3.5	1.890	2.116
2	5 "	100	120	64	3.6	2.304	2.580
3	5 "	100	120	58	3.8	2.204	2.468
4	5 "	100	120	54	3.8	2.052	2.298
5	5 "	100	120	63.5	3.3	2.095	2.346
6	5 "	100	120	84	3.0	2.520	2.822
7	5 "	100	120	60	3.6	2.160	2.419
8	5 "	100	120	91.5	3.5	3.202	3.586
		800	960	529	...	18.427	20.635

TABLE IV.

Cow, No.	Period of Experiments.	FOOD CONSUMED.		Milk Yield.	Per cent. Butter Fat.	Butter Fat.	Commercial Butter.
		Prickly Pear.	Chaff, Oaten.				
		lb.	lb.	lb.		lb.	lb.
1	5 days	160	60	53	3.6	1.908	2.136
2	5 "	160	60	60.5	3.7	2.238	2.507
3	5 "	160	55	56	4.0	2.240	2.508
4	5 "	160	60	51.5	3.7	1.905	2.134
5	5 "	160	60	60	3.4	2.040	2.284
6	5 "	160	60	81	3.1	2.511	2.812
7	5 "	160	60	58.5	3.6	2.106	2.358
8	5 "	160	60	90	3.4	3.060	3.427
		1,280	475	510.5	...	18.008	20.166

TABLE V.

Cow, No.	Period of Experiment.	FOOD CONSUMED.		Milk Yield.	Per cent. Butter Fat.	Butter Fat.	Commercial Butter.
		Prickly Pear.	Chaff, Oaten.				
				lb.		lb.	lb.
1	5 days	220	...	51	3.5	1.785	1.999
2	5 "	220	...	59	3.7	2.183	2.449
3	5 "	220	...	55	4.1	2.255	2.525
4	5 "	220	...	53	3.8	2.014	2.255
5	5 "	205	...	51	3.3	1.683	1.884
6	5 "	220	...	78.5	3.0	2.355	2.637
7	5 "	220	...	57	3.5	1.995	2.234
8	5 "	220	...	87	3.4	2.958	3.313
		1,745	...	491.5	...	17.228	19.296

TABLE VI.

Cow, No.	Period of Experiment.	FOOD CONSUMED.		Milk Yield.	Per cent. Butter Fat.	Butter Fat.	Commercial Butter.
		Prickly Pear.	Chaff, Oaten.				
		lb.		lb.		lb.	lb.
1	5 days	305	...	52.5	3.5	1.837	2.058
2	5 "	335	...	58	3.8	2.204	2.468
3	5 "	343	...	57	3.9	2.223	2.489
4	5 "	330	...	51.5	3.7	1.905	2.134
5	5 "	350	...	50	3.7	1.850	2.072
6	5 "	320	...	77	3.3	2.541	2.845
7	5 "	350	...	60	3.5	2.100	2.352
8	5 "	350	...	89	3.3	2.937	3.289
		2,683	...	495.0	...	17.597	19.707



It appears from a perusal of the above tables that the milk yield fell off as the prickly pear replaced the oaten chaff.

Table I. shows the highest return, and Tables II., III., and IV. disclose a gradual diminution in the yield. Table V. records the lowest yield, 491.5 lb. of milk for a consumption of 1,745 lb. of prickly pear, while Table VI. shows a slightly increased yield over Table V., namely, 495 lb. of milk for a consumption of 2,683 lb. of pear. Comparing results, as shown in Tables I. and VI., it is found that 1,586 lb. of oaten chaff were consumed for a return of 559 lb. of milk, and 2,683 lb. of pear for a return of 495 lb. of milk, or in the proportion of 2.83 lb. of oaten chaff to every 1 lb. of milk, and 5.42 lb. of pear to every 1 lb. of milk.

The animals lost flesh when fed on the prickly pear alone. We do not look upon prickly pear as a milk-producing fodder, and it is unlikely that it will be used as a stock food if conditions other than severe drought prevail.

In conjunction with the breeding of pure stock, Jerseys, Ayrshires, Holsteins, Guernseys, and Shorthorns, several crosses were made with a view to arrive at some decision as to the crosses that are likely to be profitable as dairy animals, and, while admitting the difficulty of coming to any definite conclusion upon the lines of cross-breeding, the following figures will, at any rate, throw some light on the subject:—

## WITCH—JERSEY SHORTHORN.

Month.	Milk.	Per cent. Butter Fat.	Butter.
	lb.		lb.
May	162	3.6	6.53
June	305	3.6	12.29
July	388	3.5	15.20
August	391	3.6	15.76
September	387	3.6	15.60
October	368	3.5	14.42
November	421	3.6	16.97
December	463	3.7	19.18
January, 1903	538	4.1	24.70
February	424	4.0	18.99
March	484	4.2	22.77
April	429	3.5	16.82
May	163	4.0	7.30
	4,923	...	206.53

## MONA—HOLSTEIN SHORTHORN.

Month.	Milk.	Per cent. Butter Fat.	Butter.
	lb.		lb.
June	454	4.0	20.33
July	488	3.7	20.22
August	501	3.6	20.20
September	444	3.8	18.89
October	384	3.7	15.96
November	566	3.8	24.08
December	743	3.6	29.95
January, 1903	699	3.6	28.18
February	554	3.7	22.95
March	665	3.8	28.30
April	564	4.0	25.27
May	179	4.4	8.82
	6,241	...	263.15

## NIGHT—HOLSTEIN DEVON.

Month.	Milk.	Per cent. Butter Fat.	Butter.
	lb.		lb.
May	352	4.1	16.16
June	368	4.3	17.72
July	451	4.0	20.20
August	442	4.1	20.29
September	356	4.3	17.14
October	322	4.2	15.14
November	388	3.9	16.94
December	461	3.8	19.92
January, 1903	470	4.0	21.05
February	367	4.5	18.49
March	387	4.7	20.37
April	80	5.1	4.56
	4,444	...	207.98

## JEANNIE—AYRSHIRE SHORTHORN.

Month.	Butter.	Per cent. Butter Fat.	Butter.
	lb.		lb.
October	536	3.6	21.61
November	731	3.5	28.65
December	605	3.6	24.39
January	599	3.5	23.48
February	617	3.8	26.25
March	532	3.4	20.25
April	390	4.4	19.21
May	310	4.2	14.58
June	340	3.3	12.50
July	204	3.8	8.68
August	103	4.0	4.61
	4,967	...	204.21



I may point out that the above returns were obtained during part of the time when we were suffering from the severe drought, they cannot therefore be taken as a fair comparison as to the amount of butter the animals would yield under more favourable circumstances. So far as the constitution and general appearance of the cross-breeds are concerned, I am inclined to favour the Holstein crossed with any of the ordinary breeds, and next, the Ayrshire. Experience, past and present, has led me to give a high position to the Ayrshire and Holstein for cross-breeding purposes, especially if the females with which they are mated are in any way delicate in constitution. It may also be claimed for these crosses that good bulky animals, in some degree suitable for butchering purposes, will be produced, especially when a good proportion of Shorthorn blood is kept in the herds. Animals that are considered unfit for crossing with any class of sire are culled and placed on the butcher's block.

The following is a list of the animals, and respective breeds, now at the College:—

Guernseys	...	...	...	1 stud bull	...	2 females
Holsteins	...	...	...	2 bulls	...	3 females
Jerseys	...	...	...	3 bulls	...	23 females
Ayrshires	...	...	...	12 bulls	...	43 females
South Coast	...	...	...	...	...	5 females
Shorthorns	...	...	...	5 bulls	...	35 females
Mixed	...	...	...	28 males	...	66 females
Total	...	...	...	51 males	...	137 females

Ten stud bulls were disposed of during the year for a sum of £98 9s. 9d. Services of stud bulls to farmers and others, 17; amount received, £5 15s.

*Killing our Own Meat.*—Mr. J. Meehan, the herdsman, has carried out his duties in a very diligent manner, and the matter of butchering has been added to his work. Having been for some years concerned in this business, he is competent to impart to the students a good knowledge of this work. A new refrigerating coil has been added to one of the cool rooms, so that we are now in a position to store our meat at a low temperature.

*Radiator.*—A steam radiator plant was erected at the College by Messrs. Brown, Webb, and Coe, and worked for a period of eight days. By the radiator method of butter-making, the milk is pasteurised at a temperature of 180 degrees F., and is cooled to a temperature of from 90 degrees to 98 degrees F. as it passes into the separator bowl. The cream, on separation, is cooled to churning temperature by a current of water of a temperature of from 40 degrees to 50 degrees F. which flows around the churning bowl. A record was kept of the quantity of milk treated, butter-fat test, and yield of commercial butter. The computed quantity of commercial butter was arrived at by allowing 12 per cent. for matter other than butter-fat in commercial butter. The plant worked smoothly. The product was a sweet, clean-flavoured butter; at the time of manufacture a pasteurised flavour and odour were distinctly perceptible. Stored for a period of three weeks, at a temperature of from 50 degrees to 60 degrees F., the butter was then found to have a clean flavour and good aroma. The butter granules were small. When working a radiator plant, it is necessary to have a good supply of cold water, and a refrigerator is indispensable. The skimming capabilities of the machine are good. The following table gives the quantity of milk treated, butter-fat reading of whole and separator milk, computed yield of commercial butter, also actual churn results. The butter was salted in the proportion of  $\frac{3}{4}$ -oz. to 1 lb. :—

Pounds of milk treated,	Whole milk, butter-fat reading, Babcock test.	Skim milk, butter-fat reading, Babcock test.	Butter yield, calculated from test, 12 per cent. added.	Actual churn yield.
			lb.	lb.
522	3.8	.025	22.216	23.00
580	3.8	.030	24.684	25.25
599	4.0	.033	26.835	27.50
592	3.7	.032	24.532	25.00
564	4.0	.030	25.267	26.00

I have no doubt that in the near future these machines will be found in use in large factories where plenty of steam and refrigerating power is available. Although the trial at the College was most satisfactory as far as the quality of the butter is concerned, I am not in a position to state definitely the results that would accrue from the use of a larger machine. The machine referred to as used in the trial here had a capacity of 30 lb. of butter per hour, and the amount of steam power required to work it was too great to allow of its being worked in small factories.

*Experiments in Keeping Butter at High and Low Temperatures.*—In order to ascertain the effects of high and low temperatures on stored butter, the following experiments were carried out:—One churning was divided into two lots, the product from which was pasteurised cream ripened with a prepared lactic acid ferment. The cream at the time of churning gave a butter-fat reading of 30 per cent. by Babcock tester, and the acidity of the cream was .4, the churning temperature was 56 degrees F., salt was added at the rate of  $\frac{1}{2}$ -oz. to every 1 lb. of butter. Lot 1 was stored at a temperature of 26 degrees to 30 degrees F., and Lot 2, at 35 degrees to 40 degrees F. Before placing in the storeroom, the two lots were tested and scored equally in flavour, 49 points from a maximum of 50. After a lapse of seven weeks, both packages were again examined. Lot 1.—The flavour and aroma were found to be equal to what they were when the butter was first placed in the storeroom; the texture was, however, not equal to No. 2. Lot 2.—The flavour and aroma had suffered slightly, while the texture was equal to when first stored. At this stage No. 1 was the better article by not more than one point. Both samples were then kept for a further period of ten days in temperatures varying from 45 degrees to 65 degrees F., and again tested, with the result that in the case of Lot 1, it was found that the flavour and aroma had gone off, and, in comparison with Lot 2, it had aged more during the ten days during which it had been submitted to the higher temperature, and at this stage both butters were equal in flavour and aroma, but Lot 2 was superior in texture.

This experiment was carefully carried out, but at the same time I am not justified in stating definitely, without further experiments, the results that are likely to accrue from the storage of butter at a temperature below freezing point, as compared with one of from 32 degrees to 35 degrees F., but I am prepared to say that frozen butter suffers more rapid deterioration when exposed to a high temperature than that which has been stored at 35 degrees F.

*Experiments with Cheese Stored at Different Temperatures.*—In the curing of Cheddar cheese, it is a matter of very great importance that certain temperatures be observed in order to obtain characteristic flavour and aroma. The temperature now observed is from 60 degrees to 65 degrees F. The effects of curing at higher temperatures



than those stated are known from practical experience to produce an article inferior in keeping qualities, strong in flavour, poor in texture, and upon all points inferior to that cured at lower temperatures. Experiments have been carried out in order to ascertain the effects of low temperature in curing cheese. It may also be said that it is only within recent years that the refrigerator has found a place in our cheese factories, manufacturers were therefore unable to carry out experiments on any fixed lines. The results of experiments carried out here may be of some interest to cheese-makers. New Cheddar cheese from one vat of milk, made under the usual conditions, was divided into two lots, A and B. Lot A was cured at a temperature varying from 65 degrees to 70 degrees F., and Lot B was stored in a cool room at a temperature varying from 32 degrees to 40 degrees F. They were placed in their respective rooms after remaining four days in an open drying-room at a temperature of 60 degrees to 70 degrees F. At the expiration of nine weeks, the cheese was sampled and the lots compared. Lot A was found to be a cheese of very fair texture, and, considering its age, strong and sharp in flavour. Lot B was found to have a clean, mild flavour, mellow, and excellent in texture. The loss in weight during the period in which the cheese was stored was 1.5 less in favour of the low temperature. The texture, flavour, and general qualities of the cheese stored at the low temperature were better than those found in the cheese cured at the ordinary temperature.

The number of gallons of milk treated during the year amounted to 20,380 $\frac{3}{4}$ , of which 3,579 were converted into cheese for a yield 3,788 lb., and 13,021 gallons produced 5,597 lb. of butter; the balance, 3,780 $\frac{3}{4}$  gallons, was disposed of to the College dining-hall and residents of the place. The value of the dairy produce disposed of to the dining-hall, including beef, was £384 19s. 5d; other than dining-hall, £119 12s. All produce is charged at market value. In addition to work actually carried out at the College, a splendid display of dairy produce, including bacon and hams, was made at the National Association's Annual Exhibition at Bowen Park in August last. A number of cattle from the College herd were shown at the Lockyer Show, and also in Toowoomba; these, needless to say, commanded much attention and appreciation. The matter of showing our live stock is considered to be of very great value to the dairy farmers, because they are thus able to see, at very little cost to themselves, stock typical of the various breeds. In considering my report on this department, I may say it must be admitted that the very best results have been, and are, accruing from the lines upon which this important work is being carried on. Students who have graduated through this branch of work are most successful, not only on their farms, but also as managers of factories and creameries. One of our students was successful in obtaining a position of manager in one of the largest butter factories in Victoria, where 30 hands are employed in the factory work alone. This student was selected from 45 applicants, and writes and thanks the College from which he received his diploma for the position he holds. Visitors from all parts compliment us for the cleanly manner in which every branch of the dairy work is carried out.

**FIG-RAISING AND BACON-CURING.**—This department has been financially the most successful in connection with our year's work. Apart from the financial gain, we have distributed pure-bred pigs, for breeding purposes, throughout all parts of the State, the demand having been far greater than the production. We have experimented with the various breeds and crosses, and find that the pure-bred Middle Yorkshire, or the Middle Yorkshire crossed with the Berkshire, to be the most profitable pig for the farmer, the pure Berkshire taking the second place. The students have received instruction in the breeding, feeding, and raising of pigs, together with bacon-curing in all its branches.

The following pigs were disposed of during the year:—

		Value.
Pure Berkshires	81	£123 13 0
Pure Yorkshires	19	30 9 0
Pure Tamworths	7	10 2 0
Suckers	49	28 0 0
Baconers	13	32 2 6
Stores	5	6 7 0
Pork, bacon, and hams		5 9 1
		<hr/>
		£236 2 7

Increase for the year—

Pure Berkshires	144
Pure Tamworths	30
Pure Yorkshires	45

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The herd kept at the College is considered by competent judges to be of a very high standard.

**Prickly Pear as Pig Fodder.**—Before feeding the prickly pear to the pigs, it was boiled for twelve to fifteen hours, and cut into pieces with a sharp spade. Swill from the dairy was fed with the pear. The classes of pig used for the experiment were matured breeding sows and weaner pigs (ten to twelve weeks old) of the Berkshire breed. The pear was eaten readily by the pigs. The mature pigs and weaners were fed as much pear as they would readily consume three times a day. It was found that the former class maintained a thin condition when fed on prickly pear and swill. The weaners did not thrive at all on the pear fodder; they lost flesh when placed on a full pear allowance, and at the end of a fortnight presented a starved appearance. It is evident that prickly pear is not a suitable fodder for growing pigs.

**SHEEP-BREEDING.**—We have been, for the past two years, experimenting with cross-breeding of sheep. The breeds selected were the merino (ewes), crossed with the Romney Marsh and Shropshire rams. The progeny from both crosses have been found to do remarkably well, and they are apparently well adapted for the country, climate, and the conditions under which they were raised. No especial care has been taken with regard to the pasture or land on which the sheep have been raised. The animals have been allowed to run on the pasture land in the near vicinity of the college buildings, having access to the low, damp, marshy land, which, during rainy weather, is swampy in places. Spear-grass, too, is found to make luxuriant growth in good seasons. The old merino ewes were found to suffer from foot-rot and from the effects of the spear-grass, while the cross-breds were not in any way affected. The sheep were at times put on the cultivation paddocks to eat down the weeds and overgrowth of grass, and for this purpose they may be classed as the "scavengers of the farms." Although much may be said in favour of both crosses, the Shropshire ram crossed with the merino ewe certainly commands the highest merit. The progeny of the above cross are, to my mind, all that could be desired for mutton, either for home or local consumption. The Shropshire is an early maturing animal, a small food consumer, will live when other breeds would perish, and appears to have the power of transmitting its good qualities to its offspring. It may also be claimed that an infusion of blood from the quickly-maturing Shropshire will counteract the defects of the more slowly maturing merino. The mutton from this cross, though dark in colour, is hard, good in flavour and texture, and I consider it to be worth as much in our



markets as that from the very best pure breeds. It may be said that we cannot go further than the first cross, because of the danger of the animals retrograding in quality; but, in my opinion, the contrary will be the result, provided that a thoroughbred sire be used, one that possesses the male qualities to the full extent, and will be, when used, prepotent and stamp himself on his progeny. Cross-bred ewes from the above, if crossed with the Southdown or Romney Marsh, and back again to the Shropshire, should produce a mutton animal of a high grade. Comparing the two crosses, as used here, I find that the Romney Marsh cross are not so strong and do not mature so quickly as the Shropshire. In crossing with heavy rams, maiden ewes should not be selected, on account of the difficulty in lambing and the great percentage of losses. Our flock is small in number, but sufficient for educational purposes.

**POULTRY RAISING.**—The Instructor, Mr. W. Hindes, devoted the whole of his time to the poultry and bee departments, and reports good results, both from a practical and theoretical point of view. The breeding, cross-breeding, feeding, use of incubator, and caponising received careful attention, as also did bee-keeping. Laying competitions with the different breeds were resorted to, and the results published in the *Agricultural Journal*. The demand for pure-bred fowls was much greater than the supply. The returns from sales of poultry were £129 4s. 3d.; from bees, £22 15s.; total, £151 19s. 3d.

The following are the records of eggs laid during the six months ending 31st January. I may state that some of the fowls had not commenced to lay during the first month, so that their records will seem low in consequence. The fowls were not in any way forced or stimulated for a large egg-production. The records kept are from breeding pens only. They were fed on a plain diet—namely, pollard in the morning and wheat at night, with a little green food, such as cabbage-leaves or lucerne, at midday:—

	Number of Hens.	Number of Eggs Laid.						Total 6 Months.
		Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	
Buff Orpingtons ... ..	5	80	80	75	75	80	75	465
White Leghorns ... ..	7	84	98	91	126	126	119	644
Brown Leghorns ... ..	3	39	45	42	48	45	48	267
Black Orpingtons ... ..	4	44	48	64	68	60	60	344
White Wyandottes ... ..	6	84	78	72	96	90	84	504
Silver-laced Wyandottes ... ..	5	55	70	65	75	75	70	410
Plymouth Rocks ... ..	2	12	30	28	34	32	28	164
Minorcas ... ..	3	18	30	42	54	51	48	243
Silver-grey Dorking ... ..	5	30	85	70	75	65	60	385
Spanish ... ..	6	66	78	60	71	80	65	420
Langshans ... ..	3	15	33	36	45	39	39	207
O. E. Game ... ..	5	25	70	65	45	45	40	290
Light Brahmas ... ..	3	0	18	42	30	21	12	123

**VEGETABLE GARDEN.**—The work in this department was successfully carried out by Mr. G. Jackson, an ex-student. By the aid of a system of irrigation which was established some years ago, vegetables were available during the whole of the dry season. In this department a great deal of useful knowledge was acquired by the students in up-to-date methods of producing all sorts of vegetables, also methods of application of manures and those best adapted for the various crops. Mr. Jackson also delivered a number of lectures on the subject of gardening.

**ORCHARD.**—This branch of work is carried out under Mr. Voller, the Assistant Fruit Expert's directions. Mr. Voller visits the College when his attention is necessary, carries out the pruning, and also gives instruction to the students in all branches of fruit culture. It is needless for me to say that his teachings are highly appreciated. The yield of fruit was small, due, in the first place, to the drought, and, secondly, to a severe hailstorm which damaged the crop of peaches which were promising to yield well. Peaches and figs appear to do best here. The following is an extract from Mr. Voller's report on the year's work:—"During the greater part of the last twelve months conditions were dead against satisfactory work. Drought held supreme sway, and things had to stand back until rain came. It says something in favour of the soil and methods of cultivation when hardly a tree died, and the majority held their own surprisingly well. Very little growth took place until the first soaking rains came, but, thanks to the good condition of the land, when they came they took full effect, and a strong growth was the result. The young trees have all made fair progress, and some will be coming into fruit this season. A serious set back, in addition to the drought, was experienced in the shape of a heavy hailstorm, its effect being much bruising of bark and limbs and destruction of buds. This damage is always most severe on young trees where each branch is of value in shaping the future tree, and buds are needed especially in arranging fresh growth. The present appearance of the trees points to a good yield for the coming season. During the year, and more particularly during last winter's pruning, a vigorous course of instruction was followed for the benefit of students in pruning and shaping, in summer pruning on the young trees, and fumigating and spraying. I wish to say that I was very pleased with the interest displayed by those who came under my tuition. A few of the students who went through the whole of the winter pruning gave me the greatest possible satisfaction in the way they took hold of the work and picked up its principles, and it was quite a pleasure to have them with me on the work. This also applies to the work of fumigation which I carried out." The vineyard work was carried on under the directions of Mr. Rainford, Viticulturist. The vines did not escape the effects of the drought, and, like most other crops, suffered severely, so much so that the yield of grapes from the vineyard near the Principal's house was nil. The vineyard on the Lockyer Creek carried a fair crop of grapes which, however, were partly destroyed by hail. Mr. Rainford carries out the work of pruning, spraying, and preparing the vines for the growth of crops, and also imparts to the students a practical knowledge of vine culture and all necessary work appertaining thereto. He reports that the students assigned to him gave strict attention to the instructions he imparted.

**BLACKSMITHING.**—Mr. A. Dennis, who is in charge of the smithy department, reports good, all-round progress in the work. Many students are competent to shoe horses, repair implements, wagons, and drays, and work up iron in a manner that would do credit to a tradesman. This branch of the work is much sought after by the students. Amongst the work performed may be mentioned horse-shoeing, general repairs to wagons, drays, and farm implements, care and attention given to engines, boilers, and steam pumps. A new cultivator and a potato plough were made, and the greater part of the ironwork for chaffcutter, also fitting up of same. All the smithy work which required attention was done on the place.

**CARPENTRY.**—This is one of the most instructive branches of the industrial work, and the desire to acquire a knowledge of handling tools is general amongst the students. Needless to say, every encouragement is given them to do so, for, at an institution similar to this, work of an educational nature is always available. The officer in charge of this branch, Mr. A. Jordan, takes a deep interest in the young men assigned to him for instruction,



and, as far as the practical work is concerned, if they do not learn, the fault lies with themselves. The following comprise the principal works carried out during the year:—Erection of eight-stall stable, size 62 feet by 15 feet, chiefly from rough bush timber; engine-shed on Lockyer Creek; large log drain to carry off water from implement shed; lining silo; making and erecting gates; painting and overhauling wagons, drays, and farm implements; general repairs to College buildings.

**VISITORS.**—We have a record of 1,064 persons having visited the College during the year. The majority of these were men interested in the production of products from the soil, and came for the purpose of acquiring knowledge to enable them to obtain better results from their labours. Apart from residents in our own State, we have had visitors from all parts of the globe; and I am sure it will be pleasing to all who have the welfare of the College at heart to know that the unanimous opinion of those competent to criticise, both at the College and abroad, was that the institution and its working were a credit to the State.

**CORRESPONDENCE.**—During the time under review, 2,247 letters were sent from this office. Most of these were in reply to persons requesting information as regards the working of their respective callings, and the lines to follow to enable them to obtain better results. All letters received punctual attention.

**HEALTH OF STUDENTS IN ATTENDANCE.**—The health all round has been exceptionally good, no sickness, with the exception of ailments of a trifling nature, having occurred. It is a fortunate and also a most singular thing that during the past five years no serious accidents have taken place. At an institution such as this, where there are so many horses, machines, and implements in the hands of learners and inexperienced persons, it is only reasonable to expect slight accidents at times.

**CONDUCT OF STUDENTS.**—The conduct of students right through has been exceptionally good. Two monitors are appointed for each dormitory, and three for the dining-hall. These monitors are responsible to the Principal for the conduct of their fellow-students in the respective places over which they have been selected to preside.

**SOCIAL LIFE.**—Cricket, football, and tennis are the chief games played. We have two football clubs, two cricket clubs, and a tennis club. A bus and horses are available when the teams visit the different villages on Saturday afternoons for the purpose of playing matches. The annual soiree was held in the gymnasium at the end of the year, and was a marked success. I may point out that, while encouragement is given to the various clubs to take part in matches, these are confined to Saturday afternoons and public holidays, so that they in no way interfere with the duties which students are called on to perform.

In concluding this Report, I may say that I have dealt with the work in as brief a manner as possible; at the same time I have endeavoured to show that good and faithful work has been performed in every branch with which we have had to deal. From the movements of the ex-students it will be observed that we are on the right lines, and that our work is being directed in the right way. At anyrate, those who ought to be the best judges—the men who send their sons here and pay for their education—are the very people who express their gratification at our work. I have no desire to claim all credit for the past work of the College, because the success is due to the loyal support I have received from the officers controlling the various departments, and also to the manner in which they have supported and assisted one another to bring about good results. My thanks are due to the visiting lecturers for their able assistance, and also to the College staff for their energy displayed during the year.

JOHN MAHON, Principal.

#### REPORT OF THE MANAGER OF THE STATE FARM, WESTBROOK.

SIR,—I have the honour to submit to you my Annual Report for the year ending 30th June, 1903.

Before giving any *résumé* of the work done for the year, it is necessary to state that the results of the previous autumn sowings of cereals, to which reference was made in my last report, were practically nil, owing to the unprecedented drought. Some of the blocks never even showed above ground, and the most that can be said of the best of them is, that they afforded a bite of greenstuff when it was most required. The drought was at its worst right up to October, when we got the first relief; but no real benefit was received until the January and February rains were upon us. All through the drought, however, we had abundance of sound dry fodder (sorghum, stover, cowpea hay, and straw) which was saved from the previous season.

The following table gives the rainfall for the year:—

	Inches.		Inches.
July ... ..	·06	January ... ..	4·21
August ... ..	·29	February ... ..	4·19
September ... ..	·38	March ... ..	1·54
October ... ..	3·20	April ... ..	·33
November ... ..	3·34	May ... ..	4·51
December ... ..	3·35	June ... ..	...
		Total ... ..	25·40

It is a little difficult for me, I find, to choose those parts which are in need of prime reference in this report for the information of the Minister, the department, and the public generally. The good work done on the farm, and also the interest taken in it is apparent, from the increase in the numbers of visitors from all parts, which include not only farmers, but men of other callings. A considerable amount of my time has been devoted to showing these visitors round the crops, and all inquiries relating thereto have been cordially replied to, and all information relating to the industry has been given by letter when desired. It is gratifying to note how the farmers are adopting recommendations for their own advancement.

In addition to the above, practical lessons on budding and pruning orchard trees, pruning and training grape vines, and the method of collecting soils for analysis have been given to the boys of the State schools who were brought here on several occasions by Mr. Stevens, head teacher. This being supplementary to the theoretical lessons given in schools must be of immense benefit to lads on whom the future success of farming depends.

Owing to the nature of the season, early field cropping could not be successfully proceeded with; but advantage was taken of the weather to have about 25 acres of land subsoiled. The great value of this work has been clearly demonstrated, it being the only portion of the farm where any crops could be kept growing during the hot dry months.



**MAIZE.**—Reference was made in my last report to the experimental blocks of maize. I may here state that sixty applicants from all over the State were supplied with seed obtained from these blocks. This realised about £50. The same varieties, with the exception of Macleay River and Golden Superb, which were discarded (being hybridised), were planted again last October; the blocks being made a little narrower, and the divisions wider. This was done to minimise the danger from hybridising, and also to give sufficient room for growing one variety of pumpkins throughout the series. The varieties are as follow:—

Longfellow Dent	Sixty Day	Leaming
Japanese Ninety Day	Riley's Favourite	Early White Horse Tooth
Early Hogan	Golden Beauty	Hawkesbury Champion
Sydney Red Nibbed	Legal Tender	Mastodon
Balderman	Piasa Queen	

The grain has not yet been threshed out, but I anticipate the yield to be very much below the average; in the case of Sixty Day and Mastodon it is almost nil. Whatever seed we have will be carefully reserved for distribution.

**MILLETS AND SORGHUMS.**—Four acres of Kafir corn, sorghums, and maize were sown broadcast in September on the recently subsoiled lands. The seed responded to the first rains, and continued to grow until the flowering stage. It was cut with the horse mower, field-cured, and built in two stacks containing 14 tons of excellent fodder. A second crop followed, varying in height from 6 to 12 feet. This crop is now being cut as required for the working horses.

A plantation of the following varieties was sown in drills, 4 feet apart, for seed purposes:—

Planter's Friend (Imported)	Sorghum, Folger's Early
Amber Cane	White Kafir Corn
Early Orange Cane	Red Kafir Corn
Sorghum, Colier	Broom Millet

The Planter's Friend and White Kafir Corn produced the most seed and the heaviest weight of fodder.

After the seed was gathered the crop was cut into sheaves by the corn harvester, and afterwards built into large weather protected stooks. There was also a trial plot of *Pennisetum* which came to me as a new plant, but I recognised it as Soudanese Millet. It is a good subject for dry hot country, giving an amazing amount of green feed, but the seed is of little value for stock.

**PANICUM.**—One and a-half acres of this plant were sown broadcast on land previously cropped with cowpeas, and yielded 4 tons of hay. A crop of 1½ acres sown much earlier, following rye, was very poor.

**LEGUMES.**—*Cowpea*: The varieties of this legume are without doubt amongst the most valuable crops a farmer can grow. Last season the seed was sold at 30s. per bushel in Toowoomba. The pulse may not only be fed to stock, but it is an excellent table vegetable. The vine makes the most nutritious of hay, is one of the best green manures, and is a luxuriant cropper. Four acres of black variety were drilled 3½ feet apart on subsoiled land for seed purposes. Although the season was very much against it, the rows overlapped one another, but the pulse did not ripen before the frost was on it. I estimate the weight of hay on the stack at about 2 tons. One bushel of seed was used to drill 1½ acres of dry stony land, and when 12 inches high the horse mower was run over it, and it was ploughed in for green manure. The great objection to growing these crops is the expense and difficulty of handling them.

*Tonga Bean.*—Three rows aggregating 50 chains long were sown along the fences. The growth of this bean is amazing. Sheep and cattle browse on it voraciously. It ought to be a good forage crop for arid regions. The pods are a delicious vegetable cooked like French beans.

**LUCERNE.**—There being a limited area of suitable land available for this crop, we have only a 4-acre block, which was sown in March. This has done very well; one light cutting was taken off in May and fed to the horses.

The following legumes were sown in smaller areas at different seasons—viz., spring, summer, and autumn—but none of them podded well until the latter season:—

The following table gives the results of a block of dwarf beans put in for testing purposes—

Startles: Rather delicate in constitution; poor crop.
Governor Denison: Hardy and abundant cropper; did well.
Inexhaustible: Did fairly well.
Anderson's Wonder: Average crop; good quality.
Negro Longpod: Cropped well; should be pulled young.
Thorburn (Lima), Burpus (Lima): Beginning to crop heavily, when the frost came.
Stringless Greenpod: The best of all; continuous bearer; lasts a long time; perfectly stringless; and splendid for table.
Runner Beans, King of the Garden (Lima), Duress Challenger (Lima): Beginning to crop when frost came.
Zebra, White Dutch, Mount D'Ore, Scarlet Runner: Succumbed to drought.

A quarter of an acre each of garden peas and broad beans sown last winter were an entire failure.

**GRASSES.**—*Paspalum dilatatum*: I am inclined to think this is the best of all the introduced grasses. It stands all weathers here, giving abundance of feed all the year round. The method I have adopted for laying down a piece of very stony land is as follows:—The land was cultivated as well as could be, and furrows drawn out the width of the wheat drill apart. Stools were dug from the old block, divided and dropped into furrow at intervals of 3 feet, and covered with the plough. Between the furrows Marshall's wheat and Nepaul barley were drilled in for green feed, and the Cambridge roller put over all. The two latter crops afforded any protection needed. When they are taken off, and the stubble ploughed in, I anticipate the self-sown seed from the *Paspalum*, which is now grown well, will cover the whole, thus producing a good sward next summer. A bed was also sown with Awnless Broom Grass received from the Hon. A. J. Thynne, M.L.C. It did very well up to seeding time, and then died off. The seed was saved for a further trial.

**PUMPKINS.**—A crop of Crown pumpkins grown on 2 acres of subsoiled land yielded 10 tons. This is one of the best-selected stocks, being the truest to name I ever had. As this spot is quite isolated, it will be valuable for seed purposes. About 15 tons of other table pumpkins were grown between the varieties of maize.

A trial was made of a new pumpkin procured from Messrs. Holmes and Co., seedsmen, Toowoomba, called "Silver Nugget." It is a small, silvery-white Crown-like variety, and the best of all for table use. This has also



been kept isolated, and a very limited supply of seed will be available. The other varieties, grown with more or less satisfactory results, were as follows:—

- Ironbark: Good crop, but not true.
- Button: Very good.
- Jonathan: Moderate crop, good fruits.
- Premium: Abundant and early.
- Victory: A few fruits only.
- Mammoth: Good, but the crop mixed.
- Turk's Cap: Fair.

*Marrows and Squashes—*

- Charles Naudin: These three so-called varieties came to me from Italy, Victoria, and U.S.A. respectively. It is an enormous cropper. The fruit is handsomely marked pumpkins, shaped light with their flesh, and a delicious flavour.
- Fordbrook: Did not do well.
- Yellow Custard Bush: A fine crop.
- White Custard Bush: A fine crop.
- Long White Bush: A fine crop, splendid fruits.
- Delicata: Delicious table variety, prettily marked.
- Crookneck: More ornamental than useful.
- Scarlet Sugar: Great cropper, sweet, but watery.
- Chili: Very large bright red.
- Hubbard: The best of all dry squashes.
- Long Bush Marrow: Abundant crop, large fruits.
- Warted Marrow: Abundant crop, large fruits.
- Long Striped Marrow: Handsome fruit, good crop.
- Rice Marrow: Good table variety, bears well.

**WATER MELONS.**—The following varieties were grown and every one did well (I still think for general purposes, market or home use, the two most satisfactory kinds to grow are "Cuban Queen" and Golio Early):—Sweet Home, Cuban Queen, Klickley, Sweets, Ironclad, Cole's Early, Santiago, and Ice Cream. Rock melons were represented by twelve varieties, and preserving melons by four. The fruits of these were not so large as in more favourable seasons, but the flavour was perfection. Amongst six varieties of cucumber an unnamed sort from Finland is particularly worthy of attention of those intending to grow for the pickle factories. It is small (never growing more than 4 inches long in the richest of land), smooth skin, very prolific in small, perfectly-shaped fruits—an ideal gherkin. All the above were grown in subsoiled land. They were never checked in growth after once making a fair start. On the 10th January a hailstorm gave them a considerable battering, which they soon recovered from, and consequently produced heavy crops. This is particularly the case with a plot of a quarter-acre of grammas.

**COTTON.**—Ten varieties were grown in ordinary land, but owing to the drought they never got a fair start. The plants were stunted, but in the autumn a few made an effort to produce bolls, and one here and there burst. The only two sorts producing a few decent bolls are "Jones Big Boll" and "Russel," both Uplands cotton. The frosts checked any chance of production in this experiment. Enough seed has been saved off most of the varieties for a further trial.

