

1900.

QUEENSLAND.

ANNUAL REPORT OF THE DEPARTMENT OF AGRICULTURE FOR
THE YEAR 1899-1900.

Presented to both Houses of Parliament by Command.

TO THE HONOURABLE THE SECRETARY FOR AGRICULTURE.

Department of Agriculture,
Brisbane, 1st August, 1900.

SIR,—I have the honour to lay before you the Annual Reports of various officers of this Department for the year which ended on the 30th of June last.

As my acquaintance with the Department commenced with the last month of the period reviewed in these papers, any comments of mine upon them or upon the general working of the Department would be decidedly out of place.

The most important event in the history of the Department since the date of my appointment was the Agricultural Conference at Warwick early in June. The official report, which has been widely circulated, shows that the attendance of delegates at this Conference was unusually large, and that questions of the highest moment to our cultivators were debated with much earnestness and ability. Perhaps the most satisfactory feature of all was the unanimous and emphatic recognition of the community of interests existing between the Northern and the Southern farmers. The practical result of the Conference will probably be the introduction, during the current session of Parliament, of Bills affecting the farming industry, and, among them, of a Bill to establish an agricultural bank under State control.

I have, &c.,

P. J. McDERMOTT, Under Secretary.

REPORT OF THE PRINCIPAL OF THE QUEENSLAND AGRICULTURAL COLLEGE.

SIR,—I have the honour to submit the following Report upon the work done at the College during the last year, to 30th June last:—

Since my last Report, a few changes have taken place in the teaching staff. Mr. H. W. Gorrie, the Horticulturist, who died on 12th February after a short illness, had been at the College since the establishment, had done much of the pioneering work, and was highly respected by all who knew him. Mr. C. Cole, who comes from Victoria with a good reputation, has succeeded Mr. Gorrie, and, by his work and teaching here, has shown that he thoroughly understands his business.

Mr. Brännich (the Chemist) severed his connection with the College as a teacher at the end of the first term. His duties are now undertaken by the Science Master, Mr. P. Sutherland, and by the Assistant Chemist, Mr. F. Lan Nott.

In addition to the work of the staff, valuable assistance has been given by the following technical officers of the Department, viz.:—Mr. Quimmell, M.R.C.V.S., in weekly lectures and demonstrations in veterinary science; Mr. Nevill, Tobacco Expert; Mr. Rainford, Viticulturist; Mr. Tryon, Entomologist; Mr. Mac Mahon, Curator of the Botanic Gardens, Brisbane; Mr. Voller, Assistant Instructor in Fruit Culture.

The popular lectures that have been given by them have added considerably to the educational part of the College. Three lectures were given by Mr. Cox, M.I.C.E., on "Artesian Waters and Well Boring;" by Mr. H. L. Jones, of Goodna, on "Bees and their Habits;" and by Mr. Worboys, of New South Wales, on "How to Make Farming Pay."

The past year has educationally been most successful. The reports of the different officers are hopeful and encouraging, and the results of the examinations held from time to time show that sound progress has been made. Much help has been rendered by many of the advanced students, who appear to take as much interest in the College as if it were their own property—a state of affairs that is very encouraging to myself and to those associated with me.

The conduct of the students, on the whole, has been good, and (with one or two exception) the rules and regulations have been strictly obeyed.

The general health of the students has been excellent.

The first term of the year under review commenced with thirty-eight students; the last term with thirty-eight. I would here draw attention to what appears to me a mistake on the part of those parents who have removed their sons from the College after a period of six or twelve months, or just at a time when they are most likely to profit from the instruction imparted. There have been but few cases of this kind, but it is possible they may happen in the future, and I utter this warning in the interests of those boys who may possibly be made to suffer by such short-sighted policy. To remove, under no pressure of circumstances, is simply to throw away so much of the boy's life, for he has not had time to thoroughly grasp the system of teaching that would be at his service.

C. A. 91—1900.

Full particulars of the course of instruction will be found in the calendar, copies of which are available for those who may ask for them.

During the year, 1,891 visitors had meals in the College dining-hall, and 300 persons (besides my own personal friends) visited my private house. Many others came to the institution, of whom no record was kept.

Large parties of farmers from many well-known agricultural districts visited the College, and it may be said, without egotism, that all expressed their warmest appreciation of the work carried out.

Before entering upon the detail of work during the year, I desire to draw your attention to the remarks made upon page 7 of my report last year, upon the "Year's Work."

The opinion then formed has been since considerably strengthened, and I am now a greater believer in practical work for students for the first year's work, with a complete subordination of the theoretical teaching. The theoretical should only be made prominent in the third year of the course.

For the first two years the theoretical or school teaching should not pass the point that will keep the student's knowledge in this respect at the level at which he began his College career.

The term "practical" here used should be taken to include the necessary lectures that are part of the actual manual or outside work that the student may be following.

FARM WORK.

The Reports by the examiners upon farming and upon dairying are—

I have already given the result of your pupils' examination in Practical Farming, and wish now to supplement it by giving you an outline of the nature of that examination, and also a general summary of the results obtained.

When in the cultivation areas with the pupils, I put them through their facings to ascertain what degree of efficiency they had attained to in the way of the ordinary manual labour common to all farming operations. The implements they used, the machinery they handled, and the horses they drove were all subjects on which I catechised them closely in order to find out what practical knowledge they had of matters most essential to successful field work. With the exception of some junior pupils, the exhibition of field work stamped the lads as thorough tradesmen, and the only disappointment met with was that some of them had confused ideas in the matter of stacking hay.

When it came to testing the pupils in the general principles of agriculture, I thought the most effectual method to have it done was by written examination papers. The questions numbered twenty-six, the respective values varying from two to five for each question. These were not confined to the principles of agriculture alone, but went into minute details of method and cost of growing the staple products of South Queensland. Many of the questions were possibly out of place for first-year pupils, but, while the papers of the senior pupils showed practical knowledge to a degree which surprised me, those of the juniors were (comparatively speaking) no less commendable.

A. MOFFAT, Radford.

DAIRY WORK.

SIR,—I have the honour to inform you that, through instructions received from the Principal of the Gatton Agricultural College, I visited that institution from the 4th to the 12th instant, and during that period I examined the College students, both in the theory and practice of dairying, as regards the production and manufacture of dairy produce as at present carried out in Australasia.

I found that a number of the students had devoted special attention to the manufacture of dairy products, whilst others had given their attention to general dairy farm knowledge in order to grasp the subject in all its branches.

To test their knowledge of those subjects, I had a number of questions set on paper which were handed to each student, and ample time was allowed in the classrooms to enable them to write out the answers according to their lights, under my personal supervision.

I may state that I attached considerable importance to the manner in which these questions were answered. But in order to ascertain their practical knowledge in dairying, they were taken through the dairy herd and questioned on the chief points of dairy stock, and on the milking and handling of same.

They were also tested in the College dairy on the manufacture of dairy produce as taught at the College.

You will please observe that the maximum number of marks which any student could obtain was 200, and were arranged under two headings to embrace the two branches of dairying taught at the Gatton College—i.e., dairy-factory and dairy-farm work. This was done to show those students who were not so fortunate as they may have expected where their weak points, in my opinion, lay as regards their knowledge of dairying.

The marks are so arranged that those receiving 150 (and over) marks are entitled to a First-class Certificate. Those who received 100 marks and under 150 marks are entitled to a Second-class Certificate.

In reference to the qualifications of those students who were successful in obtaining first honours, I wish to place on record my thorough satisfaction of their efforts, and their ability to go out into the dairy world and give a good account of themselves, as I am highly pleased with their examination-papers.

I found the students, one and all, anxious to render a good account of themselves, by answering questions and performing practical work when required, and, with few exceptions, the examination-papers show a truly honest desire to gain merit.

FRANK McCAFFREY, Examiner.

During the last twelve months 38 students have left the College, some of whom have gone through the whole College course; others, who had a fair knowledge of agriculture before coming here, left after twelve months' instruction.

Of the 38 above mentioned, I have been enabled to trace all but one, and it is pleasing to note that so many have put the knowledge obtained into practice. The following are the occupations they are now engaged in or are making preparations to the end stated:—

Managing—		Gardening	...	...	...	...	1
Cheese factory	...	Pastoral life	...	...	...	...	2
Creamery	...	Government service	...	...	...	...	2
Dairy factory	...	South African war	...	...	...	...	2
Farm	...	Commercial life	...	...	...	...	3
Dairying or farming on own account	18	School teaching	...	...	...	...	1
Working on farm	...	Left Queensland	...	...	...	...	1
" " garden	...	No trace	...	...	...	...	1
Farming and gardening on own account	...	Total	...	...	...	...	38

SUMMARY.

Factories in connection with farming	3	South African war	...	...	...	2
Farming and dairying	21	Other	...	...	...	8
Gardening	2	Total	...	...	...	38
Pastoral life	2					

RAINFALL.—The rainfall for the year ending the 30th June, 1900, amounted to 32·84, viz. :—

1899—

July	...	...	...	...	...	...	2·01 during 6 days
August	...	...	...	...	...	...	1·19 " 5 "
September	...	...	...	...	...	...	2·46 " 11 "
October	...	...	...	...	...	...	2·07 " 9 "
November	...	...	...	...	...	...	2·90 " 4 "
December	...	...	...	...	...	...	4·85 " 8 "

1900—

January	...	...	...	...	...	...	1·75 " 4 "
February	...	...	...	...	...	...	4·07 " 4 "
March	...	...	...	...	...	...	3·63 " 7 "
April	...	...	...	...	...	...	2·25 " 5 "
May	...	...	...	...	...	...	4·14 " 10 "
June	...	...	...	...	...	...	1·52 " 5 "

Total 32·84 " 78 days

THE FARM.—The year has been anything but favourable for the production of crops, owing to the want of rain at suitable seasons, and this may be said of the whole of the Lockyer district.

The lucerne planted in the early history of the College is an utter failure, due to a great extent to the land not being in good condition at the time of planting. However, crops planted since then have given much better results.

The best lucerne on the College property at the present was planted with wheat. The wheat was cut for green fodder when coming out in ear, after which the lucerne made rapid growth. Some very old practical farmers, who had evidently never given the method a trial, criticised the idea very unfavourably, and it is for this reason I mention the matter.

The whole of our lucerne crop was fed, either in the form of chaff or hay, to the animals kept on the place.

The root crops—particularly the Swede turnips and mangolds—yielded well, and, notwithstanding the dry season, 3 acres of Swedes returned an average of 20 tons per acre. Carrots and onions also yielded well.

POTATOES.—The winter crop yielded 30 cwt. per acre of good marketable quality, besides a large quantity of small tubers that were used by the College for pig-feeding. Considering the bad season, the yield may be said to be good.

Early in August 10 acres (a summer crop) were planted, but the continual dry weather spoiled all chance of a marketable crop. However, 10 tons of good seed were saved.

In connection with this crop a test was made with "Jadoo fibre," 70 lb. being applied to $\frac{1}{4}$ -acre alongside of $\frac{1}{4}$ -acre unmanured. The result was *nil*, but this may be attributable to the dry season.

Early in February, 27 acres of potatoes were planted, a portion of which were ploughed in, and the balance planted in drills (as a test). The result was found to be much in favour of the drills.

Thirteen varieties were found to yield well, viz.:—Circular Head, Blue Skin, Magnum Bonum, Brownell's Beauty, White Elephant, Early Rose, Snowflake, Satisfaction, Breese's Peerless, Snowdrop, Emperor, Irish Flounder, and The Bruce.

The following are particulars of experiments with different manures :—

POTATO EXPERIMENTS.

PARTICULARS AS TO EXPERIMENTAL PLOTS OF POTATOES, PLANTED 2ND MARCH, 1900.

No. of Plot.	Manures Used.	Quantity.	Method of Distribution.	Price.	Remarks.
1. $\frac{1}{4}$ acre	{ Ammonium sulphate Superphosphate Potassium chloride	lb. 56 84 56	Placed in drills	per cwt. 10s. 4s. 6d. 14s. 6d.	{ Previous crops :—Maize, stud wheats, and oats.
2. $\frac{1}{4}$ acre	{ Wood ash Ammonium sulphate	140 28	Placed in drills	...	Previous crops :—Maize, stud wheats, and oats.
3. $\frac{1}{4}$ acre	Bonedust	224	Placed in drills	3s. 6d.	Previous crops :—Maize, stud wheats, and oats.
4. $\frac{1}{4}$ acre	Kainit	112	Placed in drills	5s.	Previous crops :—Maize, stud wheats, and oats.
5. $\frac{1}{4}$ acre	Potassium chloride	56	Placed in drills	13s.	Previous crops :—Maize, oats, oats.
6. $\frac{1}{4}$ acre	Filter press cake from sugar-mills	tons. 3 $\frac{1}{2}$	Ploughed in	per ton. 2s.	Previous crops :—Maize, oats, oats.
7. $\frac{1}{4}$ acre	No manure	...	...	...	Previous crops :—Maize, oats, oats.
8. $\frac{1}{4}$ acre	{ Ammonium sulphate Bone phosphate	lb. 28 196	Placed in drills	per cwt. ... 4s.	{ Previous crops :—Maize, oats, oats.
9. $\frac{1}{4}$ acre	{ Ammonium sulphate Kainit	28 112	Placed in drills	...	Previous crops :—Maize, oats, oats.
10. $\frac{1}{4}$ acre	Barnyard manure	tons. 8	Ploughed in	...	Previous crops :—Maize, oats, oats.

The land was ploughed twice to a depth of 6 inches on each occasion. The potatoes were planted in drills 3 feet apart, and 3 feet between each set in the rows. The manures, with the exception of the filter press cake and the barnyard manure, were placed in the drills. The filter press cake and the barnyard manure were spread over the land and ploughed in. On 24th March the potatoes were up, and very little difference is noticeable in the various plots. All plots were planted on the same day.

POTATO EXPERIMENTS—continued.

RESULT.

No. of Plot.	Large Potatoes.			Small Potatoes.			Total Yield per ¼ Acre. Cwt. qr. lb.
	Cwt.	qr.	lb.	Cwt.	qr.	lb.	
1	4	2	19	0	3	0	5 1 19
2	7	0	4	1	2	10	8 2 14
3	6	0	20	1	1	21	7 2 13
4	6	2	4	1	1	12	7 3 16
5	7	0	21	1	1	7	8 2 0
6	6	1	0	1	3	5	8 0 5
7	4	1	11	1	1	11	5 2 22
8	4	1	0	1	1	17	5 2 17
9	1	1	14	0	3	22	2 1 8
10	2	3	14	1	1	14	4 1 0

The results have been interfered with by irregular germination of seed, &c.; accordingly it would be futile to conclude that the phosphates are useless, or that the potash salts alone account for the increase of yield in plots 2, 4, and 5. Plot 7 was unmanured, and as the basis of comparison it shows generally that very little has been gained.

POTATO EXPERIMENTS.

Analysis of soils made by the Assistant Chemist:—

	Experimental.	Farm.
Moisture	5.215	6.835
Organic matter and combined water	9.484	10.274
Iron	8.740	9.755
Alumina	9.284	9.685
Lime	1.075	.945
Magnesia	1.008	1.175
Phosphoric acid	.245	.260
Sulphuric acid	.045	.010
Carbonic acid	.470	.260
Potash	.318	.306
Soda	.180	.180
Soluble silica	.070	.120
Insoluble silicates	63.520	60.820
	<u>99.654</u>	<u>100.625</u>
Humus	3.979	2.4
Nitrogen	.200	.12

ANALYSIS OF MANURES.

POTASSIUM CHLORIDE.—

	Per cent.
Potassium chloride (KCl)	97.92
Sand	2.03
Moisture	.04
	<u>99.99</u>

Equal to 51.58 potassium or 61.9 potash (K₂O).

AMMON. SULPHATE.—

	Per cent.
Ammon. sulphate	99.7
Sand	.24
Moisture	.06
	<u>100</u>

Equal to 25.7 per cent. (NH₃) ammonia, or 21.1 (N) nitrogen.

BONES (SHELTON & BROWN).—

	Per cent.
Moisture	4.83
*Organic matter and combined water	24.781
Calcium phos.	52.013
Phosphoric acid sol. water	.076
Sand	13.061
Magnesia	.270
Sulphuric acid	.214
Soda	.720
Potash	.093
CaO (as CO ₂ & SO ₃) (Lime)	4.486
Iron, alumina, &c.	Traces
	<u>100.544</u>

* Contains 1.8 per cent. nitrogen, 23.83 phosphoric acid (P₂O₅)

FILTER PRESS CAKE.—

(From raw sugar manufactory).

	Per cent.
Organic matter and moisture	73.711
Sulphuric acid	.347
Lime	8.750
Magnesia	.396
Phosphoric acid	.121
Sand	7.295
Carbonic acid, &c.	9.380
	<u>100.000</u>

BONES (REDLAND BAY).—

	Per cent.
Moisture	5.960
Organic and combined water	33.082
Magnesia	.460
Tricalcic phosp.	55.970
Sulphuric acid	.020
Sand	1.420
Iron, CO ₂ , alkalies, &c.	3.888
	<u>100.000</u>

Nitrogen, 3.61.

BONE PHOSPHATE.—

	Per cent.
Phosphoric acid (P ₂ O ₅)	30.05
Lime (CaO)	43.35
Sand	.445
Sulphuric acid and impurities	26.155
	<u>100.000</u>

Equal to 65.6 per cent. tricalcic phos.

STABLE COMPOST.—

	Per cent.
Moisture	34.320
Organic matter and combined water	6.836
Sulphuric acid	.097
Phosphoric acid (P ₂ O ₅)	.179
Chlorine	.071
Ca O (lime)	.619
Magnesia	.215
Iron	1.519
Alumina	1.127
Potash and soda	.960
Insoluble (sand, &c.)	53.943
	<u>99.886</u>

Nitrogen .43

SUPERPHOSPHATE OF LIME.—

	Per cent.
Soluble phosphoric acid	22.11
Total phosphoric acid	27.69
Sand	4.96

CORN USED FOR SILAGE MAKING.—

	Per cent.
Water	71.140
Woody fibre	9.221
Starch	2.140
Sugars	6.940
Albuminoids	2.380
Fat and Chlorophyll	.806
Ash	2.003
Digestible fibre and pectins	4.810
Undetermined and error	.560
	<u>100.000</u>

Soluble albuminoids, 1.920 per cent.; amides (after Wiley's method), .875 per cent.

OATS.—Ten acres of black Tartarian, slightly rusted, were harvested with the "Reaper and Binder" for hay. The yield was 16 tons, all of which was chopped with lucerne and fed to the working horses. I find the black oats not suitable for our rich soil, owing to its rank growth.

MALTING BARLEY.—Fifteen acres grown on the banks of the Lockyer Creek yielded an average of 32 bushels per acre. The grain was rather small, and could not be classed as a first-class malting sample. The smallness of the grain may be attributed to two reasons—first to the frost, and secondly to the richness of the soil, which in the latter case produces abundance of straw and small grain.

Four acres were also grown near the farm gates.

The barley was ground, a portion fed to pigs, and gave a greater profit than if disposed of at market values.

Horses were also fed on the barley, for whom it is a good food when crushed.

Cape and malting barley will, before many years are passed, be much more generally grown for feeding horses and pigs. It compares favourably with maize and lucerne, and the cost of production is less.

WHEAT CROPS.—Although many varieties were planted at different seasons in the year, it cannot be said that one sample was free from rust; 35 acres, consisting of Marshall's Nos. 3 and 9, were planted in the old Bull paddock. The growth was so rapid that I found it necessary to graze it down with the cattle. The paddock was divided into two equal portions. One portion was well eaten down before the cattle were turned into the other. No good result accrued from this experiment, each being equally affected with rust.

Twelve acres were planted with lucerne and wheat at the rate of 16 lb. wheat and 16 lb. lucerne per acre. On this crop no rust was to be seen. The crop was cut green and fed to cattle.

Small plots of Allora Spring and White Tuscan were also planted later in the season, with very poor results.

In my report of last year there were detailed, on page 10, sixty-four varieties of wheat that were planted during May. The whole of those wheats were more or less affected with rust. Of these, the Indian and Maccaroni varieties withstood the pest better than the remainder.

The following experiments are now being carried out:—

Wheat experiments, under treatment with various manures and under similar conditions as to time of sowing and implements used, were begun on 27th April. The wheats chosen were Allora Spring and Belatourka. They were planted with the Massey-Harris seed-drill at different depths, as detailed below, and manures calculated to produce the best results were applied. The land sown was that bordering on the Tarampa road. As the results of these experiments may be interesting to many, it may be as well to give details:—

Plot 1.—Allora Spring: Pickled with bluestone; 1 acre; 20 lb. seed (per acre); 2 inches deep.

Plot 2.—Allora Spring: Pickled with bluestone; $1\frac{1}{4}$ acres; 30 lb. seed; 1 inch deep.

Plot 3.—Belatourka: 3 cwt. superphosphate; 1 cwt. kainit (mixed); 1 acre; 25 lb. seed; $1\frac{1}{2}$ inches deep.

Plot 4.—Belatourka: No manure; 1 acre; 25 lb. seed; $1\frac{1}{2}$ inches deep.

Plot 5.—Belatourka: 122 lb. unslaked lime; 1 acre; 35 lb. seed; $1\frac{1}{2}$ inches deep.

Plot 6.—Belatourka: Pickled with lime; 1 acre; 30 lb. seed; $1\frac{1}{2}$ inches deep.

Plot 7.—Belatourka: Pickled with bluestone; $5\frac{3}{4}$ acres; 25 lb. seed; 2 inches deep.

The bluestone pickle consisted of $\frac{1}{2}$ -lb. of bluestone crystals dissolved in a little warm water and added to 14 gallons of cold water, applied to each sack containing 4 bushels of seed. The lime treatment was carried out with 8 lb. of unslaked lime mixed with 4 gallons of water. The seed in a sack was allowed to remain in the liquid for three hours.

In comparing the different plots up to the present there is nothing noticeable. Each plot is healthy and making vigorous growth.

The following is a list of the stud wheats planted, and now looking well—196 varieties:—

1. Egyptian	42. White Naples	84. 84 B Y Farrar's Old Strain
2. Sicilian Barbe	43. White Lammas (Young)	85. B Y 83 A 1 "
3. Forelia	44. Australian Talavera	86. 85 B 3 88 A 1 "
4. Mica	45. Talavera de Bellevue	87. 85 A 1 B 1 "
5. Medeah	46. Mammoth	88. 85 A B "
6. Egyptian C 1	47. Frampton	89. 86 Y "
7. " A 1	48. Blount's Fife	90. 85 D 2 "
8. " A 2	49. Small's O K	91. 84 C J D "
9. Young's Bearded	50. Anerson's R. R.	92. 84 C J D 2 "
10. Paros	51. Russian	93. Yandilla No. 3 "
11. Atlanti	52. Scotch Fife	94. Eden No. 1
12. Banater	53. Indian Y	95. Improved Yandilla (Indian)
13. Cretan	54. Indian D	96. Armstrong Selected
14. Belatourka	55. Battlefield	97. Tilley's Sport
15. Missogen	56. Trap	98. Silver King
16. Bearded Club	57. Pringle's No. 5	99. A Farrar's New Strain
17. Pugh's R. R.	58. Australian R. R.	100. A 1 "
18. Salvator	59. Leake's Defiance	101. A 2 "
19. Algerian	60. Pringle's "	102. B "
20. White-eared Mummy	61. Defiance	103. B A "
21. Brown "	62. Emerald	104. B 1 A "
22. Poland	63. Budd's Early	105. B 2 "
23. Diche Mediterranean	64. Allora Spring	106. B 2 A "
24. Hindustan	65. Odessa Sans Barbe	107. B 3 "
25. Brogan's Red and White	66. Australian Wonder	108. B 3 A "
26. Australian Bearded Port Ger-	67. Marshall's No. 3	109. B 4 "
main	68. " " 3	110. D 4 A "
27. Early Japanese-	69. " " 10	111. C "
28. Rudy	70. Ward's Prolific	112. C 1 "
29. Lazistan	71. Hercules	113. C 2 "
30. Russian Shelton	72. Ward's White	114. C 2 A "
31. Bearded Monarch	73. Marshall's No. 5	115. C 3 "
32. Australian Amber	74. Robins R. R.	116. C 3 A "
33. Beal	75. Odessa	117. D "
34. Early Baart	76. F. 1	118. D 1 "
35. Early Bearded	77. Deception Yandilla Strain	119. D 2 "
36. Bearded Velvet	78. 66 D Farrar's Old Strain	120. D 3 "
37. Cone Rivet	79. Ibex " " "	121. D 4 "
38. Basalt	80. R " " "	122. E "
39. White Tuscan	81. R I " " "	123. E 1 "
40. Frames Early	82. Best Strain " " "	124. E 2 "
41. Californian	83. C D 1 85 " " "	125. F 1 "

126. F 2 Farrar's New Strain	150. U 1 Farrar's New Strain	174. Z Z Farrar's New Strain
127. G " "	151. V 1 " "	175. A A A " "
128. G A " "	152. Y " "	176. B B B " "
129. G 1 " "	153. Y 1 " "	177. C C C " "
130. G 2 " "	154. C C " "	178. D D D " "
131. H " "	155. C C 1 " "	179. E E E " "
132. H 1 " "	156. D D " "	180. F F F " "
133. H 2 " "	157. D D 1 " "	181. Belatourka
134. I " "	158. E E " "	182. Improved Allora Spring
135. I 1 " "	159. F F " "	183. Leask's Rust Resistant
136. J " "	160. G G " "	184. Smith's Nonpariel
137. J 1 " "	161. H H " "	185. Leakrigg
138. J 2 " "	162. I I " "	186. 178 Cretan
139. N " "	163. J J " "	187. 380 Sweetheart
140. N 1 " "	164. M M " "	188. 12 Paros
141. Q " "	165. N N " "	189. 122 Indian F.
142. Q 1 " "	166. N N A " "	190. 120 B Farrar's Gatton Pedigree
143. Q 2 " "	167. P P " "	102 C 2
144. Q 3 " "	168. Q Q " "	191. 266 Amethyst
145. R " "	169. R R " "	192. 383 Comeback
146. S 1 " "	170. T T " "	193. 391 Hayricks
147. T " "	171. V V " "	194. Yandilla
148. T 1 " "	172. X X " "	195. Gatton 65 X Y
149. U " "	173. Y Y " "	196. Crown Wheat

MAIZE.—Fifteen acres were planted in the creek paddock with five varieties, viz.:—Early Mastodon, Red Hogan, White Silver Gown, Early Heron, and Macleay River.

Notwithstanding the bad season 28 bushels to the acre were harvested, all of which (with the exception of a little kept for seed) was fed to horses and pigs.

Thirteen acres planted near the Tarampa road failed to mature and the crop was placed in the silo, the average yield being 8 tons per acre.

PUMPKINS.—Seven varieties were planted, all of which have done remarkably well and are now being fed to pigs and cattle. A record of the total weight is kept, and will be supplied to the *Agricultural Journal* for the information of the public.

BROOM CORN.—Two acres were harvested and yielded very well.

GREEN FODDERS.—Oats, rye, wheat, lucerne, green maize, sorghums, amber cane and millets, lucerne chaff mixed with bran and molasses have been used for feed; also green Cape barley, which was found to surpass everything for milk production.

INDIAN MILLETS (39 varieties) now growing are—

Gangad	Imphi	Kondal	Farfaria
Nirmali	Mogar Wain	Javari Jola	Cottur Jowar
Saragad	Nilwa (Poona)	Jowla	Dhawala
Akawa	Fulgar	Bile Jowar	Kempu
Nealo	Sadhi	Perio	Wain Perio
Kati	Dakshinu	Neoria	Nilwa (Khandest)
Amber Jowar	Kar Jola	Gudghi	Kala Bondi
Potasi	Yellaspun	Gidgar	Khondi
Rati	Mungari	Utawali	Chapti
Deshi Perio	White Wain	Sholapuri.	

A few seeds of these varieties were obtained from New South Wales, and planted in rows, thus enabling us to save the seeds without difficulty. I have found the millets to be quick growers, reaching a height of 12 feet.

The sweet corn planted cover the following varieties:—

1. Early Fordhook	9. Minnesota	17. Shervell's Evergreen
2. " Mammoth	10. Roslyn Hybrid	18. Old Colony
3. Melrose	11. White Cob	19. More's Concord
4. Mammoth	12. Hickox	20. Asylum Sugar
5. Triumph	13. Crosby's Early	21. Stabler's Early
6. Zigzag	14. Kendall's Early Market	22. Black Mexican
7. Early Adams	15. Egyptian	23. Country Gentleman
8. Perry's Hybrid	16. New Champion	24. First of All

The returns from the above were poor; many of them never matured, owing to the dry weather.

COW PEA.—Three varieties of this pea were sown upon 11 acres, and grew remarkably well until the dry weather came, when it appeared to gradually decay, with the result that only one-fourth of a crop was obtained. The pods were badly infected with insects.

FIELD PEAS AND VETCHES.—Four acres of each were planted. The former gave a very good return; was cut and mixed with oaten hay, making an excellent chaff. The latter were a failure.

GRASSES AND CLOVERS.—Eight varieties of grasses and five of clover were planted. Those which withstood the dry weather are: Grasses—*Paspalum dilatatum*, rye-grass, cocksfoot, rib-grass, prairie-grass, and red Natal.

Clovers—Red, white, alsike, scarlet, and Bokahara.

Cattle and sheep were grazed on the plots, and appeared to relish all but the Bokhara clover and red Natal grass. From a few roots of *paspalum dilatatum* which I carried over from New South Wales a few years ago, we have now sufficient to plant about 9 acres, but I have not been successful in producing the grass from seeds. I have known the seed to remain dormant for eighteen months, then germinate and grow well.

ENSILAGE.—Owing to the amount of green fodder available this season, we have not been called upon to open the silos, which contain 175 tons. There is also on hand a quantity of stock silage, which has now been held over for two years, and still holds its condition as a sound fodder. Had it not been for the silos this year, the 175 tons of good food which they now contain would have gone to waste on the farm.

It is to be hoped that this lesson will induce the farmers to take a similar course in the near future.

There is no necessity for me to prolong this Report, because the experiments, and a great deal of the important work carried out on the farms, appear each month in the *Agricultural Journal*.

In connection with this department, Mr. Watt (the Farm Foreman) reports that the students' conduct was good, and their progress excellent.

Mr. Watt and his assistant, Mr. Jordon, are hard-worked officers; their work commences at 5:30 a.m., and does not cease until 5:30 p.m. My many thanks are due to those two gentlemen for their good work and loyal support.

The following is a summary of the crops removed and crops growing at the present time:—

CROPS ON COLLEGE FARM, NOVEMBER, 1899.

Plot.	a.	r.	p.	Description of Crop.	Plot.	a.	r.	p.	Description of Crop.
1.	0	0	16	<i>Paspalum dilatatum</i>	22.	0	1	13	Mangolds
2.	0	1	2	Vacant (crops failed)	23.	0	0	29	Carrots, turnips, and radishes
3.	0	0	29	Egyptian clover	24.	0	0	17	Lentils
4.	2	1	26	Various grasses experimental	25.	0	0	26	Nepaul barley
5.	0	3	10	Onions	26.	3	0	37	Malting barley
6.	0	0	23	Carrots	27.	0	3	5	Rye grass
7.	1	3	3	Beet	28.	2	2	16	Rough cocksfoot
8.	1	3	19	Mangolds	29.	1	2	10	Prairie grass
9.	1	1	4	Carrots	30.	1	3	27	Rye grass
10.	1	1	13	Corn	31.	1	1	33	Broom millet
11.	2	3	20	Tobacco (greater part failed)	32.	0	2	1	Prairie grass
12.	10	3	22	Lucerne	33.	0	1	33	Broom millet.
13.	7	2	22	Potatoes	34.	0	1	18	Rye grass
14.	2	1	9	Lentils and oats	35.	2	0	5	Clovers
15.	13	1	23	Wheat, barley, and oats (cut for fodder)	36.	12	2	28	Maize and pumpkins
16.	2	3	24	Swede turnips	37.	4	2	9	Field peas
17.	0	1	20	Stud wheats	38.	4	2	31	Vetches
18.	0	0	25	Nepaul barley	39.	14	2	5	Maize
19.	0	0	10	Onions	40.	2	1	10	Potatoes
20.	0	0	10	Barley	41.	2	1	2	Mangolds
21.	0	0	18	Onions	42.	11	0	4	Oats
						118	2	27	

BULL PADDOCK.

a.	r.	p.	Description of Crop.
35	2	30	Wheat

GARDEN PADDOCK.

a.	r.	p.	Description of Crop.
24	1	17	Lucerne
22	3	11	Orchard
0	2	17	Vines
1	2	0	Strawberries
7	0	0	Vegetables and sundry crops
2	2	21	Panicum
38	3	26	

CREEK PADDOCK, No. 1.

a.	r.	p.	Description of Crop.
39	0	0	Wheat, barley, and oats (cut for green fodder)

CREEK PADDOCK, No. 2.

a.	r.	p.	Description of Crop.
15	0	0	Malting barley
15	0	0	Potatoes
30	0	0	

Area of this paddock is shown on June survey as 29 acres 2 roods. A road is now left along one side, accounting for the difference of 2 roods.

CROPS ON HILL, NEAR PRINCIPAL'S HOUSE.

a.	r.	p.	Description of Crop.
2	0	0	Olives and Kafir corn
2	0	0	Vines
3	0	0	Tobacco
7	0	0	

CROPS ON COLLEGE FARM, JUNE, 1900.

Plot.	a.	r.	p.	Description of Crop.	Plot.	a.	r.	p.	Description of Crop.
1.	0	0	16	<i>Paspalum dilatatum</i>	35.	0	2	1	Prairie grass
2.	0	0	39	Indian millets	36.	1	1	33	Vacant, millet lately removed
3.	2	1	2	Stud wheats, 1 rood; fallow, 2 acres 0 roods 2 perches	37.	1	3	27	Rye grass
4.	0	2	6	Cabbages	38.	4	3	31	Various grasses: Rye grass, 3 roods 5 perches; cocksfoot, 2 acres 2 roods 16 perches; prairie, 1 acre 2 roods 10 perches
5.	0	0	38	Buckwheat	39.	25	0	0	Potatoes
6.	0	1	0	Flax	0	1	17	Fallow	
7.	0	0	38	Chicory	118	2	27		
8.	0	1	20	Turnips					
9.	0	0	37	Swede turnips					
10.	0	1	17	Mangolds					
11.	1	0	7	Sugar beet					
12.	1	0	0	Onions					
13.	1	0	1	Mangolds					
14.	0	2	4	Swede turnips					
15.	1	1	22	Carrots					
16.	0	1	9	Pumpkins					
17.	0	0	28	Tobacco					
18.	2	1	23	Barley and lucerne					
19.	10	3	22	Lucerne					
20.	6	0	26	Maize and pumpkins					
21.	1	2	28	Cape barley					
22.	2	2	20	Malting barley					
23.	12	3	28	Wheat					
24.	2	3	28	Rye (part cut for fodder)					
25.	2	1	37	Potatoes (experimental plots)					
26.	5	3	17	Cape barley					
27.	1	0	4	Swede turnips					
28.	6	0	33	Amber cane and sorghum (for the most part cut)					
29.	2	1	15	Cape barley (for fodder)					
30.	0	2	8	Swampy ground planted with paspalum					
31.	13	1	9	Wheat					
32.	2	0	5	Clovers					
33.	0	1	18	Rye grass					
34.	0	1	33	Vacant, millet lately removed					

BULL PADDOCK.

a.	r.	p.	Description of Crop.
35	2	30	Maize and pumpkins

GARDEN PADDOCK.

a.	r.	p.	Description of Crop.
24	1	17	Lucerne
2	3	11	Orchard
0	2	17	Vines
0	2	21	Strawberries
7	2	0	Vegetables
3	0	0	Fallow
38	3	26	

CREEK PADDOCK, No. 1.

a.	r.	p.	Description of Crop.
12	2	0	Oats
5	1	0	Rye
3	3	12	Wheat
7	0	0	Barley
5	3	0	Pumpkins
4	2	28	Fallow
39	0	0	

CROPS ON COLLEGE FARM, JUNE, 1900—continued.

CREEK Paddock, No. 2.				PIG AND CALF Paddock.			
a.	r.	p.	Description of Crop.	a.	r.	p.	Description of Crop.
12	1	0	Malting barley	9	0	0	Ploughed and harrowed (not yet planted)
5	1	0	Cape barley				
12	0	0	Cornstalks (corn not picked)				
<hr/>				<hr/>			
29	2	0	This paddock, in the interval between November and June surveys, was planted with maize. The whole of this crop has been removed with the excep- tion of the 12 acres mentioned above.	2	0	0	Olives and Kafir corn
				2	0	0	Vines
				3	0	0	Fallow
<hr/>				<hr/>			
				7	0	0	

CROPS ON HILL, NEAR PRINCIPAL'S
RESIDENCE.

a.	r.	p.	Description of Crop.
2	0	0	Olives and Kafir corn
2	0	0	Vines
3	0	0	Fallow
<hr/>			
7	0	0	

HORSES.—Since my last report a very fine two-year draught stallion has been purchased and added to our stock. This animal was purchased in April last, and has improved very much since his arrival at the College.

Eight very nice three-year-old draught fillies were also bought from Maryvale station (Darling Downs). These mares have all been broken in and are working well. They were purchased with the view of breeding from them next year.

There are at the College at present 13 heavy draught geldings, 7 mares and 8 fillies, 6 saddle and light harness horses, 1 light mare with foal at foot, 2 mules.

Plenty of work is available for all the horses on the place.

THE DAIRY.—This department is under the supervision of Mr. C. McGrath, who is called upon to perform the most arduous duties of all the officers here. His hours are early and late, and, the work being so divided, necessitates his presence at many places during the day.

Mr. McGrath states that a deep interest has been taken by the students in the work generally, and particularly in the factory work.

The students are called upon to assist in the milking, feeding, general management of the dairy herd, and the factory work. The work is so distributed that each student has an opportunity of acquiring a knowledge of the different branches.

I wish to point out here that several of the College students have received appointments to responsible positions in butter and cheese factories, and have filled the positions with credit to the College and to themselves.

During the year a substantial increase in the output of dairy produce has taken place, as may be seen from the figures quoted:—

Month.	Gallons Milk.	Lb. Cheese.	Gallons Milk.	Lb. Butter.
1899.				
July	590	623	1,073	433
August	604	634	684	231
September	473	492	765	268½
October	859	877	1,492	517
November	...	...	3,074	1,109
December	...	...	3,704	1,332
1900.				
January	2,426	2,405	1,416	494
February	1,965	1,986	1,003	368
March	1,911	1,948	1,415	598½
April	75	80	2,991	1,197½
May	1,643	1,805	1,027	427
June	...	...	1,683	657
	<hr/>	<hr/>	<hr/>	<hr/>
	10,546	10,850	20,327	7,632½

Several shipments of pasteurised butter and cheddar cheese were sent to London, and one to South Africa.

The report from London merchants and others interested were highly favourable regarding the quality of both products.

A series of experiments in feeding dairy stock were carried out during the year, full particulars of which are as follows:—

EXPERIMENTS—FEEDING FOR MILK.

These experiments were made with six cows from the College herd.

Annie Laurie and Ream Ruthie are Ayrshires; Stumpy and Eileen are Jerseys; Toughy is a South Coast cow; Whiteflank is a grade shorthorn. Many other animals in the herd are giving far greater yields than several of the above cows, but the latter are suitable for the purpose, as they are accustomed to stall-feeding. For the first week they were allowed to feed as usual in the paddocks, no extra food being given. For the next two weeks they were fed on bran, cow-pea chaff, and molasses, the quantities being given elsewhere. A very slight increase was made as regards quantity of milk, and the proportion of butter-fat was practically unchanged.

FEEDING ON ORDINARY PASTURE FOR SEVEN DAYS, COMMENCING ON 5TH OCTOBER.

Cow.	5 Oct.			6 Oct.			7 Oct.			8 Oct.			9 Oct.			10 Oct.			11 Oct.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Annie Laurie (A.)	24	3.3	.88	24	3.2	.86	21	3.3	.77	25	3.1	.86	23	3.3	.85	23	3.3	.84	24	3.1	.83
Eileen (J.)	22	5.1	1.19	18	4.6	.92	19	3.6	.79	22	4.1	1.0	20	4.3	.96	21	4.6	1.07	20	4.4	.98
Ream Ruthie (A.)	25	3.5	.98	24	3.7	.99	25	3.8	1.06	25	3.7	1.03	25	3.6	1.0	24	3.6	.96	20	3.7	.83
Whiteflank (S.C.)	19	3.4	.72	22	3.7	.91	20	3.8	.85	26	3.8	1.09	23	3.7	.95	19	3.5	.74	20	3.6	.8
Stumpy (J.)	25	5.0	1.4	22	5.0	1.23	22	5.0	1.23	23	5.0	1.28	23	4.8	1.23	23	4.9	1.25	23	4.7	1.2
Toughy (S.C.)	21	2.6	.61	21	3.1	.72	20	3.0	.67	21	3.2	.75	21	2.9	.67	20	3.0	.67	22	3.1	.76

(A.) indicates Ayrshire; (J.) Jersey; (S.C.) South Coast.

EXPERIMENTS—FEEDING FOR MILK—continued.
TOTAL YIELDS, 5TH TO 11TH OCTOBER.

Name of Cow.	Milk.	Average Test.	Butter.
	lb.		lb.
Annie Laurie (A.)	164	3.2	5.89
Eileen (J.)	142	4.4	6.88
Ream Ruthie (A.)	168	3.6	6.85
Whiteflank (S.C.)	149	3.6	6.06
Stumpy (J.)	161	4.9	8.82
Toughy (S.C.)	146	3.0	4.85

FEEDING ON CHAFF, BRAN, AND MOLASSES AND ORDINARY PASTURE FROM 12TH TO 25TH OCTOBER.

Cow.	12 Oct.			13 Oct.			14 Oct.			15 Oct.			16 Oct.			17 Oct.			18 Oct.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Annie Laurie...	25	3.1	.86	24	3.2	.86	24	3.3	.88	24	3.1	.83	26	3.2	.93	25	3.3	.92	24	3.2	.86
Eileen ...	21	4.6	1.07	21	4.0	.94	22	4.1	1.00	19	4.9	1.04	22	5.0	1.23	21	4.3	1.01	17	5.1	.96
Ream Ruthie...	20	3.7	.83	21	3.1	.72	22	3.4	.83	27	3.6	1.08	20	3.7	.83	25	3.5	.98	22	3.6	.88
Whiteflank ...	21	3.6	.84	22	3.5	.86	23	3.7	.95	22	3.5	.86	22	3.6	.88	25	3.5	.98	21	3.6	.84
Stumpy ...	23	5.0	1.28	25	4.6	1.28	24	4.3	1.15	21	4.6	1.07	21	5.0	1.17	24	4.9	1.31	23	5.0	1.28
Toughy ...	22	3.1	.76	22	3.1	.76	21	3.2	.75	21	3.2	.75	23	3.3	.85	23	3.1	.79	22	3.0	.74

Cow.	19 Oct.			20 Oct.			21 Oct.			22 Oct.			23 Oct.			24 Oct.			25 Oct.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Annie Laurie ...	25	3.3	.92	23	3.1	.79	23	3.3	.84	27	3.2	.93	25	3.1	.86	25	3.1	.86	23	3.3	.92
Eileen ...	22	4.1	1.01	22	4.4	1.07	20	4.6	1.03	19	5.0	1.06	23	4.7	1.21	23	5.0	1.28	20	4.8	1.07
Ream Ruthie ...	23	3.7	.95	21	3.6	.85	26	3.4	.98	26	3.4	.98	24	3.7	.99	20	3.7	.83	19	3.8	.81
Whiteflank ...	22	3.5	.86	24	3.5	.94	20	3.7	.83	21	3.6	.85	22	3.4	.83	22	3.4	.83	24	3.8	1.02
Stumpy ...	23	5.0	1.28	22	5.0	1.23	23	4.9	1.25	25	4.6	1.29	27	4.7	1.41	26	4.9	1.42	21	5.0	1.17
Toughy ...	22	3.0	.75	24	2.9	.77	22	3.1	.76	24	3.0	.80	23	3.3	.85	23	3.2	.82	21	3.2	.75

TOTAL YIELDS.

Name of Cow.	12TH TO 18TH OCTOBER.			19TH TO 25TH OCTOBER.		
	Milk.	Average Test.	Butter.	Milk.	Average Test.	Butter.
	lb.		lb.	lb.		lb.
Annie Laurie ...	172	3.2	6.14	171	3.2	6.15
Eileen ...	143	4.6	7.25	149	4.6	7.73
Ream Ruthie ...	157	3.5	6.15	159	3.6	6.39
Whiteflank ...	156	3.6	6.21	155	3.5	6.16
Stumpy ...	161	4.8	8.54	167	4.9	9.05
Toughy ...	154	3.1	5.40	159	3.1	5.50

RATION FED TO THE COWS FROM 12TH TO 25TH OCTOBER.

10 lb. cow-pea chaff.
2 lb. bran.

1 quart molasses (mixed with four times its bulk of water.)

This ration was fed twice a day.

The six cows were allowed to feed on ordinary pasture for ten days, commencing 6th November, 1899.

At the end of this period they were fed, twice a day, on a ration consisting of 10 lb. mixed chaff, 4 lb. bran, 1 quart molasses (the molasses being diluted with 3 quarts of water) for each cow, this feeding being continued for ten days.

As may be seen by the result given below, the percentage of butter-fat and yield of milk remained practically the same, a result which may be attributed to a great extent to the fact that the natural pasture was very good at the time.

TEST OF SIX COWS FED ON ORDINARY PASTURE FOR TEN DAYS, COMMENCING 6TH NOVEMBER, 1899.

Name of Cow.	6 Nov.			7 Nov.			8 Nov.			9 Nov.			10 Nov.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Annie Laurie ...	23	3.1	.80	25	3.2	.89	24	3.3	.88	23	3.1	.80	24	3.3	.88
Eileen ...	22	4.1	1.01	20	4.6	1.03	21	4.4	1.03	20	4.8	1.07	21	4.4	1.03
Ream Ruthie ...	21	3.2	.75	19	3.3	.69	19	3.6	.76	19	3.5	.74	19	3.3	.69
Stumpy ...	22	4.3	1.06	25	4.6	1.23	23	5.0	1.23	23	4.8	1.23	24	4.7	1.25
Toughy ...	20	2.8	.62	20	3.0	.67	21	3.2	.75	22	3.1	.76	19	3.3	.69
Whiteflank ...	20	3.2	.71	19	3.5	.74	20	3.4	.76	20	3.6	.80	21	3.5	.81

Name of Cow.	11 Nov.			12 Nov.			13 Nov.			14 Nov.			15 Nov.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Annie Laurie ...	21	3.2	.75	21	3.3	.77	21	3.3	.77	22	3.1	.76	23	3.1	.80
Eileen ...	20	4.5	1.0	20	4.6	1.03	17	4.6	.87	19	4.8	1.02	20	4.9	1.09
Ream Ruthie ...	20	3.4	.76	19	3.5	.74	18	3.3	.65	21	3.4	.79	20	3.6	.80
Stumpy ...	23	4.9	1.25	21	4.9	1.14	19	4.8	1.02	21	4.9	1.14	22	4.8	1.17
Toughy ...	20	3.0	.67	20	3.1	.69	19	3.0	.64	21	3.2	.75	20	3.1	.69
Whiteflank ...	31	3.4	.79	20	3.6	.90	19	3.3	.89	20	3.4	.76	20	3.6	.80

EXPERIMENTS—FEEDING FOR MILK—continued.

TESTS OF COWS FED ON A RATION OF BRAN, MIXED CHAFF, AND MOLASSES FOR TEN DAYS, COMMENCING 16TH NOVEMBER, 1899.

Name of Cow.	16 Nov.			17 Nov.			18 Nov.			19 Nov.			20 Nov.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Annie Laurie ...	lb. 21	3.3	.77	lb. 20	3.2	.71	lb. 19	3.3	.69	lb. 21	3.1	.72	lb. 22	3.2	.78
Eileen ...	20	4.6	1.03	21	4.4	1.03	19	4.9	1.04	19	4.9	1.04	20	4.5	1.0
Ream Routhie ...	20	3.4	.76	19	3.5	.74	18	3.7	.74	20	3.4	.76	19	3.2	.67
Stumpy ...	23	4.7	1.21	22	4.3	1.06	19	5.0	1.06	22	4.8	1.17	20	4.6	1.03
Toughy ...	20	3.0	.67	21	3.2	.75	20	3.3	.74	19	3.0	.64	20	3.1	.69
Whiteflank ...	21	3.6	.84	20	3.4	.76	21	3.5	.81	19	3.7	.78	19	3.5	.74

Name of Cow.	21 Nov.			22 Nov.			23 Nov.			24 Nov.			25 Nov.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Annie Laurie ...	lb. 23	3.0	.77	lb. 23	3.1	.80	lb. 22	3.2	.78	lb. 21	3.3	.77	lb. 23	3.1	.80
Eileen ...	21	4.4	1.03	18	4.3	.86	20	4.7	1.03	19	4.9	1.04	19	4.6	.97
Ream Routhie ...	20	3.6	.80	18	3.4	.68	21	3.2	.75	18	3.6	.71	20	3.6	.80
Stumpy ...	21	4.7	1.10	20	4.8	1.07	23	4.8	1.23	24	4.7	1.25	25	4.9	1.36
Toughy ...	21	2.9	.67	21	3.2	.75	20	3.1	.69	21	3.0	.70	20	3.1	.69
Whiteflank ...	23	3.1	.80	21	3.3	.77	19	3.7	.78	22	3.4	.83	21	3.6	.84

TOTAL AMOUNT OF MILK AND BUTTER OBTAINED FROM 6TH TO 25TH NOVEMBER.