**ROOTS.**—An acre of subsoiled land was sown with Mammoth Long Red, Long Yellow, and Yellow Globe mangels in October. Germination was slow, several misses occurred, and the plants were stunted for a long time owing to dry weather. The crop is consequently thin, but the bulbs are of enormous dimensions. A quarter of an acre of carrots sown at the same time failed entirely: The same area was sown with Swedes in February, including Imperial Purple Top and Laing's Garden—a table variety. Both varieties are doing well, but have not attained their full size. Sowings of white turnips of the following kinds were made:—White Model, Red American, Orange Jelly, and Greentop Aberdeen. The three first are the most suitable for table use, but for stock-feeding purposes the latter is far away the best, producing very large roots. Kohl-rabi and Ruta Baga is also grown, and four varieties of onions.

**CABBAGE, CAULIFLOWER, &C.**—About two acres are under these crops. Transplanting began in March and was continued in favourable weather until May. The cabbage plot contains the following varieties:—

- Winstadt: Cone-shaped, very solid, splendid table.
- Succession: Can't be beaten for general crop.
- Autumn King: Gigantic cabbages, a late kind.
- Danish Roundhead: A fine large head, good market sort.
- Ballhead: One of the handsomest large cabbages in existence.
- Early Stonehead: Early, solid, medium sized.
- Late Stonehead: Late, solid, medium sized.
- Sunhead: Good market sort, always bears well.
- Danish Green Glazed: Peculiar variety, small heart.

The varieties of cauliflower most in favour so far are White Queen—a beautiful white medium-sized head, and very early. This variety is in full season during May and June. Carter's dwarf Mammoth is just beginning to head. This is a splendid collection. The fine even growth of magnificent heads, with no insect pests to damage the leaves and with no weeds on the plot, affords a perfect picture. The same can be said of Savoys, Red Cabbage, Brussels Sprouts, and Curled Kale.

The marketing of the above began the first week in June, and are realising from 4s. to 7s. 6d. per dozen.

**CEREALS.**—The season for sowing these has been very favourable. The land being in excellent tilth and plenty of moisture available, the plant came right away, except in the last two sections. These two were sown later and in soil much drier, consequently the plant is more tedious in making its appearance. The following table



gives the names, areas of sections, time of sowing, &c. of the different cereals. The wheats, excepting No. 21, are representative of the varieties imported by the Department of Agriculture for distribution amongst the farmers of the State:—

No. of Section.	Name.	Area of Section. Acres.	When Sown.	Appearance at Date.
1.	Marshall's No. 1	1 $\frac{3}{4}$	25 April	Tillering strong
2.	Baltic Red	1 $\frac{3}{4}$	"	"
3.	Petatz Surprise	1 $\frac{3}{4}$	"	"
4.	Baroota Wonder	1 $\frac{3}{4}$	"	Strong, upright, tallest
5.	Dart's Imperial	1 $\frac{3}{4}$	"	Tillering strong
6.	Carmichel	1 $\frac{3}{4}$	3 May	Beginning to cover ground
7.	Leatherhead	1 $\frac{3}{4}$	"	Good plant
8.	Australian Wonder	1 $\frac{3}{4}$	"	"
9.	Silver King	1 $\frac{3}{4}$	"	Rather weak, crop thin
10.	Defiance	1 $\frac{3}{4}$	"	Rather weak, crop very thin
11.	Steinwedel	1 $\frac{3}{4}$	14 May	Good plant
12.	Fillbag	1 $\frac{3}{4}$	"	"
13.	Hamblyn's Prolific	1 $\frac{3}{4}$	"	Beginning to cover
14.	Bobs	0 $\frac{3}{4}$	"	Good plant
15.	White Tuscan	1	"	"
16.	Gluyas	1	15 May	"
17.	Warwick	1	"	"
18.	Early Para	1	"	"
19.	Newman's Early	1	"	Rather weak
20.	Smart's Early	1	"	Beginning to cover
21.	Marshall's No. 3	4 $\frac{1}{2}$	16 May	Fair to good
22.	Federation	0 $\frac{5}{8}$	"	Good
23.	Budd's Early	4	9 June	Showing through
24.	Allora Spring	4	11 June	"

Further trials of crossbred wheats are being made, 60 drills being marked out 1 chain long, 2 feet apart, and planted with selected varieties; also larger trials in convenient plots of the following:—

No.	Name.	Remarks.
<i>Wheat.</i>		
1.	Viking	A variety sent for trial; strong plant.
2.	Morocco	A variety from the Mediterranean; very strong.
<i>Barley.</i>		
3.	(No name)	An unnamed variety from Finland; very weak, a plant only showing here and there.
<i>Oats.</i>		
4.	Danish Island	A variety from the United States of America; good plant.
5.	Burpees Welcome	" " " " " "
6.	Golden Giant-side Oats	" " " " " "
7.		An unnamed black variety from Finland; good plant

MISCELLANEOUS CROP.—A plot of one-eighth of an acre has been sown with a variety of "Sulla" from Russia for trial. The area under Asparagus has been considerably increased. Five rows, each 6 chains long have been added. It was planted in August, but scarcely made a move until the January rains set in. Since that time the plantation has made robust growth. The following garden crops were grown on a block near the house, but owing to the drought none thrived satisfactorily until the autumn months. Artichokes (Jerusalem) yielded heavily. Beet: Of 6 varieties under trial Crimson Globe did the best. Capsicums and chillies (10 varieties) did well in autumn. Lettuce and endive (6 varieties) doing well. Egg plants, okra, tuks, salsafy, spinach, parsley, and radish did fairly well. Eight varieties of tomatoes made but slow growth, and failed to fruit until the autumn, when they cropped abundantly. Many other vegetables were sown and planted, but owing to insufficient rains and other climatic influences, were more or less failures. A  $\frac{1}{4}$ -acre block of "saltbush," however, stood the drought admirably.

ORCHARD AND VINEYARD.—The orchard trees withstood the climatic condition of last year better than could have been expected. After the drought, the most serious drawback was the result of a heavy hailstorm, which occurred on the 10th January, and which appeared at the time to have ruined the prospect of any crop of fruit. But certain fruits, notably pears, withstood the attack, as did also some of the grapes where the foliage was thick enough to protect the bunches. Apricots and peaches were very poor indeed. Plums, where sheltered, produced a few fairly good cases. Apples and pears were of very good quality, and the consignments despatched brought good prices. It is satisfactory to note that not a tree or grape vine succumbed to the drought. The ground has been kept continuously cultivated and free from weeds. Summer pruning has been attended to. Insect and fungoid pests have been carefully looked for, and when their presence has been detected, they have been eradicated by spraying solutions.

In the vineyard the crop, owing to the above-mentioned climatic conditions, was very much below the average, but we have never had a finer sample of grapes to offer. The wine varieties were sold in Brisbane at £8 per ton., f.o.b; Westbrook and table grape, 3d. to 4 $\frac{1}{2}$ d. per lb. The earliest table sorts fit to market were the "Madeline Royal" and "Chouch," on the 22nd December, and the "Chasselas" varieties following in the first week of January.

The orchard branch is under the supervision of Mr. S. C. Voller, who has by lectures, by personal interviews with farmers, and by articles in the *Agricultural Journal* largely contributed to the advancement of the fruit-growing industry.

IMPROVEMENTS.—The flooring of the shed behind the stables has been completed, and the four stalls at the end roofed with iron. The new vineyard, consisting of 3 acres, has been staked with 3-inch by 3-inch seasoned hardwood posts. Two bedrooms and a covered way have been added to the manager's residence, and a substantial "silo," 10 feet by 10 feet, with a movable roof and cement floor, has also been erected. All property has been kept in repair and new work done where required.

EXHIBITIONS.—During the year the products of the farm were largely represented at three of the most important Exhibitions in the State, viz.:—the National Agricultural and Industrial Association, held in Brisbane, in August last; the Royal Agricultural Society, also in August; and the Drayton and Toowoomba Agricultural and



Horticultural Society's Show, held in February. Both the latter were held in Toowoomba. The first was a combined display of Westbrook and Hermitage State Farms, and considering the unpropitious season and the magnitude of the exhibit, it was the object of very favourable remark.

The display of exhibits from this farm at the "Royal" was also very fine, especially in the farm roots and vegetable sections. But the best exhibit I have seen staged in this State was that shown at the last summer show in Toowoomba. The effect was striking. It was comprehensive and instructive, and the individual excellence of the specimens has never been excelled by any collection hitherto brought together. This was in the midst of the severest drought ever known in the country. It is very gratifying to know that my efforts in this direction were appreciated by the Minister, the Drayton and Toowoomba Agricultural and Horticultural Society, the Press, and the general public.

WORKING STAFF.—The working staff for the past year has consisted of four men, as against five previously; the farm stock, of 10 field horses, 1 hack, and 1 harness mare (12 horses as against 17).

C. ROSS, Manager.

### REPORT OF THE MANAGER, STATE FARM, HERMITAGE.

SIR,—I have the honour to submit my Report for the year ending the 30th June, 1903:—

Month.	RAINFALL.						No. of inches.	No. of rainy days
	1902	...	...	...	...	...		
July,	1902	...	...	...	...	...	0.05	1
August	"	...	...	...	...	...	1.03	6
September	"	...	...	...	...	...	0.80	4
October	"	...	...	...	...	...	2.89	7
November	"	...	...	...	...	...	3.76	6
December	"	...	...	...	...	...	4.43	8
January,	1903	...	...	...	...	...	0.28	2
February	"	...	...	...	...	...	2.80	4
March	"	...	...	...	...	...	1.58	8
April	"	...	...	...	...	...	0.14	3
May	"	...	...	...	...	...	7.18	11
June	"	...	...	...	...	...	0.07	1
TOTAL							25.01	61

The past year has been probably the most disastrous experienced in this locality since agricultural settlement took place.

Except in a few isolated patches of country visited by storms, no wheat, barley, or oats were harvested. I regret to inform you that all the experiments carried out with these crops, as enumerated in last report, failed for want of moisture.

This unfortunately set our most important branch back considerably—*i.e.*, "The selection and propagation of approved strains of wheats."

Luckily, sufficient seed was retained to admit of the majority of these not being altogether lost.

MAIZE.—During September and early October an area of 27 acres was sown, half with Ninety Day and half with Amber Queen, using 7 lb. of seed to the acre. As this sowing was on recently broken up and worked land, seed did not germinate too well, and even then there was not sufficient rain at tasselling time to ensure setting of cobs. The crop was fed off by working horses, and proved acceptable at a time when grass was backward.

On the 22nd October, after marking out rows 4 feet apart, areas of 1 acre each of the following varieties of maize were sown with the "Moline" drill, distributing approximately single grains 18 inches apart, and using from 6 lb. to 7 lb. of seed per acre, according to size:—Golden Beauty, Riley's Favourite, Legal Tender, Improved Leaming, Piasa Queen, Amber Queen, Ninety Day, and Leaming.

These crops were scuffled twice and then slightly hilled with plough.

Heavy storms in December caused a very rapid and succulent growth. Plants, in their endeavour to reproduce themselves quickly, ran into "tassel," but owing to evaporation of surface moisture by excessive heat, accompanied by hot winds early in January, crops wilted beyond recovery. To turn these stalks to account, they were cut and put into "shocks," resulting in a return of from 1 to 1½ tons of cured fodder per acre. Piasa Queen gave the highest and Leaming the lowest yield.

An area of 30 acres of Leaming maize was sown in a similar manner to above-mentioned varieties, using 6 lb. of seed to the acre.

This crop also wilted in January, and was cut with the binder, a portion being made into silage in the stack and the balance stoked and cured into hay.

SORGHUMS, &c.—The following varieties were drilled in with "Reid and Gray" drill on 15th October, in drills 2 feet 6 inches apart, principally in ½-acre areas:—Sorghum saccharatum, Planters' Friend, Amber Cane, Coleman Sorghum, Early Orange Cane, Red Kafir Corn, White Kafir Corn, Folger's Early Sorghum, Broom Millet, Brown Dhoura, Jerusalem Corn, Soudan Millet.

The securing of good seed was not possible on account of dry weather at flowering time, so the crops were cut, stoked, and afterwards stacked as a standby for winter.

The first five gave the best results; No. 2 attained the maximum quantity of cured fodder, amounting to 3 tons 12 cwt. per acre.

A useful second growth was made after rain fell.

PUMPKINS.—Eight acres were planted with Mammoth Tower and Long Tom cattle pumpkins, also Ironbark, Crown, and Button. Only a light crop was obtained from a second growth of vines.



COWPEAS.—The following areas were drilled in with clay-coloured and black peas as rotation crops:—

2.40	acres	on	20th	October,	1902,	using	7	lb.	of	seed	per	acre.
15.00	"	"	17th	November,	"	"	9	lb.	"	"	"	"
8.00	"	"	5th	January,	"	"	9	lb.	"	"	"	"

In the first and last sowing the seed germinated sparingly on account of want of moisture.

The November planting gave the best results.

When once established, this plant withstands much heat and dry weather.

A quantity of cowpea hay was obtained and cured in racks.

COTTON.—Varieties mentioned were raised from seed, but the plants, after battling against adverse conditions, failed to mature; the January heat and hot winds supplying the finishing touches.—Uplands cotton: Doughly, Culpepper, Parker, Russell, Christopher, Jones's Big Boll, Truitt, Braddy, Seabrook, Sea Island.

WHEAT.—The recent introduction of South Australian wheats, and their distribution to localities with such widely differing conditions, renders it imperative that an official test may be made.

To this end, sowings have been made of each variety after treatment of the respective samples with bluestone. Particulars are as follows:—All seed was drilled in at the approximate rate of  $\frac{3}{4}$  bushels per acre.

Name.	Area Sown. Acres.	When Sown. 1903.
Dart's Imperial	5	16th May
Smart's Early	5	18th "
Petatz Surprise	5	18th "
Gluyas	5	18th "
Newman's Early	5	19th "
Hamlyn's Prolific	5	19th "
Leatherhead	5	19th "
Baroota Wonder	5	21st "
Carmichael	5	21st "
Warwick	1	28th "
Australian Wonder	1	28th "
Marshall's No. 1	1	28th "
Budd's Early	3	10th June
Early Para	1	12th "
Silver King	1	12th "
Steinwedel	1	12th "
Fillbag	1	19th "
Tuscan	1	19th "
Marshall's No. 3	$0\frac{3}{4}$	19th "
Allora Spring	$3\frac{1}{5}$	19th "

Additional wheats as detailed have been drilled in similarly to above—

Name.	Area Sown. Acres.	When Sown. 1903.
Marshall's No. 8	5	9th April
Bobs	5	12th May
Federation	5	13th "
Sullivan's Early Prolific	5	14th "
Marshall's No. 3	$3\frac{6}{10}$	25th "
Yandilla	$3\frac{1}{3}$	25th "
Manitoba	1	28th "
Farrer's 85 A1, B1	3	28th "
Farrer's 84 BY	3	29th "
Indian Fife	3	29th "
Australian Wonder	3	30th "
Battlefield	$0\frac{3}{4}$	30th "
Farrer's R	$0\frac{3}{5}$	30th "
Yandilla Imported Indian	$1\frac{1}{2}$	22nd June

#### BARLEY.

Name.	Area Sown. Acres.	When Sown. 1903.
Hallett's Imported Chevalier	$6\frac{1}{5}$	15th May
Sea of Azov	5	14th "
Mould's Imported	$0\frac{3}{4}$	22nd June
Nepaul	4	5th March

RYE.—Three acres were drilled in on March 6th, and the crop is being used as green feed.

OATS.—Twenty acres of Algerian were broadcasted on 16th and 25th June at the rate of a trifle over 2 bushels per acre.

WHEAT—*Experiments with Fertilisers.*—Details of above experiments, occupying 24 half-acre blocks, have been given in a previous report. Owing to failure of crop last season, fertilisers were not applied this year. Plots were sown with Budd's Early wheat previously pickled at the rate of  $\frac{3}{4}$ -bushel per acre on 9th and 10th June.

*Stud Wheats.*—This collection comprises some 70 odd carefully selected strains, originating principally from Mr. Farrer's crossbreds. These have been selected from a large collection, embracing some hundreds, on account of their adaptability to soil and climate. In the majority of cases, areas of one-twentieth of an acre have been drilled in with the respective samples, by means of Planet Jr. hand-drill, in rows 16 inches apart. Seeds of some promising "sports" have been sown; also a number of other samples of imported wheats.

OATS.—Appended are the names of varieties sown on 11th June to test their adaptability to locality:—Abundance, Algerian, American Banner, Black Winter, Carter's Royal Cluster, Clydesdale, Danish Island, Dun Oat, Egyptian, Golden Giant, Hopetown, Lincoln, Peerless White Bonanza, Pioneer, Red Rust Proof, Skinless, Swedish, White Tartarian, Tarter King, Waverley, Welcome, Wide Awake.



**BARLEY.**—Similarly to oats, small plots of the undermentioned have been sown on 13th June—Kinver's Chevalier, Golden Grain, Webb's New Golden Giant, Early Purple, Carter's Malting, Invincible, Hallet's Chevalier, Half-awned, and Chilian Chevalier.

**EXPERIMENTS WITH "BUNT" INFECTED SEED.**—Sixteen varieties of wheat were received from Mr. Farrar, of New South Wales, who had infected samples with "bunt" to test the relative immunity of different varieties. To make comparisons as conclusive as possible, similar collections are being tested in New South Wales, Victoria and South Australia.

**PASPALUM DILATATUM.**—Eleven thousand roots of this grass have been planted out, on 19th May, in rows 3 feet apart, sets 2 feet apart in the row.

**MARROWS AND SQUASHES.**—A collection of these has been raised—Early Orange, Hubbard, Delicata, and Custard showing out prominently among the squashes, while the Long Fruited Bush marrow gave best results in its class.

Various garden stuff has also been grown, tomatoes doing particularly well in the early part of the season.

**THE ORCHARD.**—Notwithstanding the dryness in the early part of the fruit season, and the hailstorm which injured the apricot crop principally, some excellent fruit was marketed and prices were satisfactory for all fruit of good quality.

Land occupied by trees has been cultivated twelve times during the year, besides hand-hoeing along strips and about trees.

Routine work has consisted of pruning, spraying, suckering, gathering and marketing of fruit, &c. Three hundred and seventy odd cases of assorted classes of fruit have been sold.

Mr. S. C. Voller has directed operations in this branch, and is, I feel sure, justly proud of producing such excellent fruit after the severe drought.

**THE VINEYARD.**—Work in this branch is under Mr. Rainford, the Viticulturist. This year the usual late frost luckily did not appear and cut back young shoots to the old wood. To this I attribute the phenomenal success of some of the varieties of grapes—Gordo-Blanco, White Syrian, Raisin de Calabre, Raisin de Dames, Black Prince, Royal Ascot, and Chasselas—matured bunches of grapes worthy of any hothouse. As an instance of the size of the grapes from the last-mentioned variety, three berries weighed 1 oz. The vineyard was "scuffed" three times during the year, and was lightly ploughed five times. After winter pruning the vines were dressed with sulphuric acid solution, and during early spring were sprayed with Bordeaux mixture, with gratifying results.

**IMPROVEMENTS.**—A silo, 12 feet by 10 by 10 feet has been added to our farm buildings. The framework and sheeting (the latter 6 inches by 1½ inch, tongued and grooved) are of seasoned ironbark. The roof is constructed on small wheels, to allow for rolling off on to the framework attached for the purpose. The silo has been filled with lucerne; capacity, about 30 tons.

A representative collection of produce was made at the last National Show, in conjunction with Westbrook.

H. C. QUODLING, Manager.

#### REPORT OF THE MANAGER OF THE STATE FARM, BIGGENDEN.

SIR,—I have the honour to submit the following report on the work carried out on the above farm for the year ending 30th June, 1903:—

The disastrous drought which prevailed during the greater part of the previous year still continued throughout the first six months of the year under review. Under those conditions, the usual amount of experimental work could not be carried out, and the time which would have otherwise have been devoted to the raising of the different crops had to give place to the keeping alive of the young fruit trees and vines.

From November 1901 to September 1902, no rain fell to be of any benefit to either the orchard or vineyard. The few showers that did fall were scarcely sufficient to moisten the surface of the ground, yet in the face of those trying conditions I am able to report that not a single tree or vine perished. The secret of this success did not lie in having an irrigation system to fall back upon—the well, the only water supply on the farm, having gone dry and all water having to be carted a distance of two miles—but in thorough and systematic cultivation. Since the breaking up of the drought in December, the climatic conditions have, on the whole, been favourable for the growth of the crops grown on the farm.

I attach herewith an abstract of the meteorological observations taken at the farm during the year under review.

**EXPERIMENTS WITH MAIZE.**—The experiments carried out with this crop consisted of a further testing of the varieties received from America in 1901. Field 9 was planted on 3rd October, with the following sorts:—Riley's Favourite, Golden Beauty, Piasa Queen, Leaming, Legal Tender. Owing to a light fall of rain shortly after planting, all varieties were through the ground by the 20th. No rain, however, fell during the following month, and there being no bottom moisture, all hope of getting a crop disappeared. In an ordinary season the crop would have been at once cleared off, and a further sowing made; but fodder being scarce, and no sign of the drought breaking, it was allowed to remain on the ground and cut as required for stock feed. The ground was thoroughly worked up between the rows and a fresh sowing made.

On the removal of the old crop, sulphate of ammonia was applied at the rate of 1 cwt. per acre. A small area of each plot did not receive any manure. The crop made fair growth until the flowering was reached, but, unfortunately, at that time no rain fell. This again spoiled all chances of getting a good return. Thinking that a subsequent sowing might meet the same fate, and not wishing to lose the varieties, the crop was allowed to come to maturity and harvested on the 13th of April. It would be misleading to give the returns from the individual varieties, as those plots on which the old crop was first removed had the greater advantage. Taken as a whole the returns were: for the manured, 19 bushels per acre, and for the unmanured, 14 bushels per acre. This leaves a profit of 5s. in favour of the manure.

A subsequent planting was made in Field 10. For this sowing the climatic conditions were much more favourable. The results obtained were as follows:—

American Varieties.	When Sown.	When Harvested.	Returns per Acre.	
			1903.	1902.
Riley's Favourite	... 2nd January	... 25th May	... 38 bushels	... 20 bushels.
Golden Beauty	... ..	... ..	... 30 "	... 19 "
Piasa Queen	... ..	... ..	... 28 "	... 17 "
Legal Tender	... ..	... ..	... 27 "	... 26 "
Leaming	... ..	... ..	... 20 "	... 17 "



Other Varieties.	When Sown.	When Harvested.	Returns per Acre.
Golden Nugget ... ..	3rd January	25th May	42 bushels
Golden King ... ..	"	6th June	39 $\frac{1}{2}$ "
Early Yellow Dent ... ..	"	25th May	36 $\frac{3}{4}$ "
Hawkesbury Champion ... ..	"	6th June	33 "
Early White Horsetooth ... ..	"	25th May	26 $\frac{1}{2}$ "
Argentine ... ..	"	"	22 "

*Barley.*—Owing to the severity of the drought, only a small area was put under crop last season, the results being nil. This season the conditions for sowing were much more favourable. On 14th May, Field 11 was sown, with the following varieties:—Hallet's Improved, Sea of Azov, Chevalier; and Field 2, with Cape, Chilian, Nepaul, Golden Drop, and Windproof. The soil was in splendid order for the reception of the seed, and, so far, all look healthy, and are coming on well.

*Wheats.*—Field 8 has been divided up into plots of one-tenth of an acre, each of which was sown on 16th May with the following varieties:—

Early Para	Carmichael	Yandilla
Gluyas	Tangiers Variety	Yandilla Improved Indian
Australian Wonder	Leatherhead	Farrer's R.
Hamlyn Prolific	Petatz' Surprise	Farrer's 84, BY
Silver King	Indian Fife	Farrer's 85 A1 and B1
Baroota Wonder		

The seed previous to sowing was pickled by the "bluestone" method. In all plots the seed germinated from the seventh to the eleventh day after sowing. As wheat-growing is practically new to the district, the result of this experiment is awaited with interest.

*Oats.*—Two varieties—Tartarian and Algerian—have been sown in the 4 acres of land recently brought under cultivation from Grass Paddock No. 1.

#### LEGUMINOUS CROPS (Field).

*Cowpeas.*—Those were grown in orchard between rows of fruit trees, and sown 24th October. The method of planting consisted of dropping the seeds by hand in every second furrow when ploughing, the amount of seed used being about 8 lb. per acre. The crop came on well in spite of the drought, and when coming into pod was used to great advantage as a pig feed. Shortly after the crop came into bearing a bug appeared, which did considerable damage by piercing the pods and sucking the juices from the seeds. Later on, the pest became less troublesome, and sufficient seed was secured for further sowing. The varieties grown were White's Perennial, Black, Clay, Large Black Eye, Small Black Eye, Piebald, Large White, Large Purple, Small Purple, and Grey. From a green manuring point of view the White's Perennial is the most useful variety. It is somewhat late in coming into bearing, but this is a rather valuable point, for, if the land is not at once wanted it will, by its luxuriant growth and perennial habit, keep down everything in the shape of weeds. There is very little to choose from between the Black, Clay, Grey, and Large Purple sorts. All are good croppers and give a large amount of both green material and seed. The Large White is worth growing for table use. The Small Black Eye is the earliest of all, but owing to its light cropping qualities is scarcely worth growing.

*Beans.*—Sown 24th October, between rows of trees in the citrus orchard. The manner of planting was the same as in the case of the cowpeas, only the seed was dropped in every fourth furrow instead of second. The manner in which they kept on growing during the two months' dry weather experienced after planting was truly remarkable.

The following varieties were tested as to their suitability for green manures and the amount of vine produced per acre when they had reached the blossoming stage—the correct time to plough under—was as follows:—

	Tons	cwt.	qr.	lb.		Tons	cwt.	qr.	lb.
Black Mauritius ... ..	14	19	3	18	Florida Velvet ... ..	12	0	0	0
Tonga ... ..	13	13	3	0	Green Mauritius ... ..	11	17	2	20
Mottled Mauritius ... ..	12	4	0	0	Poor Man's ... ..	9	16	1	24
Small Mauritius ... ..	12	0	0	0	Climbing Lima ... ..	9	3	2	8

Samples of the above have been forwarded for analysis, and when the results come to hand their full respective value as nitrogen producers, &c., will then be known.

#### SORGHUMS.

Field 6.—Sown on 27th October and 2nd January, in rows 3 feet apart, by means of the Planet Jr. seed drill. The first sowing made but little headway until the rains came in December, when rapid growth took place, resulting in a large amount of green fodder, which was very useful at that time as feed for the farm animals. It also gave a very fair ratoon crop.

For the second sowing the weather was more favourable, and it did well from the start. The amount of green stuff yielded per acre of the respective sorts is as follows:—

	Ton.	cwt.	qr.		Ton	cwt.	qr.
Planter's Friend ... ..	27	10	3	Teosinte ... ..	10	16	2
Collier ... ..	13	9	9	White Kafir Corn ... ..	9	10	1
Folger's Early ... ..	12	13	3	Giant Honduras ... ..	9	3	2
Coleman ... ..	11	6	3	Egyptian Corn ... ..	7	12	1
Early Orange ... ..	11	4	0	Brown Dhoura ... ..	5	13	1
Saccharatum ... ..	11	2	3				

The season was too short for the Giant Honduras, which is generally a very heavy cropper, and also a good ratoon crop. The same remark applies to the Teosinte, which is more at home in the North. Seed has been secured from all varieties, but has not yet been threshed out.

#### PANICUMS AND MILLETS.

Field 10.—Advantage was taken of the showers that fell in October to put in the following varieties of the above:—*Setaria Italica*, *Setaria Germanica*, *Panicum Miliaceum*, *Panicum Texanum*, Dakota Millet, *Pennisetum spicatum*. The seed was sown on the 6th, and by the 13th all varieties, with the exception of the *Texanum*, had germinated. No rain, to do any good, fell for two months after sowing, consequently the little moisture in the ground soon disappeared. The result was that both the *Miliaceum* and Dakota varieties failed. The *Italica* and *Germanica* gave a fair crop, while the *Texanum* did not germinate until the December rains. It then, as well as



the *Pennisetum*, made good headway, but had to be cut down before coming to its best, as the land was required for other crops. Another sowing of the abovenamed varieties was made on 21st December.

Field 6.—Practically the same results were again obtained. The *Pennisetum* on this occasion made very rapid growth, and is wonderfully prolific. It was harvested 12th April, tied into bundles, stoked, and when dry, the seed was threshed out. From the quarter of an acre grown, four bushels of seed were secured. The dry stalks, after being cut into chaff, were readily consumed by the farm horses.

## GRASSES.

In the last annual report of this farm it was mentioned that as soon as ground was available, and weather permitted, the area devoted to this most important branch would be extended, and the further testing of both native and exotic grasses, likely to prove suitable to this district, be gone on with. This has now been accomplished by clearing and breaking up new ground adjacent to Field 1. On 30th March twenty-six varieties of grass and other fodder plants were sown, each—with the exception of the saltbushes—occupying a plot 3 feet wide and 1 chain in length. The names of those experimented with are as follows:—

Perennial Rye	Rib	Mitchell— <i>Astrebla pectinata</i>
Italian Rye	Cocksfoot	„ <i>A. triticoides</i>
Timothy	Sheep's Fescue	„ <i>A. elymoides</i>
Prairie	Crested Dogstail	Red Perennial Clover
Meadow Foxtail	Sweet Scented Vernal	White Clover
Meadow Fescue	Guinea	Saltbush— <i>Atriplex nummularia</i>
Evergreen Meadow	<i>Paspalum dilatatum</i>	„ <i>A. semibaccata</i>
Smooth-stalked Meadow	<i>P. galmarra</i>	„ <i>A. halimoides.</i>
Rough-stalked Meadow	<i>P. platycaule</i>	

Germination, although in many cases slow, has on the whole been satisfactory. The sorts proving the most difficult to establish are:—Evergreen Meadow, Sheeps Fescue, Timothy, and Guinea. All will be under the closest observation, and qualities, such as drought resistance, carefully noted.

## ROOT CROPS.

Field 2.—Considering that dairying is one of the principal industries in this district, the question of providing suitable winter feed for the milking herd is a very important one. So far the growing of root crops for this purpose has not yet been attempted, therefore the experiments now being carried out are proving to many of much interest. It was intended to make a succession of sowings, commencing in September, but the prevailing dry weather did not permit of this being done. The first sowing was made of the following varieties on 4th February:—

*Mangels.*—Long Red, Long Yellow, Yellow Globe.

*Beets.*—Vilmorin's Improved Sugar Beet—round variety from Greece.

*Swede Turnips.*—Skirvin's Purple Top, Champion Smooth, Green Top.

*Kohl-rabi.*—Green and Purple.

The seed was sown by means of the Planet Jr. seed drill, the mangels in rows 3 feet apart, the turnips, beets, and kohl-rabi 2 feet 6 inches apart. When large enough the mangels were thinned out to a distance of 18 inches, the others to 12 inches in the rows. With the exception of the kohl-rabi all sorts have made excellent growth, and will soon be ready to be taken up. A further sowing was made on 10th March. Although coming on well, still they have not made the rapid growth of the previous sowing.

Full details of this experiment, together with results, will be submitted for publication in the *Agricultural Journal*.

*Sweet Potatoes.*—Field 3: Of this most useful crop, four varieties were experimented with, viz.:—Rosella, Spanish Giant, Yellow Spanish, White Maltese. Cuttings were planted during October, November, and December as weather permitted. Several ways of planting were adopted, but the yield from the respective methods have not yet been ascertained. Details of this experiment will also be submitted for publication in the *Journal*.

*Sweet Cassava or Tapioca (Manihot Aipi).*—Field 1: On 24th October a number of cuttings of the above were obtained from the North and planted in rows 4 feet apart. The soil being moist at the time young shoots soon made their appearance, and by the end of January had developed into shrubs some 4 feet in height. The crop has not yet been harvested, consequently the yield of roots cannot be given. Some roots dug up for show purposes, measuring 3 feet in length, and 3 inches to 4 inches in thickness, were grated down and yielded a fair proportion of starch. A large quantity of cuttings are now available for planting out, and next season this crop will be tested on a much larger scale, not so much as a starch producer, but as a pig food.

*Arrowroots.*—Both the Queensland (*Canna edulis*) and the Bermuda (*Maranta arundinacea*) are being grown, but the yield is a good deal below the average.

**PUMPKINS.**—The pumpkins were sown in the spaces left between the maize varieties. Of the two sowings made—October and January—the best results were obtained from the latter. Several sorts were grown, of which the best were Ironbark, Crown, Turk's Cap, and Button.

**MARROWS.**—Long White, Long Green, Long Yellow, Bush Green, Rice, and Golden Crookneck all did well. The squashes were named in order of excellence—Hubbard, White and Yellow Custard, Delicata, Fordhook, and Perfect Gem.

**MELONS.**—The crop grown, both of the water and rock varieties, was the best I have ever seen. Of water sorts the best were—Cuban Queen, Semonile, Black Eyed Susan, and Dixie. Of rock—Bay View, Banana, Skellman's Netted, Montreal Nutmeg, and Montreal Market.

**TOMATOES.**—Twenty-four varieties. Sown in transplanting tins early in August, planted out beginning of October. Did not do too well until late in the season. As an all-round tomato, the Wonder of Italy still holds its own. Ponderoso, Duke of York, American Red Stone, Golden Champion, and Crimson Cushion produced fine fruits of good quality.

**GARDEN PRODUCE.**—A varied collection of plants suitable for household use has been successfully grown, such as cabbages, cauliflowers, carrots, peas, beans, onions, cucumbers, beets, turnips, &c.

**SUGAR-CANE.**—This crop withstood the drought remarkably well. It was cut down for stock feed in October and allowed to ratoon. Of the 26 varieties experimented with, the following show from 3 feet to 4 feet of marketable cane:—Rose Bamboo, Batoe, Cheribon, and Malabar. All sorts have been cut down lately by frosts.



**COTTONS.**—The seed of the nine American varieties received from the head office in October was germinated in seed beds and transplanted out in the field on 11th November. It was not until receiving the January rains that they made anything like fair growth. From the Uplands sorts, viz.:—Doughty, Truitt, Christopher, Parker, Russell, Jones' Big Boll, Braddy, and Culpepper, a fair picking was obtained. For the Sea Island variety—Seabrook—the season was evidently too short. It made the strongest growth of any, but the bolls failed to open. Samples of the respective sorts have been submitted to experts so as to ascertain their market value. This information has not yet come to hand.

**FIBRES.**—Sisal Hemp (*Agave rigida*), *Fourcroya gigantea*, Manilla Hemp (*Musa textilis*), Ramie (*Bahmeria nivea*) are being grown, but have not yet reached the stage to be treated for fibre.

**ORCHARD.**—All trees suffered more or less from the long-continued drought, but it is gratifying to be able to report that not a single loss was sustained during the past year. It may be said that the rains that fell during December gave the orchards the first real soaking that they have had since being planted out. An additional 68 young Japanese plum trees were planted out during August, made up of the seven following varieties:—Burbanks, Chabots, Gold, Chalco, General Saigo, America, October Purple. Although planted the most trying conditions all grew and have moreover made very good headway. Mr. S. C. Voller, the Assistant Instructor in Fruit Culture, who superintends the working of this portion, gave a demonstration on pruning to a large gathering of local residents.

**VINEYARD.**—Much interest is still being taken by residents of surrounding districts in the working of this branch. Last season a large number of cuttings were applied for and distributed. The crop—a very fair one considering the season—was disposed of locally. Mr. E. H. Rainford, who has charge of the pruning, grafting, &c., gave several demonstrations in connection with his work.

**STOCK.**—Prior to the break-up of the drought, the services of the stud bull Lord Harry, stationed at this farm, were not much in request. During the past six months, however, 21 cows have been received, which shows that, as the seasons get better and ticks less troublesome, there will be more demand for his services.

The same remarks apply to the stud boar. The number of sows received also totalled 21. Six pedigree boars and 6 sows were sold during the year.

**IMPLEMENTS.**—No new additions have been made during the year. All are in good working order. Most of the implements have been repainted.

**IMPROVEMENTS.**—Four acres of new land adjacent to Field 1 have been cleared of timber, and are being brought under cultivation. The "Dropper" fence dividing the cultivation from the grass paddock has been moved to include this area.

**VISITORS, &c.**—That deep interest is being manifested in the operations carried on here is shown by the increasing number of farmers and settlers who visit the farm. The number recorded during the year amounted to 1,058. Every facility is given to those visitors requiring information in any of the branches represented.

A new departure, in the form of an agricultural instruction class, for the benefit of the youths of the surrounding districts, was commenced in October and continued until March. It was held in one of the farm buildings on Saturday afternoons and was well attended, the pupils taking a lively interest in the various subjects taught.

A collection of the products grown on the farm was exhibited at the Degilbo show.

The outlook for the coming year is very promising.

ABSTRACT of METEOROLOGICAL OBSERVATIONS taken at STATE FARM, BIGGENDEN, for the YEAR ending 30th JUNE, 1903.