Name of Cow.	6TH TO 16TH NOVEMBER.			16TH TO 25TH NOVEMBER.		
	Milk.	Average Test.	Butter.	Milk.	Average Test.	Butter.
Annie Laurie ...	lb. 227	3.2	lb. 8.13	lb. 215	3.2	lb. 7.6
Eileen ...	200	4.6	10.2	196	4.6	10.09
Ream Routhie ...	195	3.4	7.4	193	3.5	7.4
Stumpy ...	220	4.8	11.8	219	4.7	11.5
Toughy ...	202	3.1	7.0	203	3.1	7.0
Whiteflank ...	200	3.4	7.6	208	3.5	8.0

DAILY YIELD OF COWS FED ON NATURAL PASTURE ONLY FOR A PERIOD OF SIXTEEN DAYS.

Name of Cow.	1.			2.			3.			4.			5.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Eileen (Jersey) ...	lb. 17	5.0	.95	lb. 14	5.1	.79	lb. 16	5.0	.89	lb. 15	5.5	.924	lb. 15	5.1	.85
Effe (Jersey) ...	18	4.8	.967	18	4.4	.88	17	4.3	.818	17	4.5	.85	19	4.4	.93
Laverock (Ayrshire) ...	22	3.9	.94	23	3.6	.92	23	3.9	.9	22	3.7	.91	22.5	3.6	.9
Leesome (Ayrshire) ...	21	3.9	.91	22.5	4.0	1.0	23	3.8	.97	24	3.8	1.02	22	4.0	.98
Curly (Grade) ...	22	3.8	.93	23	3.6	.92	21	3.5	.82	21.5	3.7	.89	22	3.6	.88
Rusty (Grade) ...	28	3.9	1.2	26	3.4	.99	26.5	3.7	1.09	23.5	3.9	1.02	24	3.4	.91

Name of Cow.	6.			7.			8.			9.			10.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Eileen ...	lb. 15	5.3	.889	lb. 15	5.5	.924	lb. 14	5.0	.78	lb. 15	5.4	.9	lb. 16	5.1	.91
Effe ...	18	4.6	.92	17	4.2	.79	17	4.4	.83	18	4.1	.82	18	4.6	.92
Laverock ...	22	3.9	.96	23	3.7	.95	23	3.6	.92	23.5	3.5	.92	22.5	3.9	.98
Leesome ...	22	3.9	.96	18	4.2	.84	18.5	4.1	.84	18.5	3.8	.78	17	3.9	.74
Curly ...	23.5	3.8	1.0	22	3.5	.86	20	3.9	.87	19	3.7	.78	21	3.5	.82
Rusty ...	23	3.6	.92	23	3.5	.9	22	3.9	.96	21	3.9	.91	22	4.0	.89

Name of Cow.	11.			12.			13.			14.			15.			16.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Eileen ...	lb. 17	5.3	1.0	lb. 14	5.0	.78	lb. 15	5.6	.94	lb. 14	5.6	.87	lb. 15	5.0	.84	lb. 15	5.1	.85
Effe ...	17	4.3	.81	18	4.5	.9	17	4.5	.85	17	5.0	.95	18	4.3	.86	16	4.4	.83
Laverock ...	21	3.5	.82	23.5	3.8	.99	22	3.9	.96	24	3.6	.96	23	3.5	.9	25	3.9	1.09
Leesome ...	17	4.3	.82	18	4.0	.8	16	3.9	.69	17	3.8	.72	18	3.7	.74	18	4.0	.80
Curly ...	23	3.9	.99	24	3.8	1.02	22	3.6	.88	19	3.9	.82	19	3.5	.74	20	3.6	.8
Rusty ...	22.5	3.4	.85	22.5	3.8	.95	21.5	3.5	.84	23	3.4	.81	24	3.5	.94	22.5	3.6	.9

EXPERIMENTS—FEEDING FOR MILK—continued.

DAILY YIELD OF COWS RECEIVING IN ADDITION TO NATURAL PASTURE A DAILY RATION OF 20 LB. OF CHAFFED GREEN MAIZE FOR A PERIOD OF SIXTEEN DAYS.

Name of Cow.	1.			2.			3.			4.			5.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Eileen (Jersey) ...	17	5.2	.99	17	5.0	.95	15	5.4	.9	16	5.4	.96	15	5.3	.89
Effie (Jersey) ...	19	4.5	.95	21	4.4	1.02	18	4.3	.86	19	4.4	.93	18	4.5	.90
Laverock (Ayrshire)	28	3.8	1.19	22	3.9	.96	25	3.6	1.0	26	3.8	1.1	22	3.8	.93
Leesome (Ayrshire)	24	4.4	1.17	22	4.1	1.01	20	4.1	.91	24	3.9	1.04	22	3.8	.93
Curly (Grade) ...	24	3.6	.96	25	3.8	1.08	25	3.4	.95	25	3.3	.92	27	3.3	.99
Rusty (Grade) ...	30	3.6	1.22	27	3.9	1.17	27	3.7	1.15	28	3.8	1.18	28	3.6	1.12

Name of Cow.	6.			7.			8.			9.			10.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Eileen ...	16	5.2	.94	15	5.1	.85	16	5.5	.98	15	5.3	.89	14	5.2	.81
Effie ...	19	4.3	.91	17	4.4	.83	19	4.6	.97	18	4.2	.86	23	4.3	1.00
Laverock ...	26	3.5	1.01	23	3.6	.92	21	3.8	.89	22	3.8	.93	23	3.6	.88
Leesome ...	23	4.0	1.02	20	4.1	.91	20	3.9	.87	18	4.4	.88	14	4.0	.62
Curly ...	28	3.5	1.01	25	3.6	1.0	24	3.3	.88	22	3.7	.91	23	3.5	.9
Rusty ...	28	3.9	1.22	26	3.5	1.01	26	3.6	1.04	25	3.6	1.0	26	3.7	1.07

Name of Cow.	11.			12.			13.			14.			15.			16.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Eileen ...	15	5.2	.87	15	5.5	.92	16	5.3	.94	14	5.1	.79	14	5.4	.84	12	5.4	.72
Effie ...	17	4.4	.83	17	4.7	.89	15	4.9	.78	16	4.5	.80	16	4.6	.82	16	5.0	.89
Laverock ...	22	3.8	.93	25	3.7	1.03	21	3.7	.87	22	3.9	.96	22	3.9	.96	18	4.1	.82
Leesome ...	20	4.4	.98	20	4.1	.91	18	4.2	.84	17	4.0	.76	15	4.4	.73	11	4.3	.52
Curly ...	21	3.5	.82	22	3.8	.93	23	3.6	.92	21	3.6	.84	23	3.9	.90	21	3.6	.84
Rusty ...	24	3.8	1.01	24	3.4	.9	25	3.9	1.09	23	3.6	.92	24	3.8	1.02	23	3.5	.9

TOTAL AMOUNTS OF MILK AND BUTTER OBTAINED DURING EACH PERIOD OF SIXTEEN DAYS.

Name of Cow.	Fed on Natural Pasture Only.		Name of Cow.	Fed on Natural Pastures, and with the addition of a daily ration of 20 lb. Chaffed Green Maize.	
	Milk.	Butter.		Milk.	Butter.
	lb.	lb.		lb.	lb.
Eileen ...	242	14.07	Eileen ...	242	14.24
Effie ...	280	13.91	Effie ...	288	14.24
Laverock ...	365	15.02	Laverock ...	367	15.38
Leesome ...	310.5	13.61	Leesome ...	338	14.10
Curly ...	342	13.92	Curly ...	377	14.83
Rusty ...	375	15.08	Rusty ...	414	17.02
	1,914.5	85.61		1,996	89.81

To ascertain whether the milk flow of cows grazed on good natural pastures could be increased, and if so, to what extent, by the additional food, six cows were selected and allowed the run of a well-grassed paddock for a period of sixteen days. A daily record was kept of their yield. For sixteen days subsequent to this period they were allowed the same pasturage, receiving in addition a daily ration of 20 lb. of chaffed green maize daily. In making the selection heavy milkers were avoided, the preference being given to cows having a tendency to decrease the yield. From a perusal of the table of yields it will be seen that the increase that resulted from the additional ration daily was small, being 81.5 lb. of milk or 4.2 lb. of butter from the six cows for the period of sixteen days. The smallness of the increase is no doubt due to the good condition of the pastures at the time.

DAILY YIELD OF COWS FED ON A DAILY RATION OF 20 LB. GREEN CHAFFED MAIZE.

Name of Cow.	1.			2.			3.			4.			5.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Eileen (Jersey) ...	17	5.3	1.0	16	5.5	.985	16	5.2	.94	15	5.5	.92	16	5.6	.96
Effie (Jersey) ...	17	5.1	.97	17	5.2	.99	18	5.0	1.0	17	4.6	.87	17	4.8	.91
Laverock (Ayrshire)	22	3.6	.88	21	3.5	.82	22	3.8	.93	24	3.6	.96	22	3.9	.96
Leesome (Ayrshire)	19	4.0	.85	23.5	3.8	1.0	23	3.9	1.0	22	3.9	.96	23	3.8	.97
Curly (Grade) ...	20	3.8	.85	20	3.9	.87	21	3.6	.84	22	3.8	.93	23	3.9	.96
Rusty (Grade) ...	24	3.9	1.04	23	3.9	1.0	23	3.7	.95	26	3.5	1.0	26	3.7	1.0

EXPERIMENTS—FEEDING FOR MILK—continued.

DAILY YIELD OF COWS FED ON A DAILY RATION OF 20 LB GREEN CHAFFED MAIZE—continued.

Name of Cow.	6.			7.			8.			9.			10.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Eileen ...	16	5.4	.93	16	5.2	.94	17	5.1	.97	16	5.3	.94	17	5.4	1.03
Effe ...	17	5.0	.95	16	5.0	1.0	16	5.5	.99	17	5.3	1.0	16	5.2	.95
Laverock ...	24	3.8	1.0	22	3.6	.89	22	3.5	.91	25	3.6	1.0	24	3.8	1.0
Leesome ...	23	3.6	.93	23	3.7	.95	24	3.5	.95	24	3.6	.95	25	3.6	1.0
Curly ...	24	3.8	1.01	27	3.3	1.0	25	3.6	1.0	25	3.7	1.0	23	3.8	.97
Rusty ...	23	3.9	1.0	24	3.5	.95	23	3.9	1.0	24	3.6	.96	27	3.9	1.1

Name of Cow.	11.			12.			13.			14.			15.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Eileen ...	18	5.5	1.1	16	5.5	.99	18	5.0	1.0	17	5.1	.97	18	5.0	1.0
Effe ...	17	5.3	1.0	18	5.0	1.0	20	5.4	1.2	18	5.0	1.0	17	5.3	1.0
Laverock ...	23	3.7	.95	24	3.9	1.0	22	3.8	.93	21	3.9	.9	23	3.9	.99
Leesome ...	23	3.7	.95	23	4.0	1.03	22	3.9	.98	21	3.9	.9	23	3.6	.91
Curly ...	25	3.6	1.0	22	3.7	.9	24	3.5	.96	23	3.7	.95	23	3.9	1.0
Rusty ...	26	3.6	1.05	25	3.9	1.09	24	4.0	1.07	24	3.3	.88	26	3.5	1.0

DAILY YIELD OF COWS FED ON A DAILY RATION OF 20 LB. OF GREEN CHAFFED MAIZE AND 1½ LB. MOLASSES.

Name of Cow.	1.			2.			3.			4.			5.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Eileen ...	16	5.6	.99	17	5.8	1.08	16	5.3	.95	18	5.5	1.1	18	5.0	1.0
Effe ...	16	5.3	.95	18	5.8	1.16	18	5.5	1.1	17	5.3	1.0	18	5.4	1.08
Laverock ...	27	3.8	1.14	26	3.5	1.01	26	3.8	1.1	22	3.8	.93	22	3.8	.93
Leesome ...	20	4.1	.91	18	3.8	.76	17	4.0	.76	15	4.0	.67	20	3.6	.8
Curly ...	22	3.5	.86	23	3.9	.99	23	3.5	.9	22	3.7	.91	24	3.8	1.02
Rusty ...	26	3.7	1.07	28	3.6	1.12	23	3.6	.92	24	3.8	1.02	22	3.6	.88

Name of Cow.	6.			7.			8.			9.			10.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Eileen ...	16	5.3	.95	16	5.5	.99	18	5.1	1.01	18	5.0	1.0	16	5	.89
Effe ...	18	5.5	1.1	16	5.0	.89	18	5.8	1.15	17	5.0	.95	16	5.5	.99
Laverock ...	24	3.8	1.0	25	3.6	1.0	24	3.5	.95	22	3.6	.89	26	3.6	1.05
Leesome ...	24	3.6	.94	24	3.3	.88	23	3.7	.95	22	3.5	.91	20	3.8	.85
Curly ...	23	3.7	.95	22	3.7	.90	24	3.6	.96	20	3.5	.78	24	3.6	.95
Rusty ...	27	3.6	1.08	24	3.5	.95	26	3.5	1.01	24	3.8	1.02	26	3.6	1.05

Name of Cow.	11.			12.			13.			14.			15.		
	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.	Milk.	Test.	Butter.
Eileen ...	16	5.5	.99	17	5.0	.95	18	5.2	1.04	20	5	1.12	18	5.5	1.1
Effe ...	18	5.1	1.01	17	5.3	1.0	18	5.0	1.0	17	5.3	1.0	17	5.1	.98
Laverock ...	24	3.4	.9	25	3.6	1.0	24	3.5	.95	23	3.7	.95	26	3.7	1.0
Leesome ...	24	3.8	1.02	25	3.7	1.01	26	3.9	1.13	25	3.5	.98	26	3.9	1.12
Curly ...	25	3.7	1.0	22	3.8	.94	23	3.9	1.0	25	3.6	1.0	23	3.7	.95
Rusty ...	24	3.6	1.07	23	3.6	.91	24	3.9	1.05	23	4.0	1.03	27	3.6	1.08

TOTAL AMOUNTS OF MILK AND BUTTER OBTAINED DURING EACH PERIOD OF FIFTEEN DAYS.

Name of Cow.	Fed on Chaffed Maize.		Name of Cow.	Fed on Chaffed Green Maize and Molasses.	
	Milk.	Butter.		Milk.	Butter.
Eileen ...	249	14.73	Eileen ...	258	15.14
Effe ...	260	14.83	Effe ...	259	15.36
Laverock ...	341	14.12	Laverock ...	366	14.50
Leesome ...	341.5	14.34	Leesome ...	328	13.09
Curly ...	346	14.24	Curly ...	345	14.11
Rusty ...	368	15.09	Rusty ...	371	15.26
	1,905.5	87.35		1,927	88.06

To ascertain what effect would be produced by the addition of molasses (cane) to a daily ration of chaffed green maize when fed to milk cows, an experiment was conducted with six cows. In the selection of the animals only those which had been a considerable time and had a tendency to diminished yields were taken. A daily record was kept. The cows were allowed to run in a grass paddock, and received the ration night and morning at milking hours.

For the first period of fifteen days a daily ration of 20 lb. of green chaffed maize was given, and during the subsequent period of fifteen days 20 lb. of green chaffed maize and 1½ lb. of molasses were fed daily. It is found, by reference to the table of yields, that the increase following the addition of molasses to the food was small, being 21.5 lb. of milk or 71 lb. of butter. It must, however, be borne in mind that the animals were approaching the drying-off period, and no doubt would have given a decreasing yield from day to day had not they received additional foods.

Mr. McGrath states that valuable assistance was rendered by several of the older students in carrying out experiments, and the interest taken was sufficient to induce them to devote a good deal of their time outside the working hours to such work.

During the winter months fourteen head of Ayrshires, Jerseys, South Coast, and Holstein cows have been housed at night with satisfactory results, the decrease in milk consequent on the advent of cold frosty nights being thus avoided.

A number of the milkers are rugged during the winter months—a custom which is worthy of the dairy farmers of this country. Animals protected against the severe cold of our winter months produce twice the quantity of milk that the animal exposed to all sorts of weather will yield.

A daily record is kept of the yield from each animal, and published in the *Agricultural Journal* each month.

Owing to the amount of fodder available this season, the stock have been fed almost exclusively on green fodder.

The Babcock tester has been freely used in checking the churn results, and from the figures which are here given it may be seen that it is a valuable aid in ascertaining the values of cream:—

Cream. Lb.	Percentage of Butter Fat. (Babcock Tester.)	Calculated Yield. Lb.	Churn Results. Lb.
120	44	59.13	60
82	43	39.49	39
92.5	46	47.65	47.5
76	48	40.85	41.25
132	53	78.35	79.0
117	45	58.96	58.5
88.5	47.5	47.07	47.5
144.5	42.5	69.24	70
114	46.5	59.37	60
118.5	42	55.74	56
128	40.5	58.06	58.5
116.5	45	58.71	58.5
92.5	41	42.46	43
135	44.5	67.27	67

In connection with the dairy work, I have devoted a good deal of time in giving instructions in bacon-curing, and many students who have taken part in the work are now quite competent to turn out an article of first-class merit.

Each year the dairy will become more remunerative. A good deal of time is required in getting a herd together, and now that this work is nearly complete, a large number of pure-bred stock will be available for disposal each year. It is thought that the fact of disposing of pure-bred stock at reasonable prices will aid considerably in the improvement of the dairy herds of this colony.

During the year valuable additions have been made in the purchase of one young Guernsey bull and heifer, and one young Jersey bull. These animals were purchased in New South Wales, and have improved very much since their arrival here.

DAIRY PRODUCE.—Sales—year 1899-1900, £786 6s. 7d.; butter on hand, 82 lb., £4 2s.; cheese on hand, 3,050 lb., £88 19s. 2d.; total, £879 7s. 9d.

PIGGERY ACCOUNT.—Sales—year 1899-1900, £202 15s. 6d.; bacon on hand, £54; total, £256 15s. 6d. Value pigs on hand, £328 2s. Value dairy stock on hand, £1,352.

COLLEGE HERD.—The number of cattle held as on the 1st of July, 1900, can be classed as follows:—

Stud bulls (Ayrshires, Jerseys, Guernsey, Shorthorn)	6
Stud cows (Ayrshires, Jerseys, Holstein, Guernsey, Shorthorn, South Coast—grades)	68
Three-year-old males	1
Three-year-old females	9
Two-year-old males	10
Two-year-old females	24
One-year-old males	12
One-year-old females	48
Under one year old males	9
Under one year old females	13

Total 200 valued at £1,352.

PIGS.—The herd has been considerably increased during the year. The following purchases have been made from Walker's Trustees, Limited, W. R. Robinson, and others:—Berkshires, 16 sows; Yorks, large, 1 boar, 1 sow, from Hawkesbury Agricultural College.

The sales of pure-bred Berkshire totalled 26 head, and, were there more breeding sows, good returns would be obtained from sales of young stock, as a good demand exists.

The herd of pigs is as follows:—

Pure bred.—Tamworth, 8; Yorkshire, small, 3; Yorkshire, middle, 13; Yorkshire, large, 2; Berkshire 74; grades, 54; total 154, valued at £328.

EXPERIMENTS IN PIG FEEDING.

The experiments, of which particulars are forwarded herewith, were undertaken with the view of ascertaining the value of malting barley for pork production, and to compare the relative increase made by pigs under the conditions maintained during the period covered by the experiment.

Eight pigs which had been grown under similar conditions—i.e., run in a grass paddock, and receiving a daily allowance of mangold—were divided into two lots of four each.

"A" pen were given as much boiled mangolds as they would consume, and a quantity of kitchen swill.

"B" pen were fed on ground barley and boiled mangolds.

The food was fed in the condition of a thick slop. Water was supplied to both "A" and "B" pens in addition to the food.

The pigs were from common-bred sows by a Berkshire boar, and were twenty-two weeks old at the time of starting the experiment.

The gain in weight made by pen "A" was, as anticipated, very small, amounting to .6 lb. per day each, while the daily gain per head in pen "B" was 1.65 lb. It was found, in the case of "A" pen, that when an animal reached the weight of 100 lb. (live weight) the increase after that was very slight indeed; in fact, it seemed evident that the animals were growing, and not making flesh at all on the food supplied.

On perusing the increase tables, it will be noticed that pigs No. 3 in "A" and "B" pens gave the smallest return in their respective pens during the period, and it may be remarked that those animals were indifferently bred pigs, and were only included with a view of ascertaining if the better bred pigs would give a larger return for food consumed. A reference to the tables will show a difference in favour of the better-bred pigs.

The value of barley at the time of the experiment was 2s. 6d. per bushel, so by feeding to pigs it gave a return equivalent to 3s. 4d. per bushel, or 1s. 5d. in favour of its use in pork production.

TABLE I.
SHOWING WEIGHT OF PIGS AT BEGINNING OF EXPERIMENT AND DAILY INCREASE OF EACH PIG, AND TOTAL INCREASE OF EACH.

PEN A.	Fed on Boiled Mangolds.				Totals.	PEN B.	Fed on Ground Barley, Mangolds (boiled).				Totals.
	1.	2.	3.	4.			1.	2.	3.	4.	
Weight at beginning of experiment	lb. 88	lb. 91	lb. 93	lb. 84	lb. 356	Weight at beginning of experiment	lb. 116	lb. 116	lb. 100.5	lb. 95.4	lb. 427
Gain—						Gain—					
23 February ...	4	.5	1.5	3	9.0	23 February ...	5	3.5	3.5	4	16
24 " ...	3		1	1.5	5.5	24 " ...	3	1.5	1.0	2	7.5
25 " ...		1.5	.5	2.0	4.0	25 " ...	2	1.5	1.5	1	6.0
26 " ...	1	2.0	1	1.5	5.5	26 " ...	3	2.5	1.0	1.5	8.0
27 " ...		.5		1	1.5	27 " ...	1	1.5		1.5	4.0
28 " ...	2	1.5		1.5	5	28 " ...	1.5	1.0	.5		3.0
1 March ...				1	1	1 March ...	3	2	3.5	3	11.5
2 " ...	2	1	1		4	2 " ...	2	3	3	3	11
3 " ...	2	2	1.5	1	6.5	3 " ...	4	2.5	3.0	1.5	11
4 " ...			.5	1	1.5	4 " ...	1	1	2	2	6
5 " ...	1	2	1	1	5	5 " ...	3	2.5	1.0	2	8.5
6 " ...		1		1	2	6 " ...	3	2	1.5	1.0	7.5
7 " ...	1	1	1	.5	3.5	7 " ...	1.0	1	.5	.5	3
8 " ...						8 " ...	1.0	2.0	1.5	1.0	5.5
9 " ...						9 " ...	1.5	2.5	1.0	1.5	6.5
10 " ...						10 " ...	.5	2.0	.5	1.5	4.5
11 " ...						11 " ...	1.5	1.0	1.5	1.0	5.0
12 " ...						12 " ...	2	1.5	1.5	1.5	6.5
13 " ...						13 " ...	2.5	2.0	.5	.5	5.5
14 " ...						14 " ...	1	1	1	1	4.0
15 " ...						15 " ...	2	2	1.5	3.5	9
16 " ...		1	.5	1	2.5	16 " ...	1	1	1	3.0	6
17 " ...	.5	.5	1	1	3.0	17 " ...	1.5	1	1	3	6.5
18 " ...	1	.5	.5	.5	2.5	18 " ...	2	1.5	1.5	2.0	7.0
19 " ...	1	.5			1.5	19 " ...	1.5	1.0	1.0	2.5	6
20 " ...	1	.5		.5	2.0	20 " ...	1.0	1.5	.5	3.0	6
21 " ...	.5			1	1.5	21 " ...	1.0	1.5	1	1	4.5
Gain per head ...	20	16	11	20	67.0	Gain per head ...	52.5	47	37	49	185.5

TABLE II.
SHOWING WEIGHT OF EACH PIG AT BEGINNING OF EXPERIMENT, WEEKLY GAIN, AND TOTAL GAIN DURING PERIOD.