Temperature, &c.	1902.						1903.						Averages, &c.
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.	June.	
Extreme maximum ...	81.0	78.50	91.0	93.50	99.0	101.0	102.0	101.50	94.0	94.0	80.50	77.50	Extreme maximum temperature 102°, 5th January.
Mean maximum ...	73.87	74.74	81.30	84.51	89.66	93.08	92.12	86.44	87.71	80.53	73.30	73.06	Mean maximum temperature, 82.52.
Extreme minimum ...	29.0	30.0	32.50	48.0	46.0	56.0	59.50	59.50	60.0	39.0	34.0	23.0	Extreme minimum temperature, 23° on 22nd June.
Mean minimum ...	40.40	41.61	45.80	56.21	57.03	63.17	63.20	64.25	64.72	54.80	48.50	37.83	Mean minimum temperature, 53.12.
Extreme terrestrial (ground thermometer)	18.0	17.0	28.0	43.0	44.0	50.50	53.50	57.0	50.50	30.0	26.0	16.0	Extreme terrestrial temperature, 16°, on 21st and 22nd June.
Mean temperature ...	51.08	58.17	63.55	70.36	73.34	78.12	77.66	75.34	76.21	67.66	60.90	55.44	Mean temperature, 67.81.
Rainfall—inches ...	.08	.04	1.58	2.34	.25	8.08	2.25	3.15	3.95	0.16	6.07	2.07	Total rainfall, 30.02 inches.
Number of days on which rain fell	2	2	6	7	4	14	7	7	14	2	12	4	Total number of days rain fell, 81.

G. B. BROOKS, Manager.

REPORT OF THE MANAGER OF THE STATE FARM, GINDIE.

SIR,—In submitting my Annual Report for the year ending 30th June, 1903, I have the honour to state that, owing to the prevailing drought that this part of the State was suffering from, the whole area of land that was planted with cereals in May and June of last year was a total failure. From May to September the rainfall here amounted to only 10 points. The 3.15 inches of rain which fell in February, 1903, brought most of the wheat up, but it only survived for a short time, owing to the intense heat that was prevailing at the time.

On the 1st July the balance of farm horses were taken on to the Dee River for agistment. One buggy horse, and two that were too poor to take away, were all that remained at the farm. On inspecting the cattle and horses that were sent away previously, I was much gratified to find them looking better than I expected to find them.



Up till 13th June I had felled scrub and bottle-tree to endeavour to keep the sheep alive, but as they had commenced to die they were boxed with a flock belonging to the Daniels Bros., and sent down the line on agistment, where they remained till 6th October; but, owing to the continued dry weather and their inability to secure fresh country, the Daniels Bros. were compelled to sell their sheep; and as we were in no better condition in respect to feed than when the sheep were sent away, I was reluctantly compelled to sell them. I very much regretted having to take the course, as, notwithstanding the fact that the seasons had been going from bad to worse from the time the sheep were purchased until they were sold, and, after taking into consideration the cost of their agistment, they still show a balance on the credit side. A small flock would have been very handy this season in keeping down the growth of grass and weeds in the cultivation paddocks.

In December 2,000 *Paspalum dilatatum* roots were planted in one of the smaller paddocks, and part of these roots were planted with the hoe and the balance were put in drills opened with the plough. The plants were placed in position and the soil put about them by hand; the furrow was then filled in with the hoe. The land was moist when most of the plants were put in, and the greater number of them started to grow, but the heat in December and January appeared to be too much for it. I do not think the grass will do well in this district. In low, shady parts it may do fairly well, but in the open it does not grow at all during the hot weather.

The following varieties of maize were planted amongst the fruit trees:—Leaming, Legal Tender, Golden Beauty, and Riley's Favourite. Twenty-four varieties of sweet corn were also planted. In the cultivation paddock 7½ acres of maize were put in, also 15.9 of cowpeas, 5.62 of *Setaria Germanica*, 1 acre Dakota Millet, and small trial plots of the following sorghums:—Coleman, Early Orange, Folger's Early, and Collier. Though we had sufficient rain in December to give the above crops a good start, the light rainfall and the heat of the two following months, and the total absence of moisture in the subsoil, prevented these crops from maturing.

About 2 tons of hay were cut from the setaria. The maize was cut and saved for fodder.

A further area of 10 acres of maize that was planted in January was also cut for fodder, as it failed to cob. Sufficient seed for next season was about all that was obtained from this plot.

On 16th January I left here for the Dee River to bring the cattle and farm horses home. Owing to the failure of both feed and water, Mr. Moller, in whose charge the cattle and horses were placed, leased two large blocks of relief country. By doing this he was enabled to hand the stock over in good condition. We had some difficulty in collecting them, as they were spread over a large area of country. One hundred and sixty-three head of cattle were delivered to Mr. Moller. I mustered 129 head. These were put through the dip and started for home. One beast got injured, and 4 others went blind. These had to be left behind, and will be brought on with about 10 head that are in Mr. Moller's possession at present date. The losses were light, considering the hardships the cattle had to go through, including inoculation, which was answerable for a good few deaths. There has been an increase of 7 head, so that at present we are only 24 short of the original number.

The following is the area and varieties of wheat sown here this season up to present date:—

	Acres.
Marshall's No. 3	41.13
Budd's Early	11.21
Dart's Imperial	24.65
Allora Spring	37.16
13 Varieties	11.70
	<hr/>
	125.80
	Acres.
Lucerne	10.4
Rye	2.1
Oats	1.0
Orchard	4.0
	<hr/>
Total area under crops...	143.70

I regret to say the supply of water in the wells is getting gradually less. It is only constant attention to the windmills that enables us to get sufficient water for present requirements. Both the wells require to be deepened before the summer, as the present supply of water would be of no use during hot weather.

All the wheat that is up is looking well, and if we are favoured with an occasional shower the next two or three months, we may expect a good crop, and I earnestly hope that this may be the case, as it will give an impetus to agriculture in this district.

The days on which rain fell during the year 1902-3 was as under —

	No. of Wet Days.
July	0
August	0
September	1
October	0
November	3
December	11
January	5
February	4
March	3
April	3
May	8
June	0
	<hr/>
Total	38 days.

STATE FARM, GINDIE.

Return for the year ending 30th June, 1903.

	Acres.
Area under crop	143.7
Details of Crop—	
Fruit trees	4.0
Lucerne	10.4
Rye	2.5
Oats	1.0



## Wheat—

Marshall's No. 3	...	...	...	...	...	...	...	41.13
Budd's Early	...	...	...	...	...	...	...	11.21
Dart's Imperial	...	...	...	...	...	...	...	24.60
Allora Spring	...	...	...	...	...	...	...	37.16
Thirteen varieties	...	...	...	...	...	...	...	11.70
							Total	143.7
Area ploughed	...	...	...	...	...	...	...	143.70
Decrease in area under crop last year	...	...	...	...	...	...	...	77.17

## Stock—

Horses	...	...	...	...	...	...	...	Head. 17
Cattle	...	...	...	...	...	...	...	141

No improvements done during the year.

## REPORT OF THE MANAGER OF THE STATE NURSERY, KAMERUNGA, CAIRNS.

SIR,—I have the honour to submit my report for year ending 30th June, 1903.

A very exceptional season was experienced this year. The drought continued with increased severity up to the end of 1902 and was followed by a heavy wet season. The drought was not, however, so severely felt within the coastal belt of agricultural country in the north as in many parts further south and west in the State, but it was, nevertheless, unprecedentedly dry. The rainfall gauged during the first six months of the season amounted to 10.440 inches, of which the greatest fall was of 4 inches in July. During the four months from January to April 87.955 inches fell, and in May and June only 2.645 inches. In all, 101.040 inches were recorded as against 53.892 inches in 1901-02.

During the drought several plants suffered from want of moisture, which was accentuated by the fact of the Barron River, from which the water supply for the Nursery is obtained for purposes of irrigation, running so low as to become brackish, thus rendering the water useless, and in some instances dangerous to delicate plants.

The heavy wet season was also very trying to certain plants, but the specially noticeable effect was the abnormal growth of weeds, especially burrs, and grasses immediately following, occasioning a great deal of labour in weeding on the Nursery. During the comparatively light wind storm experienced here during the period of the Townsville cyclone "Leonta," a portion of the large weeping fig-tree was blown down and the jackfruit-tree damaged, but beyond this no damage worthy of the name was experienced and at present everything is looking healthy and well, and plenty of water and grass exists throughout the district.

No especially cold weather was experienced, the lowest point reached by the terrestrial radiation thermometer during the season being 40 degrees F. on the 25th May, 1903.

The unseasonable weather has somewhat reduced the applications for plants and seeds, &c., but little being applied for during the earlier part of the season and the distribution becoming heavier during the latter half.

Applications have been received from all parts of Queensland, Fiji, Samoa, New Guinea, New Hebrides, British Central Africa, Cyprus, and the Southern States, including New Zealand.

The following are the totals of the distributions:—Seed, 1 cwt. 1 qr. 24 lb. 10 oz. Plants, 2,408. Bulbs and rhizomes, 1 cwt. 0 qr. 3 lb. 10 oz. Cuttings, 2,862. Grassroots (mainly *Paspalum dilatatum*), 5,046. Suckers, 814; besides sundry cases of various fruits distributed to hospitals and charitable institutions.

The correspondence is steadily on the increase, amounting to half as much again as last year.

CITRUS FRUIT TREES.—A small collection of worked citrus trees was received from the head office, Brisbane, under the advice of the Instructor in Fruit Culture, during the season, consisted of the following:—

2 Plants, Washington Navel Orange	2 Plants, Mediterranean Sweet Orange
2 " Jaffa Orange	2 " Tahiti Limes.
2 " Scarlet Mandarin	2 " Beauty of Glen Retreat Mandarin
2 " Emperor "	2 " Valencia late Orange
2 " Ellendale Beauty (Burgess')	2 " Varigated Lemon.

These were received on the 17th September, 1902, and planted at once in Field 3, Section II., at a distance of 25 feet apart. The young plants were mulched round and watered during the first three months from planting, which proved a very trying time for them. The ground was kept cultivated and clean until the heavy rains set in, when, finding it was not possible to work the horse over the ground to keep the weeds down, cowpeas were sown to be subsequently ploughed in. In spite of all care, one Scarlet Mandarin and both Beauty of Glen Retreat died. The plants have not made great growth, but those living are in good heart, and it is hoped it will be possible to obtain buds for working into locally raised stock for distribution before long. In the same orchard were planted also two Blood Shaddock, two Seville Oranges, one Ribbed, and one Yellow Mandarin which are doing well.

SORGHUMS.—Two rows each of the following ten varieties were sown on the 24th December, 1902; in Field 1, Section II.:—Giant Honduras, Planter's Friend, Early Orange, Amber Saccharatum, Brown Saccharatum, Amber Cane, Collier's, Folger's Early, Early Orange (American variety), and Brown Dhoura.

The Giant Honduras, as usual, beat all others in point of height, amount of green stuff, and amount of crop. This variety seems to be the sorghum *par excellence* for the more tropical localities. The average height was about 10 feet.

The two Saccharatums came next, with a height of about 8 feet.

Planter's Friend, also a strong growing variety, averaged 7 feet.

The new American varieties only grew to some 5 feet 6 inches, having but little flag, and being scanty croppers.

MILLETS.—The following are the varieties sown, but as the area available is so limited no reliable return as to yields of either green stuff or grain are recorded:—

Bullrush millet (*Penicillaria spicata*, sp.): Seed obtained from South Africa; seed very like a pearl millet; African name, "N'Youti." One row sown on the 24th December in Field 1, Section III., grew very well, and has a heavy flag, but somewhat pithy stalk; average height, 6 feet, and produces a somewhat woolly-looking bullrush-like head, which sometimes attains a circumference of nearly 6 inches. It appears to be a good fodder for stock, cattle and horses being very fond of it.



Raggie (*Eleusine coracana*): An Indian grain; seed obtained from Rhodesia; grain reddish, globular, and small; African name, "U'Poko." One row sown on the 24th December, 1902, in Field 1, Section II., grew very well, taking about four months from sowing to reaping; cropped well; average height, 4 feet; a small narrow leaf, but plenty of flag; stock eat it greedily.

Penicillaria (*Penicillaria spicata*, sp.): Apparently another species of pearl millet, but one that thrives and grows well in the tropics. Not unlike Bullrush millet in growth, but smaller and cleaner head, attaining an average height of 4 feet 6 inches; stands cutting several times, and proves a good fodder; two rows in Field 3, Section II., sown the 16th February, 1903.

Hungarian Millet: One row sown on the 16th February, 1903, in Field 3, Section II. The seed did not germinate well, and, altogether, did not do so well as the fore-going, which seem much better adapted to a tropical climate. Possibly this millet will do better in a different soil and situation. Texas millet and *Panicum miliaceum*, planted on the 16th February, entirely failed to germinate.

COWPEAS AND BEANS.—Two rows of each of the following varieties were sown in Field 1, Section II., on 13th February, 1903:—Large Purple, Speckled, Black, Cream, Small Purple, Yellow, Black Eye, and White's Perennial.

White's Perennial is far ahead of the other varieties in quantity of green stuff per acre and rapidity of covering the ground. It also makes good hay and chaff, but for purposes of dry fodder it is necessary to cut somewhat green, otherwise it has a tendency to drop its leaves. Speckled, sometimes called Brown, and the Black cowpeas came next in utility; the Small Purple and Black Eye proved very poor croppers. Seed of all varieties is available, as also of the three varieties of Mauritius Bean, Black, Mottled, and Green, and the Florida Velvet Bean.

Of ground beans, a variety new to the North was obtained from South Africa, the only name by which it is at present known being the African name of "Indhtubu." One row was sown on the 7th January, 1903, in Field 1, Section II., and has proved very adaptable to the conditions here. The bean produces a heavy crop of almost round beans of various colours, about one-third of an inch in diameter, mostly in single pods, which grow in clusters near the surface of the ground. The plant is not a climber, and has but little growth above ground. The bean requires hilling up like potatoes, and proves to be good eating for man or beast. Would prove a readily-grown and apparently fattening food for stock.

The Pea-nut (*Arachis hypogaea*) grows well and is a valuable food for pigs. The market for the dried nuts is variable, but in some instances this year it proved valuable as a crop. The oil from the ground-nut would be comparatively easily extracted, and for cooking purposes always commands a market.

The Pigeon Pea (*Cajanus indicus*) proves to have a value approaching the cowpea as a green manure, and is a heavy bearing plant and a good fattening food for poultry.

MAIZE.—Of the six varieties of maize planted in December, the Red Jamaica did well; White Corn, Golden Beauty, Riley's Favourite, and Early Meronie did very poorly, and Cuzco maize failed to germinate.

The soil of the Nursery is not suited to the cultivation of maize or cereals generally, being deficient in humus. It requires deeper cultivation than it is possible to give, with a light one-horse plough, and a dressing of farmyard or bulk manures.

SPICES.—A supply of clove seed was received by the Department and forwarded for germination during the year. The seeds of both cloves and nutmegs are of very short vitality; the climatic variations of the season may also have assisted towards the comparative want of success with these. The first supply of seed was received on the 2nd May, and appeared, on being opened, to have started the process of germination either previous to or during transit, and to have been dried—in other words, to have malted. Four hundred and eighty-six were set in boxes in the germinating house, but gave no signs of life. The second consignment of seed was received on the 10th June, from the Seychelles, through the head office of the Department, and was planted (120 seed) on the same day, being set under glass. The seed, on opening, seemed quite fresh, but no signs of germination are as yet apparent.

On the 25th March, 1903, a case of clove plants was received; on being opened the case appeared to have been opened *en route* and some plants extracted; the remainder appeared damaged by salt water. On being transplanted, the roots were found bent and twisted as if grown in shallow boxes, and the plants thereby stunted.

The seedlings were carefully planted out in pots and boxes and placed in the bush-house, but in spite of great care only six are now living.

Nutmegs.—A consignment of 80 seeds was received on the 3rd May, 1902, and set at once in the germinating house. The seed appeared somewhat dry, but fairly fresh; all failed to germinate, however.

Allspice.—One box of seed of this spice was sown on the 26th September, 1902, and set in the germinating house, but no success was met with. A few plants in pots did not survive the period of shortage of fresh water.

Pepper.—This is not doing well here. Two plants are still living, being planted in the cocoa block. An effort is being made to obtain rooted cuttings for distribution.

Cardamoms.—Only one plant is living, and this suffered during the drought, but it is now doing well. It is expected that it will bear this season.

BANANAS.—The bananas, not doing very well in the field (Field A, Section I.) in which they had been for five years, were this season transplanted into Field 3, Section II., the transplanting being effected on the 19th to 21st January; Field A, Section I., being planted up with *Paspalum dilatatum* grass. The following varieties have adapted themselves to the climatic conditions of the North, and suckers are available:—Moku, New Guinea Sugar, Delena, Barrego, Butter, Dacca, Cavendish, Sugar, Long Plantain, Ladies' Fingers, and also another New Guinea variety, name unknown. Among the bananas, being of the same family, the Manila hemp (*Musa textilis*) is also planted. This is now doing well, and a quantity of suckers are available.

RUBBERS.—Owing to unfavourable season, the rubbers did not grow as well as was expected, and it was deemed advisable not to undertake experiments in tapping this year, especially as such experiments would not have been conclusive unless more or less severe.

Para Rubber (*Hevea brasiliensis*): These trees are now four years old; two bore seed this season for the first time, but only a limited quantity of seed was obtained. It is hoped seed will be available for distribution this year. Number of trees, including seedlings at the Nursery, 61; average height, 23 feet; average girth 1 foot from ground, 16½ inches.

The growth has been fairly satisfactory and it is hoped several will be large enough to tap in a small way soon.



Central American Rubber (*Castilloa elastica*): A few of these trees blossomed at the age of eighteen months, but did not set the blossoms. Number of trees, 56; average height, 10 feet; average girth at 1 foot from ground, 17½ inches. It is expected that seed of this variety will also be obtainable this year.

Assam Rubber (*Ficus elastica*): This handsome tree of the Banyan family seems particularly adapted to this climate. The three trees at the Nursery are doing well, but, though now some ten years old, do not bear. It is, however, readily reproduced by cuttings, of which any quantity are available.

West African Rubber (*Tabernaemontana crassa*): It being found, as stated last year, that these trees had been planted too far apart in Field 2, Section III., a number were transplanted on the 19th January, 1903, in pits dug diagonally between other rows; 24 trees were then transplanted, of which 6 succumbed; number now living, 48; average height, 12 feet; average girth 1 foot from ground, 9 inches. Owing to the season, these did not bear well this year, but are now blossoming freely. Seed and plants are available. An article dealing with this rubber was submitted for publication during the year in the *Queensland Agricultural Journal*.

COTTON.—The following varieties were received from the Acclimatisation Garden and planted out in Field 3, Section II., on 4th January, 1903:—Eldorado, Truit's, Big Boll, Lewis' Prize, Russell's Big Boll, Matafifi, Sea Island, and also at the same time a variety named Sea Island (*Gossypium barbadense*) from Dr. Thomatis.

These are doing well and some commencing to bear. Seed, as well as further details as to results will be available later in the season. Seed of the following were also sown on the 1st July, 1903:—Truit, Jones' Big Boll, Bradly, Parker, Doughty, Culpepper, Christopher, Russell, Seabrook, and another variety from Dr. Thomatis, named Caravonica. These have only recently germinated and are doing well.

The cotton from four trees of Sea Island cotton, Kidney variety, was weighed in the seed as gathered, 27½ lb. being recorded for the season—average, about 7 lb. per tree. From two trees of Egyptian Upland 12½ lb. were obtained—average, 6¼ lb. These trees have not been pruned, and were in their third year of life when these pickings were taken. Average height of tree, 5 feet, with, however, a very considerable spread.

FODDERS.—An experimental plot for fodder grasses was laid out in Field 2, Section I., in which beds 12 feet square were planted or sown with various grasses. It is intended to record results as to growth, amount of green-stuff per acre, drought-resisting powers, and comparative value, green, as hay and chaff, &c. The following table gives the sowings, &c. :—

Plots.	Name.	Planted or Sown.		Remarks.
1.	Mitchell grass ( <i>Astrebla pectinata</i> )...	...	17-6-02	All died but one stool.
2.	Pentzke's ( <i>Panicum myurus</i> )	...	17-6-02	Doing well; cut once.
3.	<i>Paspalum dilatatum</i> ...	...	17-6-02	"
4.	Guinea grass ( <i>Panicum maximum</i> )...	...	17-6-02	"
5.	Cocksfoot grass ( <i>Dactylis glomerata</i> )	...	17-6-02	"
6.	<i>Eragrostis pilosa</i> ...	...	17-6-02	"
7.	<i>Piptatherum multiflorum</i> ...	...	17-6-02	Heavy rain killed seedling.
8.	Russell River ( <i>Paspalum galmarra</i> )	...	17-6-02	Doing well.
9.	Red Natal ( <i>Panicum teneriffæ</i> )	...	17-6-02	"
10.	Buffalo ( <i>Buchloe dactyloides</i> )	...	17-6-02	"
11.	Cannon's grass ( <i>Paspalum platycaule</i> )	...	17-6-02	"
12.	Perennial rye grass ( <i>Lolium perenne</i> )	...	6-4-03	"
13.	Prairie grass ( <i>Bromus unioloides</i> )	...	6-4-03	"
14.	Italian rye ( <i>Lolium italicum</i> )	...	6-4-03	"
15.	Mitchell grass ( <i>Astrebla pectinata</i> )	...	11-4-03	Failed to germinate.
16.	Cocksfoot grass ( <i>Dactylis glomerata</i> )	...	6-4-03	"
17.	Sweet-scented Vernal grass ( <i>Anthoxanthum odoratum</i> )	...	6-4-03	"
18.	Timothy grass ( <i>Phleum pratense</i> )	...	6-4-03	"
19.	Sainfoin ( <i>Esparcette</i> )...	...	6-4-03	"
20.	Red Top grass ( <i>Tricholæna rosea</i> )	...	6-4-03	"
21.	Meadow Foxtail ( <i>Alopecurus pratensis</i> )	...	6-4-03	"
22.	Kentucky Blue grass ( <i>Poa pratensis</i> )	...	6-4-03	"

*Piptatherum multiflorum*.—1 pot sown, 19-3-03, in germinating house, doing well.

MANURIAL EXPERIMENTS.—A portion of Field 3, Section II., was experimented on with manures under the direction of Dr. Maxwell. Lime was first applied at the rate of 3 tons to the acre (10th October, 1902), which was harrowed and then ploughed in, afterwards harrowed again and cross ploughed, then harrowed before the seed was sown.

The following list of cereals were then sown in drills of 54 feet in length—one drill being manured with 1 lb. of the chemical manure supplied from the Mackay Experiment Station by Dr. Maxwell, and one drill without, alternately:—

Rows.	Name.	Average Height.		Remarks.
		Without Manure.	With Manure.	
		Ft. in.	Ft. in.	
2	Early Orange Cane ...	5 6	6 0	(Sorghum).
2	Planter's Friend Sorghum	6 0	7 0	Noticeably stronger.
2	Giant Honduras Sorghum	8 0	9 6	Attacked by birds.
2	Amber Saccharatum Sorghum	7 0	8 0	
2	Brown Saccharatum Sorghum	7 0	8 0	
2	Amber Cane Sorghum...	...	...	Failed to germinate.
2	Collier Sorghum	5 0	6 0	
2	Folger's Early	5 6	6 0	
2	Early Orange, American	6 0	7 0	
2	Coleman's	7 0	8 0	
2	White Kafir Corn	5 0	6 0	Attacked by birds.
2	Hungarian Millet	4 0	4 0	Scarcely any difference.
2	<i>Penicillaria</i> ...	4 6	5 3	
2	Texas Millet ...	...	...	Failed to germinate.
2	Broom Millet...	7 0	8 0	Noticeably better head.



The seed was planted on the 16th February, and crop reaped on 29th June. The quantity was so small as to preclude possibility of recording yields. The difference between the manured and unmanured drills was specially noticeable during the earlier stages of growth, the plants being far more robust and having a far greater percentage of green stuff. The manured rows matured earlier, and the yield was also slightly heavier. The plot chosen carried a very poor soil, and would seem to show better results from the manure after a heavy green manuring or mulching with vegetable matter, than after an application of pure lime.

TIMBER TREES (for forestry work).—A number of beds, 5 feet wide by 18 feet long, were made in Field 2, Section II., for raising plants of trees of value in forestry work—

No.	Name.	Seed obtained.	Sown.	Plants available.	Remarks.
1 bed	Carob	Cyprus	2-4-03	260	Germinated well.
2 rows	Teak	Agricultural Department	2-4-03	30	Germinated fairly.
3 beds	Hoop Pine	Forest Department	2-4-03	"	So far not germinated.
3 beds	Red Cedar	" "	2-4-03	300	Require shading.
3 beds	Cypress Pine	" "	14-4-03	100	" "
1 bed, 2 rows	Black Pine	" "	14-4-03	"	So far not germinated.
1 bed	Bunya Pine	" "	10-5-02	150	Did not germinate well.
1 box	<i>Prosopis Stephaniana</i>	Cyprus	10-6-03	"	Growing freely.
1 box	Algaroba	Nursery	10-3-03	"	Very irregular.
3 boxes	Jâk	"	28-2-03	70	Quantity readily procurable.

Those seeds germinated in boxes, and not at present shown as ready for distribution, are waiting to be planted out into beds. Of the others, only those fit for transplanting are shown as being available.

The mango trees bore a heavy and good crop this year, the trees apparently benefiting rather than suffering from the dry weather. Yams and root crops, space preventing detailed mention of which, also cropped well during the exceptionally dry weather. *Monstera deliciosa* bore several fruit; and seedlings have been raised from seed and are available. The Ginseng (*Aralia* or *Panax* ginseng) received from the head office on the 13th January, 1903, was set in the germinating house, but so far has shown no signs of vitality. The tree tomato plants succumbed during the drought, and choco also suffered severely. Tree lucerne, of which a few plants were obtained, failed entirely. The Giant Russian and Dwarf Sunflower, on the other hand, did well, as also *Tacca oceanica*, *Schinus Molle*, chicory, teosinte, impee, and two varieties of bottle-tree, seed of which were newly obtained this season.

Some extension of the irrigation plant was carried out with Nursery labour during the year, every length of piping, standard, and tap being now in use. No damage was done to the pump, though under water during the heavy rains and floods.

The painting of the buildings is becoming urgently necessary to preserve the woodwork; serious repairs may become necessary unless the painting is done before another wet season.

The State Nursery exhibited at the following shows during the year:—Port Douglas, in August, 1902, Cairns, September, 1902; Ingham, September, 1902; Townsville, June, 1903; and Mossman, June, 1903, and the trophies were much appreciated.

The work this year has been heavy, especially as the labour was reduced at end of last season. The energetic and steady work of Mr. J. G. Malcolm, the overseer, is worthy of record.

HOWARD NEWPORT, Manager.

#### SCHEDULE A.

ABSTRACT OF METEOROLOGICAL OBSERVATIONS FOR YEAR ENDING 30TH JUNE, 1903, TAKEN AT KAMERUNGA STATE NURSERY, CAIRNS. [Readings, 9·20 a.m.]

Thermometer Readings.	1902.						1903.						Totals and Averages.
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mch.	Apr.	May.	June.	
Mean Maximum ...	75·16	77·58	82·03	85·0	85·21	89·16	87·24	88·25	86·09	83·51	80·64	78·28	Mean average maximum, 83·18.
Extreme Maximum ...	79·0	81·0	95·5	93·5	90·0	91·5	101·5	100·5	90·5	92·00	86·0	83·0	Extreme maximum, 101·5.
On Date ...	31st.	25th.	13th.	27th.	13th.	29th.	7th.	12th.	2nd.	4th.	11th.	25th.	On date, 7th January, 1903.
Mean Minimum ...	58·69	57·77	56·6	61·74	64·91	70·91	71·54	71·57	71·5	68·86	64·25	62·95	Mean average minimum, 65·11.
Extreme Minimum ...	50·0	50·0	52·0	53·5	56·0	64·0	66·0	68·0	67·5	62·0	50·0	49·0	Extreme minimum, 49·0.
On Date ...	25th.	25th.	19th.	15th.	9th.	29th.	2nd.	7th.	17th.	16th.	27th.	2nd.	On date, 2nd June, 1903.
Mean Temperature ...	66·92	67·67	69·31	73·38	75·06	80·04	79·39	79·91	78·79	76·19	72·45	70·78	Mean average temperature, 74·16.
Rainfall, Inches ...	4·000	0·805	Nil.	0·285	1·565	3·785	20·360	10·820	37·450	19·325	2·145	0·500	Total rainfall for 1901-2, 53·892 in.; 1902-3, 101·040 in.
Number of days on which rain fell ...	14	11	Nil.	5	9	10	17	10	22	25	15	7	Number of days rain fell, 1901-2, 139; 1902-3, 145.



## SCHEDULE B.

PLANTS AND SEEDS GROWN AND AVAILABLE FOR DISTRIBUTION AT KAMERUNGA STATE NURSERY, CAIRNS.

Common.	Botanical.	Plants, Seeds, or Cuttings.
Wine Palm ... ..	<i>Diplazium maritimum</i> ...	Plants
West African Oil Palm ... ..	<i>Elæis guineensis</i> ..	Seeds and plants
Cocoanut Palm ... ..	<i>Cocos nucifera</i> ... ..	" "
Alexandria " ... ..	<i>Ptychosperma Alexandræ</i> ...	" "
Fan " ... ..	<i>Sabal Blackburniana</i> ...	" "
Areca " ... ..	<i>Areca rubra</i> ... ..	" "
Kentia " ... ..	<i>Kentia monostachya</i> ...	Seeds and plants
Palm ... ..	<i>Cocos plumosa</i> ... ..	" "
Date Palm ... ..	<i>Phoenix dactylifera</i> ...	Plants
" " ... ..	" <i>rupicola</i> ... ..	Seeds and plants
Sugar " ... ..	<i>Arenga saccharifera</i> ...	" "
Bastard Sago Palm ... ..	<i>Caryota urens</i> ... ..	Plants
Para Rubber ... ..	<i>Hevea brasiliensis</i> ...	Cuttings
Ceara " ... ..	<i>Manihot Glaziovii</i> ... ..	Seeds and plants
Assam " ... ..	<i>Ficus elastica</i> ... ..	Cuttings and plants
African " ... ..	<i>Tabernemontana crassa</i> ...	Plants
Central American Rubber ... ..	<i>Castilloa elastica</i> ... ..	Cuttings
Ramie Fibre ... ..	<i>Behmeria nivea</i> ... ..	Plants
Manila Hemp ... ..	<i>Musa textilis</i> ... ..	" "
Sisal " ... ..	<i>Agave rigida</i> ... ..	" "
Fourcroya " ... ..	<i>Fourcroya gigantea</i> ...	" "
Annatto ... ..	<i>Bixa Orellana</i> ... ..	Seeds and plants
Seville Orange ... ..	<i>Citrus vulgaris</i> ... ..	" "
Sweet " ... ..	" <i>aurantium</i> ... ..	" "
Mozambique " ... ..	" " ... ..	" "
Mandarin " (3 vars.) ... ..	" " ... ..	" "
Japanese " ... ..	" <i>trifoliata</i> ... ..	" "
Pomelloe ... ..	" <i>medica</i> ... ..	" "
Kumquat ... ..	" <i>japonica</i> ... ..	" "
Sweet Lemon ... ..	" <i>medica</i> ... ..	" "
Lemon ... ..	" " var. <i>limonium</i> ...	" "
Lime (2 vars.) ... ..	" " " <i>limetta</i> ...	" "
Washington Navel Orange ... ..	" " " ... ..	Plants
Mango (many vars.) ... ..	<i>Mangifera indica</i> ... ..	Seeds and plants
Sour Sop ... ..	<i>Anona muricata</i> ... ..	" "
Bullock's Heart ... ..	" <i>reticulata</i> ... ..	" "
Cherimoya ... ..	" <i>cherimolia</i> ... ..	" "
Star Apple ... ..	<i>Chrysophyllum cainito</i> ...	" "
Chicory ... ..	<i>Cichorium intybus</i> ... ..	Roots
Banana (8 vars.) ... ..	<i>Musa</i> ... ..	Suckers
Mulberry ... ..	<i>Morus nigrum</i> ... ..	Cuttings
Avocado Pear ... ..	<i>Persea gratissima</i> ... ..	" "
Granadilla ... ..	<i>Passiflora quadrangularis</i> ...	Seeds
Passion Fruit ... ..	" <i>edulis</i> ... ..	" "
Papaw (2 vars.) ... ..	<i>Carica papaya</i> ... ..	" "
Mangosteen ... ..	<i>Garcinia mangostana</i> ...	" "
Gamboge Mangosteen ... ..	" <i>cochinchinensis</i> ...	" "
Pomegranate ... ..	<i>Punica granatum</i> ... ..	Seeds and plants
Guava (4 vars.) ... ..	<i>Psidium guava</i> ... ..	" "
Litchi ... ..	<i>Nephelium litchi</i> ... ..	" "
Longan ... ..	" <i>longana</i> ... ..	" "
Madagascar Plum ... ..	<i>Flacourtia ramontchi</i> ...	" "
Davidsonian " ... ..	<i>Davidsonia pruriens</i> ... ..	" "
Brazilian Cherry ... ..	<i>Eugenia uniflora</i> ... ..	" "
Vi Apple (2 vars.) ... ..	<i>Spondias dulcis</i> ... ..	" "
Fig ... ..	<i>Ficus carica</i> ... ..	" "
Yung Tau ... ..	<i>Averrhoa carambola</i> ...	" "
Wam Pee ... ..	<i>Cookia punctata</i> ... ..	" "
Kei Apple ... ..	<i>Aberia caffra</i> ... ..	" "
Rose " ... ..	<i>Eugenia malaccensis</i> ...	Plants
Bael Fruit ... ..	<i>Ægle marmelos</i> ... ..	" "
Pineapples (4 vars.) ... ..	" ... ..	Suckers
Cape Gooseberry ... ..	<i>Physalis peruviana</i> ... ..	Seeds
Tamarind ... ..	<i>Tamarindus indica</i> ... ..	Seeds and plants
Queensland Tamarind ... ..	<i>Diploglottis Cunninghamii</i> ...	" "
Carob Bean ... ..	<i>Ceratonia siliqua</i> ... ..	Plants
Fijian Almond ... ..	<i>Terminalia catappa</i> ... ..	Seeds and plants
Bread Fruit (8 vars.) ... ..	<i>Artocarpus incisa</i> ... ..	Plants
Jack Fruit ... ..	" <i>integrifolia</i> ... ..	" "
Kola Nut ... ..	<i>Sterculia acuminata</i> ... ..	" "
Rosella ... ..	<i>Hibiscus sabdariffa</i> ... ..	Seeds
Okra or Bandakai ... ..	" <i>esculentus</i> ... ..	" "
Tree Tomato ... ..	<i>Solanum betacea</i> ... ..	" "
Egg Plant ... ..	" <i>melongena</i> ... ..	Seeds and plants
Cassava, Sweet ... ..	<i>Manihot aipi</i> ... ..	Cuttings
" Bitter ... ..	" <i>utilissima</i> ... ..	" "
Choko ... ..	<i>Sechium edule</i> , var. <i>alba</i> ...	Plants
Sunflower (2 vars.) ... ..	<i>Helianthus annuus</i> ... ..	Seeds
Ginseng ... ..	<i>Aralia ginseng</i> ... ..	" "
Peanut ... ..	<i>Arachis hypogæa</i> ... ..	Seeds
Horse-radish Tree ... ..	<i>Moringa pterygosperma</i> ...	" "
Pepper ... ..	<i>Piper nigrum</i> ... ..	" "
" " ... ..	" <i>methysticum</i> ... ..	Cuttings
Vanilla ... ..	<i>Vanilla planifolia</i> ... ..	" "
Allspice ... ..	<i>Myrtus pimenta</i> ... ..	" "
Cinnamon ... ..	<i>Cinnamomum zeylanicum</i> ...	Seeds and plants
Cardamom ... ..	<i>Elettaria cardamomum</i> ...	" "
Nutmeg ... ..	<i>Myristica fragrans</i> ... ..	" "
Cloves ... ..	<i>Eugenia caryophyllata</i> ...	" "
Anise ... ..	<i>Illicium anisatum</i> ... ..	" "
Tea (Assam) ... ..	<i>Thea bohea</i> ... ..	Seeds
" (China) ... ..	" <i>chinensis</i> ... ..	" "
Cocoa (2 vars.) ... ..	<i>Theobroma cacao</i> ... ..	Seeds and plants
Coffee (Arabian) ... ..	<i>Coffea arabica</i> ... ..	" "
" (Liberian) ... ..	" <i>liberica</i> ... ..	" "
" (Mocha) ... ..	<i>C. arabica</i> , var. <i>Mocha</i> ...	" "
" " " " Marago pe ... ..	" " " <i>Marago pe</i> ... ..	" "



## SCHEDULE B—continued.

PLANTS AND SEEDS GROWN AND AVAILABLE FOR DISTRIBUTION AT KAMERUNGA STATE NURSERY, CAIRNS—continued.