PEN A.	Fed on Mangolds (boiled) and Swill.				Totals.	PEN B.	Fed on Barley (ground) and Mangolds (boiled)				Totals.
	1.	2.	3.	4.			1.	2.	3.	4.	
Weight at beginning of experiment	lb. 88	lb. 91	lb. 93	lb. 84	lb. 356	Weight at beginning of experiment	lb. 116	lb. 116	lb. 100.5	lb. 94.5	lb. 427
Gain—						Gain—					
1st week ...	10	6	4	10.5	30.5	1st week ...	15.5	11.5	7.5	10	44.5
2nd week ...	6	7	5	5.5	23.5	2nd week ...	17.0	14	14.5	13	58.5
3rd week ...						3rd week ...	10	12	7.5	8	37.5
4th week ...	4	3	2	4	13.0	4th week ...	10	9.5	7.5	18	45.0
Weight at end of experiment	108	107	104	104	423	Weight at end of experiment	168.5	164	137.5	143.5	612.5
Gain at end 4th week	20	16	11	20	67.0	Gain at end 4th week	52.5	47	37	49	185.5
Average daily gain by each					.6	Average daily gain by each					1.65

With a view of comparing the feeding value of barley in a cooked and raw condition, the experiment, of which particulars are supplied herewith, was conducted.

Eight pigs, about five months old, were selected, and were all raised under similar conditions.

They were divided into two lots of four each. The pigs were from common-bred sows by a Berkshire boar. They were fed for a period of four weeks on ground barley and boiled barley.

Table I. gives the weight of individual pigs at the beginning of the experiment, and the gain made during the period.

It is learned from Table II. that the pigs fed on cooked barley gained 18 lb. more than those fed on ground barley.

Table III. shows the amount of food consumed during the period.

The pigs were fed three times a day, and were given as much as they would consume, and also received a liberal supply of drinking water. By looking at the summary of results, we find that A, fed on boiled barley, required 5.43 lb. of food for 1 lb. of gain; and B, fed on ground barley, required 5.94 lb. of food for every 1 lb. of increase. While admitting the fact that cooked barley gave better results, it must not be overlooked that the advantage is slight. It is advisable that further experiments be conducted before coming to any conclusion on the matter. A perusal of the tables will give a good idea of the relative values of cooked and ground barley as resulting from the experiment.

TABLE I.
SHOWING WEIGHT OF PIGS AT BEGINNING OF EXPERIMENT AND DAILY INCREASE OF EACH PIG, AND TOTAL INCREASE OF EACH.

PEN A.	Fed on Boiled Barley.				Totals.	PEN B.	Fed on Ground Barley.				Totals.
	1.	2.	3.	4.			1.	2.	3.	4.	
Weight at beginning of experiment	lb. 92	lb. 92	lb. 93.5	lb. 90	lb. 367.5	Weight at beginning of experiment	lb. 105	lb. 97	lb. 96.5	lb. 94	lb. 392.5
Gain—						Gain—					
9 March ...	3	3.5	2	3	11.5	9 March ...	3	3.5	4.5	4	15
10 " ...	.5	.5	2.5	1	4.5	10 " ...	2	2	3	2	9
11 " ...	.5	...	1	1	2.5	11 " ...	1.5	.5	1	1	4
12 " ...	...	1	1	3	5	12 " ...	2.5	1.5	2	1.5	7.5
13 " ...	2	4	3	4	13	13 " ...	2	1	1.5	2	6.5
14 " ...	2	1	2	1	6	14 " ...	2	1	...	1	4
15 " ...	1	.5	2	1	4.5	15 " ...	1	2	1.5	1.5	6
16 " ...	2	.5	2	1	5.5	16 " ...	2	1.5	1	1	5.5
17 " ...	1	2	1	1.5	5.5	17 " ...	1	1.5	2.5	2	7
18 " ...	2	3	1.5	1.5	8	18 " ...	1.5	2	2.5	1	7
19 " ...	3	2	3.5	3	11.5	19 " ...	1	1	.5	2	4.5
20 " ...	2	2.5	1	1	6.5	20 " ...	1.5	...	2	2	5.5
21 " ...	2	1	...	2	5	21 " ...	2	1	1.5	1	5.5
22 " ...	1.5	1	1.5	1	5	22 " ...	2.5	1.5	1.5	2.5	8
23 " ...	1	4	.5	1.5	7	23 " ...	2	1.5	3	1	7.5
24 " ...	2.5	2	3	.5	8	24 " ...	2.5	1	.5	2	6
25 " ...	...	1	2	5	8	25 " ...	1	1	2.5	.5	5
26 " ...	4	1	2	...	7	26 " ...	1.5	...	2	1	4.5
27 " ...	1	1	3	3	8	27 " ...	2.5	.5	2	1.5	6.5
28 " ...	2	2	2	1.5	7.5	28 " ...	2	2	3	...	7
29 " ...	1	3	1	2	7	29 " ...	4	1.5	2	3	10.5
30 " ...	4	1	4	3	12	30 " ...	3	1.5	2	2	8.5
31 " ...	3	3	2.5	3.5	12	31 " ...	2	3	1.5	1.5	8
1 April ...	3	3	2	.5	8.5	1 April ...	2	3	3	2	10
2 " ...	.5	2.5	2	4.5	9.5	2 " ...	3	1	2	.5	6.5
3 " ...	2.5	1.5	3	1.5	8.5	3 " ...	2	2	3	2.5	9.5
4 " ...	2	3.5	2.5	2	10	4 " ...	3	1	1	.5	5.5
5 " ...	2	1.5	2.5	.5	6.5	5 " ...	1.5	.5	1	2.5	5.5
Gain per head ...	51	52.5	56	54	213.5	Gain per head ...	57.5	39.5	53.5	48	195.5

TABLE II.
SHOWING WEIGHT OF EACH PIG AT BEGINNING OF EXPERIMENT, WEEKLY GAIN, AND TOTAL GAIN DURING PERIOD.

PEN A.	Fed on Boiled Barley.				Totals.	PEN B.	Fed on Ground Barley.				Totals.
	1.	2.	3.	4.			1.	2.	3.	4.	
Weight at beginning of experiment	lb. 92	lb. 92	lb. 93.5	lb. 90	lb. 367.5	Weight at beginning of experiment	lb. 105	lb. 97	lb. 96.5	lb. 94	lb. 392.5
Gain—						Gain—					
1st week ...	9	10.5	13.5	14	47	1st week ...	14	11.5	13.5	13	52
2nd week ...	13.5	12	10.5	11	47	2nd week ...	11.5	8.5	11.5	11.5	43
3rd week ...	11.5	14	13.5	13.5	52.5	3rd week ...	15.5	7.5	15	9	47
4th week ...	17	16	13.5	15.5	67	4th week ...	16.5	12	13.5	11.5	53.5
Weight at end of experiment	143	144.5	149.5	144	581	Weight at end of experiment	162.5	136.5	150	139	588
Gain at end of experiment	51	52.5	56	54	213.5	Gain at end of experiment	57.5	39.5	53.5	45	195.5
Daily gain by each pig	1.82	1.87	2	1.93	...	Daily gain by each pig	2.05	1.41	1.91	1.6	...
Average daily gain per pig	...	...	...	...	1.93	Average daily gain per pig	...	...	...	...	1.74

TABLE III.
SHOWING AMOUNT OF FOOD CONSUMED WEEKLY BY EACH PEN, TOTAL FOOD CONSUMED DURING PERIOD OF EXPERIMENT, AVERAGE DAILY CONSUMPTION PER PIG.

PEN A.			PEN B.		
Barley (Boiled).			Barley (Ground).		
1st week	...	280	1st week	...	280
2nd week	...	284	2nd week	...	286
3rd week	...	292	3rd week	...	290
4th week	...	304	4th week	...	307
1,160			1,163		
Average daily consumption by each			Average daily consumption by each		
10.3			10.38		

TABLE III.—continued.

SUMMARY.

PEN A.				PEN B.			
Average Daily Consumption per Pig.	Total Food Consumed.	Average Daily Gain per Pig.	Number lbs. Food Consumed for 1lb. increase.	Average Daily Consumption per Pig.	Total Food Consumed.	Average Daily Gain per Pig.	Number lbs. Food Consumed for 1lb. increase.
10.3	1,160	1.93	5.43	10.38	1,163	1.74	5.94

The experiment of which particulars are supplied herewith was conducted with a view of ascertaining the feeding value of cane molasses when combined with other foodstuffs.

Eight pigs about four and a-half months old were divided into two lots of four each. The pigs were from common sows by a pure Berkshire boar, and were fed for a period of four weeks.

Pen A were fed on ground barley, and Pen B on ground barley to which had been added molasses in proportion of 1 lb. molasses to 5.7 of ground barley.

Table I. gives the weight of individual pigs at beginning of the experiment, and gain in lb. made during the period.

Table II. gives weekly gain and total gain by each pig, daily gain by each pig, and average daily gain per head.

Table III. gives amount of food consumed by each pen weekly, total food consumed during the period, and average daily consumption per head.

The pigs were fed three times a day, and were supplied with drinking water. It will be noticed, by referring to Table I., that, while the pigs in Pen A made substantial gain during the first few days, those in Pen B showed a much smaller increase in comparison. This may be accounted for by the fact that the molasses was fed to them for the first time at the commencement of the experiment, and was not readily consumed by them at first. It was found, however, as the experiment proceeded, that the food was more readily consumed when mixed with molasses.

On perusal of summary we find that Pen A consumed 5.5 lb. of food for every 1 lb. of increase, and Pen B, fed on barley and molasses, required 5.08 lb. of food to each 1 lb. of increase, or .42 lb. of food less than Pen A for each lb. of gain.

TABLE I.
SHOWING WEIGHT OF PIGS AT BEGINNING OF EXPERIMENT AND DAILY INCREASE OF EACH PIG, AND TOTAL INCREASE OF EACH.

PEN A.	Fed on Ground Barley.				Totals.	PEN B.	Fed on Ground Barley and Molasses.				Totals.
	1.	2.	3.	4.			1.	2.	3.	4.	
Weight at beginning of experiment	lb. 98	lb. 93	lb. 92.5	lb. 96	lb. 379.5	Weight at beginning of experiment	lb. 83	lb. 89	lb. 77.5	lb. 88	lb. 337.5
Gain—						Gain—					
30 March ...	6	6	5.5	3.5	21.0	30 March ...	1	1	...	1	3
31 " ...	2	3.5	2	4	11.5	31 " ...	2	1	1	.5	4.5
1 April ...	1	.5	1.0	1.5	4	1 April ...	2	.5	2	4	8.5
2 " ...	1	2	1.0	...	4	2 " ...	4	5	4	3	16
3 " ...	...	2.5	2.5	1.5	6.5	3 " ...	3	2.5	2	2	9.5
4 " ...	2.5	.5	3.5	2	8.5	4 " ...	2	2	3	1	8
5 " ...	.5	1	1	3	5.5	5 " ...	2	1.5	1.5	2	7
6 " ...	4	1	2	3.5	10.5	6 " ...	4	3	3	4	14
7 " ...	2	2.5	1	2	7.5	7 " ...	2	1.5	3.5	1	8
8 " ...	1	2	2.5	1	6.5	8 " ...	3	3	1	1	8
9 " ...	2	2.5	2.5	2	9	9 " ...	2	1.5	1	3	7.5
10 " ...	2.5	1	.5	.5	4.5	10 " ...	1	1.5	1	1.5	5
11 " ...	2.5	2.5	1	1	7	11 " ...	1	.5	.5	.5	2
12 " ...	4	2.5	3	2.5	12	12 " ...	2	3	3	3	11
13 " ...	1	3	2.5	2.5	9	13 " ...	2.5	2	2	3	9.5
14 " ...	1	1	3	2	7	14 " ...	1	1	1	2	5
15 " ...	1	1	2	3	7	15 " ...	1.5	2	2	1	6.5
16 " ...	1	3	1	.5	5.5	16 " ...	1	2	1	2	6
17 " ...	2	1	3	1	7	17 " ...	2	...	1	2	5
18 " ...	2	2	1	3	8	18 " ...	3	2	1	2	8
19 " ...	1	3	2	1	7	19 " ...	3	3	2	3	11
20 " ...	3	2	1	1	7	20 " ...	3	3	1	3	10
21 " ...	2	1	...	2	5	21 " ...	2	2	4	2	10
22 " ...	1	1	2	2	6	22 " ...	1	1	1	3	6
23 " ...	1.5	1	2	1	5.5	23 " ...	2	2.5	1	1	6.5
24 " ...	1	.5	1.5	1	4	24 " ...	3	2	1	3	9
25 " ...	.5	1	2	1	4.5	25 " ...	1	2	2	2	7
26 " ...	1.5	2	1	1	5.5	26 " ...	2	1	2	3	8
Gain per head ...	50.5	51.5	53	50	206	Gain per head ...	58	53.5	48.5	59.5	219.5

TABLE II.
SHOWING WEIGHT OF EACH PIG AT BEGINNING OF EXPERIMENT, WEEKLY GAIN, AND TOTAL GAIN DURING PERIOD.

PEN A.	Fed on Ground Barley.				Totals.	PEN B.	Fed on Ground Barley and Cane Molasses.				Totals.
	1.	2.	3.	4.			1.	2.	3.	4.	
Weight at beginning of experiment	lb. 98	lb. 93	lb. 92.5	lb. 96	lb. 379.5	Weight at beginning of experiment	lb. 83	lb. 89	lb. 77.5	lb. 88	lb. 337.5
Gain—						Gain—					
1st week ...	13	16	16.5	15.5	61	1st week ...	16	13.5	13.5	13.5	56.5
2nd week ...	18	14	12.5	12.5	57	2nd week ...	14	14.5	13	14	55.5
3rd week ...	9	14	14.5	13	50.5	3rd week ...	14	12	10	15	51
4th week ...	10.5	8.5	9.5	9	37.5	4th week ...	14	13.5	12	17	56.5
Weight at end of experiment	148.5	145.5	145.5	146	585.5	Weight at end of experiment	141	142.5	128	147.5	557
Gain at end of experiment	50.5	52.5	53	50	206	Gain at end of experiment	58	53.5	48.5	59.5	219.5
Daily gain by each pig	1.8	1.87	1.9	1.78	...	Daily gain by each pig	2.07	1.9	1.7	2.1	...
Average daily gain per head	...	...	...	...	1.93	Average daily gain per head	...	...	...	...	1.94

TABLE III.
SHOWING AMOUNT OF FOOD CONSUMED WEEKLY BY EACH PEN, TOTAL FOOD CONSUMED DURING PERIOD, AVERAGE DAILY CONSUMPTION PER HEAD.

PEN A.				PEN B.			
Barley (ground).				Barley.		Molasses.	
lb.				lb.		lb.	
1st week	..	...	298	1st week	...	238.5	32.5
2nd week	...	...	289	2nd week	...	245	40
3rd week	...	...	273	3rd week	...	246	45
4th week	...	...	273	4th week	...	220	49
1,133				949.5		166.5	
Average daily consumption by each				Average daily consumption by each			
10.12				9.96		1.116	
						9.96 lb.	

SUMMARY.

PEN A.				PEN B.			
Average Daily Consumption per Head.	Total Food Consumed.	Average Daily Gain per Head.	Number lbs. Food Consumed for 1lb. increase.	Average Daily Consumption per Head.	Total Food Consumed.	Average Daily Gain per Head.	Number lbs. Food Consumed for 1lb. increase.
10.12	1,133	1.93	5.5	9.96	Barley. Molasses. 949.5 166.5	1.96	5.08
					1,116		

THE VINEYARD.—The work in this department is carried out under the Viticulturist's direction, and notwithstanding the dry season the vines have made very rapid growth.

Mr. Rainford, who pays periodical visits to the College, has given instruction to students in the methods, of planting, pruning, cultivation, and general treatment of vines necessary to bring about success.

THE ORCHARD.—The fruit trees have made exceptionally rapid growths. During the first six months of the year, the work was carried out under the direction of Mr. Voller, and the latter six months under the supervision of Mr. Cole. The students have received instruction in pruning, &c.

Great care has been exercised as to any insect pests appearing.

About 3 acres of ground prepared for the extension of the orchard is now nearly planted.

Near the Principal's house, 3½ acres have been prepared for planting an orchard of miscellaneous fruit trees, and are now in progress of planting.

The olive trees, which failed last year, have been replanted.

The avenue to the railway station has been planted where trees failed last year.

An avenue of camphor laurels has been planted around the circular fence two-thirds of the way, and one-third camphor laurels and plane trees alternately up to the stables. On the opposite side camphor laurels have been planted.

From the cross roads to the creek the pines were shifted on to the right-hand side of the road.

The supply of vegetables was greater than the requirements of the College. The surplus was sold locally and at Ipswich.

The return from the vegetable garden amounted to £115 5s. 6d.

Many students have taken a deep interest in this department.

APIARY.—A commencement has been made in this direction with fifteen hives. Mr. Quinn (Superintendent of the Mechanical Department) gives instructions to students in this branch.

POULTRY.—Yards are being erected, and it is intended to procure fowls at the beginning of next term. Instructions will then be given in the most successful methods of poultry-farming.

MECHANICAL DEPARTMENT.—This is under the supervision of Mr. Quinn, who reports good progress all round, and speaks of enthusiasm by the students that are under his instruction.

I have inspected from time to time the plans by the more advanced students, and found them to be very creditable.

Much work has been done under the supervision of Mr. Quinn during the year, the nature of which can be gathered from the list here given of the principal of them. In addition there were many minor matters that do not require detailing.

WATER SUPPLY.—Erection and connection of a 10 horse-power multitubular boiler. The steam Worthington pump removed from the well and replaced as a feed pump to the boiler. For protection to this machinery a galvanised iron shed has been erected. The capacity of the storage tank has been doubled.

Water service has been extended to houses, sheep paddock, new stables, and cowsheds; the total length of piping laid with necessary fittings being 3,000 feet

Four large wrought iron tanks in the horse yards.

BUILDINGS.—Additions to master's house, by erection of a veranda room and by ceiling two rooms.

Cottage for steward's quarters adjoining the dining-hall.

Smokehouse divided into three chambers.

Shed for implements, blacksmith's shop, harness and tool rooms—size, 155 feet by 37 feet. This building forms one side of the stable square.

Silo, 18 feet by 18 feet by 16 feet inside measurement, with concrete floor and doors at top and bottom.

Calfshed, 32 feet by 30 feet, divided into pens with a feed gangway in middle.

SUNDRY.—Three hundred and ninety-seven feet of glazed earthenware drain pipes connecting stables and cowsheds with cesspits.

Cesspit at piggery, with a cement floor and covered with timber.

Complete race for loading pigs.

Removal of old stables, cowsheds, and corneribs, the material of which was used for other purposes.
 Removal bodily of two sites and replacing them at the new cowsheds.
 Removal bodily of the cottage known as the men's quarters.
 Overhauling, repairing, and painting all vehicles.
 Removal of the weighbridge to a more convenient position.
 A threshing machine for broom millet with 4 feet drums.
 Renovating and painting the quarters for the Horticulturist.
 Foundation for cheese-room at dairy.

FENCING.—Eighteen chains of wire-netting to subdivide the pig paddocks. Sixty chains top-rail and four wires.

The blacksmith's shop has been kept busy all the year. In addition to the sundry work always required at a place like the College, some 120 horses have been shod.

The installation of the electric light is now in progress, under contract and under the supervision of the electrical engineer. It is now nearing completion.

In concluding this report, I would draw attention to some general matters that may be of interest.

Many parcels of seeds and grasses of varieties have been distributed throughout Queensland.

Inquiries, personal and by letter, upon matters agricultural have increased. The letters numbered 1,200.

The interest of the public in the College continues to grow.

The officers have all done their best, and my thanks are due to them for their loyal support.

The social side of the College life is well provided for; there are tennis, football, and cricket clubs. The gymnasium is well fitted and lighted. A social gathering is held in the gymnasium once a quarter, to which students are to invite their friends.

Every encouragement is given to students to attend church on Sunday at Gatton or other places in the neighbourhood. In cases where parents notify in writing that their sons should attend Divine Service regularly, their wishes are complied with, and attendance is made compulsory.

In conclusion, I desire to thank the visiting lecturers for their good work and kindness in forwarding the work of the College.

JOHN MAHON, Principal.

REPORT OF THE AGRICULTURAL CHEMIST.

SIR,—I have the honour to submit to you herewith my third Annual Report:—

On the outset I beg to state that, finding in the beginning of this year the increased number of small classes of students for both theoretical and practical chemistry taking up the whole of my time, I applied to you that I should be relieved of all College duties, in order to devote my whole time to departmental analytical work, and made a few suggestions with regard to the distribution of the work. Having received your approval I handed the whole work over to the Science Master, Mr. P. Sutherland, who, with the assistance of Mr. F. Lan Nott, continued my classes in theoretical and practical chemistry. During the annual stock-taking particular care was paid to apportioning of the various apparatus to the two departments, and at present everything is so arranged that the lecture room and students' laboratory have their own apparatus and chemicals kept quite apart from the departmental laboratory. A considerable amount of analytical and experimental work was carried out, partially under my superintendence, and the report on this work will be given by the officers in charge. There is not the slightest doubt that the experimental work carried out and to be carried out at the Agricultural College, if it should be of any value, must be checked and substantiated by careful analytical work, and such work will keep Mr. Nott fully occupied the whole of his time.

The analytical work carried out during the year, not including any work done by Mr. Nott for the College, was the following:—

Soils, complete analyses	29
„ partial analyses	15
Rocks, basalt, &c., complete analyses	4
Water analysis	1
Manures, complete analyses	4
Foodstuffs, analyses	3
Cane juices, analyses	2
Tobaccos, exhaustive analyses	4
Hide poison, dipping fluids, weed destroyers, complete analyses	3
Potassium cyanide, assay	1

In explanation of the above work I beg to add that the exhaustive analyses of tobaccos, as desired by the tobacco expert, were exceedingly laborious ones, occupying nearly two months' time. At present two more such complete tobacco analyses have been started and will only be finished in the course of next month.

The outside public has hardly as yet learned to appreciate sufficiently the importance of analytical work. This importance will become at once clear by giving one single instance: A fruitgrower purchased cyanide for the fumigation of his trees, finding the article, which was supposed to contain about 98 per cent. of potassic cyanide, giving very poor results, he sent a sample to the Department for analysis, and we found it to contain only 27.5 per cent. of potassic cyanide.

The various experts of the Agricultural Department have all, more or less, contributed to my work, and there is no doubt that in this direction alone the analytical work will be considerably increased during the coming year. It is principally in connection with such work, however, where the inconvenience of the departmental laboratory being away from the headquarters makes itself particularly felt, and I think that the time has now come for the establishment of an agricultural laboratory at Brisbane, which I have already recommended. I have already drawn out and submitted to you ground plans for such a building, which could either be erected as an addition to your departmental building, or as a separate story of a new laboratory to the Government Analyst. The largest amount of glassware, apparatus, and chemicals to fit out the new place would be taken from our laboratory at present at the College, but, as already arranged, sufficient material will be left for the carrying out of analytical work in connection with the College. The necessary addition to chemicals, apparatus, library at both places can be made gradually out of the annual votes.

In my last year's report, I drew attention to the existing danger from fire to our wooden laboratory building, and a fire service, suggested in the report, has been established in the course of the year by erecting three stand-pipes, direct connection with the water tank, and supply of two lengths of fire-hose.

The experimental milling plant for the practical testing of wheats referred to in my last year's report, and for which money has already been voted, has not as yet been purchased. There is no immediate hurry for the purchase of the plant, as we could not use the mill here at the College, as no provision for the housing and working of the mill has been made. I may state that in the Agricultural Laboratory in Sydney the mills are driven by a small Pelton water-wheel, but even then the process of testing the wheats is a rather slow one, and the time of one assistant is almost entirely taken up with the testing of wheats. I think it would be best to wait with the purchase of the mill until the new laboratory has been decided on.

So far the whole of my time has been hitherto taken up by analytical routine work enumerated above, and no time whatsoever was left for original work, for which there is such a large scope in our colony, as very little has been done so far with regard to chemical investigation of our various native plant products. I have no doubt that much of interest and also of commercial value might be elucidated by such research. A great deal of analytical work could be done in connection with our fodder plants, plants reputed to be poisonous to stock, exudations of some of our trees as gums and resins, essential oils, and perfumes, tanning materials, natural deposits of manures, &c., &c. All such work could and should be carried out at our departmental laboratory, and for this purpose I would recommend the appointment of two qualified analysts as assistants.

In the beginning of December last I received instructions to accompany Dr. Maxwell on his visit of the various sugar districts, which I did, being away for nearly two months.

During the year I wrote short articles on Boracic acid, Jadoo fibre, and soil analyses, giving a tabulated statement of the soils of our experimental farms so far analysed.

J. C. BRÜNNICH, F.C.S.

REPORT OF THE COLONIAL BOTANIST.

SIR,—I have the honour to submit the following summary of the botanical work for the past year:—

My time, as well as that of my assistant, has been occupied, as heretofore, in furnishing botanical information, both verbal and by letter. I find an ever-increasing desire evinced throughout the colony for such, persons being fully awake to the importance of systematic names and arrangement in place of the local or trivial naming of plants, the latter in the majority of cases being insufficient beyond a district or special locality.

Many objects of interest have been added to the Museum. It was my intention to have made considerable additions to the carpological collection, but the extra cases asked for last year have not as yet been supplied. This is to be regretted, as this feature of the Museum is one constantly referred to by students from the various educational establishments. If funds will allow, I would ask that the already large and valuable collection of our indigenous woods be increased, especially by some of the Northern kinds which have recently been brought to our knowledge. It is absolutely necessary that as many as possible of our woods should be in this collection, for it is frequently consulted by persons interested in the timber industry; and this interest will greatly increase when the Forestry Department is fully established.

No special bulletins have been published during the year, but descriptions of new Queensland plants, as well as some from New Guinea, have been given in the *Agricultural Journal*. In the same organ I have also given various notices, most of which were accompanied by illustrations, regarding plants reputed poisonous to stock and those of economic value, &c. Among the latter, attention might be drawn to the account in the June (1900) number of a new native ginger, which I brought from Cape York three years ago. This has since been grown in the Brisbane Botanic Gardens, and will probably prove of considerable value. Two parts of the work on the Queensland flora, mentioned in my last report, have been issued, and the third is now in the printer's hands. I find that I under-estimated the number of pages each part would contain, as about 375 were in the first and over 400 in the second.

In the November (1900) number of the *Journal* was given my assistant's report on the timbers of the Herberton district, extra copies of which were obtained and circulated.

Exchanges of herbarium and museum specimens have as usual been conducted with similar institutions, and seeds of indigenous plants have been distributed to public gardens, both colonial and foreign. These latter were received principally from persons who forwarded herbarium specimens for identification.

The expenditure for the library has been almost wholly confined to subscriptions for periodical publications. There are, however, many works required before we can say that we have a good working library.

Only one call has been made for field work—namely, in November last, to examine a part of the country in the Springsure district, where serious losses of stock had occurred, as was supposed from eating poisonous plants. My assistant undertook this work, and furnished a report, which appeared in the *Agricultural Journal* for January (1900).

Of fresh noxious weeds and fungus blights, none of any importance have come under my observation during the past year. The previously recorded ones have been as troublesome as ever to cultivators of the soil, but it is only fresh kinds that I have been in the habit of referring to in these reports.

I have, &c.,

F. MANSON BAILEY, Colonial Botanist.

REPORT OF THE ENTOMOLOGIST.

SIR.—I have the honour to submit the following report for the year ending 30th June, 1900, relating to the work of the branch of the Department under my charge, premising that this is naturally separable into the two categories—Economic Entomology and Vegetable Pathology.

ECONOMIC ENTOMOLOGY.

In addition to the numerous objects that have been subjects of special research, or have formed matters of communication between the Entomologist and the numerous correspondents of the office, the following insects, in connection with the plants that they respectively injure, may be mentioned as having been dealt with during the year in separate letters and reports in response to individual applications on the part of the public. This enumeration is, however, exclusive of the many topics of this nature considered and dealt with in response to the applications made personally by those who have visited the office from day to day.

APPLE.—Pernicious Scale Insect (*Aspidiotus perniciosus*), Crow's Nest and Killarney (Warwick); Parlitoria Scale Insect (*Parlitoria? proteus*), Brisbane; Woolly Aphis (*Schizoneura lanigera*), Ipswich; Fruit Fly Maggot (*Tephritis Tryoni*), Brisbane, Ipswich, &c.

PEAR.—Rapacious Scale Insect (*Aspidiotus camelliae*), Brisbane.

PLUM.—Plum "worm" of fruit (*Cacaecia postvittana*), Toowoomba.

PEACH.—Fruit Fly (*Tephritis Tryoni*), Brisbane and elsewhere.

ORANGE, &c.—Bronze Orange Bug (*Oncoscelis sulciventris*), Pittsworth and Brisbane; Leaf-eating Ants (*Campanotus sp.*), Sunnybank, South Queensland; Leaf-eating Beetle (*Monolepta rosea*), Mooloolah; Fruit-boring Caterpillar (*Conogethes punctiferalis*), Brisbane; Purple Circular Scale Insect (*Aspidiotus ficus*); Red Scale Insect (*Aspidiotus coccineus*); White Scale Insect (*Chionaspis citri*); Glover's Mussel Scale Insect (*Mytilaspis Gloveri*), Brisbane and Maryborough districts; Fulvous Mussel Scale (*Mytilaspis fulva*), Brisbane, Zillmere, and Wellington Point; Quince Scale (*Aspidiotus cydoniae*), Port Douglas; Soft Brown Scale (*Lecanium sp.*), Amby, Western Queensland; Scale Mite (*Rhipidolopus sp.*), North Coast Line and Brisbane; Bryobia Mite, Enoggera. Acarus victimising Red Scale Insect, Toowoomba.

PERSIMMON.—Fruit Fly Maggot (*Tephritis Tryoni*), Wellington Point; Circular Soft Scale Insect (*Lecanium hemisphericum*), Woombye; Olive Soft Scale Insect (*Lecanium oleæ*), New South Wales.

MANGO.—Flower-haunting Beetle (*Telephorus sp.*), Mullet Creek; Beetle on foliage (*Scirtes sp.*), Mackay; Ross' Scale Insect (*Aspidiotus rossi*), Maryborough; Pink Wax Scale Insect (*Ceroplastes rubra*), Brisbane.

CUSTARD APPLE.—Soft Scale Insect (*Lecanium sp.*), Moreton Island.

VINE.—Bronzy Eumolpid Beetle (*Scelodonta sp.*), Nudgee; Wood-boring Weevil, Brisbane; Wood-boring Moth-Caterpillar (*Xylorycta sp.*), Brisbane; Red Scale Insect (*Aspidiotus coccineus*), Nundah; Seed-eating Weevil (Fam. *Bruchidæ*), Zillmere.

PINEAPPLE.—Tarsonymus Mite (*Tarsonymus sp.*), Nundah; Mealy Bug (*Dactylopius? calceolaria*) Nudgee, &c.

COFFEE.—Wood-boring Moth-Caterpillar (*Xylorycta sp.*) Mackay; Wood-boring Weevil (*Orthorhinus cylindrirostris*), Mackay; Tree Cricket (*Ecanthus sp.*), Mackay; Hemispherical Soft Scale Insect (*Lecanium filicum*), Mackay; Leaf Miner (? *Oscinis sp.*), Cairns.

DECIDUOUS FRUIT TREES GENERALLY.—Fruit Fly Maggot, Stanthorpe and Warwick; Soft Brown Scale (*Lecanium sp.*), Milo, West Queensland.

STRAWBERRY.—Red Spider (*Tetranychus telarius*), Maryborough; Strawberry Aphis, Maryborough.

TOMATO.—Fruit Fly Maggot (*Tephritis Tryoni*), Brisbane and Townsville; Saprophytic Fly Maggots (*Helomyza sp.* and *Drosophila sp.*), Brisbane and Nundah; Puncturing Plant Bug, Zillmere and Brisbane.

POTATO.—Mining Caterpillar (*Gelechia solanella*), Brisbane, &c.; 28-Spotted Epilachna Beetle (*E. Figintiocto punctata*), Biggenden.

SWEET POTATO.—Sweet Potato Weevil (*Cylas formicarius*), Gooburrum, Mount Cotton, Eagle Farm, &c.

BEAN.—Bean Maggot (*Agromyza phaseoli*), Brisbane, &c.

VELVET BEAN.—Leaf-eating Beetle (*Nodina sp.*), Mackay.

CABBAGE.—Stem Borer (*Hellula costalis*), Redbank Plains.

COW PEA.—Pod-sucker (*Riptortus annulipes*), Bundaberg; Seed Weevil (*Apion sp.*), Mackay.

LUCERNE.—Leaf-eating Caterpillar (*Cacæcia sp.*), Grantham.

TOBACCO.—Split Worm (*Gelechia solanella*), Gatton, &c.

WHEAT.—Root-feeding Caterpillar (Fam. *Crambidæ*), Warwick; Wheat Aphis, Darling Downs; Caterpillars (*Leucania unipuncta*), Darling Downs, Grantham, &c.

CEREALS GENERALLY.—Caterpillars (*L. unipuncta*), various localities in South Queensland.

MAIZE.—Borer (*Heliothris punctigera*), Mackay and Brisbane.

SUGAR CANE.—Wire Worm (?), Mackay; White Ants or Termites, Ayr; Spotted Grasshopper (*Cyrtacanthacris guttulosa*), Herbert River; Yellow-winged Grasshopper (*Edipoda flava*), Herbert River.

PASTURAGE.—Yellow-winged Grasshopper (*O. flava*), Capella, &c.

ORNAMENTAL PLANTS.—(1) Rose, Bag Worm (*Thyriodopteryx Hübneri*), Gympie; Leaf-eating Beetle (*Monolepta rosea*), Brisbane; Red Scale Insect (*Aspidiotus coccineus*), Brisbane. (2) Palm (*Areca rubra*), Cottony Cushion Scale (*Icerya purchasi*), Cairns. (3) Duranta, White Wax Scale Insect (*Ceroplastes cerifera*), Sandgate. (4) Orchids, Leaf-spotting Mite (*Bryobia sp.*), Brisbane; Stem-borer (*Crioceris fuscomaculata*), Brisbane. (5) Bush-house Plants, Pulvinaria Scale Insect, Cairns. (6) Maiden Hair (*Adiantum spp.*), Root Weevil, Brisbane and Toowoomba.

ORNAMENTAL TREES.—Sterculia, Psylla, Toowoomba; Eucalyptus, Scale Insect (*Eriococcus turgipes*), Brisbane; Stinging Caterpillar (*Doratsfera sp.*), Brisbane; Oak (*Casuarina sp.*) Scale Insect (*Rippersia turgipes*), Warwick; Mulga (Acacia), Dipterous Galls, Western district.

The most noteworthy occurrences with reference to destructive insects have been the serious injuries inflicted on cereal plants by the caterpillars of a moth (*Leucania unipuncta*), and which suggested the preparation of a special article that has appeared in the *Agricultural Journal*; the further spreading of the San José Scale Insect (*Aspidiotus perniciosus*); the wider distribution of the Sweet Potato Weevil (*Cylas formicarius*); and the naturalization of two pernicious scale insects that victimize citraceous trees, viz.: The Mussel Scale Insect (*Mytilaspis fulva* on *M. citricola*) in the Cleveland, Wellington Point, and Nundah districts; and the Quince Circular Scale Insect (*Aspidiotus cydonia*) in North-East Queensland. Of these two scale insects that are injurious to the orange and its allies, the dissemination of the former may, it is considered, be credited to the trade conducted by a single nurseryman, prior to the provisions of the Diseases in Plants Act coming into operation.

Attention may also be called to some of the insects whose importation has been frustrated through the administration of this legislative enactment:—Demerara Moth Borer of Sugar-cane; Beetle Borer of Sugar-cane; (*Sphenophorus obscurus*); Pernicious Scale Insect of Deciduous trees (*Aspidiotus perniciosus*); Orange-tree Scale Insects of China, e.g., *Parlatoria zizyphi*, *Parlatoria pergandei*, and *Mytilaspis Gloveri*; Japanese Scale Insects, e.g., *Chrysomphalus sphaeroides* and *Chionaspis aspidistra*; Mediterranean Scale Insects of Citraceous plants, e.g., *Mytilaspis fulva*, *Aspidiotus limoni*; *A. coccineus*, *Parlatoria zizyphi*, *Dactylopius adonidum*, &c. Fruit Maggot Fly (*Haltiphora capitata*) from New South Wales; Codlin Moth (*Carpocapsa pomonella*), and Apple Mussel Scale Insect (*Mytilaspis pomorum*) from the southern colonies, and from California; Quince Weevil (? *Comotrachelus sp.*) from New South Wales; also several additional Scale Insects (*Coccidæ*) affecting both fruit trees and ornamental plants. And, finally, the smaller Wax Moth (*Achraea grisella*) on dried apples from California.

IDENTIFICATIONS.—As during previous years, much of the correspondence of the office has related to the nomenclature of destructive and other insects that have been submitted for the purpose of identification. This is a branch of research that alone necessitates a large expenditure of both time and energy.

VEGETABLE PATHOLOGY.

Numerous matters relating to Plant Pathology proper—i.e., to the changes attendant on parasitism on the part of vegetable organism, and to the constitutional plant derangements arising from uncongenial soil or atmospheric conditions—have been referred to this branch of the Department, and have claimed equal attention with those that fall properly within the domain of agronomic entomology. The principal ones of those dealt with are as follows:—

APPLE.—Bitter Rot, caused by *Glæosporium fructigenum*; Bitter Pit and Black Spot, caused by *Fusicladium dendriticum*.

PEAR.—Fruit Black Spot, caused by *F. pyrinum*; Leaf Scab, caused by a mite (*Phytopus*), Stanthorpe.

STONE FRUITS.—Leaf Rust, caused by *Puccinia pruni spinosum*, on Plum, Almond, and Peach, Darling Downs; Root Galls, caused by *Heterodera radicola*, Alice River Settlement; Peach Leaf Curl, caused by *Eosaccus deformans*, Wallumbilla; Nectarine Fruit Disease, caused by *Eosaccus sp.*, New South Wales; Apricot Leaf Disease, caused by *Cladosporium sp.*, Darling Downs; Apricot sclerotid condition of Fruit, New South Wales; Shot-hole Disease, apparently caused by *Phyllosticta prunicola*, Toowoomba.

CITRACEOUS PLANTS.—Leaf Incrustation, caused by lichen *Strigula sp.*, Blackall Ranges; Bark Disease and Gummosis, Cardwell; Bark Fungus, *Corticium sp.*, Brisbane, &c.; Black Spot of Fruit, caused by *Phyllosticta citricarpa*, Brisbane; Fruit Discolouration or "Maori," caused by mite (*Phytopus oleivorus*, Maryborough).

MANGO.—Leaf Blight, Brisbane; Infertility, Brisbane.

GRAPE VINE.—Shelling of fruit (physiological), Maryborough; Anthracnose, caused by *Glæosporium ampelophagum*, Biggenden and several other localities; Powdery Mildew, caused by *Uncinula spiralis*, Charters Towers, &c. False Black Rot, caused by *Tubercularia acinorum*, Brisbane district; Twig Blight, caused by *Glæosporium pestigerum*, Biggenden; Root Decay, caused by undetermined fungus, Alice River; Root Galls caused by *Heterodera radicola*, Darling Downs.

PINE APPLE.—Fruit Core-rot, caused by a mite (*Tarsonymus sp.*) and a Fungus (*Monilia fructigena*), Nundah district; Root Disease, Mount Cotton.

ENGLISH POTATO.—Rhizomorphs on Roots, Laidley; Bacterial Disease, Beenleigh district; Potato Scab, Ravensbourne; Tuber Blackening (physiological disease).

SWEET POTATO.—(1) Unprolificity and (2) Skin Discolouration of Tuber, Bundaberg and Brisbane.

COFFEE.—Leaf Blight, caused by *Cladosporium sp.*, Russell River; physiological (?) disease, Cairns; physiological (?) disease, Tinana; Leaf Blight, caused by *Cerospora sp.*, Mackay; Leaf Incrustation, caused by lichen (*Strigula sp.*), Cairns; Fungus Disease (?) caused by *Pellicularia sp.*, Russell River.

STRAWBERRY.—Leaf Blight, caused by *Sphaerella fragariæ*, Blackall Range and Maryborough.

RHUBARB.—Stem Blight, caused by *Glæosporium sp.*, Redbank Plains.

TOMATO.—Fruit Rot, caused by *Monilia fructigena*, Brisbane; Phytopus Mite Disease, Brisbane; Leaf Blight, caused by *Macrosporium*, Mount Cotton.

CUCURBITACEOUS PLANTS.—Powdery Mildew, caused by *Sporotheca castagnei*, Brisbane, Zillmere, Childers, &c.

WATER MELON.—Wilting Disease, caused by *Fusarium niveum*, Zillmere district.

CABBAGE.—"White Rust," caused by *Cystopus candidus*, Brisbane; also on Turnip; Mildew-damping off of Seedlings, caused by *Peronospora parasitica*, Brisbane and Toowoomba.

*PRICKLY PEAR (*Opuntia*).—Various physiological diseases, Darling Downs.

NATIVE SHRUB (*Maclura sp.*)—Leaf brand, caused by *Rhytisma sp.*, Cairns.

DISEASES IN PLANTS ACT.

As a member of the Board constituted in accordance with the provisions of "The Diseases in Plants Act of 1896," the Entomologist has been in attendance at its meetings, and taken part also in the deliberations that on these occasions it has engaged in.

A due share of the duties as Inspector under the same measure have been made to devolve almost exclusively upon officers appointed under the Act, doubtless out of consideration of the claims inseparable from work more exclusively attaching to the office of Entomologist.

Much and very responsible work has, however, been accomplished in the exercise of the functions of an official referee. In fact, the administration of "The Diseases in Plants Act of 1896," by the Department, has involved the preparation of some eighty-five separate reports, many of them dealing with more than one subject. These reports have related to the following amongst other topics:—Procedures involved in carrying out the Act; the condition of fruit or plants so far as related to existence of disease in connection therewith; the nature of disease observed; the degree of vitality or virulence that it manifested; and the effect due to the action of disinfecting processes upon plants or fruit; or upon the diseases or insect pests occurring in or upon them. Of such reports more than half of the number alluded to have been prepared for the information and guidance of Inspectors in the exercise of their respective duties. Thus twenty-five were issued at the instance of Mr. Inspector Knowles, twelve at that of Mr. Inspector Jones, three at that of Mr. Inspector Pink, and one each for the information of Messrs. Inspectors Newport, Williams, and Aitcheson. It is, however, gratifying to be in a position to add that this office has in turn benefited by reciprocal services, as the outcome of the patient observation on the part of the inspectorial staff in connection with the measure alluded to. Thus Mr. Inspector Knowles has enabled the Entomologist to learn of the present range of occurrence of the Fulvous Mussel Scale Insect (*Mytilaspis fulva*) of the orange in Southern Queensland; of the occurrence of a new scale insect in connection with the persimmon; of the existence in North Queensland of the scale insect, *Aspidiotus cydoniæ*, in connection with citraceous plants; and of the degree to which the fruit fly maggot (*Tephritis Tryoni*) is addicted to attacking the tomato.

AGRICULTURAL COLLEGE.

During the latter part of the year six lectures on entomology were delivered at the Agricultural College to a class averaging fifteen students, all of whom bestowed marked attention on the instruction thus afforded. It is to be regretted that these addresses were not sufficiently numerous to admit of the full syllabus of study that had been arranged for being dealt with, but the claims of other official work were too urgent to allow of the programme being more fully carried out.

FIELD WORK.

Investigations in the field have been carried out as follows:—

1. Visit to the Beenleigh district to inquire into nature and cause of disease of English potato.
2. Visit to Grantham district to investigate caterpillar plague.
3. Visit to Darling Downs for similar purpose.
4. Visit to Laidley to inquire into English potato disease.
5. Visit to Jondaryan to investigate prickly pear disease.
6. Visit to Nundah to inquire into disease affecting watermelon.

*NOTE.—Considerable attention has been given to local diseases of the prickly pear, at the suggestion of the late Under Secretary, but with but little definite result. It was, moreover, deemed as a matter worthy of inquiry to discover whether there existed elsewhere a specific disease peculiar to *Opuntia*, that if introduced into Australia would serve as a means for effecting its destruction. In prosecuting this investigation, the existence of a bacterial disease affecting the so-called *Fico d'India* in Italy, and producing speedy decay of its tissue, has been ascertained, and communication initiated with Professor Savastano with a view to discover the practicability of employing it for the purpose mentioned.

PHYLLOXERA CONFERENCE.

During August, 1899, the Entomologist, in company with Mr. E. H. Rainford, Viticulturist, attended the Intercolonial Phylloxera Conference held in Melbourne on 31st August and six following days. In connection with this, he assisted in arranging the programme of work, took part in every important discussion, and submitted resolutions that were afterwards adopted.

NOTE.—It is understood that a report of this Conference, prepared by Mr. E. H. Rainford, has already been submitted.

PUBLICATIONS.

The following publications have issued from this branch of the Department, viz. :—

- (1.) "Potato Disease," *Queensland Agricultural Journal*, Vol. V., pp. 57-63.
- (2.) "Vaginula Slugs," *Op. cit.*, Vol. V., pp. 63-70.
- (3.) "Coffee-Leaf Disease and Seed Importation," *Op. cit.* Vol. V., pp. 408-10.
- (4.) "Catterpillar Plague (*Teucania unipuncta*. Hare), *Op. cit.* Vol. VI., pp. 135-147.

COLLECTIONS.

The official entomological collection has been augmented during the year by additions that have been made principally in the orders Coleoptera and Homoptera; although some few representatives of other orders also have been secured. These accessions were effected, in great part, by the late Mr. Nugent, whose services were placed at the disposal of this office in September, 1899. But several small purchasers have also supplied many important desiderata, and the insect cabinets have been enriched, moreover, through the liberality of private donors. Amongst whom may be mentioned especially Dr. J. Turner, Mr. R. Illidge, Mr. F. P. Dodd, and the Government Entomologist of Victoria.

The work of the year has, however, served to emphasise the necessity for a special effort being made to largely increase the comprehensiveness of the various divisions that this collection comprises; and a small sum of money might be, with great benefit, devoted to the fulfillment of this need, for the Entomologist, owing to the urgent requirements of other duties, can bestow little or no time to accumulating and preparing, for permanent preservation and display, insect specimens, as well as illustrations of their depredations and of their serviceable work. Specimens of every insect that is directly, or indirectly injurious or beneficial, in each of the stages of its metamorphosis, and of objects serving to throw light on its life history, should find a place in the cabinets here, and exponents of the insect fauna, generally, of each of the major divisions of the colony, secured, in order that cognizance may be taken of the extent to which the interests of the residents in each of them are, or may be, affected by the different members of this section of animal life, and of the kinds of insects that are respectively concerned. The information, of a class that so comprehensive a collection might be calculated to afford, is frequently in demand. The requirements of the entomological course in the curriculum of the Agricultural College, necessitated, moreover, even a much larger collection that is at present available for use.

Whilst dealing with the subject of collections, it may be mentioned that some progress has been made in securing pictorial illustrations of insects of Agronomic interest and their depredations, as well as of plant diseases generally. This has been largely due to the ready co-operation of Mr. C. J. Wills, artist to the Department, whose skilful and patient work I gladly acknowledge.

MR. L. J. NUGENT.

In conclusion, reference may be permitted to the loss the office has experienced through the decease of Mr. L. J. Nugent, attached as an assistant in September, 1899. He had previous to the date mentioned distinguished himself as a close observer and student of plant life, and already when his brief career had ended, had not only proved himself to be an indefatigable collector of insects, but one competent to also elucidate the many problems relating to their life histories. These qualifications, moreover, were enhanced by the zeal and industry that he brought to bear on whatever work either duty or mental interest dictated.

HENRY TRYON, Entomologist.

REPORT OF THE INSTRUCTOR IN FRUIT CULTURE.

In my last annual report I stated that, in my opinion, one of the best methods of assisting and improving the fruitgrowing industry in this colony was by means of practical instruction in the various branches of fruit culture given to fruitgrowers in the orchard itself. This is still my opinion, and my experience during the past year proves that the practical instruction given in the past has been appreciated by fruitgrowers throughout the colony, and has been acted upon by them with considerable advantage in many instances.

Whilst visiting the various fruitgrowing centres in the Southern part of the colony during the past year, I have been gratified to note the beneficial results of previous practical instruction, especially as regards the varieties of fruits planted, the cultivation of the land, the pruning of the trees, and the destruction of fruit pests. In some instances the results are very marked; orchards that were entirely unpruned and greatly neglected at the time of previous visits are now well pruned, and during the present season have borne good crops of fruit. The results of previous practical instruction having thus proved so satisfactory, I have continued to work largely on similar lines during the past year, and have given many practical demonstrations in many districts. Much greater and more intelligent interest is being taken by fruitgrowers in all branches of their business, and the old practice of promiscuous planting and indifferent culture, or, in some instances, entire absence of culture, is slowly but surely dying out. Fruitgrowing is becoming a primary industry, and the orchard, instead of being considered an adjunct of the farm or dairy, is, in many instances, being recognised as the main source of income, and the farm or dairy as subsidiary to it.