Common.	Botanical.	Plants, Seeds, or Cuttings.
Rice (3 vars.) ... ..	<i>Oryza sativa</i> ... ..	Seeds
Tobacco (3 vars.) ... ..	<i>Nicotiana tabacum</i> ... ..	"
Castor Oil (2 vars.) ... ..	<i>Ricinus communis</i> ... ..	"
Black Gram ... ..	<i>Cicer arietinum</i> ... ..	"
Pigeon Pea ... ..	<i>Cajanus indicus</i> ... ..	"
Coca ... ..	<i>Erythroxylon coca</i> ... ..	"
Copal Tree ... ..	<i>Hymenæa courbaril</i> ... ..	"
Maté Tea ... ..	<i>Ilex paraguayensis</i> ... ..	Cuttings
Cotton (12 vars.) ... ..	<i>Gossypium arboreum</i> ... ..	Seeds
Creepers ... ..	<i>Monstera deliciosa</i> ... ..	Plants
" ... ..	<i>Beaumontia grandiflora</i> ... ..	Cuttings
Coralita, Creeper ... ..	<i>Bignonia venusta</i> ... ..	"
Algaroba Bean Tree ... ..	<i>Antignon amabile</i> ... ..	Seeds and plants
Mesquit " " (sp.) ... ..	<i>Prosopis juliflora</i> ... ..	"
Divi-divi ... ..	<i>Prosopis stephaniana</i> ... ..	Plants
Bermuda Arrowroot ... ..	<i>Cæsalpinia coriaria</i> ... ..	Seeds and plants
Queensland " ... ..	<i>Maranta arundinacea</i> ... ..	Rhizomes
New Guinea Arrowroot ... ..	<i>Canna edulis</i> ... ..	"
Turmeric ... ..	<i>Tacca oceanica</i> ... ..	"
Jamaica Ginger ... ..	<i>Curcuma longa</i> ... ..	"
Yams (5 vars.) ... ..	<i>Zingiber officinale</i> ... ..	"
Sweet Potatoes (5 vars.) ... ..	<i>Dioscorea</i> ... ..	Roots and cuttings
Red Cedar ... ..	" ... ..	"
Burmese Teak ... ..	<i>Cedrela Toona</i> ... ..	Plants
Knobkerra Wood ... ..	<i>Tectona grandis</i> ... ..	"
Millets (vars.) ... ..	<i>Milletia caffra</i> ... ..	"
Striped Bamboo ... ..	" ... ..	Seed
Grasses (24 vars.) ... ..	<i>Bambusa</i> ... ..	Cuttings
Candle Tree ... ..	<i>Paspalum dilatatum</i> ... ..	Seeds and plants
" Nut ... ..	" ... ..	Seeds
Sorghum and Kafr Corn (10 vars.) ... ..	<i>Parmentiera cereifera</i> ... ..	Plants
Cowpea (10 vars.) ... ..	<i>Aleurites moluccana</i> ... ..	Seeds
Mauritius Bean (3 vars.) ... ..	" ... ..	"
Florida Velvet Bean ... ..	" ... ..	"
Sword Bean (2 vars.) ... ..	" ... ..	"
Poor Man's Bean ... ..	<i>Canavalia ensiformis</i> ... ..	"
Bunya Pine ... ..	" ... ..	"
Doomba Tree ... ..	<i>Araucaria Bidwilli</i> ... ..	Plants
Loquat ... ..	<i>Calophyllum inophyllum</i> ... ..	Seeds and plants
Madagascar Bean (3 vars.) ... ..	<i>Photinia eribotrya</i> ... ..	"
Dwarf Lima " ... ..	" ... ..	Seeds
Climbing Lima " ... ..	" ... ..	"
Narico Bean ... ..	" ... ..	"
Bauhinia (and vars.) ... ..	<i>Dolichos lablab</i> ... ..	"
Sappan ... ..	<i>Bauhinia variegata</i> ... ..	Seeds and plants
Cassia ... ..	<i>Cæsalpinia sappan</i> ... ..	"
" ... ..	<i>Cassia grandiflora</i> ... ..	"
Rain-tree ... ..	" <i>fistula</i> ... ..	"
" ... ..	<i>Albizia saman</i> ... ..	"
" ... ..	" <i>stipulata</i> ... ..	"
" ... ..	<i>Poinciana pulcherrima</i> ... ..	"
" ... ..	" <i>regia</i> ... ..	"
Kafir Boom ... ..	<i>Hypocæne thebaica</i> ... ..	"
Weeping Fig ... ..	<i>Ficus Benjaminea</i> ... ..	"
Indian " ... ..	" <i>indica</i> ... ..	Seeds
Cork Oak ... ..	<i>Quercus suber</i> ... ..	"
Bean-tree ... ..	<i>Castanospermum australe</i> ... ..	Seeds
" ... ..	<i>Erythrina phlebotarpa</i> ... ..	Seeds and plants
" ... ..	" <i>indica</i> ... ..	"
Jacaranda ... ..	<i>J. mimosafolia</i> ... ..	"
Pepperina .. ..	<i>Schinus molle</i> ... ..	Plants

## REPORT OF THE INSPECTOR AND VALUATOR UNDER THE SUGAR WORKS GUARANTEE ACTS.

SIR,—I have the honour to submit my Annual Report, for the season 1902, on the operations of the Central mills under "The Sugar Works Guarantee Acts, 1893 to 1895."

Of the total advances made under the Act—viz., £498,800 8s. 10d.—the sum of £25,794 0s. 9d. has been paid in redemption, leaving the amount now outstanding at £473,006 8s. 1d.

Further temporary advances, however, have been made to the two Government controlled mills—viz., to the Proserpine mill, £5,600; and to the Moreton mill, £3,400. These amounts, added to those previously advanced, make the temporary loans to these two mills £14,100 and £8,700 respectively.

The additional advance to the Proserpine mill provides for 6 miles more of permanent tramway, 50 cane trucks, and the installation of the electric light in the mill and yard, necessitated by the heavy crop to be handled this season. The additional loan to the Moreton mill provides for an extension of the Dulong tramway line for a further distance of 4 miles.

The past season, particularly in the Southern division of the State, has been a very unfavourable one, owing to the severe and continued drought experienced.

The shortage of crop in the South was most serious, as will be gathered from the following crop returns for the past four seasons:—

1899	...	...	...	105,773 tons cane.
1900	...	...	...	45,503 "
1901	...	...	...	60,530 "
1902	...	...	...	9,193 "



From the above it will be seen that the shortage in the Southern crop over that of the previous season was 84·8 per cent.

The Northern central mills, while experiencing almost similar weather relatively to the Southern mills, have not suffered to the same extent. The following crop returns for the past four seasons at our Northern central mills will show that the shortage over that of the previous season only amounted to 17·05 per cent. :—

1899	...	...	...	...	156,958 tons cane.
1900	...	...	...	...	174,371 "
1901	...	...	...	...	201,573 "
1902	...	...	...	...	167,222 "

The shortage in the cane crop was caused by the extremely dry season, but to the same cause may also be attributed the considerably increased sugar content of the cane, which, in a measure, compensated for the other. The following figures will show to what extent this operated :—

	1901.	1902.
Cane crushed (tons)	201,573	167,222
Sugar made "	22,637	21,126
Cane, per ton, sugar	8·9	7·8

The total tons of cane crushed by our central mills during the 1902 season amounted to 176,415, and the sugar made to 22,045 tons. Of this total the Southern central mills contributed 9,193 tons of cane and 919 tons of sugar, or 5·2 per cent. and 4·1 per cent. respectively.

Statements of expenditure and mill work are attached hereto and show the effects of the dry season on the Southern mills' finances. The total cost of making a ton of sugar at the Southern mills has been worked out merely to show the relation existing between a full supply of cane and the cost of work.

As regards the Northern mills, it is satisfactory to note that the improvement in mill work still continues. The total cost of making a ton of sugar was reduced from £9 12s. 9½d. in 1901 to £8 13s. 10¾d. in 1902: a gain of 18s. 10½d. per ton of sugar. The net price paid the grower for cane increased from 14s. 5d. to 14s. 11½d. per ton. The total cost of manufacture—that is, wages, rations, salaries, firewood, mill supplies, and horse feed—was reduced from £1 6s. 9d. per ton of sugar to £1 1s. 7¼d. per ton: a net gain of 5s. 1¾d., per ton of sugar; thus proving that, as these mills reach their capacity, still better results will be obtained.

A glance at the financial results will show that, after providing for Government interest, the profits made by the Northern mills amounted to £24,522 5s. 8d., equal to 8·5 per cent. on the capital invested. In the previous season the profits of the Northern mills amounted to £31,239 17s. 10d., or a decrease of £6,717 12s. 2d., entirely due to the unfavourable season. This is emphasised in the case of the Southern mills, whereas in 1901 they made a profit of £12,474 12s. 2d., the season 1902 ended in a loss of £7,162 4s. 3d.

To the 30th June, 1903, the mills have paid into the Treasury for interest and redemption, a sum amounting to £10 896 18s. 7d. for the year 1902-3. The total payments from the inception of the mills to the same date amount to—For interest, £73,465 19s. 6d.; and for redemption, £25,795 9s. 1d.; or a total of £99,261 8s. 7d.

Arrears of interest stand at £63,632 1s. 11d., and redemption £26,660 12s. 2d., or a total of £90,292 14s. 1d.

The Mulgrave and Mossman mills, both being in a position to meet their instalments due for redemption, amounting to £3,798 16s. 2d., are holding back these payments pending some decision as to utilising these amounts in lieu of the additional loans promised.

Considerable headway is being made at the two Government controlled mills. The crop at the Proserpine particularly is a good one, and it is estimated that the output of sugar will be close on 3,600 tons, or an increase of 1,500 tons over that of the previous season. The Moreton mill is estimated to turn out 1,500 tons of sugar this season, an increase of 1,200 tons over that of the previous season.

R. W. McCULLOCH,  
Government Inspector and Valuator.

REPORT OF THE INSPECTOR AND VALUATOR UNDER THE SUGAR WORKS  
GUARANTEE ACTS

—I have the honor to submit my annual report for the season 1902-3 on the operations of the Central mills under the Sugar Works Guarantee Acts. The total quantity of cane crushed under the Acts during the season was 1,198,500 tons, and the amount of sugar made therefrom was 123,700 tons. The total quantity of cane crushed under the Acts during the season 1901-2 was 1,198,500 tons, and the amount of sugar made therefrom was 123,700 tons. The total quantity of cane crushed under the Acts during the season 1900-1 was 1,198,500 tons, and the amount of sugar made therefrom was 123,700 tons. The total quantity of cane crushed under the Acts during the season 1899-0 was 1,198,500 tons, and the amount of sugar made therefrom was 123,700 tons.



## PARTICULARS OF MILL WORK, SEASON, 1902.

Particulars.	Marian.	Pleystowe.	Plane Creek.	Proserpine.	Mulgrave.	Mossman.	Gin Gin.	Mt. Bauple.	Isis.	Moreton.	Nerang.	Totals.
Capacity of mill—tons sugar per annum ...	5,000	6,000	5,000	6,000	5,000	6,000	4,000	4,000	4,000	3,000	2,000	50,000
Commenced crushing ...	5 Aug., '02	10 Aug., '02	24 July, '02	13 Aug., '02	16 July, '02	21 July, '02	19 June, '02	17 July, '02	22 July, '02	4 Aug., '02	12 Aug., '02	
Ceased crushing ...	15 Nov., '02	3 Nov., '02	17 Oct., '02	26 Nov., '02	28 Nov., '02	2 Jan., '02	10 July, '02	31 July, '02	19 Aug., '02	16 Sept., '02	16 Aug., '02	
Hours crushing ...	1,027.02	746.00	1,035.05	933.02	2,409.06	2,375.07	147.02	93.00	239.00	261.00	23.00	
Hours lost time ...	...	13.05	245.00	64.00	37.09	599.03	27.04	17.00	12.00	50.00	7.00	
Tons cane crushed per hour ...	14.08	24.07	17.05	19.01	18.06	22.05	14.08	14.03	10.06	11.00	10.00	
Tons cane crushed ...	15,182.06	18,484.00	18,131.00	17,849.00	44,854.04	52,726.02	2,193.00	1,335.00	2,539.08	2,894.00	236.00	176,417.06
Tons sugar made ...	1,732.07	2,070.00	2,265.02	2,035.07	5,422.00	6,268.00	206.00	123.00	229.00	277.06	24.00	20,653.02
Ditto ...	1,851.00	2,213.00	2,400.00	2,174.05	5,792.00	6,696.00	220.00	131.03	244.06	297.00	26.00	22,045.04
Tons cane per ton sugar ...	8.02	8.03	7.05	8.02	7.07	7.08	9.09	10.01	10.03	9.07	9.08	
Tons wood ditto ...	1.02	0.50	0.84	0.70	0.50	0.53	...	1.03	0.94	1.07	...	
Average cost of firewood per ton ...	6s. 6½d.	5s. 6d.	5s. 3½d.	4s. 9d.	6s.	7s. 9d.	4s. 10d.	5s. 5½d.	3s. 9½d.	3s. 9d.	...	
Percentages of sugar made, No. 1 ...	85.07	82.07	79.00	74.02	73.04	...	76.03	72.03	88.05	87.09	...	
Ditto No. 2 ...	10.06	10.06	19.00	21.03	23.08	...	5.07	...	...	4.06	...	
Ditto x ...	4.04	6.07	2.00	4.05	2.08	...	18.00	27.07	11.05	7.05	...	
Average net titres, No. 1 ...	96.77	...	96.15	96.04	95.58	...	94.08	96.64	93.91	93.60	...	
Ditto No. 2 ...	95.26	96.36	93.78	85.02	92.43	...	92.04	...	...	88.57	...	
Ditto x ...	83.35	76.00	81.00	80.09	76.05	...	80.02	72.35	86.04	76.08	...	
Average of all sugars ...	96.11	94.00	95.04	93.03	94.32	...	94.04	90.00	93.06	92.42	...	

R. W. McCULLOCH, Government Inspector of Central Mills.



COST OF MANUFACTURE—SEASON, 1902.

Particulars.	Marian.	Pleystowe.	Plane Creek.	Proserpine.	Mulgrave.	Mossman.	Gin Gin.	Mount Bauple.	Isis.	Moreton.	Nerang River.	Totals.
Salaries (crushing season)	£ 140 0 0	£ 164 0 0	£ 300 0 0	£ 369 18 4	£ 485 0 0	£ 975 16 8	£ 37 4 5	£ 30 13 5	£ 124 13 4	£ 110 0 0	£ 10 0 0	£ 734 13 4
Wages and rations	1,798 13 11	1,580 18 0	1,276 12 11	1,908 3 2	3,292 6 3	4,755 13 2	262 7 2	175 8 8	247 0 3	311 18 4	64 18 8	7,342 13 11
Firewood	608 14 11	276 2 0	468 6 0	362 2 8	1,230 3 5	1,378 9 6	107 7 4	33 12 0	43 15 4	107 12 0	20 5 0	3,242 13 11
Mill supplies	261 8 7	353 9 4	371 1 6	300 15 8	700 0 0	344 6 1	16 13 4	66 3 0	130 13 9	75 6 6	16 8 9	1,412 13 11
Horse feed	15 0 0	7 0 4	20 0 0	7 0 0	38 10 0	30 0 0	...	9 5 8	7 10 0	14 6 10	...	137 13 11
TOTAL	2,823 17 5	2,381 10 4	2,436 0 5	2,947 19 10	5,745 19 8	7,484 5 5	423 17 3	315 2 9	553 12 8	619 3 8	111 12 5	25,804 10 11
Cane purchased	11,220 3 5	13,869 11 4	13,144 3 0	11,602 3 7	36,082 2 11	39,357 9 4	1,080 9 5	649 2 1	1,317 14 10	1,485 15 7	163 9 7	73,000 10 11
Cane haulage	374 13 11	752 8 0	1,237 13 1	318 3 9	1,311 10 0	1,736 1 7	106 6 6	142 12 3	234 16 3	175 1 8	33 11 4	4,000 10 11
Cane assessment	63 6 2	77 0 4	75 11 0	37 4 3	186 17 7	219 16 4	9 2 9	5 11 3	10 11 8	6 0 7	0 19 8	500 10 11
TOTAL	11,658 3 6	14,698 19 8	14,457 7 1	11,957 11 7	37,580 10 6	41,313 7 3	1,195 18 8	795 5 7	1,563 2 9	1,666 17 10	188 0 7	137,077 5 0
Salaries (off season)	392 9 6	491 0 0	612 17 2	444 15 0	337 10 0	674 3 4	370 1 8	358 1 3	554 0 0	281 3 0	85 5 0	2,000 10 11
Maintenance charges	1,418 7 2	788 6 11	1,416 17 1	915 10 4	3,144 8 5	3,556 3 7	120 13 11	38 5 1	128 3 9	362 8 1	72 7 2	7,000 10 11
Sugar charges	573 3 3	597 5 0	243 5 1	35 12 6	1,690 12 10	1,206 4 11	74 16 3	102 11 3	85 9 11	142 2 3	8 2 11	3,000 10 11
Office, legal, and printing expenses	132 6 1	433 12 8	73 16 0	67 16 9	276 1 2	163 4 5	21 19 4	32 5 8	42 15 6	40 12 11	22 14 4	1,000 10 11
Insurances	72 11 3	79 3 9	137 1 1	155 0 5	341 10 2	185 4 10	98 7 10	118 5 9	88 17 3	70 11 8	45 3 6	1,000 10 11
Directors' and auditors' fees	93 0 0	134 8 0	71 0 0	...	300 0 0	82 18 4	5 5 0	97 12 0	21 0 0	60 10 0	...	1,000 10 11
General expenses	126 7 6	376 15 2	357 14 11	146 19 3	1,152 5 1	1,004 14 6	154 6 3	23 15 6	12 19 0	12 0 2	79 15 7	2,000 10 11
Government interest	1,460 9 4	1,378 9 8	2,476 6 8	2,126 4 1	1,723 10 2	2,525 17 2	1,977 1 11	1,237 8 8	1,273 5 8	1,252 1 3	799 19 2	10,000 10 11
TOTAL	4,268 14 1	4,279 1 2	5,388 18 8	3,891 17 4	8,966 6 10	9,398 11 1	2,822 12 2	2,008 5 2	2,206 11 2	2,221 8 4	1,113 7 8	46,565 12 8
GRAND TOTAL	£18,750 15 0	£21,359 11 2	£22,282 6 2	£18,797 8 9	£52,292 17 0	£58,196 3 9	£4,442 8 1	£3,120 13 6	£4,323 6 7	£4,507 9 10	£1,413 0 8	£209,447 8 9
Depreciation written off	£ 2,000 0 0	£ 1,856 14 6	£ 2,964 4 3	£ 1,033 0 0	£ 3,116 3 6	£ 5,658 3 9	£ 1,880 14 0	£ 1,432 11 0	£ 1,880 14 0	£ 2,221 8 4	£ 1,113 7 8	£ 209,447 8 9
Average price paid per ton cane	0 14 9½	0 15 0	0 14 6	0 13 0	0 16 1	0 14 11½	0 9 10½	0 9 8½	0 10 5½	0 10 3	0 13 0	0 14 9½
Average cost haulage	0 0 5½	0 0 10½	0 1 3½	0 0 4½	0 0 8	0 0 8½	0 1 0½	0 2 1½	0 1 10	0 1 2½	0 2 10	0 0 5½
Average cost cane at carrier	0 15 4½	0 15 10½	0 15 11½	0 13 4½	0 16 9	0 15 8	0 10 10½	0 11 11½	0 12 9½	0 11 6	0 15 11	0 15 4½
Average cost manufacture per ton cane	0 3 8½	0 2 6½	0 2 8½	0 3 3½	0 2 6½	0 2 10	0 3 6	0 4 8½	0 4 4½	0 4 3½	0 9 5½	0 3 8½
Cost of manufacture per ton sugar	£ 1 12 7 10	£ 1 3 0 1 1	£ 1 6 1 0 1	£ 1 8 11 1 7	£ 1 1 2 0 19 0	£ 1 3 10 1 3	£ 2 1 1 1 1	£ 2 1 1 1 1	£ 2 8 4 2 5	£ 2 4 8 2 1	£ 2 1 8 1 3	£ 1 12 7 10
Cost of cane per ton sugar	6 14 7 6	6 12 10 6	6 12 10 6	5 17 8 5	6 18 7 6	6 11 9 1 1	5 16 1 1 1	6 9 7 1 1	6 16 6 6 10	6 0 4 5 12	7 16 8 1 7	6 14 7 6
Cost of maintenance per ton sugar	0 16 4 0 15	0 7 0 7 0	0 12 6 0 11	0 9 0 8 5	0 11 7 0 10	0 11 4 0 10	0 10 7 0 10	0 11 7 0 10	0 12 9 0 10	0 11 6 0 10	0 15 11 0 10	0 16 4 0 15
Cost other charges per ton sugar	0 16 0 0 15	0 1 0 5 0 19	0 13 2 0 12	0 8 4 0 7 9	0 15 1 1 1	0 10 7 0 9	0 3 6 0 3 6	0 4 8 0 4 8	0 4 4 0 4 4	0 4 3 0 4 3	0 9 5 0 9 5	0 16 0 0 15
Cost Government interest per ton sugar	0 16 10 0 15	0 13 3 0 12	1 1 10 1 0 8	1 0 10 0 19 6	0 6 4 0 5 11	0 8 0 7 6 2	0 3 6 0 3 6	0 4 8 0 4 8	0 4 4 0 4 4	0 4 3 0 4 3	0 9 5 0 9 5	0 16 10 0 15
Total cost of sugar per ton	10 16 6 10 2	7 10 6 4 9	9 16 9 9 4	9 4 8 8 12 11	9 12 11 9 0 7	8 13 8 13 9	21 11 3 20 3 10	25 7 5 23 16 5	17 13 8 16 5	15 5 15 3 6	16 5 15 3 6	10 16 6 10 2
Average price realised per ton	11 1 5 10 7	3 10 14 1 10	6 1 9 17 1 1	10 12 9 10 0 0	11 1 3 10 7 1	11 2 4 10 8 5	11 5 1 10 10 9	11 2 4 10 8 9	11 17 5 1 10 13 0	11 18 4 1 11 2 3	11 18 4 1 11 2 3	11 1 5 10 7
Profit per ton	0 4 10 0 4	0 7 8 0 7	0 13 9 13 0 1	1 8 1 1 7 1	1 8 4 1 6 6	1 16 7 1 14 7	10 6 2 1 9 13	13 7 7 13 7	7 10 1 7 0 7	7 4 7 1 4	7 4 7 1 4	0 4 10 0 4
Loss per ton	...	...	...	...	...	...	...	...	...	...	...	...
Total profit on season's operations	£ 624 17 8	£ 796 11 10	£ 2,003 19 7	£ 2,945 14 8	£ 7,691 5 3	£ 10,459 16 8	£ 2,163 9 0	£ 1,646 10 8	£ 1,212 3 0	£ 1,033 2 3	£ 1,106 9 4	£ 24,622 5 8
Total loss on season's operations	...	...	...	...	...	...	...	...	...	...	...	...
Percentage of profit on capital	1.7 per cent.	2.4 per cent.	3.2 per cent.	5.4 per cent.	14.5 per cent.	14.5 per cent.	...	...	...	...	...	7.1 per cent.
Total interest paid to 30th June, 1902	10,750 10 9	6,999 3 5	7,113 2 11	...	12,206 0 7	16,627 5 1	6,914 14 10	4,169 15 8	7,496 13 9	350 7 4	839 0 0	73,466 14 4
Total redemption to 30th June, 1902	3,149 10 11	2,864 12 11	4,190 12 11	...	2,936 8 2	4,232 5 6	...	508 3 9	7,913 6 11	...	...	25,795 1 1
Arrears of interest to 30th June, 1902	2,730 4 2	4,805 12 3	11,202 5 5	15,543 2 11	1,556 17 6	2,243 18 8	8,309 16 0	5,764 2 8	625 15 4	8,421 15 0	6,229 8 2	63,632 1 1
Arrears of redemption to 30th June, 1902	659 19 7	1,657 14 11	2,159 10 0	5,274 14 6	...	...	4,684 0 0	2,664 10 9	565 11 7	3,210 4 8	1,983 10 0	26,660 12 2

NOTE.—In the calculations of "average price realised per ton sugar" and "profit on season's operations," the bonus was taken at £1 2s. per ton. It has since been ascertained that the bonus will be £1 2s. 7½d. per ton 94 N.T. sugar. The profits of the Northern mills will, therefore, be increased by £743 10s. 7d., and the losses at the Southern mills reduced by £26 13s. 7d.

R. W. McCULLOCH, Government Inspector, Central Mills.



## REPORT OF THE INSTRUCTOR IN FRUIT CULTURE TO 30TH JUNE, 1903.

SIR,—The past year, though by no means a favourable one for fruit-growing in many parts of this State, has nevertheless witnessed a considerable increase in the area under cultivation. Extensive plantings of deciduous fruit trees principally apples, peaches, nectarines, plums, and cherries have taken place throughout the Stanthorpe district, and to a somewhat smaller extent throughout the colder parts of the State generally. The varieties planted consist largely of those that have already proved their suitability to the districts in which they are to be grown, thus ensuring not only good returns when they come into bearing, but the production of fruit suitable to the requirements of our market.

Citrus culture, despite the losses through drought in some sections, has also been largely extended, many thousands of fresh trees having been planted. The extension in citrus culture is very largely in the direction of planting worked trees of the best varieties rather than seedlings. Only a few varieties are being planted, and those of proved merit. The result of this will be a marked improvement in the quality of our produce when the trees come into bearing, as we shall be able to maintain shipments of high-class fruit, of even quality, which will make and maintain a market in whatever part of the world it may be sent to.

Pineapple culture is extending in many parts of the State, the principal extension being in the Cairns, Rockhampton, Maryborough, North Coast, and Cleveland districts. The quality of the fruit grown has been excellent, and very satisfactory prices have been realised for first-class smooth-leaved pines in the southern markets. The question of canning the common or rough-leaved pines is receiving much more attention, and this method of utilising the surplus during periods of plenty, when there would otherwise be a glut on the market, has tended to maintain prices at a profitable level.

The pineapple industry is one that, as far as Australia is concerned, is practically confined to Queensland, so that we have no competitors to fear in the local trade. At the same time, the pine is a fruit that we can and do grow to perfection, and, given up-to-date methods of utilising the crop when grown, I see no reason why we should not only supply all the requirements of the Commonwealth, but also be able to compete successfully in the markets of the world. During the year I have received many inquiries respecting the canning of pines, and I am glad to say that there is an inclination on the part of our great meat-preserving companies to take up this work in addition to that of meat preservation, provided that growers will agree to produce a sufficient quantity of fruit to warrant their going in for the business on a large scale, so as to reduce the cost of production to a minimum, and to enable them to compete in the markets of the world with a reasonable chance of success.

The crop of deciduous fruit in the Stanthorpe district was a very fair one, despite the dry weather, and prices, though not in some cases equal to those of previous years, were still remunerative. The quality of the fruit grown was equal if not superior to that of previous years, that exhibited at the Stanthorpe show being hard to beat in any part of Australia.

Citrus fruit has not been a good crop owing to the drought, still that of the North Coast has never been of better quality. The citrus crop of Northern Queensland was a good one, especially in the Cardwell district, though it was not marketed to advantage. The quality of the fruit was excellent, and a consignment of sixty cases sent from Cardwell to Melbourne realised the highest price obtained for seedling oranges during the season. There was practically no loss in this consignment, showing that, given the requisite care in handling, sweating, and packing, our Northern citrus fruit has good carrying qualities. Seville oranges for marmalade-making were in good demand, and consignments from Cairns and Mackay realised satisfactory prices. In my opinion, there is a good market for the Northern fruit both on account of its quality and earliness, and, if the industry is conducted in as business-like a manner as it is now in many of the Southern districts, there should be no difficulty in finding a good market for all the fruit grown, a large part of which has in the past been allowed to go to waste. The citrus crop of 1902, though by no means a good one in the Southern part of the State, was more than sufficient for local requirements, and the action of the Queensland Citrus Growers' Association in disposing of a considerable portion of the crops in the southern markets relieved the local market, thus securing a better price and at the same time maintaining the reputation of our fruits in the southern markets. The work of the association during the year has been of great service to fruit-producers, and fruits other than citrus have been handled. It is to be hoped that the scope of the association will be extended so that not only will fruit-growers be able to find good markets for their produce, but they will be able to obtain all spraying or cyaniding materials, manures, &c., at the lowest rate, thus reducing the cost of production; the object aimed at being to produce fruit of the best quality at the lowest rate, and to market it in such a manner as to leave the largest possible margin of profit to the grower.

Little has been done in the way of export during the year, as Australian markets were capable of utilising the whole of the crop at remunerative rates. The association, however, realised the importance of opening up new markets, and consignments have already been sent to Vancouver and New Zealand, and, as the output of fruit increases, other markets will be exploited.

The citrus crop of 1903, now being disposed of, is a small one, the dry weather, cyclone in the North, and the prevalence of fruit pests (particularly the sucking moth) being responsible for the falling off in yield. Prices have also been far from satisfactory, as, owing to the lateness of our season, our crop has come into direct competition with that of New South Wales instead of preceding it, the combined crops thus overloading the market.

The banana crop in the Southern parts of the State suffered severely from the drought, but plantations have rapidly recovered since the rain, and promise a good yield during the coming spring. The Northern crop was not injured to any extent.

Strawberries were, owing to the dry weather, a failure in many places, but the crop now ripening never looked better, and there is every promise of a record yield.

The question of fighting fruit pests of all kinds has received considerable attention, growers now realising that it does not pay to grow dirty fruit. Cyaniding of citrus and other evergreen fruit trees for scale insects, and the spraying of deciduous trees for scale and other pests, is now the rule and not the exception. Growers now carry out the work themselves, in most cases, with little assistance from the Department of Agriculture; at the same time, wherever instruction has been required, both Mr. Voller and the writer have given it. During the year I have given several practical demonstrations of the best and most approved methods of fighting fruit pests of all kinds in various parts of the State, the instruction so given being much appreciated, and leading in many cases to growers following up the instruction given in a practical manner.

During the year I have also visited most of the principal fruit-growing districts from Wallangarra in the South to Cairns in the North. I have delivered a number of lectures on fruit culture, and have given many practical demonstrations in pruning, budding, grafting, treatment of fruit pests, handling and packing of fruit, &c. At the same time I have given information to a large number of fruit-growers and intending planters on the kinds of fruit to grow, the soil and climate best adapted for particular fruits, the best methods of pruning same manuring, &c.

The question of irrigation, as applied to orchards and vegetable gardens, has received careful attention, and an article dealing with this subject was written by me for the *Queensland Agricultural Journal*. The importance of securing a supply of water for irrigation purposes during dry spells has been pointed out over and over again



and advice has been given in the erection of many small plants, and of the distribution of the water when obtained. Growers realise the necessity of having an available supply of water for irrigation during dry spells, especially during the spring months, as the absence of sufficient moisture in the soil during the setting of the fruit either destroys the crop or lessens it to such an extent as to render it unprofitable. This has been amply proved during the past year, a splendid promise of fruit being ruined through lack of moisture, whereas in cases where water was given a good crop has resulted.

The important question of pineapple culture has been dealt with by me in a series of three articles in the *Agricultural Journal*, and the matter already written will be followed by more on the same subject shortly, the intention being the production of a complete pamphlet on pineapple culture, which will be of value to those now engaged in the industry, as well as being a text-book for those who purpose going in for this branch of fruit culture.

In conclusion, I may state that, though the industry has passed through a very trying time, it has continued to make steady progress, and I feel that my work amongst the fruit-growers of this State is appreciated by them, and is producing tangible results which are of benefit to the State at large.

It is in the practical side of my work, whether same be in the pruning of the trees, the treatment of disease, or in the handling and packing of the fruit, that I have obtained the best results, as this appeals directly to those who are making their living by fruit-growing, actual results speaking more forcibly than any theoretical instruction.

It is pleasing to note that the appreciation of the results of the work of the fruit branch of this Department is recognised outside the State, as instanced by the remarks of Mr. T. Jessop, M.L.A., the president of the Sydney Fruit Exchange, and a gentleman who has had a life-long experience in the handling of all kinds of fruit. Mr. Jessop visited Brisbane in May last, and in the course of an interview with the reporter of a Brisbane daily made the following statement:—"I have to congratulate your fruit-growers on their excellent productions. I should say that the citrus fruit of Queensland could not now be easily beaten. From all districts come excellent samples, all much superior to what is produced in New South Wales. It is plain that your orchardists are taking more pains in their business, paying more attention than before to the fumigation of trees and cleaning of fruits for the market. I am surprised at the Queensland pineapple crop for the present year. It exceeds the output for any previous season, and I am glad to hear that preserving factories are being brought equal to the occasion. I wish chiefly to emphasise my admiration for Queensland citrus fruits."

Testimony like this is extremely gratifying, and proves that the fruit branch of this Department is recognised outside the State as having done good work for the fruit-growers of this State.

A. H. BENSON, Instructor in Fruit Culture.

#### REPORT OF THE INSTRUCTOR IN COFFEE CULTURE, Etc.

SIR,—I have the honour to submit my report for the year ending 30th June, 1903.

As my position as a responsible officer of the Department, entirely resident in the tropical portion of the State, necessitates a somewhat wide range of work covering several branches of agriculture, and does not permit of my confining myself, as was at first anticipated, to work in connection with coffee culture, I am including in this report short references to such other duties as can be grouped under distinct headings. Indeed, during the past year no inconsiderable portion of my time has been occupied with such matters, of importance themselves in tropical agriculture, but which cannot be included under the one heading of "coffee culture."

The scope of the Department is steadily increasing in the North, and the necessity for due consideration to agricultural matters is becoming increasingly evident—matters that often require special treatment, owing to the great climatic difference between the Northern and the other districts of the State.

**COFFEE CULTURE.**—The season for coffee has this year been somewhat trying, owing largely to the extreme meteorological variation experienced during the first half of the season, when the conditions of drought, already severely felt during the previous season, continued and increased in severity until the close of the calendar year, and also the latter half of the season, when heavy rains amounted to almost an equal extreme, showing a fall within six months or so almost equal to the average for the past ten years.

The excessively dry time in the earlier part of the season referred to had the effect in several instances of making the coffee droop, and in a few cases of burning off blossom—a thing previously unknown. The effect throughout the country has been to make the crop considerably later than usual. The subsequent heavy wet season has induced a heavy flushing or growth of leaf and wood, but altogether, while somewhat trying, but little harm has been done.

Fair to good crops have been obtained generally, as was anticipated, especially on estates that have received attention in weeding, and prospects are for a really heavy crop in the coming season.

The dry season also had the effect of retarding the growth of trees, which in the case of badly-planted estates has resulted in good rather than harm, the condition of the trees, after the enforced rest, being remarkably fine.

The sample of berry, which last season was small owing to the continued shortage of rainfall, is, this year, very much larger, and will undoubtedly obtain better prices in consequence, especially when better attention is given to curing.

No frosts were experienced this season, and estates that were affected last year have recovered, the trees being almost as large and bearing even more heavily than before they were so unfortunately frost-bitten. The continued drought, especially after the damage by frost, has resulted, as anticipated in last year's report, in the dropping out of several small growers and the abandonment of their small areas, in which places the coffee-trees, though by no means killed out, are now almost past recovery from neglect and weeds.

I was pleased to note in many directions adoption of improved methods, and greater attention to culture and field work as well as curing, and in some cases the satisfactory overcoming of little difficulties in the direction of labour for picking and other matters showed resourcefulness and self-reliance on the part of some of the pioneers of the industry.

The matter of reducing the cost of production to the lowest possible point by attention to details both in field and store work is not yet receiving the attention from growers that I should like to see. As growers begin to appreciate the importance of this matter and exercise due economy in time and labour, there is no doubt they will find, not only that it makes often all the difference in amount of profits, but settles most of the vexed questions assailing the planter.

The greater number of inquiries for advice and information this season have, however, been in the direction of curing and disposing of crops.



The smaller growers have complained of a difficulty in obtaining a ready market, owing to the reduced demand by the smaller local produce merchants to whom they had hitherto been able to dispose of their small lots, the merchants explaining that the abolition of the duty on tea has so widened the difference in price between the beverages as to show an appreciable reduction in the consumption of coffee. The reimposition of the duty on tea being impracticable, a bonus on the coffee produced in the Commonwealth, as petitioned for by the Coffee Growers' Association, even if considerably less than the amount stated by them, would undoubtedly largely meet the case. Nor need it be feared that such assistance would not benefit the growers, but be taken advantage of by speculators—in other words, the produce merchants—who now buy direct from the producer, if the growers will go to the open markets of the Commonwealth, as in Sydney and Melbourne.

The total amount of such assistance would be but trifling, and, in any case, is not to be compared to the advantage to the Commonwealth of fostering, encouraging, and, in fact, establishing so advantageous an industry.