In addition to the increased interest that is being taken in fruit culture by those who have established orchards, there has been a considerable amount of attention given to the matter by the general public, with the result that many new orchards have been planted or have been got ready for planting. During the year there has been a large increase in the area planted in orchard in the colony, due largely to heavy planting of citrus trees in the coastal districts, and of the earlier varieties of deciduous fruits in the Stanthorpe district, as well as the planting of mixed orchards throughout the colony. I am glad to say that the many warnings issued by this Department from time to time respecting the planting of unsuitable varieties of fruit trees, are beginning to have some effect, and that many growers are now confining their attention to the cultivation of fruits having a commercial value, and best adapted to their particular district. This is the only way fruitgrowing can be made to pay, as unless any particular fruit is grown under the conditions that are most suitable to its proper development it cannot be grown to pay, as success depends on the production of the best article at the lowest cost. To repeat what I have written over and over again, the only way to make fruit culture a success is to grow in a district the particular fruit that is best adapted to that district, and not to attempt to grow any fruits that can be produced elsewhere under more favourable conditions of superior quality, and at a much smaller cost. Despite all the warnings that have been

given, there are still a number of persons who pay little, if any, attention to them, and who go on planting year by year trees that are absolutely unsuited to the climatic conditions of the district in which they are planted. Such trees are not only a loss to their owner, but are a fruitful source of danger to the neighbourhood, as they usually become a breeding-ground for all the fruit pests of the district. Those who plant trees in this manner are usually not fruitgrowers, or are not mainly dependent on fruit culture, but are principally selectors or townspeople having suburban gardens who wish to grow a few fruit trees for their own use. These persons, having no special knowledge of fruit culture, fall an easy prey to the plausibleness of the itinerant fruit-tree hawker, whose main object is usually to get rid of his goods at the highest price, quite irrespective of their suitability to the district to which they are sent.

On different occasions I have noticed fruit trees going to Northern districts which the Stanthorpe district is not cold enough to produce profitably, such as currants and gooseberries; and varieties of apples, pears, plums, peaches, &c., are frequently sent from the southern colonies to Northern ports that have no more chance of producing a profitable crop of fruit there than if they were sent to the South Pole. I have also noted such plants as guavas, Brazilian cherries, Queensland nuts, &c., sent up from the southern colonies for planting here. Where the former is a need, the Brazilian cherry can be obtained by hundreds under any leaning tree, and the Queensland nut is a native of the colony. Intending planters should bear these remarks in mind, as no one can afford to plant fruit trees that are pre-doomed to failure; besides which, the planting of such trees is a loss to the colony. If intending growers do not know what to plant, let them consult the Department of Agriculture. The trouble of writing a letter will be well repaid thereby, and they will have the satisfaction of knowing that if their soil is suitable for fruit culture, and if they take decent care of their trees when planted, that they will get some return for their trouble, time, and money, which is very problematical if unsuitable varieties are planted.

During the year the Department has treated nearly 7,000 citrus and mango trees with hydrocyanic acid gas for the destruction of various scale insects. The orchards treated have all been situated in the coastal district extending from Mount Cotton in the South to the Burrum River in the North. In reply to a circular letter sent out by the Department to all those who had their orchards treated, we had a large number of replies, the general tenor of which was highly satisfactory, some large growers speaking in especially flattering terms of the results of the treatment, and of the manner in which the work was carried out by the Department's officers. The cyaniding outfit has been largely added to during the year, and the men in charge of it have become both careful and expeditious in carrying out the work. The outfit is standing the knocking about it receives in transit from place to place very well, and the duck from which the sheets and tents are made is wearing satisfactorily, and answers its purpose well. I am glad to be able to say that a number of growers in different parts have already purchased small plants for treating their own trees, and I hope that during the coming year several complete private or co-operative outfits will be at work throughout the colony.

In addition to cyaniding, a number of experiments have been carried out in spraying, both as regards the treatment of insect and fungus pests, and further experiments have been conducted with a view of diminishing the ravages of the fruit fly. Smoking the infested trees was found ineffectual even when the smoke produced by the burning of large quantities of dried cow-dung was allowed to envelop the trees for a couple of days. The most satisfactory results were obtained by carefully destroying the first crop of flies, and thus preventing their increase. The destruction consisted in the boiling of larvæ-infested fruit, and the catching of the fly itself. Although the latter may seem an impossibility, and the method adopted—viz., that of catching the flies with a net—an absurdity, still the results were very satisfactory. Fruit flies do infinitely more damage than either fruit-eating birds or flying-foxes, yet as soon as these become plentiful the grower starts shooting them, but at the same time does nothing to keep the fly in check, although the latter is his greatest enemy, and the destruction of the first crop of mature insects will prevent serious loss later on in the season.

During the year no work of any importance has been carried out at the Redland Bay experiment orchard, as, owing to the fact that the lease terminates in October of this year, it has not been deemed advisable to initiate any fresh work or carry out any further experiments, but simply to conduct the working of the farm at the least expense. This orchard has come in useful for trying some experiments in spraying mangoes and as a headquarters for the cyaniding plant; all tents and sheets being tanned and mended here.

The fruit season of 1899-1900 has only been a moderately successful one. The late frosts of the spring of 1899 destroyed a large proportion of the deciduous fruits of the Downs, as well as the bulk of the peaches and cherries of the Stanthorpe district. In the citrus-growing districts there was a good promise of a heavy crop early in the season, but the unusually dry spring and summer caused a considerable reduction in the output of several districts. Other districts, notably the North Coast Line, had a much better rainfall, and consequently showed a very substantial increase in production. On the whole, pineapples have done fairly well, but an outlet for the surplus fruit of the summer crop is badly wanted. A better system of distribution of the fruit throughout the colony and the southern colonies, so that it could be purchased at reasonable rates by the general public, would absorb the surplus crop, as the cheaper the fruit can be sold, the greater the demand. At the same time steps should be taken for utilising the fruit by means of canning, or crystallising. Bananas have, as a rule, done well, though the price has been in many cases very unsatisfactory. As in the case of pineapples, a better and cheaper means of distribution is badly wanted; and as the English public will now purchase the fruit dried, there is an opening for some of our surplus by utilising it in this manner.

One of the most important questions to be dealt with is the opening up of new markets for our fruit, especially citrus fruit, pineapples, and bananas, as our Australian market already shows signs of being unable to absorb all our produce. In the case of citrus fruit especially, there is bound to be an enormous surplus within a few years owing to the very heavy planting that has taken place within the last three or four years. The opening up of new markets for our fruit is thus becoming absolutely necessary, and the best means of doing so is matter for very careful consideration by this Department. The whole question of fruit export outside of Australia will have to be gone into thoroughly, so that it shall be established in such a manner that the business can be run on systematic commercial lines.

ALBERT H. BENSON.

REPORT OF THE VITICULTURIST.

SIR,—I have the honour to report upon my work for the year ending 30th June, 1900.

By direction of the Minister I attended the Phylloxera Conference held at Melbourne in September, 1899, as a Queensland delegate, at which the best means of coping with the pest, the reconstitution of destroyed vineyards, and other matters, were discussed, and resolutions passed. Amongst others was one recommending the introduction of American resistant stocks, and formation of nurseries of the same for future distribution under Government control. In the report I made to the Minister on my return I recommended this resolution, amongst others, to his consideration, suggesting that this Department should prepare for a possible invasion of Queensland by the pest by importing a number of plants of various American resistant stocks, and forming the same into a nursery at one of the experimental farms. This has been acted upon, and plants of ten varieties of resistant stocks have been imported from Europe, which are at present in quarantine, and some of each will eventually be distributed to the different experimental farms, and tested as to their adaptability to the various soils, and also as to their grafting adaptability for the various table and wine grapes.

These experiments will be of great future benefit to our vignerons, should the phylloxera eventually find its way into Queensland, and vineyards have to be planted with resistant stocks, as this Department will then be in a position to advise which variety or varieties is best adapted for a given soil, and which grapes give best results when grafted on them.

The vines imported last year and planted in quarantine on the island of St. Helena have done very well considering the time they were travelling (in some cases nearly five months), the varieties from Portugal and Madeira being especially vigorous. Up to the present the most careful examination has shown no sign of disease whatsoever, and they will shortly be removed to the Westbrook farm for propagation.

I regret to have to report the total destruction of the grape crops last season at the Hermitage and Westbrook Experimental Farms by the severe October frosts. A small second crop of Black Clusters and Blanquettes was obtained at Westbrook. Not only was the crop destroyed, but, what was far worse, nearly all the spurs and young wood, in many cases the vines were killed down to the ground. The result was a copious growth of suckers which necessitated much extra labour to keep them under, and in a great number of cases the re-formation of the vine on one of the suckers is necessary, by which the growth of the vines will be retarded and the symmetry of the vineyard destroyed.

The work completed and begun in the vineyards at the Experimental Farms is as follows:—

HERMITAGE.—No change.

WESTBROOK.—As the vines last year showed a tendency to disease, and the moisture hung in the soil after wet weather, it was decided to drain the vineyard, which was done by trenches formed by first ploughing out the soil to a depth of 12 inches, and then finishing off with pick and shovel to a depth of about 2 feet by 1 foot wide. These were then filled in with loose stones up to 12 inches from the surface, and then top soil was replaced. Since draining the soil dries quicker, and the vines have been healthier. About half the vineyard has also been trellised in a substantial manner, and preparations are being made to put in this winter an overhead trellis 17 chains long planted with choice table varieties now in quarantine at St. Helena.

GATTON COLLEGE.—About 3 acres were planted last winter near the principal's residence, and about 2 acres will be added this season. This vineyard will be planted exclusively with wine grapes with the object of giving eventually practical lessons in winemaking to the students of the college; it will contain none but the best varieties of French, Spanish, and Portuguese grapes.

BIGGENDEN.—About 1 acre of vines of both wine and table varieties, new to the district, has been planted with a view to future distribution of those kinds which succeed best. About as much again will be planted this winter of fresh varieties.

GINDIE.—About 8 acres have been cleared and broken up ready for planting. On this plot it is proposed to put in this season 5 acres of Zante currants, 2 acres of export grapes (Almeria), and 1 acre of mixed varieties, wine and table. The plantation of the Zante and Almeria is an experiment to prove whether Queensland cannot grow her own currants and grapes for export as is done in South Australia. I have every confidence of being successful. The light, well-drained, easily-worked soil typical of a large area in this colony should produce healthy grapes fit for export or for drying. The climate of Gindie is eminently suitable for currant-drying, which, moreover, entails no skilled labour or expensive machinery. If South Australia can successfully ship grapes to London realising 15s. a case, Queensland should be able to do likewise, and if the experiment at Gindie is successful, a large area of land at present not utilised could be put under vines with an unfailing market in Great Britain and Canada for table grapes, and our own market for currants.

The cost of cultivation for the vineyard at Westbrook for the past season was an increase upon last year owing to the amount of labour required to remove the suckers as they shot up after the frost. The land was ploughed once only, the draining operations interfering with the first ploughing, at a cost of 17s. per acre, as the soil had been so hardened by the traffic on the drains that extra horses were required, and the work done more slowly. I may say that, in estimating all cultural expenses at the Westbrook Farm, 2s. 6d. per diem is allowed per team for feed. The land was cultivated seven times, at a total cost of 10s. 6d. per acre, and 10s. per acre is allowed for pruning, and 3s. 6d. per acre for hoeing the strips. The balance of £5 per acre was spent in tying up and suckering, which was quite exceptional, as already mentioned. Under ordinary circumstances the cultivation can well be kept within £3 per acre.

No figures are to hand from the other farms, but next year I hope to be able to quote cost of cultivation at all the State farms.

With a view to enabling visitors to the Westbrook vineyard the easier to grasp the principles of pruning, I have inaugurated what are called "record" boxes. A box or small cupboard is placed over a vine representative of a system of pruning. From the time the vine is planted photos. are taken of it before and after pruning, which are pasted in a book, and reasons for the course adopted written down. This is and will be done every pruning season, so that at any time an inquirer can see for himself how a vine has been pruned from the day it was planted to the day he is looking at it. Six systems of pruning will be illustrated at Westbrook, in some cases more than once. The same arrangement will be followed at Gatton College and Biggenden Farm, and eventually also at the Gindie Farm.

Whilst on the subject of pruning, it is interesting to note that one of the most fervent detractors to a system of pruning advocated by me during a visit to Roma in 1898 has now adopted that system in all its details in his new vineyard, although he still continues to assert I know nothing of pruning.

GENERAL REMARKS.—In last year's report I touched upon the necessity for Queensland vignerons preparing to meet the coming competitors from the south, and I again repeat the advice I gave therein, as the danger does not appear yet to be fully realised by them. I am alluding to those winemakers who supply the larger towns, and not those whose trade is in the bush, and entirely local. The competition will be most severely felt in the light, dry, red and white wines. Moreover, with a reduction in the price of wine from the abolition of the 6s. a gallon duty on southern wines, the number of wine-drinkers will be increased, but they will be captured by the Victorian or South Australian winemakers and not by the Queenslanders, because of the generally superior quality of the light wines they have to offer compared with Queensland light wines, price for price.

If, as is likely, a baby bottle of claret or chablis will be sold for 6d., many men who now take beer with their lunch will drink wine instead, but will order Victorian or South Australian in preference to Queensland wines, for the reasons already mentioned. If I suggest making light, red, and white wines to the average Queensland vignerons, he tells me there is no sale for that class of wine, but a ready sale for sweet, heavy wines; and the would-be wine-drinker complains he is obliged to drink beer because he cannot get a natural light wine at a reasonable price, a vicious circle which will be rudely squared by the southerner later on.

The reason for this general superiority may be attributed to a certain extent to climate, but not much. More powerful factors are as I have more than once pointed out—First: Choice of soil. In many cases the vines in this colony are planted in far too heavy and humid a soil to give a fine quality of wine. Second: The better quality of vines planted. All the inferior varieties have been grafted or replaced with such vines as Carbenet, Malbec, Hermitage, Riesling, &c., whereas in most of our vineyards the inferior varieties far outnumber the finer kinds, and the best claret grapes, such as the Carbenet, Malbec, Merlot, and Verdot, are practically non-existent. Third: The greater attention given to certain details during the fermentation and other periods of the wines birth, in attention to which in Queensland cause them to be lacking in bouquet and finesse, and to possess coarseness. There are other points to be attended to in the wines, after life, such as a nice get-up in bottling, capsuling, &c.,

but the above-mentioned are all important. Defective fermentation is easily rectified, but the question of the soil and vines is not so easily overcome for those who have vineyards already planted. A certain number of the inferior varieties could, however, be grafted each season until they were cleared out, as has been done in South Australia, and the sooner this is set about the better for those vignerons who wish to supply our market with light wines. Upon those who intend establishing vineyards or extending those already planted, I cannot sufficiently urge the necessity of planting the finer varieties if they wish to successfully compete with southern wines.

Again, there is no reason whatever against Queensland eventually taking her share of the trade with Great Britain in Australian wines, for I feel convinced that in this colony, quite as good wines can be produced as the bulk of the wine shipped from Victoria and South Australia, but there will be no hope of doing so if vignerons stick to the inferior kinds of grapes so common in Queensland vineyards, and this should be a further inducement to them to make the change, as they cannot tell whether they will not be glad to have that market some day. With extending cultivation in Queensland, and southern competition in the bargain, the colony's requirements will soon be overpassed, and our vignerons will then begin to look round where to dispose of their surplus stock. England offers an unlimited market if the wine is up to a certain standard in quality easily attainable in Queensland. Unfortunately, the British public will not have formed a very high opinion of Queensland wines from those samples sent to the Greater Britain Exhibition last year, if we are to judge from the remarks passed upon them by the judges as published in the official report on the Queensland exhibits.

Out of twenty-five samples examined by the judges, only six were found to be of any value in the British market, and such criticisms as "medicinal," "astringent," "sour," &c., are applied to the remainder, being almost word for word the same criticisms passed by myself in an article published in the *Agricultural Journal*, for September, 1899, on the wines exhibited at the Brisbane Exhibition last year.

It was a very great mistake to permit our winemakers to send what they considered to be suitable wines, instead of somebody with a knowledge of the English market choosing a few of the best made wines as typical of Queensland possibilities. It would be of great service to this colony if British capital could be invested here in wine-making establishments on a large scale for export trade, which is not unlikely if it can be shown that good sound wine, up to the standard of English requirements, can be made. But this will never come about if Queensland continues to exhibit such wines as were sent over to London last year.

E. H. RAINFORD.

REPORT OF THE TOBACCO EXPERT.

SIR.—I have the honour to report upon the work done by me during the year ending 30th June, 1900. The crop mentioned in my last Report as being in the farmers' hands has been marketed, and brought to the growers some £20,000. The crop now in the hands of the growers is not so large, by reason of continued drought during the transplanting season, and the prevalence of blue mould throughout the tobacco-growing districts of Texas and Inglewood, causing great destruction of plants. So far, my experiments with fungicides as a cure for blue mould have not been satisfactory. I have not yet tried them as preventives. Other experiments have given better results, but have not yet been sufficiently tried to be regarded as beyond the experimental stage.

Conditions under which blue mould prevails are well known, and our most satisfactory experiments have been to neutralise these conditions as much as possible by covering the plant beds with cloth at night, thus conserving the heat obtained during the day, and ceasing to water as much as possible, allowing the beds to be as dry as is consistent with plant life; when water is used, to have it as near the temperature of the plants as possible, to prevent chilling. In future we shall probably supplement this treatment with flour of sulphur, sprinkled over the beds, when the plants first appear. The experimental crop of 4 acres, grown in Texas, has given satisfactory results, producing about 2½ tons of good, well-cured leaf, of good quality, and much of it very desirable for wrappers.

The growers are continuing to manifest an interest in the improvement of their product, and the plough is fast being substituted for the hoe in cultivation. The proposed experimental farm is looked forward to by them with much interest. This farm will be centrally located, and convenient to all the growers. The consumption of locally grown leaf is making satisfactory progress, showing an increase in the past twelve months of 77,571 lb. over the preceding year; while the increase of imported manufactured tobacco shows only 17,000 lb. The import of raw leaf is merely nominal. At my request, the Department had Mr. Brünnich to make a comparative analysis of American and Queensland grown leaf, of similar varieties; the Queensland-grown leaf compares favourably with the other, and I believe the slight defects may be largely overcome by proper curing and manipulation.

Our local manufacturers are using every effort to popularise our home-grown tobacco, and are taking great pains to get the best results from our leaf.

Unfortunately, I have not been able to visit the Cairns district this year. A few small experimental crops have been grown there, and inquiry has been made by manufacturers for samples. I have not yet received their report.

Two samples of cigar tobacco have been sent to this office, from the district between Mackay and St. Lawrence, which were very good indeed, and I have so reported to the growers.

R. S. NEVILL.

REPORT OF THE INSTRUCTOR IN COFFEE CULTURE.

SIR.—I have the honour to submit my Report.

Since my Report of last year, Cairns has been made my headquarters and the centre of my operations. From here I have made tours into the surrounding coffee districts, giving advice and demonstration to those who applied for it. During the year some fifteen separate tours have been undertaken with very gratifying results, and have extended from the north of Cairns to the Buderim Mountains, within some 50 or 60 miles of Brisbane itself. It will be seen, therefore, that the area over which the coffee industry is spread, and which has to be visited, is extensive, and consequently the touring has occupied a considerable amount of time.

In detail the places visited, and where coffee is grown, include Cooktown, Daintree, Port Douglas, Cairns, Atherton, Myola, Oaklands, Mantaka, Kuranda, Mulgrave, Lower Russell, Clump Point, Mackay, Mount Jukes, Hampden, Rockhampton, Byfield, Yeppoon, Maryborough, Pinalba, Bundaberg, Blackall, Coolum, and Buderim.

Space would not admit of even short notes regarding each individual district and place where coffee is being more or less cultivated.

In general, however, I found from Cooktown southward to near Townsville a zone of country having a somewhat heavy rainfall—eminently suitable for the cultivation of coffee, but possessing a climate that will necessitate artificial methods of drying by means of kilns or drying machinery. At Cooktown and Townsville, and as far South as Rockhampton, the climate is such that there is every probability of growers being able to dispense with kilns and to dry in the open air, which, when possible, is always the more satisfactory method.

South of this, again, the absorptive power of the sun is less strong, but, the atmospheric moisture not being great, it is probable that open-air curing may be possible. There is at present scarcely sufficient fully-grown coffee in these parts to thoroughly test this.

The majority of gardens are small, though I found several of fair size, the largest being Messrs. Cutten Bros.' estate at Clump Point, of 80 acres; Messrs. De Molyns Bros., of the Lower Russell, running them very closely with 75 acres. There is very little coffee in cultivation of more than five or six years of age, the majority being either now in its second year or bearing its maiden crop this season. Some few acres in each of the three districts of Cairns, Mackay, and Buderim may be called old coffee, but their exact age is, in nearly every case, doubtful. The first coffee-tree ever imported has been pointed out to me, and it is healthy and flourishing; but, as this has occurred in several different localities, its exact age also is somewhat vague.

The varieties of coffee to be found are *Coffee Arabica* and *Coffee Liberica*. The former is the principal species, and is the usual coffee of commerce, and the most valuable, growing and cropping readily. It is comparatively easily cured, and, though delicate as a seedling, is hardy enough once it has reached maturity. The latter is the larger and hardier shrub, but is more difficult to pulp and cure, and is only worth about one-third the price of *C. Arabica*.

Of *C. Arabica* several varieties are noticed:—*C. Arab.*, var. *Mocha*, a small, stunted-looking and small-leaved tree, slow-growing, bearing freely, but having a very small bean; *C. Arab.*, var. *Maragogipe*, almost the opposite of the former, being a loosely-knit tree, with large leaves and berries, but somewhat delicate, and a sparse bearer; *C. Arab.*, var. *Nalknad*, which would seem to be identical with the varieties known as "Ceylon" and "Java"—a strong, heavily-bearing tree; *C. Arab.*, var. *Coorg*, a variety having very few points of difference from the previous variety, and being also a hardy tree and good bearer; *C. Arab.*, var. *Chick*, I have come across in one place only, and this is essentially the worst variety of *C. Arabica*, recognisable readily by its primary branches pointing invariably upwards.

Of these, several hybrids are to be seen, especially between the *Nalknad* and *Coorg* or *Ceylon*. These prove somewhat delicate but good-bearing trees. *Chick-Nalknad* or *Chick-Ceylon* hybrids are extant, and in every case seem to have been raised from seed obtained from the estate on which some healthy specimens of "chick" are still to be found. Several young plants are to be seen that look uncommonly like *Maragogipe-Ceylon* hybrids, but which are not yet old enough to identify as such. Such hybrids would probably prove valuable trees, if the bearing capabilities of the *Ceylon* can be combined with the size and quality of the *Maragogipe*. *Arabica-Liberica* hybrids I have not seen in this colony as yet, though experiments are being conducted at the State Nursery, Kamerunga, with a view of obtaining this valuable hybrid.

On the whole, the condition of the estates as I found them, was not encouraging—in some cases the weeds were over the coffee. Where the coffee had been kept clean, the growth and bearing were remarkable. For amount of crop the Buderim Mountain is noticeable, the quality being also specially good here. On the Daintree River one or two estates that had been kept assiduously free from extraneous growth showed remarkable development, trees of thirteen and fifteen months being topped at 4 feet, having a good spread of secondary growth, and spiking heavily, showing promise of a 5 to 6 cwt. crop that would ripen when the trees were not more than two and a-half years old. For all-round good qualities, some of the properties in the vicinity of Cairns, especially on the range about Kuranda, are pre-eminent.

To summarise, the area especially adapted to coffee culture may be said to extend from Rockhampton northward to Cooktown, and the principal centres to be at, or in the vicinity of, Mackay, Geraldton, Cairns, and Port Douglas. The places that I have yet been unable to visit are Bowen, Cardwell, Geraldton, Johnstone River, the Bloomfield, St. Lawrence, and Percy Island.

Owing to the amount of work entailed and the large area to be traversed, it was not possible during the year to visit every district where coffee is grown or every estate on which it is cultivated. Figures regarding the extent of the industry, therefore, are still necessarily approximate rather than exact, the owners' estimates being uncertain, though I hope to be in a position to give exact statistics later on.