The obvious remedy for the present low prices offered within the State for the raw product, apart from co-operation and organisation were it practicable, is in the further treatment of the coffee by hulling and grading, as pointed out in last year's report and in my report submitted after visiting the southern States for this especial purpose. This curing can be done by each individual grower with hand-power machines of cheap cost. (*Vide Queensland Agricultural Journal*, "Coffee Machinery," June, 1902.)

Acting on my advice, several growers have so cured their crops this season, and despatched them to Sydney for sale by auction by brokers; the coffee being dealt with in the same manner as tea, with very gratifying results. The cost of sending the crops to Sydney amounts to no more than in shipping to Brisbane, and the freight and charges amounted to less than  $\frac{1}{2}$ d. per lb. The prices obtained were not the highest possible by any means, but were good, and taking into consideration the fact of the small size of the sample, largely due to the drought, and the fact of this being in most cases the first consignment, the prices were gratifying and the sales prompt. Accordingly as care is taken in curing, *i.e.*, thorough drying after pulping, hulling, and grading, packing in double bags, not more than 70 lb. in a bag, branding and marking (for neatness of packing is just as important a point in coffee as in any other line of produce), the quality is recognised as being uniform and reliable, and the brand becomes known, so will the confidence of the buyers be obtained and the prompt and ready sale of each grower's crop, be the quantity large or small, be assured and prompt.

With an industry capable of extension to twenty times its present size before any grave consideration need be given to exportation, no fear need be entertained regarding the advisability of the cultivation of coffee in the Commonwealth on account of the apparent surplus in the world's supply of low-grade coffees as would seem to be entertained in some quarters.

With attention to what may seem small items of field and store work, adoption of practical and approved methods, all of which lead to reduction in cost of production, which cannot be too much emphasised, and due attention to curing, &c., the prospect for coffee-growers in Queensland are very distinctly favourable.

The tour through the coffee-growing centres in the Southern part of the State, usually undertaken during the earlier part of each season, was this year abandoned through the necessity for retrenchment, and therefore the districts of Rockhampton, Yeppoon, Byfield, Tungumul, Percy Island, Maryborough, Pinalba, Mount Buderim, and Maroochie River were not visited. It is proposed to visit these places this season, however. The touring for instruction and demonstration has been therefore confined to the North—between Mackay and Cooktown; the only places not visited this season being the Bloomfield River and Geraldton. In all, seventeen tours were undertaken, aggregating 117 days.

The amount of correspondence, including applications for information, advice, and visits, &c., has been about the same as last season. One article entitled "Staking" has been published in the *Queensland Agricultural Journal* for August, 1902. It is to be regretted that the general work in the North, especially while single-handed in the office, does not admit of more time being devoted to the writing of such articles for the *Journal*.

**DISEASES IN PLANTS ACT.**—The inspections of export and import fruit, plants, seeds, &c., at the port of Cairns has been carried out thoroughly during the season.

The examination of exports is by far the greater work, but the imports are none the less important, especially now that coffee leaf disease has been found in New Guinea, and importations of all plants from thence prohibited by special regulations, the Northern ports being the nearest and most frequently in direct communication with New Guinea, and the principal seat of the coffee industry being in North Queensland.

In the matter of exports, bananas have somewhat decreased this season, and pines increased. The decrease of bananas exported may be put down to the effect of floods over some of the most productive gardens along the Cairns-Mulgrave tramline and the abandonment of gardens in the Barron district.

This decrease will be more than made up shortly by the coming into bearing of considerable areas now tapped by the Cairns-Mulgrave tramway extension. Bananas are also being planted to some extent in the Port Douglas district—notably the Daintree—where some considerable exportation to the South Queensland and the southern States may be anticipated as soon as communication is arranged with the port. The export of fruit from small ports, both north and south of Cairns, shows signs of increasing, and arrangements for due inspection will have to be made should this happen.

The orange crop, especially of mandarins, is poor this year in the North, on account of the unfavourable season; but it may be anticipated that a notable reduction in damage from fruit fly will be the result next season.

The Diseases in Plants Inspector at Cairns is supplied with a spraying outfit as well as a small tent for fumigating. A certain amount of work in this direction, as well as giving demonstrations of pruning of citrus trees, has been carried out during the year, and the energetic work and interest displayed in it by Mr. Drummond Macpherson is to be commended.

To garden inspections the inspector has been assiduous in devoting any time not actually required on the wharf, to the very apparent advantage of citrus culture in the district.

Citrus fruit culture is on the increase in the vicinity of Cairns, as well as about Atherton and the Mossman, and it is hoped that since the situation of these districts in the North prohibits the direct attention of the instructor in fruit culture himself, except at considerable intervals, it will be possible for the inspector to devote more time and attention to fumigating, spraying, pruning, and general advice in citrus fruit culture upon any lines that may be approved by Mr. Benson. Such work, when coupled with an inspection having as an object the reduction of fruit fly, scale, and other pests, is urgently required in many outlying orchards, and would prove of inestimable benefit to settlers.

Wild guava and deserted banana gardens and orangeries continue to be the one great difficulty in the fight against insect pests, and no ready solution of it seems likely to be forthcoming.

**THE KAMERUNGA STATE NURSERY.**—Conducting the work of this Nursery constitutes a very considerable portion of my work in connection with the Department of Agriculture in North Queensland. As a separate report is submitted dealing with the work of the Nursery, in order to come into line with the other more or less similar institutions, it would be out of place to go into details in this report.



The special work of the Nursery—in acclimatising and propagating imported and propagating and improving indigenous plants, trees, and shrubs of economic value, and in distributing them to agriculturists, horticulturists, pastoralists, and settlers generally, and in experimenting with economic products of all kinds—is in itself an extensive work. The popularity of the institution has largely increased, and is evidenced by the increasing number of farmers and others who visit the Nursery to see the various experimental plots and obtain seed, plants, and cuttings, as also by the steadily increasing correspondence.

The utility of the work and practical experiments in economic products are admitted on all sides, communications reaching this office from various parts of the Empire.

The attending and exhibiting at agricultural shows in various centres of the North is a considerable feature in the work of the institution, which is not only very much appreciated, but is showing practical and good results.

**RE-AFFORESTATION WORK.**—During the season some re-afforestation work was undertaken at the instance of the Inspector of Forests and under the direction of the Under Secretary of the Department of Public Lands.

In March of this year I proceeded to Atherton, and inaugurated the work of transplanting young cedar plants from the scrubs adjacent to Atherton into the Forest Reserve at Carrington. Young plants from 1 foot to 2 feet high were chosen and replanted in the reserve along the old timber tracks which intersect it, the transplanting being effected with gratifying success.

The number of young cedars thus planted amounted to 1,536, at a gross cost of £25 3s. 6d., and a net rate, exclusive of certain unavoidable initial expenses such as purchase of tools, of some 25s per 100. Credit is due to Mr. W. Stovell, to whom the work was intrusted, for conscientious work under somewhat trying climatic conditions.

The sum granted was very small, so that the whole work may be considered more as an experimental step than the inauguration of any general scheme of re-afforestation. It is, however, hoped that it is only the first step leading to more or less extensive planting out by the Forest Department of trees of value, both in the direction of timber and general forest produce.

The value to the State of such work can only be roughly computed, but at present values, which there is no reason to suppose will decrease as the supply is being gradually exhausted, and considering the rate of growth of this class of timber, it may, I think, safely be estimated that, even allowing for failures, &c, within, for the State, the comparatively short period of fifty years or so, the cedars now planted will show a return value approaching 200 times the amount of original outlay.

As an experiment, so far as it has gone, the work already done may be considered a distinct success, and it is trusted that it will be deemed at least sufficiently conclusive to warrant the consideration of the advisability of more extensive operations in the same direction by the Forest Department.

Besides trees actually planted out, seeds of various valuable trees have been received through the officers of the Forest Department and germinated at the Kamerunga Nursery, among which may be mentioned—Red cedar (*Cedrela Toona*), hoop pine (*Araucaria Cunninghamii*), cypress pine (*Callitris robusta*), black pine (*Podocarpus pedunculata*), and Bunya pine (*A. Bidwillii*). From other quarters seeds of trees of value for purposes of forestry have also been received and successfully germinated, such as the carob (*Ceratonia siliqua*), Burmese teak (*Tectona grandis*), the Algaroba (*Prosopis juliflora*), Mesquit bean-tree sp. (*P. Stephaniana*), Jâk-tree (*Artocarpus integrifolia*), Moreton Bay chestnut (*Citinospermum australe*), Doomba-tree (*Calophyllum inophyllum*) and bottle-trees (*Sterculia* sp.).

Several of the latter have a high value as fodder, as well as timber trees, and some have the faculty of thriving, not merely upon poor forest soils, but under conditions of but scanty rainfall, a direction in which wide scope exists for particularly valuable work by this department.

Plants of all the trees mentioned are in greater or less quantity already available, and can be transported with facility to any desired spot, while plants in any desired quantity could readily be raised should they be required.

HOWARD NEWPORT, Instructor in Coffee Culture.

#### REPORT OF THE TOBACCO EXPERT.

SIR,—I herewith submit report of work done at the Experimental Tobacco Farm at Texas for the year ending 30th June, 1903.

It was intended to plant between 14 and 16 acres in tobacco, but, on account of the continued drought, only a scattering stand could be obtained in the fields, from which we have harvested something near 2 tons of fairly good and serviceable tobacco.

The value of the experiments for the prevention of blue mould in the seed beds cannot be determined, as the atmospheric conditions that usually prevail to produce the disease were absent the past year, and hence the disease did not manifest itself in any part of tobacco-growing districts.

We planted six of the very best and most approved varieties of tobacco to determine which was the most desirable for our soils and climate. These were Lax, Blue Pryor, Yellow Pryor, Heston, Conqueror, and Burley. I am not fully satisfied with the results, as the drought also made the experiments inconclusive.

Of these varieties, the Lax proved by far the hardiest, or most drought-resisting—in fact, the only one from which we succeeded in getting much yield. This tobacco is a good grower, maintains its type stubbornly, and yields and cures well, and is a favourite tobacco in both Kentucky and Virginia.

The Burley stood next best, but, unfortunately, being a sport, has a strong tendency to revert to the original type. Will try it again. Of the others only a few plants survived the hot winds, and of the Yellow Pryor only one plant survived. I shall try another variety the coming year.

I also had a few plants of native tobacco, but I doubt if it has any value.

There are also a few plants of Transvaal tobacco, but they perished by the hot winds. It has also been the aim of the farm to demonstrate that tobacco can be grown at a profit by the white farmer. I have employed none but white men on the farm, at good wages, and the first two years' returns show that, notwithstanding the drought with which we have had to contend, we only lack £27 16s. 5d. of having paid actual working expenses; and off this, if we can deduct the plant-bed, framing, and covering, and the tobacco screw, which are largely permanent investments, and the amount we have had to pay for horsefeed on account of drought, we would be something like £50 to the good.

Besides, we have greatly added to the value of the property, by getting other ground ready for the plough, which will be in cultivation the coming year.

In conclusion, I may say that the work of the farm has demonstrated that the white farmer can grow tobacco profitably, and the small farmers are manifesting an interest in it by reason of these results.

R. S. NEVILL, Tobacco Expert.



## REPORT OF THE VITICULTURIST.

SIR,—I have the honour to report upon my work for the past twelve months as follows:—

Notwithstanding the serious effects of the past year's drought on many vineyards, a considerable and growing interest is being shown in this branch of fruit culture, and my time has been fully occupied in visiting vignerons in all districts of the Southern part of the State to advise on choice of soil, varieties to plant, pruning of same, &c. I have also given part of my time to the State vineyards, about which I have to report as follows:—

WESTBROOK VINEYARD.—The new varieties imported from Europe three years ago came into bearing for the first time this season, but the long drought affected them so adversely, and the fruit was so meagre in quantity and poor in quality that I am unable to make any reliable report upon their merits this year. Moreover, the dryness of the season prevented any development of fungus diseases on vines. On this point, observation as to their liability or resistance to the same is very necessary before a vine could be recommended for distribution. For this reason I will defer making any report as to their merits or defects until next year. To judge from some of the grapes grown under such adverse circumstances, there are several valuable additions to our collection of table and wine grapes among them.

I made further observations during the season upon the drought resistance of the phylloxera resistant vines imported from France, which practically confirm those of last year. The order of resistance was as follows:—

1. Aramon x Rup Gauzin No. 1.
2. Mourvedre x Rup 1202.
3. Rip x Rup 3309.
4. Rip x Rup 10114.
5. Rupestris Martin.
6. Rip x Solonis 1616.
7. Rup Forthworth.
8. Riparia Gloire.

The continued drought seriously affected the crop of grapes, which was practically nil. on many varieties. Some of the table grapes had a fairly good crop, especially Muscat of Alexandria, but, unfortunately, a heavy fall of hail destroyed two-thirds of the bunches and badly damaged the remainder. The returns from the vineyard were therefore very small. With a good season and the new vineyard coming into full bearing there should be a heavy crop this coming year. The results of the drought on the vines at Westbrook show that in this class of soil (heavy chocolate, of basaltic origin) the varieties most affected are—Mataro, Mavzac—Riesling. Those least affected were the Black and White Hermitage and Clairette. Muscat Hamburg suffered, but the Muscat of Alexandria did not.

HERMITAGE VINEYARD.—For the third time hail destroyed the crop from these vines, consequently there was no return from it. This vineyard requires to be replanted with the varieties adapted to the district. Those planted in the first instance are mostly unsuitable to the Downs country and will, in my opinion, never do well there.

GATON COLLEGE.—Considering the season, there was a promise of a good crop of table grapes from the vines near the creek, but a hailstorm, unfortunately, ruined it utterly. The vineyard near the College buildings suffered rather severely from the drought, and a number of vines have died in consequence.

BIGGENDEN VINEYARD.—This vineyard stood the drought better than the others, and had, for the season, a fairly good crop. The wood this year is strong, and shows that the vines suffered less than was to be expected. The vineyard at this experimental farm is an object of interest to the farmers of all the surrounding districts. I have invariably a large and appreciative attendance when pruning the vines and doing other work on them, and there is no doubt that the establishment of this vineyard will have the effect of considerably increasing the culture of table grapes in this locality, numerous applications for vine cuttings having already been made.

GENERAL REMARKS.—The disastrous drought of the past year destroyed the crop from grape vines like that from all other fruit trees, except where they had been planted on deep, moist, sandy soils, the fortunate owners of which reaped a fine harvest, as the prices of grapes of all kinds ruled high this season. In consequence the returns of the past year, both for fresh grapes and for wine, will be very seriously reduced. It is to be feared that the coming crop will, in many localities, be a very light one, as the pruning wood will, in the majority of cases, be found to be spindley and wanting in fruit-bearing eyes; the effects of the drought will be felt for at least another year. In the Roma district, the past year, coming on top of five other very dry seasons, gave the *coup de grâce* to old vineyards and those which had been weakened by over-production. It may be estimated that upwards of 50 per cent. of the vines about Roma are dead or dying and will have to be replanted. Some of the growers are hesitating about doing so, as they fear that the demand for wine and other grapes will in the future be a diminishing one. Grapes of approved varieties will always find a sale, but they must be the best; it will be a waste of time to replant with Mataro or Black Cluster, Clairette, and other big croppers. Experience has shown that the vine has proved to be the farmers' friend about Roma.

E. H. RAINFORD.

## REPORT OF THE COLONIAL BOTANIST.

SIR,—I have the honour to submit the following brief summary report of the work appertaining to the office of Colonial Botanist for the past year.

The usual number of personal calls and written applications have been made by persons in quest of information regarding the classification, as well as the cultivation of plants, proving that the interest taken in these branches of knowledge by a considerable portion of the public is by no means diminishing.

The museum of economic botany has proved of value to a number of persons who have visited it in the course of their various professions or callings. This portion of a botanist's work, which is of so much practical use to so many, has been but very slightly increased by exhibits owing to the want of funds to furnish cases to place additional exhibits in.

The herbarium has been constantly but slowly added to both by exotic and Australian specimens, and here again much inconvenience and loss has occurred from the want of additional cabinets for the specimens.

A few days spent by my assistant collecting seeds of indigenous grasses, furnished enough to make up packets for a few correspondents, but to have furnished anything like representative examples of our grasses, a collector would have to be constantly in the field, and travel far and wide, so as to be able to hit upon the exact time when the seed was ripening.



With regard to noxious weeds and poisonous plants, few of this character reached me during the drought, the information then sought by country correspondents being rather if grasses or other plants could be sent to them that would furnish food for stock independent of rain or moisture. It is well known that plants receive their food in a liquid or gaseous state; therefore, without such supplies no growth must be expected. However, since the rains started grasses and many other plants have sprung up, some of which, owing to their uncommon rank growth, were thought by many to be new to the flora and were sent to me for identification, but in most cases they proved to be only strong growths of the former inhabitants of the country.

Among those sent as suspected poison-plants very few proved to be of a poisonous or deleterious character. The additional fungus blights for the year are given in a botanical bulletin now in the press.

The publications were the 6th and last part of the Queensland Flora, which was issued in December last, and for which I have received very flattering notices in botanical publications and by fellow-botanists both within and beyond the Commonwealth.

I have kept the expenses of the library down to the sum (£10) which was allowed for carrying on periodicals, a sum altogether too small for the work. When first appointed, £50 per annum was allowed to the purpose, which, although small for the object for which it was granted, enabled me, by judicious expenditure, to get together a fair nucleus of a botanic library, and I trust that a like sum may soon be again allowed for carrying on this much-needed work.

My assistant has, as usual, paid weekly visits during the year to the Agricultural College for the purpose of giving botanical lectures to the students.

F. MANSON BAILEY, Colonial Botanist.

## REPORT OF THE ENTOMOLOGIST AND VEGETABLE PATHOLOGIST.

### INTRODUCTORY.

The services of the Entomologist and Vegetable Pathologist have, in 1902-3, as compared with what has occurred in past years, been in equal request, even if greater public demand has not been made upon them during this period. The drought that obtained during the earlier portion of the time embraced in this report determined the presence in examples of almost all cultivated plants, both those of field and orchard, of constitutional derangements; and these conduced not only to the subsequent inroads of specific diseases, but to the incursions and attacks of injurious insects also. For, with the recurrence of normal climatic conditions, animal life of this class became unusually prevalent, with the result that much damage accrued to fruit—for instance, from the operations of sucking moths *Ophiderinæ* and other equally notorious pests—and to field crops and pasturage from the successive visitations of caterpillars and grasshoppers. Moreover, some of our native insects, through being temporarily deprived of their usual food plants, manifested during the year harmful relations to cultivated naturalised ones, previously unremarked. Thus not only have special urgent inquiries been presented, but novel investigations entered upon in number far in excess of what has been usual. The insect life thus conspicuously prevalent has, too, experienced, to a lesser degree than is ordinarily the case, the checks usually exerted by our feathered friends; drought, as well as the exercise of the growing propensity for bird destruction on the part of our colonial youth, having operated in effecting a great diminishment in their numbers.

As evidence in support of the facts thus generally described, it may be mentioned that, in addition to the information that has emanated from this office relating to questions concerning plant pathology and agronomic entomology on the occasion of personal interviews on the part of those interested, the following, amongst other topics embraced in the same departments of knowledge, have formed objects of written communication and report:—

### CORRESPONDENCE AND REPORTS.

#### I.—ECONOMIC ENTOMOLOGY.

APPLE.—Pernicious Scale Insect (*Aspidiotus perniciosus*), Toowoomba, Tenterfield, and Brisbane; Codling Moth (*Carpocapsa pomonella*), Stanthorpe and Tenterfield; Scarlet Mite (*Bryobia sp.*), Stanthorpe; Shoot-puncturing Insect, Stanthorpe.

PEAR.—Greedy Scale Insect (*Aspidiotus cameliæ*), Toowoomba; Fruit Fly (*Tephritis Tryoni*), Warwick; Sucking Moths (*Ophiderinæ*), Yandina.

PEACH.—Pernicious Scale Insect (*Aspidiotus perniciosus*), Darling Downs, Brisbane, and Raglan; Ripe-fruit-damaging Beetle (*Glyciphila brunneipes*), Brisbane; Parlatoria Scale Insect (*Parlatoria proteus*), Brisbane.

PLUM.—San José Scale Insect (*Aspidiotus perniciosus*), Brisbane; Parlatoria Scale Insect (*Parlatoria proteus*), Brisbane; Scarlet Mite (*Bryobia sp.*), Darling Downs.

FIG.—Fruit-frequenting Beetle (*Cetonia atomaria*, Fabr.), Brisbane; Fruit-frequenting Beetle (*Brachypeplus binotatus*), Cleveland.

LOQUAT.—Greedy Scale Insect (*Aspidiotus cameliæ*), Brisbane.

ORANGE (AND OTHER CITRACEOUS PLANTS).—Sucking Moths (*Ophiderinæ*—*Ophideres fullonica* and *Mænas salamina*), Blackall Ranges, Yandina, Burrum River district, &c.; Fruit-eating Caterpillar (*Papilio erectheus*), Gympie; Fruit Mining Caterpillar (*Conogethes punctiferalis*), Brisbane; Fruit-eating Caterpillar (*Bombycidæ* gen. et sp. in-det.), Gympie; Wood-boring Beetle (*Urocanthus Cryptophagus*), Coomera; Leaf-gauging Beetle (*Prosayleus phytolymus*, Olf.), Buderim Mountain; Leaf-eating Beetle (*Monolepta rosea*), Rockhampton; Green Fruit Plant Bug (*Biptorulus hibax*, Breddin), North Coast Line and Sunnybank; Bronze Plant Bug (*Oncosceli sulciventris*), Toowoomba; Phytopus Mite (*Phytopus oleivorus*), Palmwoods and Maryborough; Scarlet Fruit Mite (*Brevipalpus sp.*), Buderim Mountain; Fungus-eating Mite (*Leiosoma sp.*), Redland Bay; Circular Black Scale Insect (*Aspidiotus ficus*), Maryborough and Oxley; Black Scale Insect (*Lecanium oleæ*), Toowoomba; Circular Red Scale



Insect (*Aspidiotus coccineus*), Cardwell, Gladstone, Gympie, Nambour, &c.; White Scale Insect (*Chionaspis citri*), Cardwell, Gladstone, Ipswich, Brisbane, &c.; Pale Circular Scale Insect (*Aspidiotus lataniæ*), Cardwell; Glover Scale Insect (*Mytilaspis gloveri*), Gladstone and Brisbane; Fulvous Mussel Scale (*Mytilaspis fulva* = *M. citricola*), Brisbane, Cleveland, and North Coast Line.

MANGO.—Fruit Fly Maggot (*Tephritis Tryoni*), Brisbane; Purple Wax Scale (*Ceroplastes rubens*), Brisbane and Cleveland; Fruit Weevil (*Cryptorhynchus mangiferæ*), Brisbane; Fruit-sucking Moths (*Ophideres fullonica*), Brisbane.

PAW-PAW, PERSIMMON.—Fruit-sucking Moths (*Ophideres fullonica*, &c.), Yandina.

CUSTARD APPLE.—Fruit-boring Caterpillar (*Conogethes punctiferalis*), Zillmere.

GRAPES.—Wood-boring Beetle (*Orthorrhinus cylindrirostris*), Brisbane and Biggenden; Fruit-sucking Moths (*Ophideres fullonica*, &c.), Brisbane and Bundaberg; Termites, or White Ants, Beebo and Roma; Fruit Fly Maggot (*Tephritis Tryoni*), Brisbane.

COFFEE.—Polydesmid myriapod (*Haplosomidæ*)—presence, however, not significant of injury, Daintree River.

COCOANUT.—Foliage destruction, erroneously attributed to a cicada, Rattlesnake Island.

STRAWBERRY.—Leaf-eating Beetle (*Diphucephala* sp.), Palmwoods; Plant Louse or Aphis, Woombye; Fruit-eating Beetle (Fam. *Nitidularidæ*), Wellington Point.

COTTON.—Banks' Shield Plant Bug (*Tectacoris Banksii*), Cairns, Mackay, and Biggenden.

POTATO.—Tuber-gnawing Millipede, Palmwoods; Potato Moth Borer (*Gelechia operculella* = *Lita solanella*), Coomera; Tuber-gauger (*Isodon puncticollis*, Fam. *Scarabæidæ*), Brisbane.

SWEET POTATO.—Sweet Potato Weevil (*Cylas formicarius*), Bowen and Beenleigh.

BEANS.—Bean Fly Maggot (*Agromyza phaseoli*), Brisbane, Wynnum, &c.; Bean Aphis, (*Aphis rumicis* ?), Brisbane.

COWPEA.—Leaf-eating Caterpillar (*Heliothis armiger*), Degilbo; Bean Weevil (*Bruchus obsoletus*), Brisbane. Cowpea Plant Bugs (*Riptortus annulipes*), Bundaberg.

CABBAGE.—Leaf-eating Caterpillars, Ravenswood, Alpha, Kadanga Creek, Toowoomba, and Brisbane; Diamond Moth Caterpillar (*Plutella cruciferalis*), Brisbane; Stem-boring Caterpillar (*Hellula undalis*), Mount Morgan; Potato Cut-Worms (*Agrotis subnigra*), Brisbane.

TOMATO.—Root-gauging Beetle (*Isodon puncticollis*, Macl.), Cleveland; Plant-eating Beetle (*Opatrum nigrum*), Wellington Point; Leaf Mite (*Phytopus* sp.), Brisbane.

CAPE GOOSBERRY.—Fruit-eating caterpillar (*Heliothis armiger*), Woombye.

SUGAR-CANE.—Mealy Bug (*Dactylopius calceolariae*), Nambour; Moth Borer (*Nonagriæ exitiosa*), Yandina; Beetle Grub (*Rhopæa* sp.), Childers; Beetle Grub (*Lepidoderma albohirta*), Mackay; Root Parasite or Ground Pearl Insect (*Margarodes* sp.), Bundaberg.

MAIZE.—Stem Borer (*Heliothis armiger*), Darling Downs; Leaf-eating Caterpillar (*Heliothis armiger*), Degilbo; Cut-Worms (*Agrotis upsilon*), Darling Downs, Toowoomba, and Degilbo; Cob-boring Caterpillar (*Conogethes punctiferalis*), Brisbane; Leaf Hopper (*Megalmerus*, Fam. *Fulgoridæ*), Burdekin district and Cairns.

PANICUM GRASS.—Caterpillars (*Agrotis upsilon*), Darling Downs.

GUINEA GRASS.—Scale Insect, Brisbane.

PASTURAGE.—Grasshoppers, Darling Downs.

MISCELLANEOUS GARDEN PLANTS.—(A.) *Trees and Shrubs*: Red Scale Insect (*Aspidiotus aurantii*), on Camphor Laurel, Rockhampton; Circular Black Scale Insect (*Aspidiotus ficus*), the same; Ross' Circular Scale Insect (*Aspidiotus rossi*), Toowoomba; White Wax Scale Insect (*Ceroplastes coccifera*) on Duranta, Sandgate and Childers; Fruit-Fly Maggot (*Tephritis Tryoni*), on *Maclura* fruit, Herbert River. (B.) *Herbaceous Plants*: Slugs (*Vaginula* sp.), Brisbane; Orchid Stem Fly Maggot (*Isosoma* sp. ? *orchidearum*), Brisbane; Root Mite (*Rhizoglyphus echinopus*), on Dahlias and Gladiolus Bulbs, Brisbane; Stem Fly Maggot (? *Bibionidæ*), on Sapiglossis (Fam. *Scrophularineæ*), Brisbane.

TIMBER.—White Ants (*Termes lacteus*), Brisbane; Hardwood Beetle-Borer (*Sinoxylon* ? *gibbicollis*, Macl.), Brisbane; Soft-Wood Beetle Borer (*Anobium* sp.), Brisbane; Gigantic Ship Worm (*Teredinæ*: *Mollusca*), Townsville.

FOOD PRODUCTS.—Psocid insect (*Atropos divinatoria*), in Rolled Oats, Brisbane; Cheese Mites (*Tyroglyphus siro*, Lin.), Brisbane; Caterpillars (*Ephestia elutella*, Fam. *Phycitidæ*), in Date Fruit, Brisbane.

MAN-INJURING INSECTS.—Dipterous Insect (*Musca* sp.) reputed to be insect communicative of ophthalmia, Brisbane; Mosquito "Plague" (*Pulex vigilax*), Brisbane; Scrub-Itch Mite (larvæ of *Trombidium*), Moreton district; Centipede (*Heterosoma sulcidens*), Manly; Rat Fleas (*Pulicidæ*) in their relation to man as communicative of plague bacilli; Poisonous Spider (*Latrodectus*), Moreton and Darling Downs districts.

STOCK AND OTHER ANIMAL PARASITES.—Preliminary determinations of different ticks submitted by the Chief Inspector of Stock, and that had been derived from cattle, horses, native bears, &c., representing the genera *Ixodes*, *Rhipicephalus*, *Hæmaphysalis*, and *Hyalomma*.



**UTILISATION OF INSECTS.**—The Cochineal Insect (*Coccus cacti*), and the question of its being profitably raised on Prickly Pear (*Opuntia vulgaris*); Indigenous *Bombycidæ* as silk producers—for Royal Baccological Station of Padua; Prickly Pear (*Opuntia vulgaris*) repression and destruction by (1) the Cactus Diaspid Scale Insect (*Diaspis cacti*), and by (2) a Cactus Mealy Bug (*Pseudococcus sp.*), of India and Ceylon. [Note.—In connection with the latter it may be stated that steps have been taken to insure its early introduction into the State.] The Parasite of the Scarabæid Beetle Grubs of Sugar-cane (*Dielis formosus*). The Parasite of the Sweet Potato Hawk Moth Caterpillar, named *Sturmia* (*Diptera: Tachinidæ*) at Zillmere; the European hymenopterous Parasites of the Colling Moth; their names, and the project of their utilisation in the subjugation of this notorious apple-pest in Australia.

**IDENTIFICATIONS.**—The ascertainment of the names and systematic relations of insects (in some instances comprised in small collections) submitted from time to time by various applicants, with a view to their acquiring such information, has, as in the past, involved the expenditure of much time and labour, and should have stimulated the growing taste for the study of entomology.

**INSECTIVOROUS BIRDS.**—The collection of insectivorous and frugivorous birds, whose formation has been some time in progress, is almost complete—that is, as far as Southern Queensland is concerned. It comprises no less than 136 glass cases, in which 110 species of birds are represented, and which are devoted to the illustration of the habits as well as of both sexual and seasonal plumage-variations. The specimens, moreover, have been accurately named, and, whenever practicable, observations made and recorded in view of the preparation of a report on them and their economic significance for public information. It is with regret that it has to be placed on record that, notwithstanding the incorporation amongst our Statutes of Native Birds Preservation Acts, the persistent destruction of our native insectivorous birds is a matter of great concern to both agriculturists and horticulturists. This, too, is likely to continue until the natural history relating to our indigenous fauna form part of the educational curriculum of the public schools—even at the cost of the exclusion of other subjects—and some official check be placed upon the possession and indiscriminate use of firearms—at least of special character—a check whose institution and enforcement no sportsman, however ardent he might be, would oppose.

## II.—PLANT PATHOLOGY.

Numerous inquiries relating to plant pathology proper, as distinct from the injuries occasioned by the presence and attacks of injurious insects, have also been dealt with by this branch of the Department; although, during the first six months of the period embraced in this report maladies due to purely parasitic life appear to have been held in subjection by the prevalent arid climatic conditions. On the other hand, as already stated, these conditions conduced to the occurrence of constitutional derangements—affecting fruit-trees on the one hand, and farm crops on the other—too numerous to be particularised in this review. Of the more important of the former class of plant affections, forming objects of complaint and subjects for inquiry, the following may be mentioned:—

**PEACH AND PLUM TREES.**—Gumming with bacteriosis, Killarney.

**CITRACEOUS PLANTS.**—Gummosis, Charters Towers and Toowoomba; acariosis of fruit or russetting thereof, Charters Towers; rotting of fruit, accompanied by presence of *Penicillium* fungus, North Coast district and Brisbane; Leaf Scab of Lemon, caused by *Phyllosticta scabiosa*, McAlp. Brisbane; Fruit Rot of Tahitian Lime, of undetermined origin, Palmwoods and Oxley.

**MANGO.**—Leaf Blight, caused by presence of *Glæosporium mangiferæ*, Rai., Brisbane; Fumagine, caused by the presence of coccid insects and *Capnodium* fungus, Brisbane and Mackay.

**BANANA.**—Constitutional derangement involving the fruit, caused by nematode (*Heterodera* and *Tylenchus*), parasites of roots, Cairns; Fruit Rot, caused by *Glæosporium? fructigenum* fungus, Cairns and Geraldton.

**VINE.**—Pustular outgrowths, simulating those produced by the *Phytopus* parasite of the vine; fruit affection, caused by the presence of *Strumella vitis*, McAlp., Esk district; soil frequenting fungus at roots, Charters Towers; Anthraenose, caused by *Glæosporium ampelophagum*, Brisbane, &c.

**COFFEE.**—Physiological bark affection, Daintree River.

[NOTE.—Coffee leaf Disease (*Hemibelia vastatrix*). The recent occurrence—announced in May, 1903—of *Hemibelia vastatrix* in British New Guinea, under circumstances that would appear to suggest its reintroduction thereto, although not at present confirmed by the receipt at this office of authentic illustrative material, has, nevertheless, been regarded as a fact sufficiently established to justify the extension of the prohibitive regulations under the Diseases in Plants Act, directed against the importation of plants from all countries in which this notorious malady of the plant named has become established, to the State of the Commonwealth in question. It is a matter for regret that our coffee-growing industry should, at this early period in its development, be menaced by the existence of *Hemibelia vastatrix* so near our shores; for it is yet to be learnt that adequate measures have been taken to stamp it out in the quarter alluded to as witnessing this recent manifestation of its presence.]

**SUGAR-CANE.**—Cane rot accompanying root disease, Herbert River District; Cane smut, caused by *Ustilago sacchari*, Herbert River district; Cane-leaf Freckle, caused by *Leptosphaeria sacchari*, v. Bred., Herbert River, Geraldton, Cairns, &c; Cane Rust (*Uredo Kühnii*, W. et W.), Cairns.

**PEPPER.**—Diseases incident to the pepper plant of commerce not present in the State.

**PINEAPPLE.**—“Tangle-foot” (root-affection), Ormiston and Brisbane; fruit a symmetry, Maryborough; fruit gummosis, Tiaro; “Black Heart,” Nundah.

**STRAWBERRY.**—Leaf and fruit mildew caused by *Erysiphe humuli*, North Coast district, in three localities. (Note.—This serious affection of the strawberry appears to be a new occurrence, dating no further back than some two seasons. Fortunately it may be almost entirely held in check by the vigorous adoption of the process for coping with it recommended by this office.)

**ROSELLA.**—Root-affection, Rockhampton.

**TOMATO.**—Proliferation of floral organs and consequent barrenness, Morven; Leaf Spot, caused by *Septoria lycopersici*, Brisbane and Wellington Point; leaf destruction, caused by *Phytopus* mite, Brisbane; fruit rot, attended by presence of *Fusisporium solani* and bacteria, Brisbane, &c.



CABBAGE.—Wilting of young plants and leaf destruction, caused by *Peronospora parasitica*, Zillmere.

TIMBER TREES.—Disease of young pine-trees (*Agathis robusta*), Frazer's Island Plantation.

#### MISCELLANEOUS INVESTIGATIONS OR REPORTS.

1. Certain forms of blindness of human beings and the relation of the fruit of the finger cherry (*Rhodomyrtus macrocarpa*) thereto.
2. The recently ascertained presence of an hydrocyanic acid compound in sorghum, as a possible explanation of the fatality remarked in Queensland amongst stock that had partaken of the plant named.
3. Examination of fodder plants for the detection and identification of parasitic fungi, in view of the occurrence of a certain fatality amongst stock in the Warwick district, under circumstances suggestive of "ergotism" occasioned by their use.
4. Water hyacinth destruction.—Suggestion for certain experimental investigations and on the employment of a preparation named "Harvesta Compound" in killing this notorious aquatic-weed in the United States.
5. Measures for adoption in the purchase, disinfection, and storage of seed wheat, calculated to obviate the introduction and establishment, through its agency, of injurious insects and diseases affecting that cereal.

#### DISEASES IN PLANTS ACT, 1896.

The prevention of the introduction and dissemination of the diseases and of the injurious insects of plants, provided for in the administration of "*The Grape Vines Disease Act*" and proclamations based thereon, and in that of "*The Diseases in Plants Act of 1896*" and the regulations thereunder, the latter of which measures principally originated with this officer, is of far-reaching importance in the present stage of the history of this State, characterised as it is by so great an extension of both agricultural and horticultural enterprises, and has always been regarded as one of the most urgent duties it is incumbent upon him to co-operate in performing. Hence it has been always sought to utilise in this service not only the exclusive opportunities attaching properly to the posts of entomologist and vegetable pathologist, but those of Inspector under the Diseases in Plants Act and of member of the Board of Advice constituted in accordance with its provisions.

The duties thus discharged have consisted in advising the Minister as to the attitude he should assume with regard to the many technical questions that have arisen in administering the measures alluded to, and regarding the scientific and economic considerations constituting the basis and justification thereof.

In addition, and in the same connection, much attention has been given to the requirements of the inspectors under the Diseases in Plants Act occasioned by difficulties that have been experienced in the course of their duties. Moreover, they have from time to time been accorded the expert advice they have sought to guide them in their decisions, especially whenever it would appear that their contemplated actions might with advantage be reviewed from a special standpoint.

#### CORRESPONDENCE.

This has been unusually heavy, as is suggested by the foregoing concise summary of the inquiries received. The obligation, however, to confer with professional confrères elsewhere, and to deal with their communications, involves also much literary work supplementary to this.

#### COLLECTIONS.

The series of insects of different orders, comprising examples of directly and indirectly harmful and serviceable species, that constitutes the collection so indispensable for reference purposes and public enlightenment, to the official economic entomologist, has received numerous small increments during the year, principally through purchases, but to some extent also as the outcome of the liberality of private donors. It is, owing to the constant attention it receives, in a good state of preservation. Its detailed arrangement—a work of great magnitude in consequence of the research that it involves—has, however, to some extent remained in suspense, in consequence of the exacting nature of other duties not admitting of an expenditure of time adequate for the accomplishment of this important work, and to a hesitation to incur expenditure for expensive entomological cabinets that it would necessitate, out of respect for the policy of economy in expenditure obtaining and that it behoves all branches of the Department to respect. These considerations too have operated meanwhile to stay the effectual carrying out of a resolve to seek the necessary authority for preparing a series of exhibition cases in which shall be displayed insects and illustrations of their life-history and habits as object-lessons for direct educational purposes.

#### LIBRARY.

The accessions to the reference library attached to the office, by purchase, have been confined almost entirely to current numbers of serials and of special works of periodical issue relating to plant pathology and agronomic entomology. The office has, however, very extensive foreign relations, and these have resulted in the receipt of many and important literary donations, made by some of the ablest of the world's scientific men, that have contributed most materially to its perfection and usefulness.

#### DIRECT EDUCATIONAL WORK.

QUEENSLAND AGRICULTURAL COLLEGE.—In the report of the Entomologist for 1898-9 the question of securing the services of that officer in providing the instruction in Entomology for the "second year students" at the Agricultural College, in accordance with the curriculum relating to the scope of its educational work, was raised. Subsequently, visits were made weekly to this institution; and, on these occasions, addresses were given on Systematic and Economic Entomology to the junior, and on Economic



and Vegetable Pathology to senior members thereof, the lectures to the separate classes of students being given on alternate occasions. But in January of the present year (1903) application was made to be freed from the obligation of performing these services. This was made on the grounds that, as had been repeatedly brought under your notice by the public, this officer was considerably in arrears with his work—a result that arose in great measure from these visits to the College, and the interruptions in the prosecution of special research that they had necessitated—and that such complaints as were alluded to would, with great probability, be again and again made unless his duties were abridged in the manner suggested. Under the circumstances, and as the outcome of this representation, it was then proposed that monthly visits should alone be made, and instruction on these occasions extended to the senior students only. This proposition was acquiesced in; but its effectual compliance with was frustrated by duties necessitating service in another part of the State. It is hoped that this important work, that, as has been seen, originated in a suggestion emanating from this office, will be resumed by it under circumstances more conducive to its effectual carrying out than those that have hitherto obtained.

HENRY TRYON, Entomologist and Vegetable Pathologist.

#### REPORT OF THE DIRECTOR, BOTANIC GARDENS AND GOVERNMENT DOMAIN.

At the commencement of the year financial considerations reduced the strength of the staff of the Botanic Gardens. It became necessary, in consequence of the unavoidable retrenchment, to make such disposition of the reduced staff, and to so husband resources as to preserve as far as possible under the circumstances, the valuable contents of the Gardens, and so avoid what would be, not only a serious loss to the State, but a waste of all the care and expense of many years.

The difficulties and anxieties of the position were greatly intensified by the fact that the disastrous drought continued during almost the whole period with merciless rigour. It was only two months ago—in May—that rains fell which brought any permanent relief to suffering vegetation.

The business of fighting a drought like this was rendered much more arduous by the absence of a proper water supply, and still more so by the fact that every gallon of water used had to be paid for. In the battle which had to be fought against the drought in its latest and worst stage, the active and willing assistance of the staff could always be relied on. It is amazing to find that only about half a dozen trees and shrubs out of the thousands of exotic specimens in the Gardens succumbed to the effects of a drought which killed considerable areas of native timber in the near vicinity.

A very strong appeal was made to the Board of Waterworks, through the Minister, for a water supply at a greatly reduced rate, their charge being 1s. per 1,000 gallons, whereas a maximum supply of 6,000,000 gallons for a minimum charge of £75 was asked for. The Board, though they could not see their way to reduce the charge to the extent requested, brought it down one-fourth, or to a rate of 9d. per 1,000 gallons for future supplies, thus making it possible to use 2,250,000 gallons at a cost of £75, which is the sum available for this service.

The bush-houses and glass-houses here cover an area of 28,745 square feet or '66 of an acre.

For public purposes, such as State schools, municipalities, Government institutions, and the like, 2,498 large-sized plants and 539 cuttings were distributed during the year. By way of exchange were received 1,546 plants, 455 species of seeds, and 856 cuttings, 125 birds, and 11 animals; and given 1,437 plants, 193 species of seeds, and 312 cuttings. Institutions in the city and suburbs to the number of 39 requested the loan of pot-plants for decorative purposes in connection with bazaars and similar movements, and plants to the number of 904 were so lent.

The necessity for constructing a deep drain to the river from the lagoon near Albert street became obvious during the year. It was proposed to carry out this work by the aid of the unemployed, and a small extra grant of £35 was asked for the purpose of purchasing the necessary pipes. This was approved, and the work is now approaching completion. The pipes were, however, purchased by curtailing already authorised expenditure in other directions. The drain is 18 feet deep at the river end, and about 13 chains long, and will completely drain out the lagoon by means of a sluice-valve, or keep the water therein at any desired level at pleasure. The idea is to gradually make the formal outline of this piece of water more picturesque, and at the same time curtail its area, thereby lessening future expense for purchase of water.

During the year I have consistently endeavoured to obtain the greatest effects from the minimum of the expenditure, and the bold and brilliantly-coloured foliage plants which succeed so admirably in our climate have enabled a considerable height of success in this direction to be reached. The Lord Mayor of Sydney, in inscribing his name in the visitors' book which is now kept here, referred to the Gardens as "the most beautiful gardens which I have seen in Australia." Of the variety and beauty of their contents the owners—the public—have just reason to feel proud after such untoward years of flood, drought, and retrenchment.

The foresight and industry of my predecessors should never be forgotten in this connection, particularly of Mr. Walter Hill, for many years director, for to him is due the introduction of most of the noble exotic trees which adorn not only the Gardens but many other positions throughout the State, as well as many of the products which to-day play so large a part in its industrial life.

It is not my business to deal here with the question of the expenditure upon the Gardens, particularly at a time when retrenchment has been so urgent in all directions, but to cheerfully do the best with whatever funds may be granted, though it is permissible to ask that means may be considered in estimating results. It will, however, prove interesting to show the percentages of the various items of expenditure for the Gardens and Domain combined. These are—

Wages	...	...	...	...	...	...	...	...	...	78.38 per cent.
Hardware, tools, timber, coke, machines, pots, seeds, repairs, and sundries	...	...	...	...	...	...	...	...	...	9.10 "
Fodder for horses and food for birds and animals	...	...	...	...	...	...	...	...	...	5.04 "
Water	...	...	...	...	...	...	...	...	...	3.48 "
Two horses purchased	...	...	...	...	...	...	...	...	...	2.06 "
Materials for new drain	...	...	...	...	...	...	...	...	...	1.94 "
										100.00

It will be seen that almost the entire vote is absorbed in wages. The economies which have been found necessary for some time past have prevented the application of manures and fertilisers to the Gardens. This must, of course, affect them adversely, and it is to be hoped that it may be found possible to supply the deficiency in the near future.



In 1894 the system of giving a day's work to the unemployed in exchange for a week's rations was initiated here, thereby avoiding the pauperising influence which the acceptance of a dole is believed to have on the recipients. The plan was found to be successful from most points of view, and from that time, whenever there were, unfortunately, unemployed to be provided for, they were sent here. They were not employed to make and maintain flower-beds. These would have to be abandoned when the unemployed found work, or expensively kept up. They have been employed in doing work which saved expense, and yet did not enter into competition with outside labour; such, for instance, as the drain before referred to, the grading of land, &c.

These men are of varied occupations, and of all stages of efficiency and non-efficiency. Most of them are quite unaccustomed to the work which they find themselves called upon to perform here, but all seem willing to make themselves useful, and cases of loafing are extremely rare. Their work is supervised by members of the regular staff, under my supervision. They are treated with all consideration possible under the circumstances, and cases of trouble have been practically unknown.

In addition to the ordinary duties of maintaining the Gardens, there are others incidental to their public character which consume a great deal of time, and for which, I fear, proper allowance is not generally made. These are the care of the birds and animals, the opening and closing of the Gardens at daylight and dark, the picking up of papers, &c., carelessly and plentifully scattered by the public, the packing of plants required for public purposes, and their de-patch to the railway stations, the collection of flowers for the hospital, the protection of valuable plants from injury by the public, particularly at such times as there are thousands of children in the Gardens on holidays, and many other matters, individually small, but aggregating to a very formidable mass of work, all of which has to be provided for.

The collection of plants has been added to as far as possible during the year. Six hundred species of plants not previously in our collections have been sown. The portion of the Gardens which lay for so many years uncultivated, comprising 4 acres, and known as No. 17, was further improved. This land has shown excellent qualities for the growth of roses; one, a huge bed containing 300 plants in 200 distinct varieties, has been fenced and planted. Other three large beds, besides additional beds containing roses of distinct character, displayed a profuse wealth of blooms since the rains began.

The large plot of coffee shrubs planted on this slope has recovered from the effects of the drought, and is looking splendid. The coffee shrubs which have stood so long in No. 5 have suffered so much from the effects of age and drought that they may now be removed, the younger and more vigorous plot taking their place.

Small plantations of various plants of industrial value have been made in various parts of the grounds during the year, and much attention has been paid to the introduction of trees likely to prove of value for timber.

It is possible to distribute at present to anyone desiring to give them a commercial trial a quantity of cuttings of good basket willows, which succeed as well in the Gardens as anywhere, and for which there should be a payable demand.

There are also for distribution *Paspalum dilatatum*, which has been growing freely over the lawns for some years past; also guinea grass, and para grass, which can be recommended as a most excellent fodder.

Any selector who has good, rich soil can obtain some seeds of the Indian Sugar Palm, which bore most profusely here during the past autumn. It is a plant of considerable economic importance, requires little attention, and appears to succeed here magnificently.

There is a constant stream of inquiries here about horticultural matters, and to these I give all the personal attention possible. During the year 430 official letters, some of considerable length, were written, and 397 received. A very large number of memoranda and minutes relating to exchanges, plants, work, materials, &c., had also to be written. Accounts are kept of all expenditure, posted to its proper subdivisions, to enable well-balanced and economical work to be carried on; the daily work of each man; the species and destination of all plants distributed for public purposes or given or received in exchange; all seeds sown and their ultimate behaviour and destination. All plants planted out are marked with cheap imperishable labels, numbered to preserve their identity, and their legible labelling if ever time and funds admit.

Rainfall, temperature, state of cloud, wind, and weather are taken and recorded here daily, and transmitted to the Weather Office.

The old animal house and potting-shed were demolished during the year, and the grounds in the vicinity laid out and planted. The ground around the new kiosk was also laid out, and lawns formed in that vicinity. A good road, over a quarter of a mile long, was formed of material carted by the Tramway Company from their new line in Edward street. This was a great and much-needed improvement, which would have cost a considerable sum if done in the ordinary way. Acknowledgments are due to His Worship the Mayor for kindly permitting the use of the municipal steam-roller to form this road.

During the spring, I delivered a course of six lectures on forestry to the students at the Agricultural College. Though this is a business which requires to be taught practically, there is reason to hope, from their intelligent attention, that they formed an acquaintance with at least the outlines of a practical science which is now commanding an increasing share of attention in many countries.

The supervision and arrangement of all the matters referred to above, with a view to the best results from the means available, have entailed a busy and anxious but very interesting and on the whole successful year's work, of which I have endeavoured to give a brief and popular sketch.

PHILIP MAC MAHON, Director.

#### REPORT OF THE TRUSTEES OF THE QUEENSLAND MUSEUM.

SIR,—In presenting our Report for the past year we cannot pretend to feel the pleasure which we were annually able to express when the Museum was making fair progress. The exigencies of the State have of necessity stayed all progress. In our regret for that result we have no doubt that we shall have your sympathy.

VISITORS.—If we may fairly estimate the interest taken in the institution, and the educational benefits obtained from it, from the number of persons recorded as visitors, we are entitled to say that they show no sign of waning. There were admitted altogether 68,774—namely, on Wednesdays 35,997, and on Sundays 32,777. The total shows an increase of 2,376 on the number for the previous year, and we are well content that our forecast of a decrease should be dishonoured by the event. In the last year of our establishment in William street the number was 56,638.

DONATIONS.—These have numbered 456, or 77 fewer than last year. The difference is due to two causes—First, our inability to send out collectors into the country who, while pursuing their quests, stimulated our friends in many parts of the State to contribute largely; second, to our loss of the means of printing our annals as in former years. We are no longer able to furnish a *quid pro quo* to the various societies and institutions which look for such return.



**EXCHANGES.**—Since June last, when our staff was reduced to its present level, we have, much to the disadvantage of our collections, been compelled to decline many offers of exchange, as these consume time which cannot be spared. The more important of the few which were arranged during the year were a series of skins of mammals and birds sent to Professor Crookshank in return for a collection of Egyptian antiques; birds and minerals, in return for those of West Australia; and sundry exchanges of shells and insects.

**PURCHASE OF SPECIMENS.**—No fund for this purpose being provided, some serviceable opportunities of enriching the Museum by its means were regrettably lost.

**LIBRARY.**—Accessions to the library by purchase were almost entirely confined to that kind of serial literature which has been found most useful to the staff, and has at the same time been obtained at an expenditure of £40. There has been a notable falling off in the supply of publications by gift in consequence of our inability to make a suitable return. A large number of our books are sadly in need of the art of the binder.

**STAFF.**—In the middle of the year, four of the eight members of the staff were retired, and there fell upon the remaining four so much of the work, to the neglect of their special duties, as they were able to carry on. In 1893 in a building one-third of the capacity of the present one, retrenchment still left three persons to care for its contents.

**WEIGHTS AND MEASURES.**—The standards are maintained in an efficient condition; no appeal to them has been made during the year.

**COPYRIGHT ACT.**—Twenty-four certificates were issued.

Signed on behalf of the Board.

A. NORTON, Chairman.

## REPORT OF THE CHEMISTRY DIVISION.

(Section of Feed Stuffs and Products.)

The report of this year is an extension of matters treated in the report of last year, and a statement of analytical results of investigations in the laboratory, which in their order, are being brought to maturity according to the lines of work laid down in last year's statement.

It was stated in last year's report that "the laboratory of the Department is now engaged in the examination of many of the known varieties of maize. The purpose is to determine the relative feed value of each of the several varieties. . . . The maize cobs of several varieties are also being examined. This is being done in order that the cob may take its place in the list of animal feed stuffs. The advisability of this work has been most acutely emphasised by the protracted drought, which has caused every description of vegetable growth to be brought into use for the keeping of starving cattle alive."

Eighteen varieties of maize have been examined and the feed value of each determined, the results of which are set forth in the following table. In addition to the varieties which may be distinguished as American varieties, the analysis of a sample from a shipment of Argentine maize is given. This includes the analysis of the Argentine maize as directly imported, and also the analysis of the first crop grown in Queensland from the imported seed:—

### ANALYSIS OF MAIZE VARIETIES.

Varieties.	Moisture.	Proteids.	Fats.	Carbo-hydrates.	Ash.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Sydney Red-nibbed	11.90	12.96	5.50	60.50	1.67
Ninety Days	11.87	13.28	5.76	69.32	1.59
Balderman	12.41	12.84	5.47	62.22	1.41
Sixty Days	11.59	13.36	5.96	62.66	1.28
Riley's Favourite	12.23	13.80	5.33	63.80	1.40
Golden Beauty	11.14	13.04	5.99	69.91	1.62
Early White	12.44	12.55	5.52	72.41	1.60
Hawkesbury Champion	12.13	12.95	5.41	66.80	1.54
Mastodon	11.81	13.29	5.44	63.49	1.53
Golden Superb	12.01	12.09	5.35	68.06	1.61
Longfellow Dent	12.21	13.61	5.00	65.21	1.64
Early Hogan	12.38	13.30	6.01	67.10	1.67
Legal Tender	11.31	13.67	5.64	66.06	1.52
Piazza Queen	12.21	13.21	5.27	67.43	1.61
Star Leeming	11.56	12.91	5.36	64.21	1.65
Macleay River	11.80	12.46	5.42	63.60	1.53
Means	12.00	13.10	5.50	65.80	1.55
Argentine (Imported)	12.00	10.69	6.04	63.20	1.66
Argentine (Queensland)	11.28	12.92	5.20	61.00	1.45
United States	10.93	9.88	4.17	71.95	1.46

The example given of United States' maize is taken from the publications of the Department of Agriculture, Washington. The figures represent the average of the varieties of maize exhibited at the World's Fair, Chicago, the analysis being made in the laboratories of the United States' Chief Chemist, Dr. H. W. Wiley.

It is specially noteworthy that the Queensland varieties of maize which were grown at the State Farm, Westbrook, are very much richer in proteids, also in fats, than the similar varieties grown in the United States. This is a matter of special import, since the proteids, being the flesh-forming nutrients to a notable extent, determine the forage value of feed stuffs. In a shipment of a 100,000 tons it is seen that the Queensland maize furnishes 13.10 thousand tons of proteids against 9.88 thousand tons contained in the American varieties. This is a matter of leading import in large affairs, such as army contracts, and no less so in smaller transactions. It is indicated, on the other hand, that varieties of maize growing in the soil and climatic conditions of Queensland incline to starch formation in a less degree than in the United States. This indication appears to receive some support from the behaviour of the Argentine maize grown in this State; it is seen that the Queensland grown Argentine variety contains 2 per cent. less starch than was found when it was imported. The behaviour of the Argentine maize grown in Queensland also confirms the tendency to a higher proteid formation in Queensland conditions. The directly imported Argentine contained 10.66 per cent. of proteids, while the Queensland grown sample of the same maize yielded 13 per cent. Further data are required, however, before these indications can be pronounced certain.



At this place it is necessary to correct the impression circulated by the trade that Argentine maize has a higher feeding value than Queensland-grown maize. So far as the laboratory observations have gone it is unmistakably indicated, first, that Argentine maize possesses a notably lower feed value than the Queensland varieties; second, that the Argentine appreciates quickly and notably in value when grown in the natural conditions of Queensland. To determine the agricultural and commercial values of the different varieties of maize, in addition to the chemical composition, it is necessary to know their yielding power per acre. When further and more reliable data are to hand, giving the yields of the varieties, and in different types of soil, the economic equivalent of each variety will be determined and made known. From the double standpoint of the yield per acre and the contents of food nutrients, so far as the experiments indicate at present, the varieties Balderman and Sixty Days are pre-eminently the best. The result may be modified, however, when these varieties are grown in other types of soil.

## ANALYSES OF MAIZE COBS.

Varieties.	Moisture.	Proteids.	Fats.	Carbo-hydrates.	Ash.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Sydney Red-nibbed ... ..	9.14	2.26	0.46	26.52	1.46
Ninety Days ... ..	9.62	2.22	0.59	27.44	1.74
Balderman ... ..	8.43	2.57	0.70	27.74	3.14
Sixty Days ... ..	8.92	2.84	0.52	26.26	1.71
Riley's Favourite ... ..	8.59	1.87	0.66	30.22	1.47
Golden Beauty ... ..	7.22	2.36	0.93	28.78	1.91
Early White ... ..	7.98	2.52	0.81	32.40	1.62
Hawkesbury Champion ... ..	8.13	2.67	0.86	31.89	1.61
Mastodon ... ..	7.94	2.90	0.85	31.50	1.64
Means ... ..	8.44	2.47	0.71	29.19	1.70

The analyses indicate that the corn cobs are a valuable adjunct to the maize as a feed stuff, and particularly in conditions of drought and feed scarcity such as the State has recently experienced. It was explained in the report of last year that the omnibus companies of Europe are using the cob ground down with the maize as a mixed feed, which is supplemented with bran, and with satisfactory results.

In the report of last year it is further stated that "other great classes of plants that are bound up with the necessities of the farm," such as the grasses, cane, and other members of the Gramineæ, in addition to the great family of the Leguminosæ, would be brought under investigation, and their feed values made known. The results of these investigations up to date are set forth briefly in the following table:—

## COMPOSITION OF SOME GREEN FODDER PLANTS.

Varieties.	Water.	Dry Substance.	COMPOSITION OF THE DRY SUBSTANCES.			
			Proteids.	Fats.	Carbo-hydrates.	Ash.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Sorghum (general) ... ..	65.80	34.20	5.38	2.29	21.25	6.97
Sorghum (Planter's Friend) ... ..	74.10	26.90	8.15	7.72	44.06	5.20
Sorghum (Early Amber) ... ..	78.90	21.10	9.62	6.07	39.04	4.93
Sugar-cane (cane tops) ... ..	66.80	33.20	6.11	3.17	16.39	7.51
Mackay (stalk) ... ..	71.40	28.60	9.39	1.20	38.26	2.86
Sugar-cane (leaves) ... ..	71.20	28.80	9.00	2.60	15.97	6.56
Isis (cane tops) ... ..	77.20	22.80	7.39	...	15.95	5.35
Isis (stalks) ... ..	71.42	28.58	4.73	...	43.51	2.99
Paspalum (very fresh) ... ..	70.60	29.40	12.56	2.38	18.85	12.88
Paspalum (drought-dried) ... ..	40.40	59.60	8.16	0.46	24.19	7.56
Panicum muticum ... ..	76.40	27.60	13.45	2.07	14.40	12.24
Guinea grass (fresh) ... ..	73.95	26.05	15.80	2.03	10.45	13.97
Guinea grass (very fresh) ... ..	87.23	12.77	5.22	1.79	19.73	12.20
Broom Corn ... ..	67.20	32.80	8.04	4.42	14.90	7.77
Soudan Millet ... ..	66.96	33.04	11.59	5.75	26.21	9.50
Kafir Corn ... ..	70.82	29.18	9.72	7.47	25.08	7.92
Lab Lab ... ..	79.60	20.40	15.77	3.63	14.86	11.67
Saltbush (O.M.) ... ..	64.90	35.10	17.81	2.85	22.71	16.57
Saltbush (A.L.) ... ..	79.20	20.80	19.56	3.65	10.14	16.68

It is seen that the analyses given in the table are mainly of plants belonging to the Gramineæ or grass family.

At the Mackay Experiment Station several varieties of plants belonging to the Leguminosæ and other orders have been grown with a view to determine their value as green manure crops; certain of these have a high value as feed stuffs, and for this reason the analyses are given, and for purpose of comparison with the maize and other graminæ.

## COMPOSITION OF THE DRY SUBSTANCE OF SOME LEGUMES AND OTHER PLANTS.

Varieties.	Proteids.	Fats.	Carbo-hydrates.	Ash.
	Per cent.	Per cent.	Per cent.	Per cent.
Soja Beans ... ..	19.02	7.14	28.68	6.88
Yellow Lupin ... ..	22.52	8.42	15.01	7.51
White Lupin ... ..	30.52	6.83	10.87	6.86
Cowpea ... ..	27.28	5.38	14.94	8.95
Winter Vetch ... ..	22.48	7.10	11.70	10.38
Velvet Bean ... ..	21.53	5.44	14.00	9.57
Black Mauritius Bean ... ..	20.48	4.28	8.50	5.91
White Mustard ... ..	26.25	3.30	14.05	16.32
Rape ... ..	25.10	4.81	15.06	14.85

Certain of the plants in this table are unfit for fodder purposes in the green state, including the lupines in particular. Special note is made of the mustard and rape plants on account of the great crops which they can produce and of their high value for feed purposes.



It is observed that the statement of composition of the several plants is made to cover only the more essential nutritive constituents. A detailed statement would be out of place in this report.

At a later time, when the laboratory has covered upon a broader scale the investigations now in course, it will be recommended that a "Bulletin of Feedstuffs and Products" be published which shall embrace generally the forage plants and products of the State, and indicate the composition and nutritive values of all crops and produce furnished by its various soil and climatic conditions.

It was also stated in the report of last year that "the laboratory was about to look into the food values of some of the better known varieties of wheats." Since that time it has become necessary, as a result of the drought, to restock the State to a large extent with imported varieties of seed wheat. As a matter of fact, a new beginning practically is being made in wheat production, and as stated, with largely imported varieties.

The laboratory therefore decided to make a full examination of the nutritive values of all the varieties that have been distributed as seed within the State. It is also intended to collect samples from the bulks of all the varieties that shall have been grown upon the types of soils within the State, and to analyse those in order to note what increase, or otherwise, of nutritive and bread-making value has resulted from the growing of those wheats in Queensland conditions. The Agricultural Adviser, Mr. Peter McLean, furnished the director with 22 varieties of wheats, which he has distributed within the State, and the laboratory is at this time engaged with their examination.

Examinations of tapioca starches have been made, the samples being furnished by the manager of the Kamerunga State Nursery. These starches show a good quality, and a relative freedom from the impurities which render the manufacture of tapioca difficult.

As a part of the new work that the Department has in purpose, investigations will be made of the pineapples of the State, as recently explained by the Minister for Agriculture. It is intended to examine and determine the compositions of the normal pines, and to compare with these the constitution and condition of pineapples known to be diseased. It is hoped that by the aid of chemico-bacteriological examinations further light will be cast upon the trouble now assailing the pineapple industry.

In conjunction with the examination of the pineapples, analyses are about to be made of soils in which the fruits are being grown. The predisposing cause of the disease may be found in the soil, due to lack of given essential food constituents. The question is thus to be approached from the standpoint of the fruit, and of the soil in which it has grown. One of the soil chemists of the Bundaberg laboratories has already samples of the chief pineapple localities, and the analyses will be proceeded with in their order. The examination also of the pine fruits will be undertaken by the Brisbane laboratory at as early a date as current investigations will allow.

It was explained in the report of last year that all inorganic work, including the examination of soils, waters, &c., is conducted in the laboratories at Bundaberg, and the examination of organic substances, including feed stuffs, products, fruits, &c., is carried out in the Brisbane laboratory, for which kinds of work each laboratory is more specially equipped. This division has been abundantly justified by the facility and expedition with which the work has progressed in the laboratories.

#### MR. BRÜNNICH'S REPORT.

The following is the report of the chemist made to the Director upon the analytical work of the laboratory of the past year:—

##### STATEMENT OF LABORATORY WORK.

Substances.	Samples.	Analyses.
Seed of Green Manure Plants ... ..	7	10
Seed of Maize Varieties ... ..	18	31
Maize Cobs ... ..	9	9
Samples of Green Crops ... ..	27	40
Mineral Matters of Green Crops (full analyses) ...	51	51
Feedstuffs (grasses), Sugar-cane, &c. ... ..	35	52
Hydrocyanic Acid Examinations of Sorghum, Maize, and Grasses ... ..	56	86
Cyanides and Dipping Fluids ... ..	6	6
Starch Samples ... ..	4	4
Totals ... ..	213	289

J. C. BRÜNNICH, Chemist.

It is explained that each of the analyses included several determinations, according to the partial or complete nature of the examination.

Concerning the investigations of sorghum and other crops in relation to the matter of cattle poisoning, statements have already been made to the Minister for Agriculture, and due warnings have been issued to farmers and others covering this important question.

WALTER MAXWELL, Director.

#### SORGHUM POISONING.

[BY DR. MAXWELL.]

It will be borne in mind that the subject of the effect of feeding green sorghum to animals, especially to cows, which are liable to have a very ravenous appetite for such succulent food, came up for discussion before the annual Agricultural Conference held in Bundaberg two years ago. At the instance of the Minister for Agriculture, the Hon. D. H. Dalrymple, I remarked, as bearing upon the question, that it was hardly a matter for general discussion, but rather one for special investigation by the laboratory. Those observations appear to have been amply confirmed by the results of examinations that have been undertaken since that time.

A preliminary notice has already been made by me to the Minister stating that, as a result of the examination of sorghum grown under our own direction in the Botanical Gardens, it has not only been proven that a poison called hydrocyanic (prussic) acid is present in sorghum during stages of its growth, but that the proportion of poison thus found is very largely governed by the nature of the soil, particularly its richness in nitrogenous elements of plant food.

I will explain that small plants of sorghum were planted in the Botanical Gardens, and in a soil almost exclusively sand in its composition. One series of plantings was allowed to grow without any special manurial assistance, and another series was manured with nitrate of soda, a manure whose chief element is nitrogen. This



experiment was made in order to see if the supply of additional nitrogen to the soil affected the amount of prussic acid incorporated in the growing plant—nitrogen being an element of that poison. The results, according to repeated analyses made by Mr. J. C. Brünnich, who has carried out the laboratory work, have shown, with something approaching mathematical accuracy, that the supply of available nitrogen increases the amount of poison that the sorghum and other plants are capable of making and storing up within their composition. These facts fully prove the statement intimated by me at the Bundaberg Conference, that sorghum and similar plants, when grown on rich soils, would be more liable to contain highly dangerous amounts of the poison than when grown on soils poor in nitrogen—in other words, that the nature of different soils very largely governs the amount of danger.

Relating to the age or stages of development of the sorghum plant when it is most dangerous to allow animals to feed freely upon it, the investigations show that it is not safe to let stock have all that they will eat until the stage of growth when the sorghum is preparing to seed. The plant, when very young, and from the age of three up to seven weeks, contains distinctly dangerous amounts of prussic acid. After that age the poison rapidly disappears by decomposition, the nitrogen passing over into other and strictly nutritious elements of food. When the flowering stage is reached, not more than a trace of the poison is found. As the growth does not strictly depend upon the age or the number of weeks since it was planted, it is better to speak of stages of development, and for this reason it may be generally stated that the sorghum plant, until it approaches the flowering or seeding stage, is not safe for free feeding.

It must be understood, however, that even young sorghum and such plants as may be known to contain dangerous amounts of poison may be judiciously used as a green mixture with dry hay chaff to make the feed tasty to animals. When diluted in this way, the green sorghum being very carefully stirred up and mixed with large quantities of the dry food, no harm will follow, and the dry food is made capable of use. Yet it is necessary to very expressly repeat the certain danger of allowing stock to have free course to the young growing sorghum, since it is now proven that the whole trouble is due to the presence of the poison stated. The fact of the poison being prussic acid also accounts for the sudden fatalities following immediately upon cows having free access to sorghum, the prussic acid spreading rapidly through the system and having an almost immediate fatal effect.

It may here be stated that the plant-poisoning investigations have been extended to include also maize, sugar-cane, and most of the grasses in use. Prussic acid has been found in quantities varying from a mere trace up to the danger point. So far, however, only *Panicum muticum* comes anywhere near the sorghum plant in its dangerous content of the poison, and several, including sugar-cane and *Paspalum*, so far as they have been tested, being completely free from prussic acid.

It is intended to extend, in due time, these examinations, bearing upon their poisonous contents, to all the crop plants grown or growing and made use of in the State. This is highly important work, the importance of which is more accentuated and brought to light during seasons of drought, when all available kinds of plant produce are pushed into service as feed stuffs. Incidentally, I may remark that the Experiment Station at Mackay is now making careful comparative tests of some eight or ten different varieties of sorghum, and not only for the purpose of observing their liability to contain poisonous elements, but also to determine their relative values as feed stuff. The results of these experiments and tests will be fully placed at the service of farming communities as soon as they are to hand.

The data covering these examinations are to be published in full through the official journal, and for this reason I have not weighted this letter with matters of detail.

It is interesting to note that investigations of the sorghum plant have been made by scientific men recently in other countries, and that prussic acid has been found in the plant. The investigators in those countries, however, do not appear to have attempted to decide the stage of growth at which the plant becomes safe to use; they have confined themselves so far to the recognition of the poison in the plant.

Investigations covering the examination of varieties of maize grown in Queensland, and also of green crops of feed and other manure purposes, which have been grown at the Mackay station, will be fully set forth in later publications.

#### ADDENDUM.

It has been omitted to state that the rather common belief amongst farmers that sorghum ratoons are more liable to be poisonous than plant sorghum is a mistake. The results of our work have shown in all cases that the young plant sorghum has contained more prussic acid than the ratoons of the same age. It is important that the farmers shall be fully aware of this fact in order to prevent them taking liberties with the ratoon sorghum.

### REPORT OF MEAT AND DAIRY PRODUCE ENCOURAGEMENT BOARD.

24th September, 1903.

SIR,—I have the honour to submit to you a report on the operations of the Board appointed under the provisions of "The Meat and Dairy Produce Encouragement Acts, 1893 to 1901," for the year ending the 30th June, 1903.

#### ADVANCES AND REPAYMENTS.

No fresh advances were made during the year, nor were any applications for advances received. The restriction of this portion of the Board's operations, so far as the Dairy Fund is concerned, no doubt being entirely due to frightfully severe losses sustained by stockowners through the late devastating drought. This contention is fully borne out by the fact that already numerous inquiries from all parts of the State are being received for information as to the terms and conditions upon which advances may be obtained for the erection of district butter factories, mostly on co-operative lines.

The total amount of advances remaining on the books on the 30th June, 1903, was—

				MEAT FUND.					
				£	s.	d.	£	s.	d.
Southern district	...	...	...	25,165	14	0			
Central district	...	...	...	25,199	11	5			
Northern district	...	...	...	25,634	1	3			
Carpentaria district	...	...	...	2,900	0	0			
				—————£78,899 6 8					
				DAIRY FUND.					
				£	s.	d.	£	s.	d.
Southern district	...	...	...	5,296	7	0			
Central district	...	...	...	1,000	0	0			
Northern district	...	...	...	950	0	0			
Carpentaria district	...	...	...	...	...	...			
				—————£7,246 7 0					
Total	...	...	...	...			£86,145 15 8		



The amount repaid by borrowers in accordance with the Act during the year was—

			MEAT FUND.								
			Interest.			Redemption.			Total.		
			£	s.	d.	£	s.	d.	£	s.	d.
Southern	...	...	1,927	1	1	1,980	13	8	3,907	14	9
Central	...	...	1,012	14	6	1,862	8	2	2,875	2	8
Northern	...	...	870	2	10	2,119	13	8	2,989	16	6
			£3,809	18	5	5,962	15	6	9,772	13	11

			DAIRY FUND.								
			Interest.			Redemption.			Total.		
			£	s.	d.	£	s.	d.	£	s.	d.
Southern	...	...	26	5	10	18	7	4	44	13	2

The recent disastrous drought considerably affected the repayments in connection with the advances from the Dairy Fund, rendering it necessary for the Board to grant an extension of time to several companies in which to pay the amounts due. But, now, that welcome and copious rains have fallen throughout the State, and with every prospect of a return of good seasons, the action of the Board in not pressing these defaulting borrowers will, no doubt, be justified at an early date. In one case, however (a creamery upon which £120 had been advanced), the mortgagors, owing to the fact that all or nearly all the dairy cattle in the district were killed by the drought, notified that they could not carry on, and requested the Board to take possession of their security, and realise upon it. This action was taken, and after unsuccessfully endeavouring in several ways to obtain some person or company to take over the creamery subject to the mortgage debt, the creamery was placed in the hands of an expert dairy manager for disposal; and it is regretted that only one offer of £52 10s. could be obtained. This was finally accepted, and is the first actual loss sustained in connection with advances from these Funds.

It may not be out of place to mention here that the principal cause of this loss, apart from the large decrease in the herds of the shareholders in the creamery, is that most of the dairy farmers in Southern Queensland have adopted the hand separator, thus greatly depreciating the value of all steam plants such as this one. This action is not conducive to the improvement of the butter produced at the manufactories, as the cream thus separated is delivered by each individual as he is able to send it to the railway, and it arrives at the factory in various degrees of ripeness, thus rendering it very difficult for the manufacturer to make an article which will compete successfully in the markets of the world. It is, therefore, to be regretted that these central creameries or separating stations are for the moment as it were "out of fashion," as there is no doubt that the cream, when regularly delivered from a common centre daily, must reach the factory in a more even degree of ripeness than when received from various centres from individual suppliers delivering at varying periods of time.