There would appear to be some 200 growers, aggregating 700 acres or more. I have not included in this the areas that have been allowed to lapse during the past year, and which amount to over 100 acres alone. The industry is now on a much firmer and better footing than last year. I found in some instances that areas had been opened by growers (perhaps in an excess of enthusiasm) without experience, knowledge of coffee culture, or consideration of the natural conditions governing the growth of the coffee-tree, which they were in consequence subsequently utterly unable to cultivate or properly attend to. In such cases I have advised the concentration of attention upon some lesser part of the estate, and the practical temporary abandonment of the rest pending the coming into bearing of the selected portion. The result of such work on the part of the grower has been to reduce the extent of the industry, but to put their estates on an infinitely better footing, financially and otherwise. The increase of area under cultivation is steady, though not rapid, for the same reason. Under my advice, those intending to open up are clearing perhaps 4 or 5 acres to begin with, in the place of 20 or 30, but with the obvious result that what is opened is well cultivated, satisfactory, and in a condition to pay the cost of subsequent openings in due course, instead of large and unsatisfactory estates, which, being difficult to keep clean from the commencement, are ever after a source of extra expense in weeding alone.

The number of applications for seed and advice *re* opening up is increasing, and the area reduced will, it is to be expected, be more than made up during the coming year by these new clearings.

The value of the industry cannot be gaged by the mere acreage, coffee being considerably more valuable than most farm staples. The area under coffee in the colony at present is capable of giving easily—with ordinary cultivation and no manuring—an average of 10 cwt. to the acre, a crop worth some £20,000, and possibly giving a crop worth at the same valuation £25,000 to £30,000 annually.

The improved methods of work started last year are showing good results, the samples of coffee at the various shows improving vastly, both in size, shape, and colour, and showing better and more satisfactory returns both to the grower and buyer. At present, practically all the Queensland grown coffee is bought up and manufactured in the colony, the prices remaining fairly steady at from £56 in the parchment to £112 per ton clean, according to sample.

Last season some buyers complained of the quality of coffees received, owing to the loss they sustained in both weight and bulk on manufacture. This I found to be due, to a great extent, to the insufficient drying of the crop before hulling. In hulling insufficiently dried coffee the quality of the manufactured article is seriously impaired, and loss in weight of from 30 to 35 per cent. sustained. It is not always easy for growers to dry thoroughly, and bulk, but it was possible to very greatly improve, in this matter alone, on last year's work, and this has been very generally done. Growers see the advantage of drying thoroughly, and having buyers ask again for consignments, and buyers appreciate the absence of heavy losses in weight and possible loss by mould, &c., on storing. An advantage that is satisfactory to both parties, and one that has resulted in an apparently newly-discovered improvement in the quality of colonial coffees generally. The improvement is very noticeable in the manufactured article now being put on the local retail market.

Coffee is being put on the local market in tins, well got up, and of very good quality, at from 1s. 6d. to 1s. 9d. per lb., and the local sales of such would tend to show an increased and increasing consumption of the commodity. Local manufacturers are finding, as was to be expected, that they have to purchase from smaller growers to supply the demand. A healthy state of affairs that will, it is to be hoped, continue, enabling small estate-owners to dispose at once and for cash of the raw article. Seeing the apparently large price obtained for coffee per lb. manufactured compared with the price in the raw, there seems to be an inclination among some of the small growers to attempt the manufacture individually, which is to be deprecated. The putting on the market

of an unlimited number of brands would result, in course of time, in a lowering of prices, adulteration, and reduction of quality. The grower will find it pay better to sell in the parchment than to spend the time in manufacturing small quantities; and *vice versa*, the manufacturer will find that the work entailed and time occupied in manufacturing will not admit of the proper working of an estate for cultivation of the coffee also.

The prospects of the industry are decidedly good. That the sample, when properly treated, is of high-grade quality has been amply demonstrated this season, and, in spite of labour competition in other countries, it has also been demonstrated that the colony's natural advantages can compete with them, by the fact of a high-grade coffee being put on the retail market at the same or a lower figure, with a fair margin of profit to both grower and manufacturer. The removal of intercolonial tariffs will also open up the Australasian markets to this staple of Queensland, and in the home markets the prices are slowly but surely rising.

From the grower's point of view it is one of the most paying of products, giving a return of 10 cwt., and, possibly, a 15 to 20 cwt. crop, which, at even 6d. per lb. in the parchment, or £56 per ton, would mean £28 gross, or a net return of from £15 to £20, at least, per acre. In the present state of the industry it seems to be inadvisable to open up large areas for various reasons, and smaller gardens are more readily managed. Most of the growers have at present also small areas, and, in consequence, coffee is looked upon, to some extent, as a by-product. It will undoubtedly prove a very valuable by-product for any farmer, though with due attention to cultivation it will be found, as it is already in several instances, a profitable crop to grow as a sole staple, the returns giving a good living. And as the colony becomes more populated, large areas will be possible where at present labour difficulties practically prohibit the opening up of, say, a 100-acre estate.

Want of experience and carelessness in opening up coffee gardens can account for considerable loss and disappointment in the colony. Ignorance and inexperience of coffee culture, in many instances only showing in the second and third year. The necessity for ordinary attention to the area planted up in order to ensure satisfactory results cannot be too strongly dwelt on.

The initial three years or so of waiting before any return can be obtained has, unfortunately, been the cause of the neglect of even the fundamental laws of agriculture, occasionally, with the result that the field has either taken four or five years to come into bearing, or that the trees have been so retarded and hampered in their growth that when the strain of the maiden crop was felt they were found to have no stamina to carry it.

Coffee is perhaps one of the most responsive of any fruit-tree to cultivation, and it is certainly one of the most profitable, but, at the same time, not being indigenous, is very susceptible to neglect, and easily dwarfed and stunted by weed growth, &c.

The erection of a telephone connecting the Kamerunga office with the exchange at Cairns has also been of special utility, saving much time and trouble and many unnecessary journeys, especially in connection with the working of the Diseases in Plants Act and other duties connected with this appointment.

The amount of touring necessary has been considerably more than anticipated, and the periodical visiting has not been possible consequently, except in a few cases. For the most of the year, since I have not been able to visit all the growers individually, I was obliged to pay second visits to only those growers who directly applied for them, and then only when such visits could be arranged for on my happening to be in the district. The visiting would appear to be appreciated from the number of applications for further visits received (some thirty-five letters), and the results, as evinced by the state of the gardens, satisfactory.

The systematic visiting of the growers and their estates is especially necessary in the culture of coffee, since the work in connection with it may be said to differ radically, not only in different localities, but according to the age of the plant, and it would be advantageous to devote as much time as can be spared from office work to touring. In the course of the coming year I hope to have visited all the gardens again and to submit an even more detailed report of the state and extent of the industry.

The touring this year has, as already stated, covered a considerable area, and has occupied over 200 days, or nearly seven months of the year, allowing very little time, only some ten or twelve days each month, for the increasing correspondence, reports, articles, notes, &c., not to mention the time occupied in the correspondence and management of the State nursery and the Diseases in Plants Act work.

The incoming correspondence relative to coffee alone has amounted to 240, and the outgoing to some 200. Applications for visits, 35; and for advice and information, 49. Reports on various subjects, 14. Articles published in the departmental journal:—

1. Coffee Seed Selection, Preparation and Germination ... ..	...	Queensland Agricultural Journal, Vol. V., Part 6, page 684	
2. Pea Berries and Male Coffee...	...	ditto	582
3. Coffee Nurseries ... ..	...	VI., ditto 2,	120
4. Coffee, "The Poor Man's Crop" ...	...	ditto 3,	210
5. Root-growth of Coffee Plants ...	...	ditto	214
6. Remarks on Coffee Notes ... ..	...	ditto 4,	300
7. Selection of Land for Coffee Culture...	...	ditto	304

HOWARD NEWPORT, Instructor in Coffee Culture, Queensland Government.

REPORT OF THE CURATOR, BOTANIC GARDENS.

SIR,—I have the honour to report that the Botanic Gardens during the past year have been managed upon the lines approved by the Department, and the best possible results obtained under the circumstances.

During the past eleven years I have begged, almost pathetically, to be allowed to make them more national, and a centre for the horticultural activity of the colony, from Cape York to Thargomindah.

There is abundant evidence that a demand exists throughout the colony for that stimulus to horticulture which these Gardens are in a position to supply, and should supply, and which, as Curator, I am only too anxious to supply. Every civilised country in the world has awakened to the fact that the beautiful and useful art of horticulture deserves every encouragement which the most enlightened Governments can give it. It is taught in the schools as a most essential part of an ordinary education. When the French or Belgian boys leave school they have no incentive to increase the numbers of the unemployed of the cities, or to swell the lower ranks of the professions, to the injury of themselves and everyone else. They have been taught to delight in their gardens and to find their pleasure there.

This colony wants gardeners, and wants them very badly. Persons adapted for clerical and similar employments are much more easy to find, and there seems to be a very fair stock already on hand, but the youth who loves the land, and is willing to make his home there, and knows how to do it, is a crying need of the times, and is worth going to a little trouble to secure. The task of imbuing the rising youth of the country with such ideas is being done elsewhere with the most marked results upon the prosperity of many States; and it can easily be done here. I can, if the matter meets with the necessary encouragement, make these Gardens the headquarters of a movement which will result in turning out thousands of such youths from our schools within the next ten years. To do this, I would ask for sympathy rather than for money. To tell exactly how this can be done, would be to swell this brief report to the dimensions of a book. It must never be forgotten, when looking at horticulture from a national standpoint, that it is only the very shallow-minded person who despises what he calls the "merely ornamental" side of it. You cannot disassociate the useful and the beautiful in nature. The one helps the other always.

The various bodies of persons banded together in the colony to promote horticulture have no bond of union, no definite scheme, and no set of universal canons for their guidance. If they had, their numbers would be increased, their influence for good enlarged, and their objects promoted. Here is a direction in which both I and the institution I represent can be made of national service.

All horticultural exhibitions which I have seen in the colony during the past eleven years have been so much alike that the very first might have been taken as a pattern for all the rest. It is possible for these Gardens to be so employed as to bring about a great improvement in this respect. In places like Toowoomba, Warwick, Maryborough, Ipswich, Bundaberg, Beenleigh, &c., &c., it would be possible to stage exhibits, and to give expositions of horticulture, which could not fail to popularise the love of gardens, and to promote what most people in their hearts desire—a genuine love of home and rural life, and an appreciation of the beautiful in nature, allied, as it always is in a garden, with the useful. A fairly free hand in carrying out these matters would be an essential to success. No one with a knowledge of his business could hope to succeed on any other terms.

In my annual report of last year I drew attention to a scheme which I had submitted to the Department, framed on the lines of that adopted by the Royal Horticultural Societies and the County Councils in England, for horticultural examinations. These have tended to improve in a marked degree the tone of horticulture there, and I would ask that the paper be looked into.

The instructions issued to the gentleman (Mr. Charles Fraser) who laid out these Gardens in July, 1828, seventy-two years ago, were to "establish a public garden, to collect the vegetable products of the country, to make observations on their uses and importance, especially the forest trees, and to report on the nature of the soil."

The Gardens can claim to be the oldest public institution in the colony, and there is certainly none which has given so much healthful, refining, and elevating enjoyment to so many people. Owing to the central position of the Gardens, their easy accessibility, and the fact that the city has been so neglected in the matter of public parks, the yearly number of visitors is far in excess of that to any other metropolitan gardens in Australia.

The duty of collecting the living plants of our own colony (the richest in Australia in its varied flora), imposed upon the first director of the Gardens has not met with sufficient encouragement during my time, and I ask for the sympathy of the Department in carrying out the wise intention of the original founders. It is necessary to do this that the Curator should have opportunities of making himself acquainted with the colony generally, and of arranging for the collection of its plants. A yearly tour through at least a section of the colony, to be spent in lecturing, plant-collecting, promoting horticulture in public schools, visiting and encouraging the public and semi-public gardens, &c., would, in my opinion, prove of considerable advantage to the general community.

GENERAL WORK.—The general work of the Gardens has been carried on at about one-third of the cost per acre of any other national or State garden in Australia, the objects striven for being (a) the provision of the greatest possible amount of healthful and humanising enjoyment for the public and for those who visit the city and use the Gardens in such numbers, (b) the provision of instruction, by means of as full a collection as possible of native and exotic plants, (c) the distribution of plants for public purposes, (d) the dissemination of information on economic botany and horticulture, and (e) the acclimatisation and propagation of useful exotic plants, as well as those of ornamental character.

The Gardens have been improved, despite the fact that much extra work has been placed on the staff during the year, altogether outside their regular work. The tenants of the lawn tennis courts have been greatly dissatisfied by the expenditure upon their courts, and the efforts made to satisfy them has occasioned serious neglect of the legitimate work of the institution. A tennis court costs the clubs 2s. 4d. weekly. For this sum it has to be mown, rolled, swept, marked, &c., and the very whitening has to be purchased for marking. Some of the courts have in addition been specially top-dressed each year for the past two years, and yet the clubs are dissatisfied. The courts are kept as well as those at Government House, and the players would soon discover, if they had to pay for the work done to their courts, that they could cheerfully put up with a much worse state of things. At least four times the work is now done to each court than was done when I first took office here, though the rent then charged was double what it now is. Two of the clubs (those renting the favoured courts) have nevertheless constantly asked your Department for further expenditure as a right, and I advise therefore that the whole system of letting the tennis courts be overhauled.

In addition to articles in the *Queenland Agricultural Journal* from month to month, I have started a series of lectures on Economic Botany and Horticulture at the Agricultural College, and the interest which the pupils have displayed in these, so far as they have proceeded, is, the Principal assures me, very gratifying to him.

Large numbers of seeds have been received during the year from kindred institutions in many parts of the world, and seeds sent away in exchange.

The demands for trees for Arbor Day have been met from these Gardens without any difficulty, as also for the purpose of planting in several municipalities, and in public places. Arbor Day as an institution for tree-planting wants to have a good deal of life infused into it. When one learns that in the State of Nebraska alone 350,000,000 trees have been planted during the last quarter of a century by the medium of this public festival, it becomes clear that we are only playing at arboriculture in Queensland. The patriotic Minister for Public Instruction in Italy, Signor Bacelli, is actually reforesting the whole of the country through the influence of the schools, the Queen doing her share of the work. The Feast of Trees in Queensland could be made a very big thing.

We have a larger stock of all sorts of plants from every quarter of the globe than ever before.

The Palms which I have been careful to plant in good positions throughout the Gardens are now attaining large dimensions and giving to the place that tropical appearance which excites the admiration of all strangers, and creates such a good impression as to the fertility of our soil and climate.

It is to be hoped that arrangements can be made to secure the attendance of a good military band every Sunday afternoon. On that day by far the greatest numbers of people are to be found here, and those are chiefly persons whose vocations keep them closely engaged during the week, and who have no other opportunity of experiencing the refining enjoyment of delicious music amid most beautiful surroundings. The five bands associated with the Government forces in Brisbane are on a voluntary basis, and as matters now stand the expenditure of £250 per annum would be necessary to secure the weekly attendance of a good military band.

The need of sufficient seats is very severely felt by those who visit the Gardens. In our climate seats and shade are very important matters in all outdoor public places.

The asphaltting of the walks is also a matter urgently requiring attention. I have no fund available for this purpose.

PHILIP MACMAHON, Curator.

ANNUAL REPORT FOR THE STATE NURSERY, KAMERUNGA.

SIR,—I have the honour to submit the annual report for the year ending 30th June, 1900.

The season as a whole has been favourable, although the weather has been somewhat unusual. The ordinary wet season has, instead of lasting through from January to March or April, resulted in a heavy fall of some 58½ inches in January, and an almost dry February, with showers through March, April, and May. Except for a few freshets in the river in January, therefore, no floods have been experienced. The total rainfall for the year amounted to 79.145 inches, some 13.077 inches less than last year.

The weeding of the Nursery has been a difficult matter during the past year. The climate has been particularly favourable for weed growth, and the ground being impregnated with seed, weeding needed close attention. I am glad to say, however, that the place has been kept clean, and the amount of seed in the ground reduced, so that hereafter it is expected that it will be possible to devote a considerable amount of the labour expended on this work to other matters. The rubbers and fibres have received special attention. The soil in parts is poor, and some fields have been ploughed over and improved by a growth of cow pea and other leguminous crops. A considerable amount of grafting, pruning, potting, packing, and despatching has been involved in the increased interest taken in this Nursery, as evinced by the applications received.

A plot of land in the Nursery reserve, adjacent, but not adjoining, has been selected and brushed; but pending the receipt of seeds and plants of spices, &c., nothing further than this has been done. It is to be regretted that the cardamom, clove, nutmeg, and other spice seeds have not come to hand yet.

The number of applications received has amounted to 702, and the seeds, plants, cuttings, and rhizomes distributed are as follows:—

Seed—7 cwt. 3 qr. 15 lb. 2 oz.
Seed in packets—150.
Plants—4,523.
Cuttings—466.
Rhizomes—129 lb.

The correspondence has very considerably increased this year, and the books supplied for the incoming correspondence have admitted of the systematic docketing and recording of letters asking information, advice, or making application for plants and seed. The incoming letters for the year have amounted to 375, and the outgoing, 387.

The fields, of which the Nursery is divided into nine, are utilised as follows:—

Field No. 1 is occupied by numerous citrus fruit, palm and rubber trees, principally citrus. No. 1 (a) is devoted to Manila hemp and New Guinea bananas.

Field No. 2, on which the buildings stand, has also fruit trees and arrowroot. No. 2 (a) has ginger, turmeric, yams, &c.

Field No. 3 is devoted to fibres, the annona family, mangoes, and grasses. The meteorological instruments are in this field also.

Field No. 4.—New Guinea and other varieties of cane, Vi apple, and other trees.

Field No. 5.—The bush-houses, Para rubber, cow peas, divi-divi, &c.

Field No. 6.—Once occupied by coffee, being a poor field, is in process of being green-manured by cow peas and beans.

Field No. 7.—Ceara rubber, African oil palms, and cocoanuts, &c.

Field No. 8, from which sugar-cane was ploughed out last year, has been planted out with West African rubber, and the remaining portion utilised for Kafir corn and sorghums.

Field No. 9.—One-half of this field is under Ceara rubber, and the rest is held in reserve for plants that are expected shortly and for general extension.

In detail the progress has been as follows:—

SUGAR-CANE.—The patch of cane in *Field No. 4* contains some sixty odd varieties, most of which are New Guinea. These do not show the growth they might, owing possibly to the want of cultivation, due to lack of implements and horse-power at the Nursery.

THE CITRUS FAMILY.—Constant spraying and attention has reduced the amount of fungoid growth and scale, resulting in a better appearance and growth. Fruit fly, however, has been very bad this year, utterly spoiling the crop. Plants and grafts are available for distribution, however.

BANANAS.—The names of many of the imported varieties, especially New Guinea, were missing on taking over charge last year, and it has been found impossible to identify them. Several have borne for apparently the first time, but in no case has the result been of any special value, none coming up to the ordinary Sugar or Cavendish.

COCOA (*Theobroma cacao*).—Only one tree has borne hitherto, though several have blossomed and show signs of cropping. This tree gave three pods last year, from which several healthy young plants have been obtained. The crop this year is fairly good, and it is hoped that a fair stock of seedlings will result with which to experiment on a larger scale and in greater detail. At present the trees are being attacked by a species of borer grub. The supply of plants that came from the three pods produced last year was naturally limited, and as they were required for planting up a new field for experiments as to yield, &c., applications had to be refused. Applications for seed or plants of this tree have been numerous, and it is hoped that this season it may be possible to spare a few for distribution.

MANGOSTEEN (*Garcinia mangostana*).—The growth of these trees have been somewhat disappointing. The two trees in the bush-house continue to grow, but those in the field (No. 1) remain stunted and sickly. The shade and humus obtained in the bush-house will account for the difference, and there is no doubt that transplanting into the new block, which will be shaded, will allow of their recovering and doing well.

A few seed still in the husk were received from the Department during the year, but failed to germinate.

Divi Divi (*Casalpinia coriaria*).—These trees form a very handsome avenue between *Fields 4* and *5*. They are bearing well, though not quite as heavily as last year; there are several more in bearing. There is an unlimited supply of seed and a few plants available.

PALMS.—These have shown a considerable amount of growth during the past year. There are at the Nursery sixteen varieties, of which the African Oil Palm (*Elæis guineensis*), the Date (*Phoenix dactylifera*), the Sugar Palm (*Arenga saccharifera*), and the Sago (*Caryota urens*) may be considered the most important. The last three mentioned are not yet full grown; the first, however, is in bearing, and would seem to be particularly prolific, and the nut from which the palm oil of commerce is extracted, grows in a handsome bunch on a short stalk close to the stem of the palm in the axis of the leaves.

Having no means at our disposal of extracting the oil, it has not been possible to give any figures or information *re* economic value so far. Plants and seed of most of the varieties are available.

THE JACK FRUIT (*Artocarpus integrifolia*).—One tree bore a number of fruit, but only of small size. The tree grows readily here, though the fruit is very inferior to that of the East Indies in point of size and flavour. Seed are particularly delicate, losing their vitality very quickly; plants, therefore, have been distributed, and a number are still available. It may be mentioned that cattle will readily eat both the leaves and fruit; the latter need to be cut open for them. The tree is greatly used in some countries as fodder in dry weather.

BREAD FRUIT (*Artocarpus incisa*).—Shortly after despatching last year's Annual Report—*i.e.*, on the 3rd of July last—the terrestrial radiation thermometer dropped to 31.8 degrees Fahr., and the minimum to 40.5 degrees Fahr. The frost was so slight that no damage was done to any of the delicate tropical plants in the Nursery, save only the breadfruit. These having grown into trees some 15 to 18 feet high, had the top buds nipped, the effect subsequently spreading down the branches and necessitating the removal of some 5 or 6 feet of wood. It was some months before the trees recovered from the shock, but are now doing well, and promise to speedily regain their former height. No crop was obtained this year, but a number of root cuttings were successfully raised.

THE ALGAROBA OR MESQUIT BEAN (*Prosopis juliflora*), of which tree there is but one in the Nursery, has fruit for the first time this year. A large crop of pods was the result, and being recognised as a useful fodder plant adapted for drought-stricken parts, the applications received for seed barely fell short of three figures. A large number of applications had perforce to be held over till next crop. The tree has lately made rapid growth, and gives promise of yielding a still heavier crop next season, with which we hope to be able to meet the demand for seed and plants.

THE CANDLE-TREE (*Parmentiera cerifera*).—This fodder tree has adapted itself to the climate and soil remarkably, and seems to stand cold weather also. Any number of plants are available.

KOLA NUT (*Sterculia acuminata*).—One of these trees bore for the first time this year, but unfortunately the nuts fell off before reaching maturity. They are now some nine or ten years old, and it is hoped that they will bear this season. Plants are being produced by layering, with the object of reproducing the species as well as ascertaining whether the trees thus produced will come into bearing in less time than the parents.

RUBBERS.—There are now in the Nursery five varieties of rubber trees growing. Para Rubber (*Hevea brasiliensis*).—Some 60 plants or so were put out when about 18 inches high early this season in Field No. 5, and have now attained an average height of 5 feet or so, and are growing strongly and well. As seedlings they seem delicate, but grow readily when established. Ceara Rubber (*Manihot glaziovii*).—This has proved the most hardy of any of the imported rubbers in North Queensland, and would seem to grow anywhere readily. It seeds freely, and both seed and plants are available for distribution. A few trees in Field No. 1 are older, and experiments in tapping and extracting will be carried out during the year. Assam Rubber (*Ficus elastica*).—A number of these trees are now a good size; it is said that the sap is thin, and contains very little rubber until some considerable age is attained. The branches and leaves are, however, full of a milky sap, and it is proposed that experiments be conducted to prove this during the year. In any case, the tree grows readily, and is easily reproduced from cuttings. The Mexican or Panama Rubber (*Castilloa elastica*).—A few plants only of this rubber tree have been obtained. They are very small at present, but are healthy and thriving. West African Rubber (unnamed).—A number of these trees were obtained by the Department at the beginning of the year through Messrs. T. Christie and Son, London, and were planted out as plants 6 inches or so high from their pots in July last. These have speedily adapted themselves to the climatic conditions here, and have grown to an average height of some 3 feet or so, the largest tree being some 5 feet high with leaves 2 feet long by 8 inches broad. This would, therefore, seem to be a rapidly-growing tree. The rubber is extracted from the fruit, which is large, and weighs some 2 lb. or so. The seed of the African Rubber (*Kickzia africana*) that were obtained at the same time entirely failed to germinate.