It was also found necessary to defer the time for the payment of accrued interest due in respect of an advance upon a Northern meatworks, owing to the inability of the owners of the works to obtain cattle for treatment at remunerative rates. In another similar case in the Central district, no claim was made for the payment of redemption instalments which became due. This company has, however, met its interest payment to date, and there is every prospect that they will be in a position to reopen their works at an early date, when, no doubt, the outstanding amount due for redemption will be paid. In the latter case it may be mentioned that a mortgage, coming after the Board's, is held by a financial institution for a sum in excess of the amount advanced by the Board, thus practically guaranteeing the repayment of the advance from the Fund.

Table A attached shows clearly the exact position of each advance as on the 30th June last.

#### REFUNDMENTS TO CERTIFICATE HOLDERS UNDER THE AMENDMENT ACT OF 1895.

During the year the sum of £22,200 was made available out of the amounts repaid to the Meat Fund in the Southern, Central, and Northern districts respectively, thus enabling the Board to make refundment payments to the holders of certificates issued under the provisions of the Act of 1895 at the following rates, viz.:

	£	s.	d.
Southern district, at 3s. in £1	5,665	9	9
Central district, at 3s. in £1	5,140	8	5
Northern district, at 6s. in £1	7,878	13	6
	£18,684	11	8

This appropriation also permitted the Board to pay in full all claims made by holders of certificates drawn against these Funds for the sum of £1 and under. The amount thus refunded to 30th June being—

	£	s.	d.
Southern district	67	11	2
Central district	18	13	9
Northern district	15	10	3
	£101	15	2

making a total refundment for the year of £18,786 6s. 10d. as follows:—

	£	s.	d.
Southern district	5,733	0	11
Central district	5,159	2	2
Northern district	7,894	3	9
	£18,786	6	10

The number of certificates upon which refundments were made was—

	Southern District.	Central District.	Northern District.	Total.
Paid in full	118	30	24	172
Paid on account	900	570	416	1,886
	1,018	600	440	2,058

The cost of distributing this amount was £247 7s. 6d., the principal items contained therein being—

	£	s.	d.
Secretary, commission on disbursements	87	10	5
Accountant, salary from 4th July to 2nd December	82	5	1
W. Walker, messenger, bonus	9	5	0
Postages	33	12	8



This work involved a very great amount of extra correspondence, and required the utmost care and accuracy on the part of the officers intrusted with the carrying out of the refundments.

The Board were extremely fortunate in being able to obtain the services of Mr. M. Hudson, whose knowledge of the accounts acquired when keeping the assessment and other registers in connection with the collection of the funds in 1893-4-5-6 was found invaluable. As it was, it was only by the closest application during the first four months of the year that the work was performed by the staff available, and it is satisfactory to know that the method adopted for making the payments to claimants has received unanimous commendation from those pastoral companies and banks through whom the bulk of the business was transacted.

Appended will be found a statement of receipts and expenditure from the inception of the Fund in December, 1893, to the 30th June, 1903, from which it will be noted that the interest allowed on the credit balance of the Meat Fund has up to the present more than met the expenses of administration of that Fund.

In addition to his ordinary duties in inspecting and reporting on the various securities held by the Board, the surveyor to the Board, acting at the request of the Chief Inspector of Stock, and with the sanction of the Board, inspected and reported upon the whole of the butchers' abattoirs handling the fresh food supply of Brisbane, Ipswich, Toowoomba, Warwick, Dalby, Roma, Charleville, Gympie, Maryborough, Bundaberg, and Gladstone. This additional work involved the writing of eighty-five reports, dealing especially with the suitability of the sites, the available water supply, the pollution of fresh water in the streams in the neighbourhood of certain of these abattoirs, the antiquated and obsolete planning of some of the yards, and the sanitary condition existing in every case. Sixty-seven of the premises inspected were licensed under "The Slaughtering Act of 1898," and eighteen were registered under "The Live Stock and Meat Export Act of 1895," including all meatworks operating outside of "The Meat and Dairy Produce Encouragement Act of 1893." Plans and specifications of a modern private abattoir for butchers were also prepared by the surveyor at the request of the Chief Inspector of Stock for his guidance when framing fresh regulations to govern the special business in the interest of the public health.

Operations during the year under the "Vote for Loans in Aid of Co-operative Agricultural Production," which is administered by the Department of Agriculture, acting upon the recommendation of the Board, were confined to the advancing of £1,370 to the Dalby Farmers' Flour-milling Company, Limited, for the erection of a mill of a capacity of three bags of flour per hour, together with a suitable grain store, and of £138 to the Roma Co-operative Milling Company, Limited, for the erection of a flour store.

From the statement appended it will be seen how each advance stood on the 30th June, and, now that there is every prospect of a record yield of wheat and a good dairying season in this State, it is considered that the flour-milling and dairying companies should make every effort to reduce substantially the amount outstanding to the Treasury for interest and redemption.

W. CHAS. GREEN,  
Secretary.

TABLE A.  
ADVANCES FROM MEAT FUND AS ON 30TH JUNE, 1903.

To Whom Advanced.	Amount		Repayments to 30th June, 1903.		Balance.	Payments in Arrears to 30th June, 1903.		Remarks.
	Authorised.	Advanced.	Interest.	Redemption.		Interest.	Redemption.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
<i>Southern District.</i>								
Queensland Meat Export and Agency Company, Ltd., Eagle Farm	13,250 0 0	13,250 0 0	4,099 5 10	2,251 7 8	10,998 12 4			
Borough of South Brisbane and Messrs. Birt and Co., Ltd., South Brisbane	10,000 0 0	10,000 0 0	2,715 17 9	832 18 4	9,167 1 8			
Charleville Refrigerating, Preserving, and Boiling Down Company, Ltd.	5,000 0 0	5,000 0 0	1,041 4 1	...	5,000 0 0	a 1,071 15 7	...	a Since paid.
<i>Central District.</i>								
Broadsound Meat Company, Ltd.	6,000 0 0	5,852 15 0	1,635 16 3	...	5,852 15 0	a 107 6 1	b 994 9 4	a Since paid. b Allowed to remain in abeyance for the present. Works not in operation.
Gladstone Meat Works of Queensland, Ltd.	22,000 0 0	21,500 0 0	5,880 6 2	3,653 3 7	17,846 16 5			
James Wilson ...	1,500 0 0	1,500 0 0	a	a	1,500 0 0	a	a	a No payment yet due.
<i>Northern District.</i>								
Queensland Meat Export and Agency Company, Ltd., Townsville	13,250 0 0	13,250 0 0	4,099 5 10	2,251 7 8	10,998 12 4			
Bergl Australia, Ltd., Bowen	16,052 10 0	16,052 10 0	4,248 19 0	6,921 11 4	9,130 18 8	a 182 12 4	a 495 9 9	a Paid, 3rd July, 1903.
Mackay Meat and Dairy Export Company, Ltd.	6,350 0 0	6,000 0 0	...	...	6,000 0 0	a 1,048 15 11	...	a Allowed to 25th April, 1904, to pay.
<i>Carpentaria District.</i>								
Queensland Meat Export and Agency Company, Ltd., Burketown	2,900 0 0	2,900 0 0	...	...	2,900 0 0	a	a	a No payment yet due.
	£ 96,302 10 0	95,305 5 0	23,720 14 11	15,910 8 7	79,394 16 5	1,410 9 11	1,489 19 1	



## ADVANCES FROM DAIRY FUND AS ON THE 30TH JUNE, 1903.

To Whom Advanced.	Amount Authorised.	Amount Advanced.	Repayments to 30th June, 1903.		Balance.	Payments in Arrears, 30th June, 1903.		Remarks.
			Interest.	Redemption.		Interest.	Redemption.	
<i>Southern District.</i>								
Greenmount Dairy Company, Ltd.*	£ s. d. 200 0 0	£ s. d. 200 0 0	£ s. d. 71 11 0	£ s. d. 51 13 2	£ s. d. 148 6 0	£ s. d. a 2 19 4	£ s. d. a 9 7 3	a Paid 3rd July, 1903.
Ditto ... ..	500 0 0	500 0 0	...	...	500 0 0	...	...	No payment yet due.
Pilton Dairying Company, Ltd.†	462 0 3	462 0 3	149 4 3	78 9 10	383 10 5	a 22 3 7	63 5 2	a Allowed time owing to unfavourable seasons. Expect to resume repayments at an early date.
Daly Bros., Jondaryan*	350 0 0	350 0 0	99 4 11	29 3 0	320 17 0	a 18 12 11	a 46 1 7	a Payment of balance of loan and interest demanded. Proprietors promise repayment in near future.
Wallumbilla Co-operative Creamery ‡	71 0 0	71 0 0	...	...	71 0 0	a 18 13 8	a 5 18 2	a Allowed time owing to unfavourable seasons.
Teviotville Farmers' Co-operative Dairy Company, Ltd.‡	120 0 0	120 0 0	20 0 0	...	a 120 0 0	a 7 0 6	...	a Security taken possession of and sold, realising— £ s. d. Interest ... 7 0 6 Redemption 42 17 0 49 17 6 Payment made on 20th August, 1903.
Cressbrook Dairy Company §	775 0 0	775 0 0	...	...	775 0 0	...	...	No payment yet due
Milora Farmers' Co-operative Dairy Company ‡	100 0 0	100 0 0	...	...	100 0 0	...	...	" "
Lord John Swamp Co-operative Dairy Company ‡	75 0 0	75 0 0	...	...	75 0 0	...	...	" "
Mount Walker Co-operative Creamery Company, Ltd.‡	87 0 0	87 0 0	...	...	87 0 0	...	...	" "
Silverwood Dairy Factory Company, Ltd., Gympie †	1,200 0 0	1,200 0 0	...	...	1,200 0 0	...	...	" "
Charles Sealy, Tre-lawny §	1,400 0 0	1,400 0 0	...	...	1,400 0 0	...	...	" "
Ramsay Dairy Company, Ltd.‡	125 0 0	125 0 0	...	...	125 0 0	...	...	" "
<i>Central District.</i>								
Peak Downs Butter Factory Company, Ltd.†	1,000 0 0	1,000 0 0	...	...	1,000 0 0	...	...	" "
<i>Northern District.</i>								
Mackay Meat and Dairy Export Company, Ltd.†	1,015 0 0	950 0 0	...	...	950 0 0	...	...	" "
£	7,480 0 3	7,415 0 3	340 0 2	159 6 0	7,255 14 3	69 10 0	124 12 2	

\* Cheese factory.

† Butter factory.

‡ Creamery.

§ Condensed milk factory.



## TOTAL RECEIPTS AND EXPENDITURE FROM INCEPTION OF FUND TO 30TH JUNE, 1903.

## MEAT FUND.

—	Southern.			Central.			Northern.			Carpentaria.			Total.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
<b>RECEIPTS.</b>															
Assessments ... ..	42,834	8	8	44,085	16	2	30,430	10	6	6,477	3	10	123,827	19	2
Less Refunds ... ..	920	13	2	1,583	11	6	631	3	3	639	13	4	3,775	1	3
	<i>a</i> 41,913	15	6	42,502	4	8	29,799	7	3	5,837	10	6	120,052	17	11
Interest on Fund ... ..	1,946	5	2	1,860	3	0	524	8	3	408	17	6	4,739	13	11
Inspection Fees, &c. ... ..	145	14	0	96	9	3	210	2	6	10	16	0	463	1	9
Loans—Repaid ... ..	5,416	6	0	3,653	3	7	11,972	19	0	...	...	...	21,042	8	7
Loans—Interest on ... ..	8,067	4	5	7,496	2	5	8,712	13	6	...	...	...	24,276	0	4
<b>Total</b> ... ..	<b>57,489</b>	<b>5</b>	<b>1</b>	<b>55,608</b>	<b>2</b>	<b>11</b>	<b>51,219</b>	<b>10</b>	<b>6</b>	<b>6,257</b>	<b>4</b>	<b>0</b>	<b>170,574</b>	<b>2</b>	<b>6</b>
<b>EXPENDITURE.</b>															
Salaries and Contingencies ... ..	1,220	13	2	1,412	13	1	1,045	19	8	523	0	8	4,202	6	7
Loans ... ..	30,582	0	0	28,852	15	0	38,102	10	0	2,900	0	0	100,437	5	0
Refunds to Certificate Holders ... ..	5,733	0	11	5,159	2	2	7,894	3	9	...	...	...	18,786	6	10
<b>Total</b> ... ..	<b>37,535</b>	<b>14</b>	<b>1</b>	<b>35,424</b>	<b>10</b>	<b>3</b>	<b>47,042</b>	<b>13</b>	<b>5</b>	<b>3,423</b>	<b>0</b>	<b>8</b>	<b>123,425</b>	<b>18</b>	<b>5</b>
Balances, 30th June, 1903	£ 19,953	11	0	20,183	12	8	4,176	17	1	2,834	3	4	47,148	4	1

*a* The Refundment Certificates which have been issued against these amounts to 30th June, 1903, were—

Southern.	Central.	Northern.	Carpentaria.	Total.
£40,243 3 10	£36,337 4 6	£28,963 9 2	£4,979 17 1	£110,523 14 7

## TOTAL RECEIPTS AND EXPENDITURE FROM INCEPTION OF FUND TO 30TH JUNE, 1903.

## DAIRY FUND.

—	SOUTHERN.				Central.	Northern.	Carpentaria.	Total.	
	Erection.		Bonus.						
	£	s.	d.	£	s.	d.	£	s.	d.
<b>RECEIPTS.</b>									
Assessments ... ..	4,714	7	4	3,127	10	10	4,319	17	8
Less Refunds ... ..	9	2	1	0	1	0	3	4	6
	<i>a</i> 4,705	5	3	3,127	9	10	4,316	13	2
Interest on Fund ... ..	126	4	9	101	7	4	306	10	5
Inspection Fees, &c. ... ..	87	6	0	50	3	0	10	10	0
Loans—Repaid ... ..	5,457	14	5	...	...	...	...	...	...
Loans—Interest on ... ..	1,219	13	2	...	...	...	...	...	...
Loan—From Revenue ... ..	600	0	0	...	...	...	...	...	...
<b>Total</b> ... ..	<b>12,196</b>	<b>3</b>	<b>7</b>	<b>3,279</b>	<b>0</b>	<b>2</b>	<b>4,633</b>	<b>13</b>	<b>7</b>
<b>EXPENDITURE.</b>									
Salaries and Contingencies ... ..	1,310	8	5	288	13	2	749	0	9
Loans ... ..	10,763	8	8	...	...	...	1,000	0	0
Bonuses ... ..	...	...	...	2,990	7	0	...	...	...
	12,073	17	1	3,279	0	2	1,749	0	9
Balances, 30th June, 1903	£122	6	6	...	...	...	2,884	12	10

*a* The Refundment Certificates which have been issued against these amounts to 30th June, 1903, were—

Southern.	Central.	Northern.	Carpentaria.	Total.
£5,566 0 7	£3,247 18 10	£3,171 6 6	£531 16 4	£12,517 2 3



## ADVANCES FROM THE VOTE FOR LOANS IN AID OF CO-OPERATIVE AGRICULTURAL PRODUCTION AS ON 30TH JUNE, 1903.

To Whom Advanced.	Amount Authorised.	Amount Advanced.	Repayments to 30th June, 1903.		Balance.	Payments in Arrears, 30th June, 1903.		Remarks.
			Interest.	Redemption.		Interest.	Redemption.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Bundaberg Co-operative Dairy Company, Ltd.*	800 0 0	800 0 0	97 4 1	136 10 4	663 9 8	a 38 16 6	a 74 15 6	a Company allowed time in which to pay owing to adverse seasons; promise to reduce amount this year.
Ditto † ... ..	350 0 0	268 0 0	12 18 0	50 0 0	218 0 0	a 13 7 3	a 34 2 7	" "
Roma Co-operative Milling Company, Ltd.‡	1,750 0 0	1,750 0 0	44 18 2	...	1,750 0 0	a 137 9 0	a 145 8 4	a Company promise to reduce this amount this year.
Ditto § ... ..	184 0 0	184 0 0	...	...	184 0 0	a 13 3 11	a 15 5 9	" "
Ditto    ... ..	138 0 0	138 0 0	...	...	138 0 0	a 1 3 0	...	" "
Maryborough Co-operative Dairy Company, Ltd.*	1,164 0 0	1,164 0 0	81 9 0	96 14 5	1,067 5 7			
Queensland Farmers' Co-operative Dairy Company, Ltd., Booval*	1,200 0 0	1,150 0 0	73 2 3	62 17 4	1,082 12 8			
Dalby Farmers' Flour Milling Company, Ltd.‡	1,370 0 0	1,370 0 0	...	...	1,370 0 0	a	a	a No payment yet due.
	£ 6,956 0 0	6,824 0 0	309 11 6	346 2 1	6,477 17 11	203 19 3	269 12 2	

\* Butter factory.

† Creamery.

‡ Flour-mill.

§ Grain store.

|| Flour store.

## REPORT OF THE CHIEF INSPECTOR OF STOCK AND BRANDS FOR THE YEAR 1902.

SIR,—I have the honour to submit the following Report on this Branch of the Department for the year 1902 :—

## I.—DISEASES IN SHEEP ACTS.

The number of sheep in the State as at 31st December last, adapted by me to the various pastoral districts from the Registrar-General's returns under "The Stock Returns Act of 1893," show the numbers in each of such districts, compared with those of 1901 :—

DISTRICT.	1902.	1901.	INCREASE.	DECREASE.
Burke ... ..	1,081,857	1,153,490	...	71,633
Burnett ... ..	27,863	29,842	...	1,979
Cook ... ..	21,310	209	21,101	...
Darling Downs ... ..	810,790	2,051,409	...	1,240,619
Gregory North ... ..	698,210	1,055,031	...	356,821
Gregory South ... ..	221,772	108,118	113,654	...
Kennedy ... ..	144,830	189,886	...	45,056
Leichhardt ... ..	139,246	244,053	...	104,807
Maranoa ... ..	712,393	1,046,346	...	333,953
Mitchell ... ..	2,087,598	2,783,690	...	696,092
Moreton ... ..	7,533	8,867	...	1,334
Port Curtis ... ..	58,561	33,821	24,740	...
Warrego ... ..	1,183,802	1,321,806	...	138,004
Wide Bay ... ..	18,220	4,403	13,817	...
Total ... ..	7,213,985	10,030,971	173,312	2,990,298

These figures show a decrease of 2,816,986, or 28·08, per cent., as against a decrease of 2·9 per cent. in 1901.

Compared with the number in the State in 1892, when the total reached 21,708,310, the decrease in the ten years has been 66·8 per cent.

As so many sheep were on the roads at the usual time of making the returns, and, as our inspecting staff has been so heavily retrenched, I am not satisfied that the above figures are correct, and it is hoped that the losses have not been so heavy as above indicated.

The number of sheep introduced by sea and the border during the year was 193,243, and the number that similarly left the State was 140,030, giving an excess of imports over exports of 53,213.



The number of sheep operated on at the various meat-curing establishments was—

Frozen	...	...	...	...	...	...	...	...	...	109,468
Canned	...	...	...	...	...	...	...	...	...	203,089
Boiled and extract	...	...	...	...	...	...	...	...	...	2,951
										315,508
Deduct excess of imports over exports as above	...	...	...	...	...	...	...	...	...	53,213
Total output for the year	...	...	...	...	...	...	...	...	...	262,295

as against 406,181 in 1901.

No disease has been known to exist in the sheep; but, as in previous experiences, where a fresh spring in vegetation follows severe drought, there have been considerable losses in travelling sheep from poisonous weeds. Weeds are the first to appear above ground after drought, several of which, particularly those of a milk-producing character, are poisonous in their incipient stages of growth, notably those of the order Euphorbiaceæ or Spurge family.

The hardships through which sheep had to pass during the drought suggested to me the obtaining of an expression of opinion from men of experience as to the relative hardiness of the merino and crossbreds.

That opinion was unequivocally in favour of the merino in all districts in which the two varieties had been kept.

## II.—DISEASES IN STOCK ACTS.

The number of cattle in the State as at 31st December last, arranged into the various pastoral districts from the returns under the Stock Returns Act, courteously submitted to me by the Registrar-General, was as under—

DISTRICT.	1902.	1901.	INCREASE.	DECREASE.
Burke	622,598	768,497	...	145,899
Burnett	176,014	389,728	...	213,714
Cook	228,120	206,303	21,817	...
Darling Downs	154,076	280,223	...	126,147
Gregory North	104,790	120,842	...	16,052
Gregory South	33,361	15,159	18,202	...
Kennedy	324,206	497,432	...	173,226
Leichhardt	179,704	502,305	...	322,601
Maranoa	70,320	136,361	...	66,041
Mitchell	47,084	30,413	16,671	...
Moreton	286,855	401,313	...	114,458
Port Curtis	117,925	236,399	...	118,474
Warrego	52,406	70,979	...	18,573
Wide Bay	146,012	116,753	29,259	...
Total	2,543,471	3,772,707	85,949	1,315,185

This shows a decrease on the previous year of 1,229,236, or 32.55 per cent.

Comparing this year's returns with those of 1894, when the numbers were 7,012,997, the decrease for the eight years has been 63.7 per cent.

The returns, however, for the past year are, as regards a large majority of the runs, merely given by approximation, as no complete muster has been made for years, and, until a complete muster has been possible, the returns cannot be considered of much value for statistical purposes. It may be the case that in many instances the losses have been overestimated, and *vice versa*. It is satisfactory to know that the losses in the Northern districts have not been so heavy as anticipated, and that the increase in calves there has been fairly satisfactory.

The number of cattle introduced by sea and land during the year was 11,593, and the exports 35,299, showing an excess of exports over imports of 23,706.

The number of cattle operated on at the various meatworks was—

Frozen	...	...	...	...	...	...	...	...	...	130,689
Canned	...	...	...	...	...	...	...	...	...	44,958
Boiled and extract	...	...	...	...	...	...	...	...	...	2,943
Pemmican	...	...	...	...	...	...	...	...	...	214
										178,804
Excess of exports over imports	...	...	...	...	...	...	...	...	...	23,706
Total output for the year	...	...	...	...	...	...	...	...	...	202,510

As compared with 249,451 in 1901.

The tick fever did not show up with virulence during the year, except on portions of the South Coast, and then only after the breaking up of the drought. In the Gulf districts, where it first appeared, the cattle continue immune, and are only now tick-infested to a limited extent.

On portions of the North-east Coast, however, there has been a recurrence of heavy infestation accompanied by cases of tick fever. It has been found difficult to convince owners in those districts of the beneficial effects of periodical dipping, which are daily becoming more apparent in the Southern and Central districts.



It is probable that, as in the case of sheep scab, it may, ultimately, be advisable to make the dipping of all tick-infested cattle compulsory, as the only means of successfully controlling the pest, but until—as in the case of sheep scab—we have discovered a dip on which implicit reliance can be placed, such a course would not be advisable. Meantime, good work is being done by means of the dipping material referred to in my last report as having been formulated by Mr. J. C. Brünnich, the Analyst to the Agricultural Department—and which, for convenience, we have called the “Departmental Dip.”

Much of the time of the Moreton Inspector has been employed in travelling and inducing cattle-owners in the district to construct dips, and in selecting sites, supplying plans, &c, and, although at first with little success, all have now come to see the value of periodical dipping. It is regrettable, however, that in many cases sufficient care has not been exercised in apportioning the various medicaments in dipping material. This cannot be too carefully attended to where arsenic forms the principal ingredient.

The question of permanent immunity of cattle from tick fever has again been brought into prominent notice. Of late, tick fever has appeared in a virulent form in cattle travelled from districts in which they had for years been immune, both from natural and artificial inoculation.

That, however, has been the experience of America, where, as stated in one of Dr. Salmon's able reports the disease has reappeared in supposed immune cattle that have been removed from one farm to another.

### III.—HORSES.

The number of horses in the State at 31st December last, arranged into the pastoral districts, was:—

DISTRICT.	1902.	1901.	INCREASE.	DECREASE.
Burke ... ..	36,165	41,752	...	5,587
Burnett ... ..	14,954	30,131	...	15,177
Cook ... ..	27,097	30,383	...	3,286
Darling Downs ... ..	43,881	55,959	...	12,078
Gregory North ... ..	16,791	19,303	...	2,512
Gregory South ... ..	7,110	4,642	2,468	...
Kennedy ... ..	65,512	67,879	...	2,367
Leichhardt ... ..	33,150	43,827	...	10,677
Maranoa ... ..	12,903	17,268	...	4,365
Mitchell ... ..	19,057	22,238	...	3,181
Moreton ... ..	57,002	62,398	...	5,396
Port Curtis ... ..	24,228	34,603	...	10,375
Warrego ... ..	11,842	12,250	...	408
Wide Bay ... ..	29,430	19,486	9,944	...
Total ... ..	399,122	462,119	12,412	75,409

The above shows a decrease of 62,997 or 13·63 per cent. on the number of the previous year.

The number introduced by sea (mostly stud horses) and by land was 892, and the number similarly exported 9,271. Those exported by sea were principally shipped to India.

I have made an effort through the inspecting staff to arrive at an estimate of the quality and description of the horses in the various districts. In all the replies, with one exception, the quality of the saddle horse is given as medium to inferior; light harness, inferior; and heavy draughts, good, in the farming districts.

The percentage of the various classes is given as—

Saddle horses ... ..	66 per cent.
Light harness ... ..	21 „
Heavy draughts ... ..	13 „

Of the means of improvement being adopted, it is stated that there is a fair number of good sires in each district, but almost solely of the racing type, with a few Clydesdales and Suffolks in the farming districts; but from all districts comes the complaint that too little attention is given to the selection of brood mares.

### IV.—BRANDS.

The number of brands registered during the year was 548, and the total registered up to the end of last year 42,314. The total number transferred was 10,089, of which 754 were transferred during the year. The number cancelled during the year was 160, and the number of cancelled brands re-allotted during the same period was 145.

Very few have taken advantage of the Amending Act of 1898 by registering symbol brands. Many are desirous of doing so, but object to the use of the earmarks provided by that Act. The Law Officers advise that the Act does not empower us to allot fresh earmarks other than those specified by the Act, and a strong and general desire has been expressed in favour of an amendment of the Act, so that more suitable marks may be provided.

In consequence of the great enhancement in the value of stock and the reduction in the inspecting staff, consequent on the heavy losses from drought, it is to be regretted that stock stealing has become very rife, and many cases of illegally branding and altering and defacing brands have been prosecuted.

Those cases are now prosecuted under sections 447 and 448 of the Criminal Code, and the fines paid into the consolidated revenue. This has shorn the Brands Fund of a considerable source of revenue.



## V.—MARSUPIAL BOARDS ACT.

With the close of the year (30th June, 1902) the number of marsupials and dingoes destroyed and bonus on scalps paid for since the inception of the Act (1877) has been 17,378,392, comprising 7,407,863 kangaroos and wallaroos, 9,290,039 wallabies, 460,838 paddamelons, bandicoots, and kangaroo rats, and 219,652 dingoes. The number destroyed during those decades by disease, drought, and innumerable other causes cannot be estimated; but the enormous destruction from those causes has been so great as to enable the boards to adopt more energetic measures for the destruction of the dingo and wild dog, both of which are comparatively little affected by drought.

For the year ending 30th June, 1902, the number of scalps paid for was 281,445 kangaroos, 751,061 wallabies, 30,684 of the smaller kinds, and 21,289 dingoes; total, 1,084,479. This represents a decrease on the numbers for the previous years of 132,547 kangaroos, 65,239 wallabies, 9,833 others, and 3,650 dingoes, or a total decrease of 211,269 scalps. The shortage under the heading of kangaroos is accounted for by the fact that many of the boards are discouraging the presentation of scalps of those animals, as the skins are of sufficient value to render hunting remunerative without the bonus. The fact that of the 31 boards 11 were inoperative for a great portion of the year, owing to lack of funds, accounts to a large extent for the decrease under all the headings.

The Aramac Board again led in the number of kangaroo scalps paid for, with 45,877 as against 123,516 in the preceding year, while the Darling Downs Board paid for 190,716 wallaby scalps, or 217,447 less than during the year ending 30th June, 1901. In paddamelons, bandicoots, and kangaroo rats the Downs Board also showed the largest destruction—viz., 4,966—but 5,147 less than last year's return. The Burnett Board once more accounted for the greatest number of dingoes destroyed, 2,347, and was 209 scalps in excess of the previous year.

The dingo and wild dog are increasing to an alarming extent, and united and energetic action is necessary. In all districts a bonus is (as provided by law) now offered for scalps of these pests, but unless this is backed up by energy and determination on the part of boards and stockowners the extermination of these enemies to sheep and young cattle will be a long and costly process.

## VI.—LIVE STOCK AND MEAT EXPORT ACT.

The long-continued drought had the effect of closing down most of the meat-curing establishments for a considerable part of the year, and with the reduced number of stock it is feared that the majority of them will continue inoperative for some time to come.

By permission of the Meat and Dairy Board, and with the concurrence of the Minister, Mr. Robert Ferguson, the surveyor to that Board, visited and reported on the various works registered under the Act, and furnished valuable reports on each. Copies of those reports were furnished to each of the companies respectively, and those who acknowledged receipt expressed their appreciation of the improvements suggested by Mr. Ferguson.

## VII.—THE SLAUGHTERING ACT OF 1898.

As previously pointed out, the inspection of the meat supply for the metropolis must, in the absence of public abattoirs, be of only a cursory nature, seeing that slaughtering is carried on simultaneously at some twenty different slaughter-yards, spread over a large area.

With the consent of the Minister, Mr. Robert Ferguson, the surveyor to the Meat and Dairy Board, made a minute inspection of all the slaughter-yards around Brisbane and at various other centres of population. These reports show that, with very few exceptions, the present slaughter-houses are very defective in their sanitary arrangements. In respect of those from which the metropolitan meat supply is drawn, Mr. Ferguson's remarks are endorsed by Mr. Veterinary Inspector Tucker, who superintends the slaughtering of meat for the Brisbane district.

Mr. Ferguson has been good enough to furnish plans and specifications of buildings and fittings of butchering premises of an inexpensive character, as a guide to slaughter-men, architects, and builders of the requirements necessary for slaughtering and handling of meat under hygienic conditions. These plans and specifications will be found as an appendix hereto.

I have, &c.,

P. R. GORDON,

Chief Inspector of Stock.

Brisbane, 5th May, 1903.

## APPENDIX.

## SKETCH PLANS AND SYNOPTICAL SPECIFICATION OF A MODERN PRIVATE ABATTOIR FOR BUTCHERS.

PREPARED BY R. FERGUSON, SURVEYOR TO THE MEAT AND DAIRY BOARD.

Synoptical specification of a modern private abattoir for butchers who are licensed to slaughter and supply flesh food for human consumption in the city and suburbs of Brisbane. Attached hereto is a sketch lithographed plan for the guidance of architects when preparing plans and specifications which shall be submitted to the Honourable the Minister for his approval before tenders are invited for the work.

*Site.*

The site of the abattoir building must be approved by the Chief Inspector, and will be satisfactory if selected on a dry and elevated portion of the paddock, at a safe distance from all freshwater creeks and water-courses leading thereto, with the view to prevent the pollution of same from the abattoir premises during heavy and



continuous rains. It is important that the site should be fairly level, with falling gradients sufficient for surface drainage to the receiving sewage tank, and to assist the handling of loaded trucks from the slaughter-house to the manure pit, the hide-house, and the boiling department or digester-house, which would be situated from 4 to 5 chains distant from the dressed meat hanging-room.

It is also important that, if possible, the falling gradient should continue from the drainage receiving tank on to land suitable for cultivation, also at a safe distance from fresh water, where the sewage may be pumped, at the minimum cost for steam, for irrigating and fertilising purposes, that horse, cattle, and hog feed may be profitably grown, and the sanitary condition of the whole premises constantly maintained in a salutary and wholesome state, and the atmosphere of the neighbourhood rendered fairly pure and healthy.

#### *Water Supply.*

Every site for a butcher's abattoir should have, within a distance of 20 chains, a permanent and reliable freshwater supply from a creek, lagoon, dam, or well, equal to a constant demand upon it of one thousand (1,000) gallons per hour, being the minimum quantity which is considered necessary.

The water would be pumped and forced to the site through a 2-inch galvanised pipe, discharging into a 3,000-gallon tank elevated 25 feet above the floor level, and fixed on a strong hardwood seat, the angle posts being sunk 4 feet in the ground, and securely braced and bolted together.

The delivery-pipe will require to be 2 inches, with  $1\frac{1}{2}$ -inch piping in the abattoir, with at least four (4)  $1\frac{1}{4}$ -inch brass hose connections, and a coil of  $1\frac{1}{4}$ -inch hose for flushing and washing purposes generally.

Branches of  $\frac{3}{4}$ -inch pipe would lead to all the pens and cattle-yards, fitted with taps discharging into proper drinking vessels, and fitted to receive 1-inch hose connections for flushing the pens and drains in connection therewith daily.

#### *Pens.*

The pens for cattle, sheep, and hogs are detached, to the rear of the abattoir at least 30 feet, and connected to the killing enclosures by a race in each case, that specially constructed for cattle being erected of sawn hardwood posts and three rails, close-sheeted vertically on the inside with hardwood tongued and grooved boards, and capped on top.

The floors of all pens and races will be laid with 3 inches of gravel concrete on a layer of 3-inch metal rammed or rolled in close contact with the soil, the gravel concrete on top being finished rough on surface. Surface drains will be laid down in connection with the above to carry off flushing water into the main system discharging into the receiving tank.

#### *Abattoir.*

The abattoir building would be designed in accordance with the sketch plan herewith, the dimensions of each department being increased or reduced to meet the present and prospective requirements of the proprietor.

The structure would be erected with sawn hardwood posts, rails, and vertical battens to external walls throughout, as shown, the whole being framed and braced in the best manner, the battens being spaced  $\frac{3}{4}$ -inch apart for light and through ventilation, and cut in straight lines  $\frac{3}{4}$ -inch from the finished concrete floor.

The whole of the back elevation towards the cattle, sheep, and hog pens and yards will be framed with bottom and top plates and studs, sheeted close on the outside with 6-inch by 1-inch wrot and rebated hardwood or beech chamfer boards.

All gables above the top plates would receive 3-inch by 2-inch studs, and sheeted close with chamfer boards before described.

The hanging tie beams would be of hardwood. Ironbark 10 inches by 4 inches spaced on top of each post as shown, sunk down on plate until a bearing is obtained on top of post inside of the latter, and secured to plate by a 8-inch by  $\frac{5}{8}$ -inch coach screw, and also bolted to rafter.

#### *Roof.*

Ridge-valley rafters, common rafters, and collars would be of pine, executed in the best manner, the wide projection at eaves and at gables being supported in straight lines by hardwood 5 inches by 3 inches, wrot and stop chamfered bracket struts tenoned and secured to every post and to rafter and fascia, and fixed double on all angle posts.

Similar struts will be fixed to all posts and hanging tie beams, as shown on sections.

Batten roof for iron 2 feet apart, and cover the whole structure with best quality of iron in a workmanlike manner, fixing ventilators and spouting with all down pipes discharging into surface drains.

#### *Fascias.*

Fascias and gable boards would be of  $1\frac{1}{4}$ -inch pine, wrot and fixed in the best manner, and with the spouting painted when fixed.

Finish roof with valleys, ridging and flashings all of the best, and fixed in a workmanlike manner.

Loading-shed would be constructed open as shown, with posts, top plates, and rafters all executed in the best manner, the gables being enclosed with 6-inch by 1-inch pine tongued and grooved boards fixed vertically and cut to pattern at bottom.

The fascia, gable boards, battens, irons, flashing, and spouting would be executed in accordance with that specified for the main roof.

#### *Doors.*

The doors and gates throughout, as shown, would be framed of hardwood and battened to the rails to match the walls, and fitted with strong hinges and fastenings of forged wrought iron.

#### *Sashes.*

Sashes as shown in all gables for light and ventilation would be framed of 2-inch cedar hung on centre pivots of strong make, and fitted with strong sash cord to open and shut same, and belaying hooks fixed to posts.

#### *Poling Pen.*

The knocking-down pen would be framed with sawn hardwood 6-inch by 6-inch posts and angles, and 3-inch rails, 2 feet apart, sheeted close both sides with 4-inch by 1-inch tongued and grooved hardwood vertical boarding.



The door to race would be heavily framed of 3-inch hardwood with four (4) 2-inch rails sheeted one side only, with 4-inch by 1-inch boards, before mentioned. This door will lift vertically, running in solid grooves in the posts each side, and would be balanced for easy action by one person with counter weights of iron or lead, steel wire cords, and strong pulleys on each side of posts.

The side opening through which the animals will be delivered on to the hoisting-floor, after being poled, will be of the full width and height of side wall between posts, framed as before, and will hoist vertically by the winch, and would be lowered into position by similar means when the insensible animal was outside, or this door may be balanced by counter weights, wire cords, and pulleys as before.

The angle post of pen on this side would be of 6 inches by 6 inches, going up to the plate level, and tenoned into a 6-inch by 3-inch plate fixed under tie beams and scarfed to wall plate. The door would work up and down in a length of channel iron of light section securely and neatly fixed to posts at each side by  $\frac{3}{8}$  counter-sunk screws 18 inches apart.

#### Race.

The walls of cattle race would be constructed of sawn hardwood posts, 7 inches by 5 inches, spaced 8 feet apart, sunk 3 feet in the ground, fixed on a concrete footing, and encased with gravel concrete 6 inches in thickness to above the surface level, mortised to receive 4 rails, in height of 4 inches by 2 $\frac{1}{2}$  inches, framed within 1 inch of face of post inside, and sheeted close with 4-inch by 1-inch boards as before, and capped on top.

Fence to hog and sheep lanes will be constructed with 4-inch by 5-inch posts, 4-inch by 2-inch rails, and 1-inch battens, spaced 1 inch apart vertically, and cut in straight lines at top.

#### Fittings.

The hog-scalding tank would be constructed of well-seasoned pine 2 $\frac{1}{2}$  inches in thickness, and bolted together perfectly watertight, having steam connections with boiler in digester-house, and brass waste to drain.

The scuttling table for hogs, and bleeding tables for sheep, would be strongly framed of pine, the former being neatly covered on top with a strong gauge of zinc secured along edge of top with tinned flat head tacks.

The hangers for the overhead rails would be forged to the form shown, the rail being 18 inches below the soffit of tie beams, the strap of hanger being carried over the top of beams and turned down 1 inch on the opposite side. The strap would be secured to side of tie beam by two  $\frac{1}{2}$ -inch coach screws 2 $\frac{1}{2}$  inches in length. The travelling pulley and hook pendant from rail would be of the usual meatworks pattern, forged and cast in this city.

The brackets shown attached to posts carrying the wall rails for hogs and sheep would be forged to detail, and secured by coach screws, as shown, 4-inch by  $\frac{5}{8}$ -inch.

The hangers for hog rail would be attached to tie beams as before, and stayed by iron straps from same to prevent lateral movement at the lower level.

The section of ironwork in hangers, brackets, and rails will be calculated according to the load that may be carried between the bearings, allowing a safe factor of four (4).

#### Floors.

The floor of the abattoir throughout, including the loading-shed and the catch pens, will be laid with concrete in the best manner, as follows, viz.:—

The natural surface of the ground being formed to the level necessary, and trenches executed to the proper depth for all drains inside and outside providing for the necessary falls to the main drain leading to the receiving drainage tank, a layer of hard metal broken to a gauge of from 3 inches to 4 inches will be laid down under all floors and drains and rolled and rammed until each piece is solidly bedded into the soil and is closely compacted together to receive the gravel concrete.

The concrete on top of metal in floors and drains will be 3 inches in thickness above the top of metal generally but going down and filling the interstices of same solidly, and will be composed of 4 parts of clean river gravel 1-inch gauge clear of sand, 2 parts of washed coarse sand screened from the gravel, and 1 part of approved Portland cement. The aggregates after being measured will be turred over dry, and twice after being wet through the rose of a water can or hose thoroughly mixed and amalgamated, the pick being used freely for the purpose, until the material is handled into barrows and removed on to the floor or drain.

Prepare for laying floors by thoroughly wetting the metal with a hose or water can with rose, then wheel on planks laid down for the purpose the gravel concrete in a plastic condition, and discharge same rapidly on the face of metal, filling all the interstices as it is raked and rammed true to the section curvature, having a fall of 2 $\frac{1}{2}$  inches from the centre of building to the side walls in the dressing space and wings, also in the hanging space.

The surface of floors will be rammed and wrot true to section template and straight edge on face floted at once with  $\frac{1}{2}$ -inch of cement mortar, 1 sand to 1 cement, until sufficiently hard to trowel smooth and fair without exhibiting tool marks on completion.

The floor of killing and hoisting space will fall to the bleeding duct, and the catching pens to the surface drain outside. The floor of cattle race will fall to each side, and the sheep and hog runs and yards generally will have a fall to surface drains of 2 $\frac{1}{2}$  inches every 10 feet.

The floor of the loading-shed will fall to the surface drain on each side; the centre portion, as shown forming the wagon wheel track, will be laid with wood blocks.

The surface drains, where shown outside the walls of the abattoir, will be formed as shown on sections, the concrete of floors and the outside of drains being retained by pine boards until set, when the face will be finished with cement mortar, as before mentioned, and floted fair and true in straight lines, the plinth being splayed as shown around the structure.

The drains will be formed throughout 10 inches in width with 3-inch concrete on metal similar to floor by 3 inches in depth at the ends, wrot with a fall generally of 1 $\frac{1}{2}$  inches in 10 feet, the bottom being conical, in form inverted.

The bleeding duct as shown across the building, embracing the three departments, will be of the depth on section to carry the drainage from the outside drains on the sheep side of the structure to discharge into the main drain on the opposite side of the building with the fall specified.

The deep section of the duct will be 10 inches wide, similar to other drains in the centre of the width shown on plan, the 12 inches on each side of drain being finished with a hollow splay down to the edge of same, 3 inches below the floor level.

The drain shown across floor inside between the dressing and hanging space will be of such width and depth as may be determined after, but the cost may be taken similar to the others.



*Main Drain.*

The main drain will be laid as before specified, 12 inches in width by 12 inches in depth, the bottom being conical in form, similar to the others, the direction selected for the tank giving good and sufficient fall all the way, the top of drain being flushed with the natural surface of the ground throughout.

*Receiving Tank.*

The receiving tank will be installed at a distance of not less than 5 chains from the abattoir, and will be 14 feet in diameter by 4 feet in clear depth under the surface of the ground.

The walls of the tank will be executed with 9-inch brickwork laid and flushed up solid with cement to 3 inches above the surface level. The bottom will be laid with two courses of bricks set and grouted flush and full at all the joints with cement similar to walls.

The bottom and wall sides of tank will be faced with cement  $\frac{3}{4}$ -inch in thickness fluted to a fair and true face, and then trowelled close and smooth watertight; the top of wall of tank all around being finished to below the surface of the soil on the outside, both angles being chamfered  $\frac{1}{2}$ -inch to prevent chipping with the usual wear and tear.

*Tramway.*

The tramway, as shown inside of the abattoir, and leading to the digester-house, hide and skin departments, and the manure pit, 5 chains distant, would be laid down with 14-lb. steel rails upon 4-inch x 4-inch ironbark sleepers, spaced 24 inches apart. The rails inside the building would be fixed to gauge as the floor is being laid, bedded on the metal and concrete at such depth that the top of the rail will be perfectly flush with the finished surface of the floor, a neat groove being wrot in the cement to receive the wheel flange.

*Painting.*

The sashes in all the gables would be glazed with 20 oz. best quality of Chance's sheet glass bedded in oil putty, and neatly back puttied, and finished to the front in the best manner.

The walls of the building, both inside and outside, should be primed as soon as the woodwork is fixed in position, and painted two round extra coats of zinc white and white lead mixed in equal proportions as soon as the roof is finished.

The woodwork of roofs, fascias, and gable-boards, with all timbers of the loading-shed in front, would be primed and painted in a similar manner.

*Remarks.*

This painting of the timbers is most essential from a hygienic point of view, as the pores of the timbers will be sealed up and absorption of blood and other matter likely to decompose and emit noxious odours prevented.

The painted walls, both inside and outside, may be washed down with the hose daily perfectly clean, as all foul matter will be easily washed off the painted surface.

The flushing and cleansing work in the abattoir would be performed fairly constant when practical operations are going on, keeping a steady current in the drains sufficient to move along all solid matter to the receiving tank, where it will be recovered daily when empty, and carried to the digester-house or the pots.

Hides may only be salted and cured when removed to the distance before mentioned for the digester-house and the drainage receiving tank, and all glue pieces, horns, hoofs, and bones of every description may not be treated or stored at a less distance.

Hog yards may not be installed within a distance of twenty (20) chains from the abattoirs, having proper shelters for the animals, and with the yards and pens floored with concrete and fitted with surface drains and a water supply.

The slaughter of animals before noon in a semi-tropical climate when the temperature is highest—the *general practice*—is most objectionable where chill-rooms do not exist, and the sanitary conditions are imperfect, producing a noxious atmosphere, and blow flies in myriads with putrefactive bacteria in countless multitudes in every cubic inch of space in which the meat has to be hung.

This reprehensible practice, with the transit of meat to the city in open wagons in a hot, flabby, and flaccid condition, the beef quarters with the carcasses of sheep and hogs being piled on top of each other in an indiscriminate manner, and carried at high temperatures during the afternoon daily, should be prohibited by early legislation upon the whole subject.

The killing and dressing of animals of every kind as food for human consumption should be performed late in the afternoon daily, and the meat when dressed and washed down would be carried by the overhead tracking in the new abattoir into the enclosed hanging space, where the air current is cool and wholesome as a result of the hygienic conditions described.

The beef hanging in sides during the night in this satisfactory atmosphere would be sufficiently hardened up at 4 o'clock a.m. to be quartered and carried to the city in specially constructed wagons covered at such height that the beef quarters, sheep and hog carcasses will hang detached from each other and clear of the floor.

This meat when delivered at the market will exhibit a shapely and bright appearance, appetible and wholesome as an article of food, and will hang in a sound condition for several days in a suitable atmosphere.

Retail butchers who are not in a position financially, through reckless competition for live stock at the saleyards, to erect suitable and modern abattoirs as described, and carry meat to the city in proper vans for the purpose, can be more profitably supplied with beef quarters and carcasses of veal, sheep, and hogs by the several companies operating meatworks in the neighbourhood of this city, who purchase their stock at from 25 to 50 per cent. under saleyard prices, and realise immense profits from the special treatment and disposal of the by-products.

Master butchers who are financially in a position to instal a modern private abattoir before described, or to convert their present premises upon the lines mentioned, should be permitted to do so in accordance with plans and specifications submitted to the Honourable the Minister for his approval.

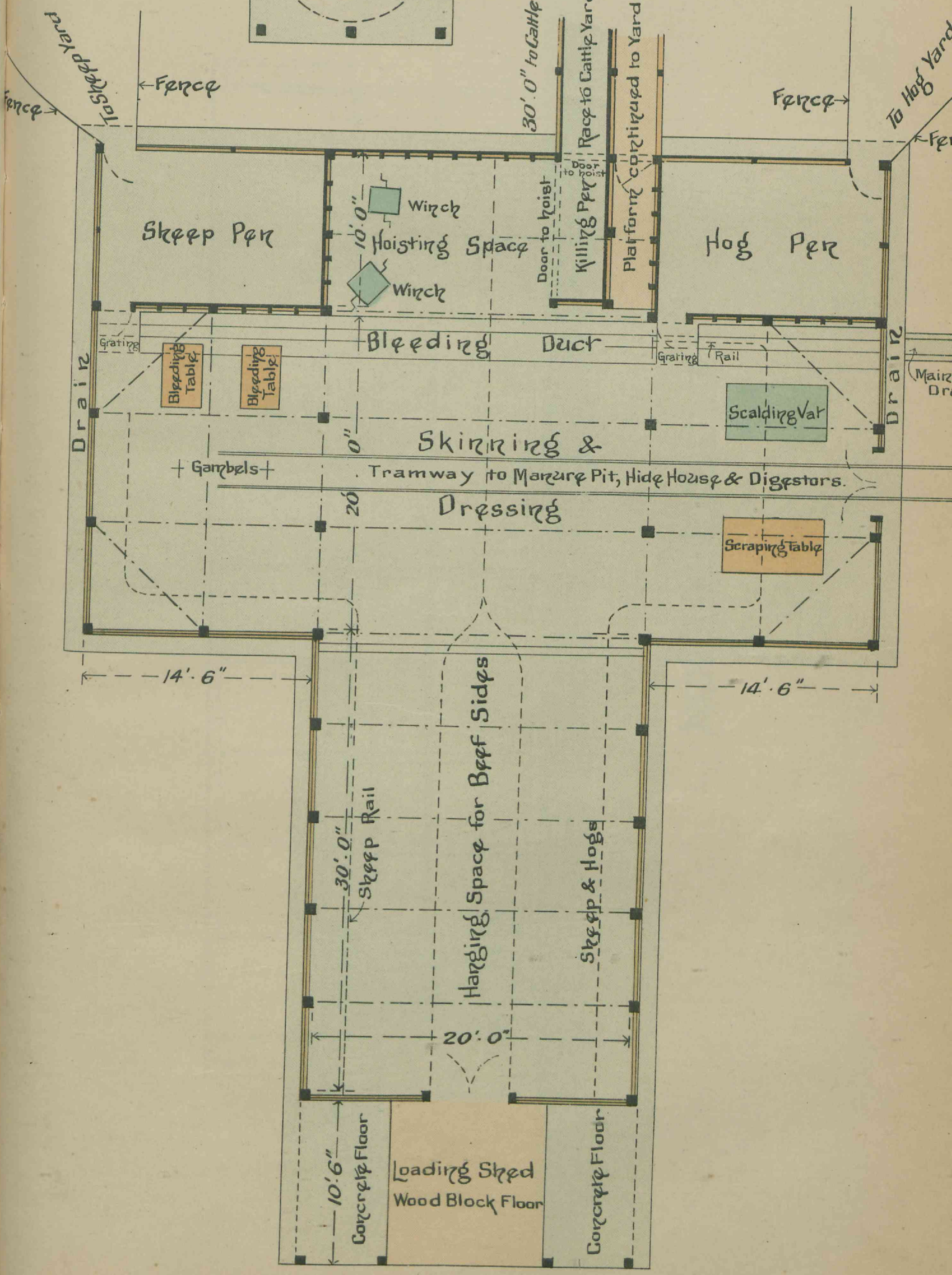
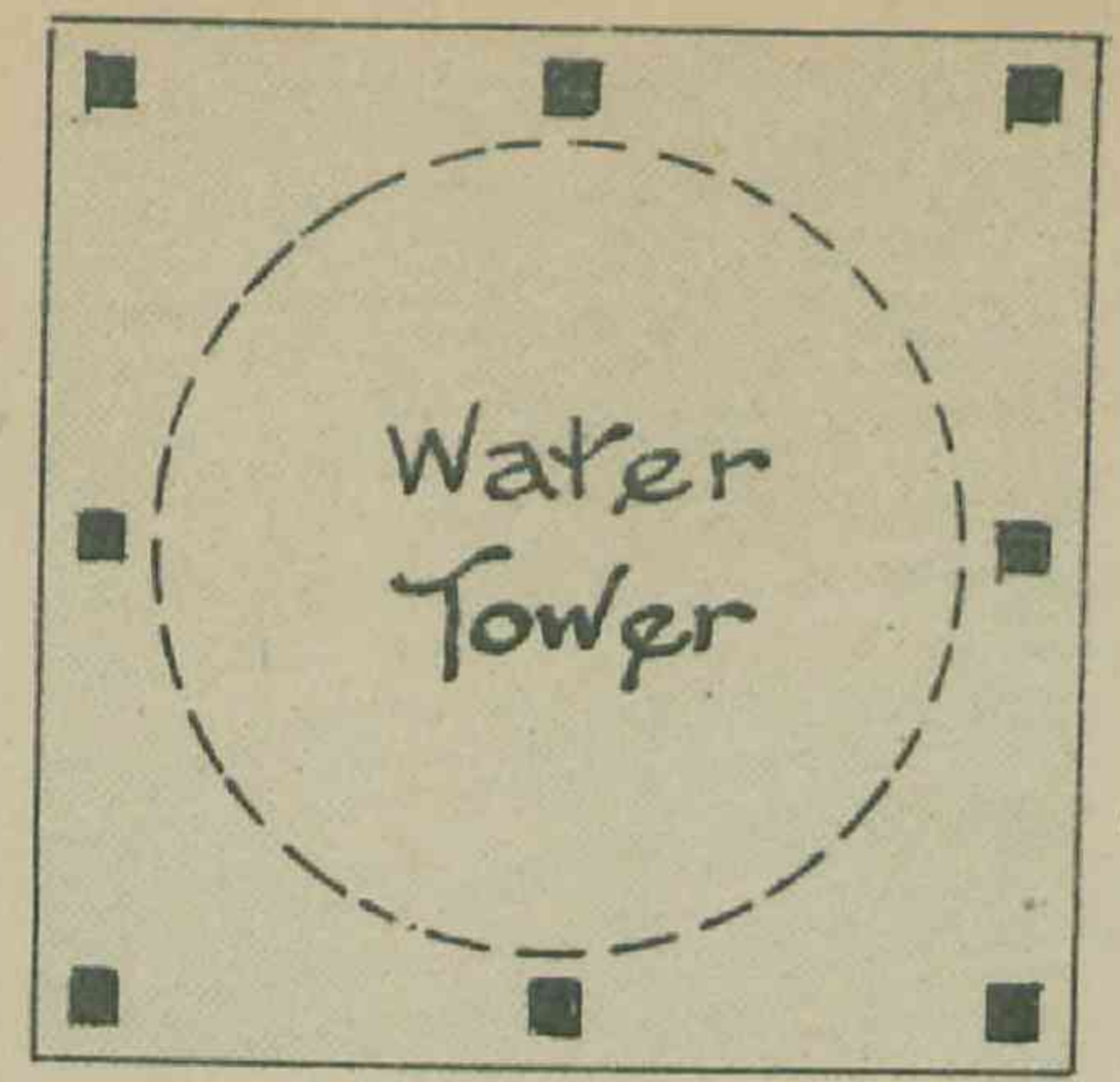
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By Authority: GEORGE ARTHUR VAUGHAN, Government Printer, William street, Brisbane.



— DESIGN FOR —  
**PRIVATE ABATTOIR**

8" = 1"

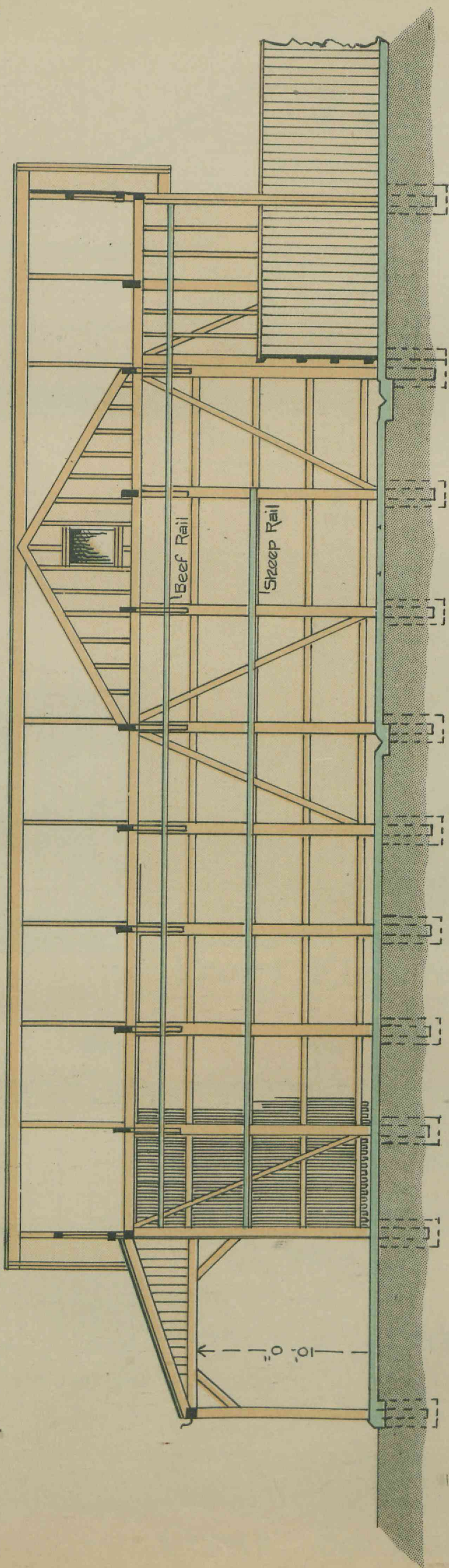


— Plan —



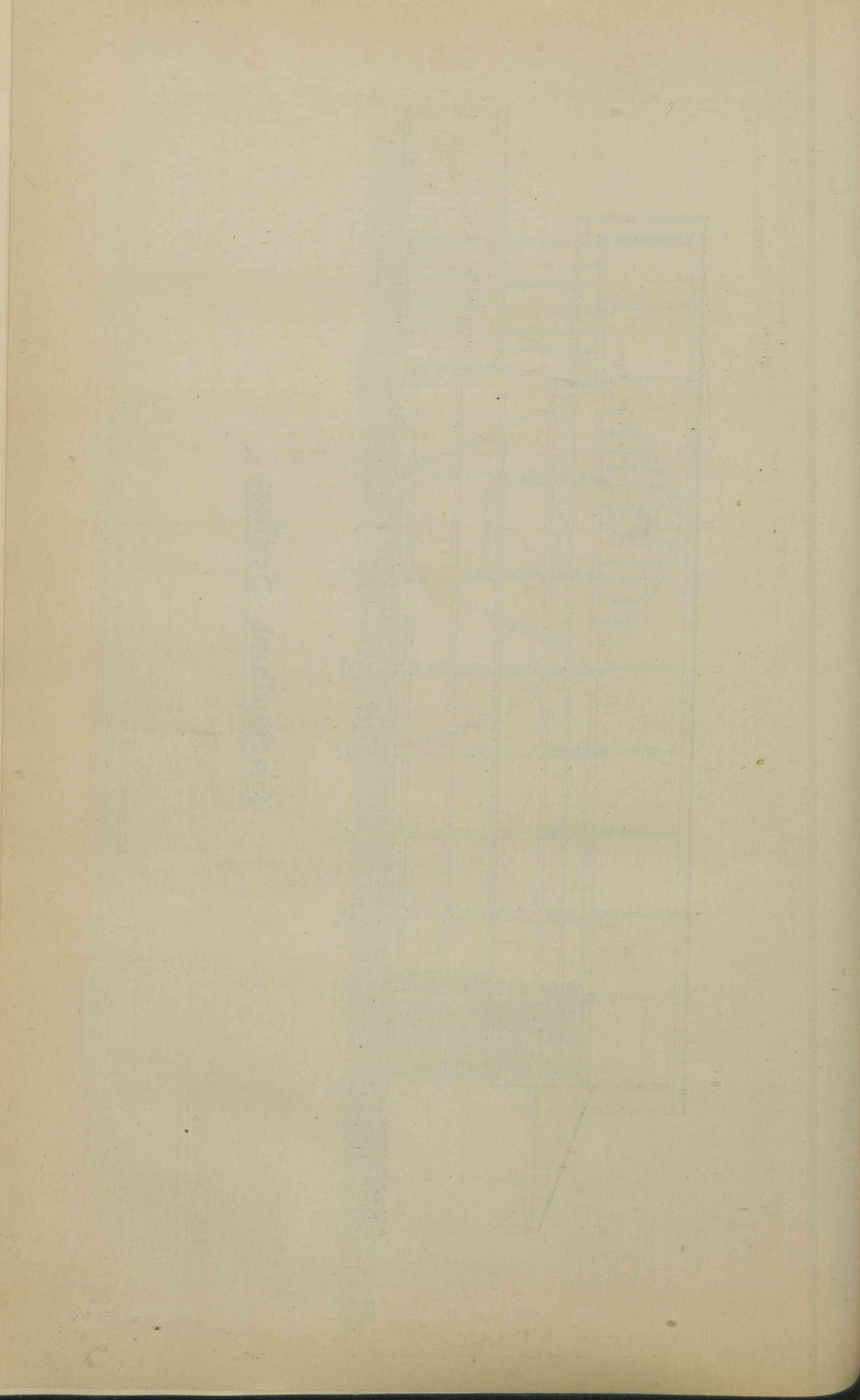




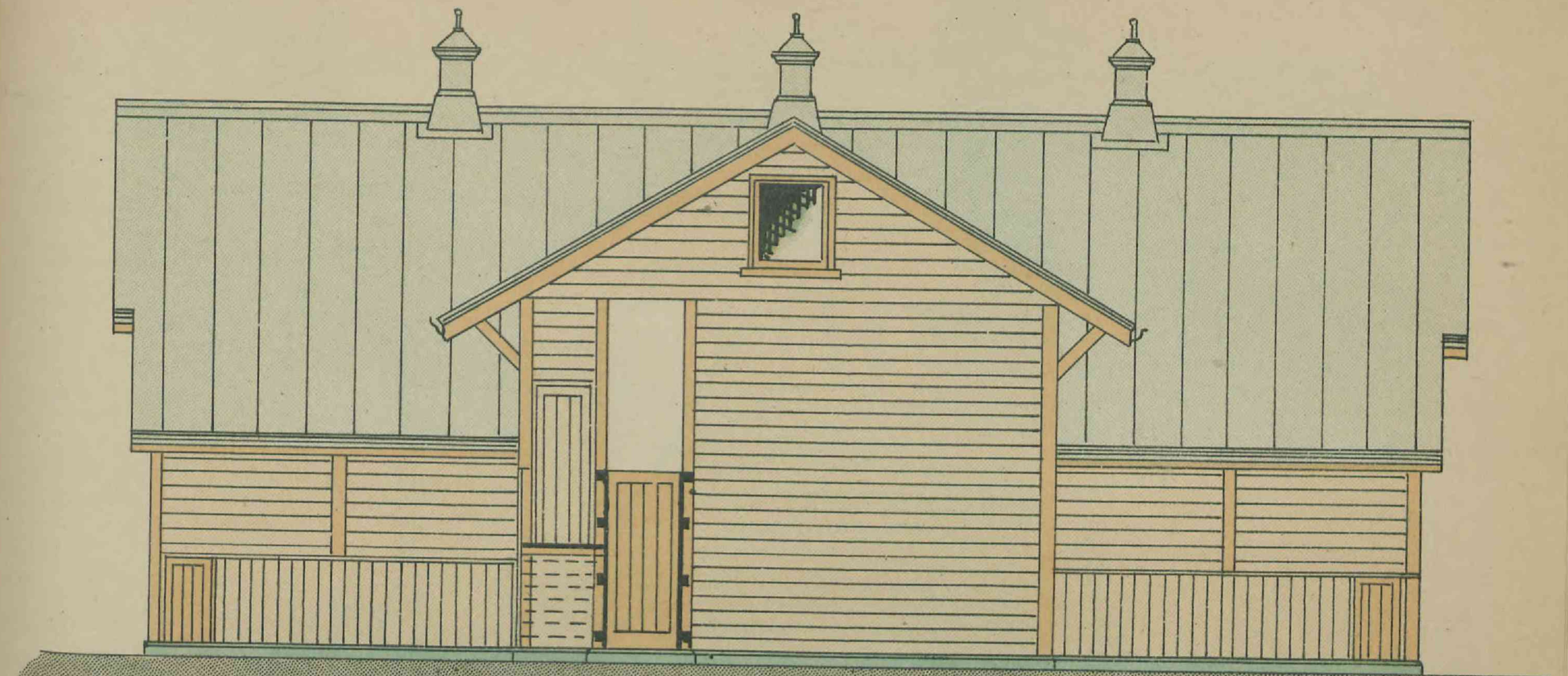


Longitudinal Section

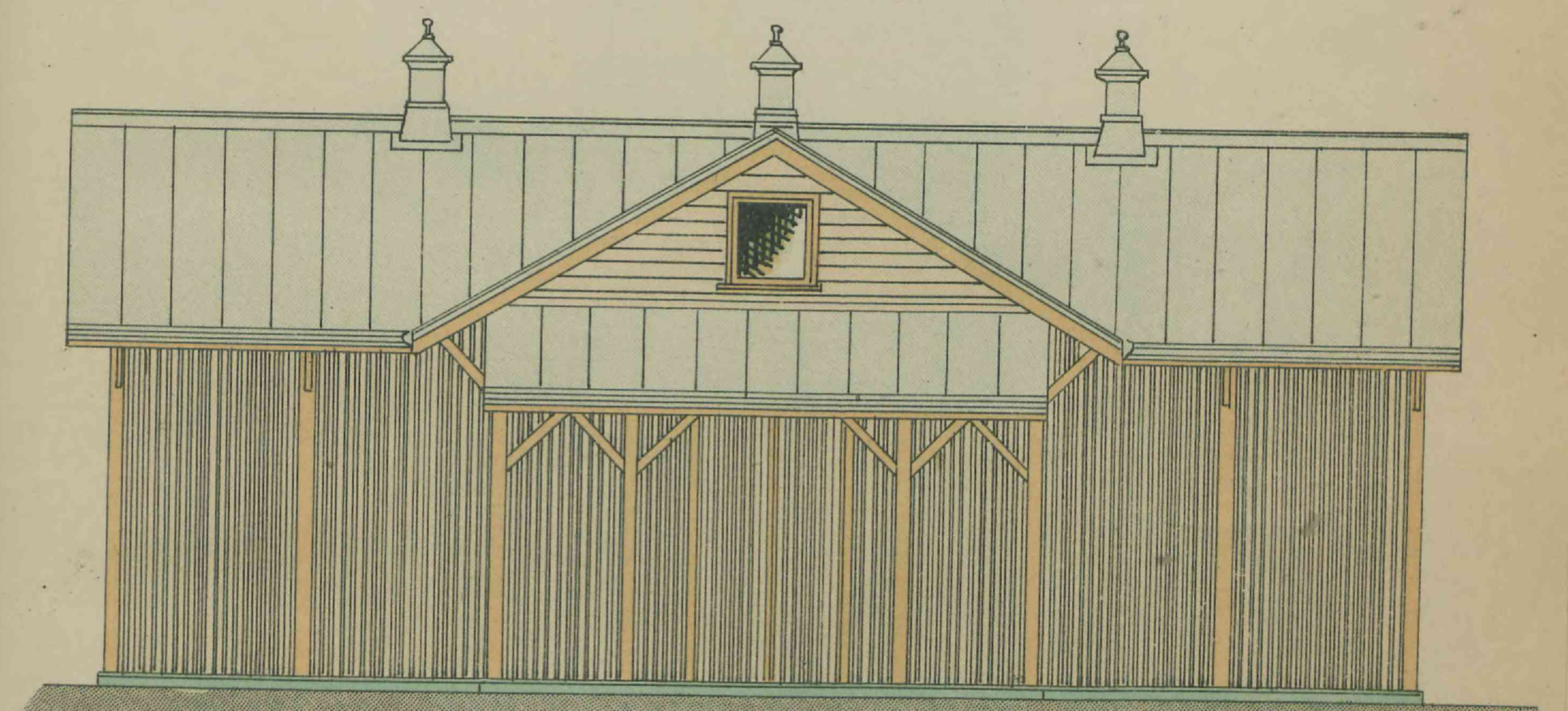




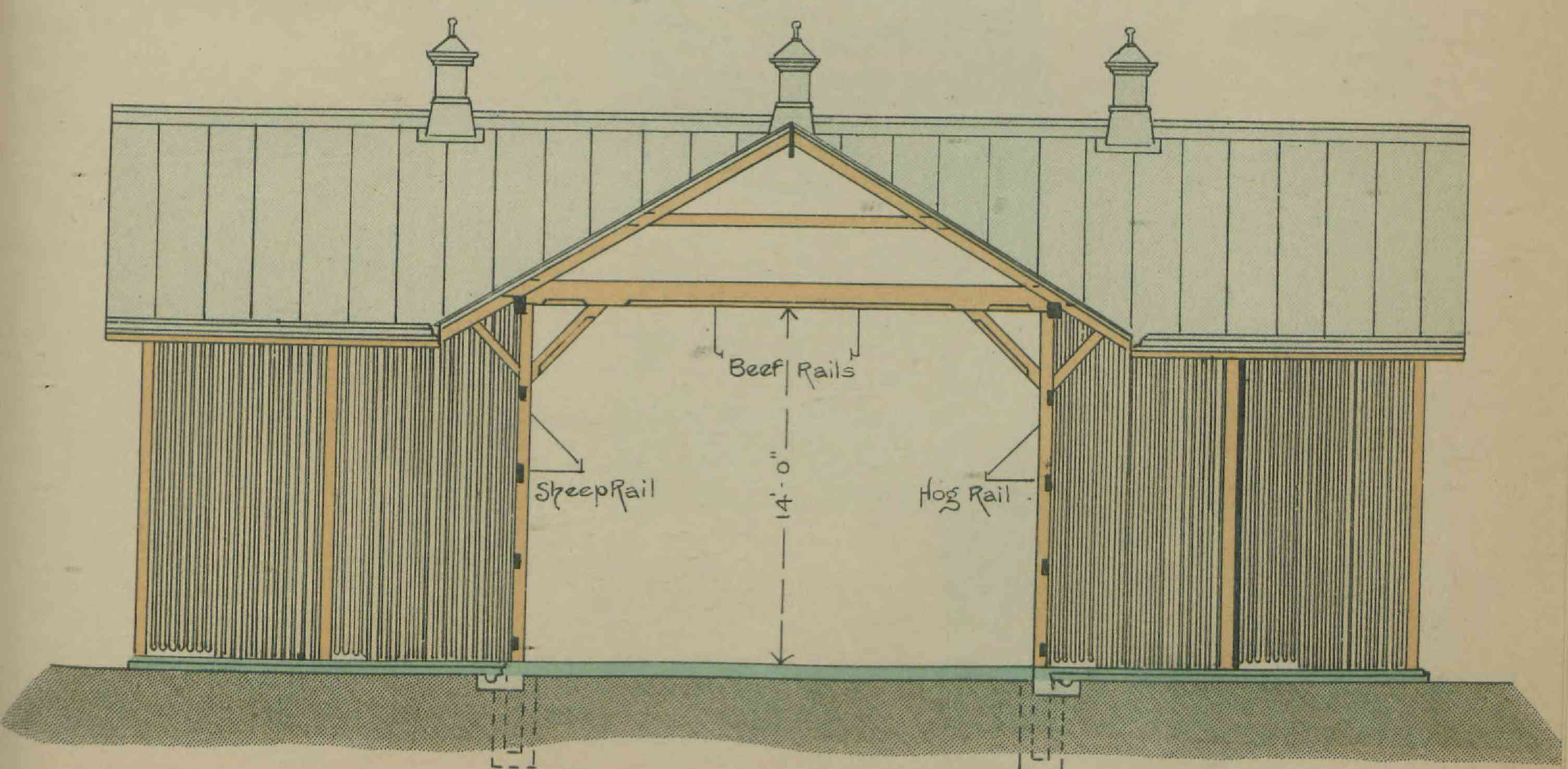




— Back Elevation —



— Front Elevation —

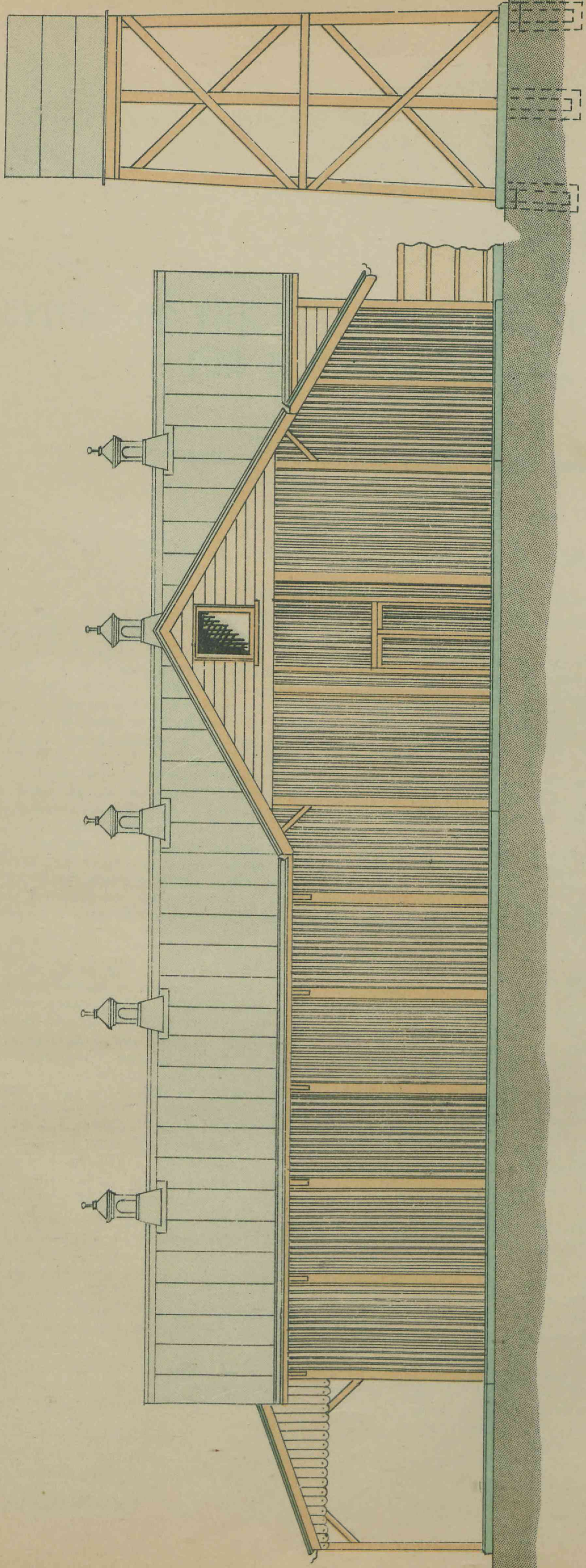


— Cross Section —









— Side Elevation —