A rubber-extracting machine was applied for and granted by the Department, and though on its way out from London has not been received up to the time of writing this Report. The advent of this machine will open up possibilities of experiment in the direction of rubber-bearing plants and trees, not only imported but indigenous, that will be of immediate and direct practical utility. During the year, or by next Annual Report, results of experiments will be published.

FIBRES.—Sisal Hemp (*Agave rigida*), as well as *Fourcroya gigantea*, grows well. Plants of both are available. Manila Hemp (*Musa textilis*) has grown very well, and proves prolific. Suckers of this may be obtained in quantity. Ramie does not thrive. Fibre from all these was prepared and exhibited at the show at Townsville, together with fibre from several other common fibre-producing plants such as Arnatto, Pineapple, &c.

A fibre decorticator would be of practical benefit to the Nursery and, as in the case of Rubbers, admit of the obtaining and publishing of useful information *re* output per acre and per plant, and subsequently cost of production and value of product.

SORGHUMS, &c.—The following varieties of sorghums and Kafir corn have been received from the Department and grown at the Nursery during the past year. Sorghum saccharatum, giant Honduras, planter's friend, amber cane, early orange cane, brown Dhoura, red and white Kafir corn. The whole of the above, with the exception of brown Dhoura, yielded an excellent crop. For fodder purposes the giant Honduras would seem by far the best, admitting as it does of three to four ratoonnings and giving in each case a heavy yield. The Kafir corn also yields a heavy crop of seed. A plentiful supply of seed of the above has been secured and is available for distribution purposes.

COW PEAS AND BEANS.—Several varieties of cow pea and beans have been experimented with and also grown for green manuring purposes. Among the cow peas, White's perennial has, under the various conditions, been the most successful, the black and grey varieties failing in every case to cover the ground. They, however, produced a large quantity of clean healthy seed. Among the beans the spotted Mauritius and Florida velvet gave the best results. Quantities of seed of the above have also been secured for future experiments and for distribution.

ROOT CROPS.—Arrowroot, ginger, turmeric, cassava, and yams have all come on well. The demand for ginger last year was large and the supply ran short; it was therefore necessary to refuse applicants and plant out. This year Jamaica ginger will be available for distribution. Turmeric is particularly prolific.

The pump and machinery have been working satisfactorily. The heavy rains and freshets in the river in January bent and damaged the piping a little, but this having been put right and so fixed that no flood can do much damage, no subsequent trouble was experienced.

The Nursery sent an exhibit to the annual show of the Agricultural, Pastoral, and Industrial Association of Townsville, on the 7th and 8th of June. The exhibit was representative of the Nursery and instructive. It attracted considerable attention and was very favourably spoken of.

An article on the Algaroba or Mesquit Bean (*Prosopis juliflora*), from the pen of the overseer, appeared in the *Agricultural Journal* of April, 1900.

HOWARD NEWPORT, Manager.

SCHEDULE A.

ABSTRACT of METEOROLOGICAL OBSERVATIONS for YEAR ended 30TH JUNE, 1900, taken at the State Nursery, Kamerunga, Cairns.—Readings at 9.20 a.m.

Thermometer Readings.	1899.						1900.						Totals and Averages.
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	
Mean maximum ...	74.23	73.61	78.72	83.85	85.94	88.98	84.46	87.46	86.67	85.68	81.90	80.96	Mean average maximum, 82.62. Extreme maximum, 102.0. On date, 30th December.
Extreme maximum ... On date ...	80.5 10th	81.8 22nd	85.5 30th	88.0 28th	100.2 19th	102.0 30th	88.5 2nd	93.0 22nd	90.0 5th	89.0 30th	87.0 5th	86.0 12th	
Mean minimum ...	54.95	56.65	62.94	63.15	67.43	68.33	67.75	67.5	68.76	68.76	66.08	63.20	Mean average minimum, 64.62. Extreme minimum, 40.5. On date, 4th July.
Extreme minimum ... On date ...	40.5 4th	45.5 13th	57.5 25th	54.0 2nd	61.5 4th	63.0 7th	67.0 3rd	62.0 14th	65.5 4th	62.5 23th	53.5 31st	51.0 30th	
Mean temperature ...	64.14	65.13	70.83	73.50	76.18	78.65	76.10	77.48	78.18	78.18	73.99	72.08	Mean average temperature, 73.62. Total rainfall for 1898-99—92.222. 1899-1900—79.145. No. of days rain fell, 1898-99—120. " " 1899-1900—142.
Rainfall—Inches ...	2.810	1.115	3.280	.320	1.110	3.840	48.580	10.97	7.600	3.745	3.650	2.090	
Number of days on which rain fell	9	8	16	5	7	11	24	9	17	17	14	5	

SCHEDULE B.

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

Common.	Botanical.	Plants or Seeds Available.	Common.	Botanical.	Plants or Seeds Available.
Para Rubber	<i>Hevea brasiliensis</i>	Plants	Divi-divi	<i>Cæsalpinia coriaria</i>	Seeds & plants
Ceara "	<i>Manihot Glaziovii</i>	Seeds & plants	Candle Tree	<i>Parmentiera cerifera</i>	Plants
Assam "	<i>Ficus elastica</i>	Cuttings	Sugar-canes	Large number of varieties	Cuttings
Mexican "	<i>Castilleja elastica</i>		Kumquat	<i>Citrus japonica</i>	Plants & seeds
African "	Unnamed	Plants	Lemon	" <i>medica</i> , var. <i>limoneum</i>	Seeds & plants
Ramie Fibre	<i>Bœbmeria nivea</i>	"	Lime	<i>Citrus medica</i> , var. <i>limetta</i>	" "
Sisal	<i>Agave rigida</i>	"	Seville Orange	<i>Citrus vulgaris</i>	" "
Manila Hemp	<i>Musa textilis</i>	"	Sweet "	" <i>aurantium</i>	" "
Annatto	<i>Fourcroya gigantea</i>	"	Mandarin "	" <i>trifoliata</i>	" "
Mango	<i>Bixa Orellana</i>	Seeds & plants	Japanese "	<i>Lumia</i>	" "
Sour Sop	<i>Mangifera indica</i>	" "	Sweet Lemon	<i>Thea bohea</i>	Seeds
Bullock's Heart	<i>Anona muricata</i>	" "	Tea	<i>Ilex paraguayensis</i>	Cuttings
Star Apple	" <i>reticulata</i>	" "	Maté Tea	<i>Vanilla planifolia</i>	"
Algaroba Bean	<i>Chrysophyllum cainito</i>		Pepper	<i>Piper nigrum</i>	"
Paw-Paw	<i>Prosopis juliflora</i>	Seeds	Orris Root	" <i>methysticum</i>	
Persimmon	<i>Carica papaya</i>	Seeds & plants	Candle Nut	<i>Iris florentina</i>	Roots
Jack Fruit	<i>Diospyros kaki</i>	" "	Bauhinia	<i>Aleurites moluccana</i>	Seeds
Bread Fruit	<i>Artocarpus integrifolia</i>	Plants	Sappan	<i>Bauhinia variegata</i>	Seeds & plants
Mangosteen	" <i>incisa</i>	" "	Cassia	<i>Caesalpinia sappan</i>	" "
Pomegranate	<i>Garcinia mangostana</i>		Cocoa	<i>Cassia grandiflora</i>	" "
Guava	<i>Punica granatum</i>	Plants	Coffee	" <i>fistula</i>	" "
Litchi	<i>Psidium guava</i>	Seeds & plants	"	<i>Theobroma cacao</i>	" "
Madagascar Plum	<i>Nephelium litchi</i>	" "	"	<i>C. arabica</i>	" "
Brazilian Cherry	<i>Flacourtia ramontchi</i>	" "	"	<i>C. liberica</i>	" "
Carob Bean	<i>Eugenia uniflora</i>	" "	"	<i>C. maragogipe</i>	" "
Date Palm	<i>Ceratonia siliqua</i>		"	<i>Monstera deliciosa</i>	Cuttings
" "	<i>Phoenix dactylifera</i>	Plants	"	<i>Beaumontia grandiflora</i>	"
" "	" <i>rupicola</i>	Seeds & plants	"	<i>Albizia saman</i>	Seeds & plants
" "	" <i>reclinata</i>	" "	Rain-tree	" <i>stipulata</i>	" "
Sugar Palm	<i>Arenga sacchifera</i>		Kafir Doom	<i>Hyphcne thebiaca</i>	" "
Sago	<i>Caryota urens</i>		Banana	<i>Poinciana pulcherrima</i>	" "
Wine	<i>Diplolhemium martimum</i>		Weeping Fig	" <i>regia</i>	" "
West African Oil Palm	<i>Elæis guineensis</i>	Seeds & plants	Striped Bamboo	<i>Musa</i> , several var.	Suckers
Cocoanut	<i>Cocos nucifera</i>		Taro	<i>Ficus Benjaminea</i>	Cuttings
Royal Palm	<i>Oreodera regia</i>		Mulberry	<i>Bambusa</i>	"
Beatrice Palm	<i>Ptychosperma Beatrice</i>	Seeds & plants	Teosinte	<i>Colocasia esculenta</i>	Rhizomes
Fan Palm	<i>Corypha</i>	" "	Kafir Corn (white)	<i>Antignon amabile</i>	Plants & cuttings
Areca	<i>Areca rubra</i>	" "	" (red)	<i>Morus</i>	Cuttings
Kentia	<i>Kentia monostachya</i>	Seeds & plants	Early Orange Cane	<i>Eucheæna luxurians</i>	Seeds
New Grenada	<i>Martinezia caryotæfolia</i>		Amber Cane		
Arrowroot	<i>Cocos plumosa</i>	Seeds & plants	Planters' Friend		
Turmeric	<i>Maranta arundinacea</i>	Rhizomes	Sorghum Saccharatum		
Ginger	<i>Curcuma longa</i>	"	Giant Honduras		
Cassava	<i>Zingiber officinale</i>	"	Brown Dhoura		
Yams	<i>Manihot aipi</i>	Cuttings	Gram	<i>Cicer arietinum</i>	"
Peanut	<i>Dioscorea</i> (3 var.)	Rhizomes	Florida Velvet Bean		
Granadilla	<i>Arachis hypogea</i>	Seeds	Black Mauritius		
Passion Fruit	<i>Passiflora quadrangularis</i>	"	" (sport.)		
Rosella	<i>Passiflora edulis</i>	"	Cowpea (black)		
Castor Oil	<i>Hibiscus sabdariffa</i>	"	" (grey)		
Cotton	<i>Ricinus communis</i>	"	" White's		
Tobacco	<i>Gossypium arborum</i>	"	Perennial		
Rice	<i>Nicotiana tabacum</i>	"	Poor Man's Bean		
Russell River Grass	<i>Oryza sativa</i>	"	Lima		
Red Natal Grass	<i>Paspalum galmarra</i>	"	Pigeon Pea	<i>Cajanus indicus</i>	"
Guinea Grass	<i>Panicum teneriffæ</i>	"	Kola Nut	<i>Sterculia acuminata</i>	Plants
Vi Apple	" <i>maximum</i>	"			
Tamarind	<i>Paspalum dilatatum</i>	"			
Fijian Almond	<i>Spondius dulcis</i>	Seeds & plants			
Fig	<i>Tamarindus indica</i>	" "			
	<i>Terminalia catappa</i>	" "			
	<i>Ficus carica</i>	Cuttings			

REPORT OF THE CHEMIST OF THE SUGAR EXPERIMENT STATION, MACKAY.

SIR,—I have the honour to submit the following Report on the condition and progress of the Sugar Experiment Station, Mackay, during the past year.

Upon the instructions of the Minister, and with the advice of Mr. S. C. Voller, such of the fruit trees, &c., as it was deemed advisable to be without were condemned, removed, and destroyed. The trees retained were the Indian mango, tamarind, orange, grape vine, paw paw, mulberry, candle nut (these last two as breakwinds), as well as a few seedlings of other fruit trees.

The season's work has been chiefly "dead" work, ploughing out and destroying various roots, &c., ploughing and sowing green manures, which will be ploughed in in due course. The recently acquired "Secretary" disc plough has done very good work here.

Of the green manures tried extensively, velvet beans gave the best result, but it is a slow grower. Notwithstanding the fact that velvet bean has done so well here, it is possible that cow pea might suit the cane farmers better on account of the rapidity with which crop matures, and the facility for procuring seed. Detailed results of these green manures have already been published in the *Queensland Agricultural Journal*.

In view of the dairying business being started in Mackay, the Department sent a case of the grass *Paspalum dilatatum*, a grass which is very highly spoken of by Mr. Mahon. This is doing well here.

For more economic working, the young plants, &c., available for distribution were planted out in one block of land. The past season has been very dry, but have now all got a firm hold, and are making satisfactory progress. These are Brazilian cherry, persimmon, fig, litchi, sweet sop, loquat, rose apple, peach, hemlock, tamarind, bail fruit, kumquat, bitter orange, sweet orange, mandarin orange, rosella, pineapples, cassava.

The following remarks apply to the larger trees, &c., retained in July last year:—

MANGO.—There are twenty-three trees, the size and growth being very uneven owing to cyclones, &c., in past years. The crop from these was very poor from the high winds experienced, which reduced the mango crop all over the district, and perhaps also from the very severe pruning these had received. The growth of these trees is affected by scale of various sorts. Pending the arrival of a suitable tent wherewith to cyanide, the trees have been sprayed with the "resin wash." This treatment has certainly been beneficial, and when all the scale is dead, I have no doubt more vigour will be shown. During the past season the trees have been cultivated, and useless wood has been removed. At present a crop of cow pea is growing between the rows of trees, which will, in time, be ploughed in.

TAMARINDS.—There are seventeen. Last season the crop was a good one. Forty-three cases of tamarinds were harvested, but unfortunately the value of the crop was reduced by the presence of a weevil, which bored into the pod. We have cultivated round these, and pruned out useless wood. The growth has been uniformly good, and the growing crop promises well if the weevil will not get into it later on.

ORANGE.—There are thirteen small trees. These were pruned by Mr. Voller in July last, and the crop from them is a very fair one indeed. Unfortunately, these were suffering very badly from scale. They were sprayed with the "resin wash," which benefited them somewhat, but the scale was not killed. We managed to cyanide these (with one exception) in March, and the scale is now practically gone. The exposed position occupied by these trees is against the formation of symmetrical trees. It will take some time before the trees recover from the effect of the scales.

GRAPE VINES.—There are four rows of grape vines, each about $5\frac{1}{2}$ chains long. In July these were pruned (by Mr. Voller) right back with the object of reforming the vines. The old bark was rubbed off and the stems painted with calcium sulphide. A few very excellent bunches were obtained though the crop was very poor, as was to be expected. Cane grub beetles did considerable damage to the foliage; as many as 300 beetles have been picked off these in a morning. The land between these rows has been ploughed, scarified, and weeded as was necessary.

CANE.—The cane grown here last year (109 tons) was harvested in August, and sold to the Racecourse Central Mill, after which the remaining stools were all ploughed out and destroyed by fire. A portion of the Nursery (about one acre) which had been planted with all the varieties of New Guinea canes then on the place, has been allowed to stand, and the growth is being most carefully watched for disease or pests. This crop is most irregular (in places some of the varieties are represented by one or two stools, in others by thirty-five stools). Analyses of last season's canes were made, but as there is some doubt as to the age of these, and further, as I have no data as to the weight yielded by these varieties, the analysis of each will not be given, but only a few of the best and the worst. It must further be understood that these canes had not been compared with Mr. Tryon's catalogue, and the numbers assigned them are those numbers they were marked with in the field. These are—

No.	Cane Sugar. Per Cent.	Fruit Sugar. Per Cent.	Brix. Per Cent.	Quotient.	Pure Obtainable Cane Sugar.
15	17.08	0.36	18.65	92	16.29
22	16.52	0.34	18.15	91	15.70
24	16.12	0.47	17.63	91	15.36
38	15.44	0.27	16.72	92	14.80
66	16.00	0.68	18.45	87	14.77
41	15.75	0.26	17.43	90	14.71
53	07.08	2.48	11.78	60	04.73 (immature)
10	09.68	2.29	13.75	70	07.64
12	10.56	1.25	13.43	79	09.12
25	11.56	1.81	15.43	74	09.62

A cane called "Loucia" gave very good results here last year. The analysis of this was—

17.24	...	20	...	18.12	...	93	...	16.80
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A fairly complete set (one stool of each) of the canes introduced by Mr. H. Tryon has been planted in the field adjoining the laboratory, and are making good progress now. These were planted merely to retain the varieties on the station, and may serve, with the acre of cane already referred to, for analysis and notes on growth during the coming season. New varieties of cane, ordered by the Department from various sugar-producing countries, will arrive shortly. These will be planted out, but it may be some time before any of these are available for distribution.

PERMANENT IMPROVEMENTS.—A piece of land to the north of the station was obtained from the municipality of Mackay in exchange for that portion of our land in which their well was situated. This has been fenced in and two gates erected.

A main entrance gate has been erected in Alexander street, and a 12-chain roadway formed from this gate to the buildings. All the gates on the station have been repaired and painted.

A breakwind of bamboos has been planted along the south and eastern sides of the station. These are doing fairly well in spite of unfavourable circumstances. A mango breakwind has been planted on the north side. Tree-guards have been erected round these and the bamboos. A new harrow and a new roller have been made on the station.

The existing open drain from the north side of the station, and which discharges into the lagoon, has been cleaned out and deepened.

A bamboo framework to support and a tripod for raising the small bell tent used for cyaniding have been erected by us.

CHEMICAL LABORATORY.—Four students attended here last term, and another entered this term, in February.

Lectures on elementary theoretical chemistry were delivered bi-weekly last term, and periodical examinations were held throughout the term.

In practical chemistry these students have been taught the use of the chemical balance, polariscope, and graduated instruments used in sugar work. After preliminary instruction in the estimation of cane and fruit sugars, ash and water, the following analyses have been carried out by the majority of students under my supervision:—Canes, megass, juices, syrups, jellies, masse cuites, molasses, sugars, and filter-press cake. About three weeks were devoted exclusively to instruction in the calculations involved and in tabulating and drawing up a chemical bookkeeping sheet, showing the season's work in a sugar mill. A visit was also paid to a sugar mill in work. The process of manufacturing sugar was explained, and the best methods of taking the various samples, the analysis of which controls the mill work, was discussed.

These students all entered for the second term, and have been practising the analysis taught them in the former term.

In my capacity as chemist I have personally carried out the following analyses for the public. :—

Manures	...	...	...	...	1	involving	10	determinations
Sugar-cane	...	...	...	...	11	"	55	"
Alloys	...	...	...	...	1	"	5	"
Butter	...	...	...	...	3	"	18	"
Total	...	...	...	...	16	"	88	"

While the following Departmental work has been carried out :—

Manures	...	...	...	...	16	"	76	"
Fodders	...	...	...	...	2	"	14	"
Sugar-canes	...	...	...	...	77	"	273	"
Molasses	...	...	...	...	6	"	24	"
Green Manures	...	...	...	...	3	"	12	"
Sugars	...	...	...	...	7	"	28	"
Soils and Subsoils	...	...	...	...	5	"	130	"
Total	...	...	...	...	116	"	557	"
Grand total	...	...	...	...	132	"	645	"

I have to express my thanks for the services rendered to the laboratory by one of the elder students, Mr. E. MacCarthy, who, in his capacity as student and honorary assistant, has done very good work indeed.

The work of analysing certain of the green manure crops growing here is now in hand, and the results will duly appear in the *Journal*. Experiments on growing cane in sand, using various manures, were started in June last year, and the results of these, so far as we have gone, have appeared in the *Queensland Agricultural Journal*. These results were so encouraging that a second series was commenced in April of this year, and will be more carefully carried out. There are six experiments, and one blank experiment—the manures used being varied—the water applied being measured and the boxes weighed at intervals.

Manuring experiments have been carried out by the Department at Mr. MacCreedy's and at Mr. Swayne's—these gentlemen supplying the land and labour, and the Department supplying the manures and carrying out the balance. Unfortunately the frost last year was so severe that many plants in these experimental blocks were killed. On account of this (though these misses were all supplied), reliable information could not be obtained from these experiments.

Improvements to Laboratory.—A large ventilator, 3 feet square, has been erected here with great benefit. Additional shelving and tables, rendered necessary by having students here, were erected by station labour, as was also the erection and painting of a lavatory and the addition of 10 feet to the shed.

A small cane mill, with 5-inch rollers, was procured and erected, which enables us to obtain samples of megass, juice, &c., for students' use.

The only literary work done was "The Sugar Industry in the North," "Seedling Canes," "Guinea Grass," and "Lime—its functions and use in Agriculture," which were written for the *Queensland Agricultural Journal*.

The inward correspondence last year was 270 and the outward correspondence 300.

ALEXANDER RAMSAY, F.C.S., Mem. Soc. Pub. Analysts, London.

REPORT OF THE STATE FARM, WESTBROOK.

SIR,—I have the honour to submit herewith my report upon the operations at this farm during the past year :—

AVERAGE TEMPERATURES, JULY, 1899, TO JUNE, 1900.

Date.	Dry Bulb.	Wet Bulb.	Maximum.	Minimum.	1 Foot.	2 Feet.	4 Feet.	6 Feet.	Solar Radiation.	Terrestrial Radiation.	Number of Rainy Days.	Rainfall. Total Amount.
1899.												
July ...	54.3	50.0	60.3	40.4	53.0	55.4	59.1	61.9	121.5	37.4	Record incomplete	Record incomplete.
August ...	55.9	51.8	62.1	41.4	55.3	57.1	59.2	61.3	127.9	31.8	6	1.80
September ...	61.6	56.6	68.9	48.5	62.3	62.7	61.1	61.7	135.7	42.9	11	1.69
October ...	62.1	58.2	78.1	50.0	66.6	66.6	64.1	64.4	142.1	41.8	7	0.92
November ...	75.8	63.5	87.1	57.7	75.1	72.1	69.3	68.3	153.9	47.8	6	2.35
December ...	76.3	70.0	87.6	58.1	79.2	76.3	70.5	67.9	150.9	52.7	7	3.36
1900.												
January ...	72.4	65.0	83.6	60.5	79.5	78.1	73.1	70.6	153.1	55.1	4	0.71
February ...	75.9	67.5	85.9	61.7	79.8	79.9	75.7	73.3	152.3	54.4	8	3.71
March ...	73.7	65.4	82.2	60.8	78.1	78.6	75.3	74.1	146.9	50.4	6	1.78
April ...	59.5	52.9	70.1	49.5	68.7	76.1	72.5	73.0	136.1	38.9	5	1.81
May ...	59.5	59.5	67.9	40.4	62.0	65.3	69.6	68.6	New thermometer not obtainable	36.0	11	3.40
June ...	55.6	52.0	61.2	40.1	54.5	58.3	63.6	64.3	30.4	30.4	5	1.16

ORCHARD.—Area, 20 acres. The manner in which the trees are thriving gives good promise for the future of this industry. The summer and winter pruning from the first has proved a valuable object lesson, the shapely and uniform rows of trees calling forth admiration and interest in the system adopted.

During the year two ploughings were given when trees were dormant; since then, six cultivations have been given at intervals, followed by hand boring.

Spraying has been kept up throughout the season, as directed, with the gratifying result that the trees are perfectly clean.

VINEYARD.—A "rubble" drainage system has been adopted throughout, the drains being opened up by means of a strong breaking-up plough, which minimises the cost.

Substantial trellising has been erected over a portion of this block, using No. 8 galvanised wire stapled on and gauged for different systems of pruning.

The introduction by Mr. Rainford of a number of record boxes, placed at intervals throughout the vineyard, has proved a boon to visitors interested in viticulture. These being weather-proof, are bolted on hardwood standards sunk into soil. In the respective boxes, books are placed containing a description of each system of pruning, with photographs illustrating the treatment from year to year.

The growth made by the vines, notwithstanding the disastrous frost, has been remarkable. During the year the land has been ploughed once and cultivated seven times, with subsequent hand-hoeing along the rows.

Owing to precautionary measures being taken by dressings of sulphuric acid solutions and sulphuring, the vines have not developed any disease.

WHEAT.—The season 1899 was almost all that could be desired to produce first-class crops of grain and straw, until that unprecedented frost, when, in one fell swoop, all hopes of securing grain were blighted, except from late sown and late maturing varieties.

Apart from this unseasonable defect, we experienced a plague of caterpillars, whose ravages were apparent in the blocks of experimental wheats. No line of demarcation could be drawn between those portions affected, still I desire to record that the damage done seriously interfered with the results. The ground temperatures registered here on the occasion of the abovementioned frost were as follows:—2nd October, 18.5 degrees Fahr.; 3rd October, 21.9 degrees Fahr.; 4th October, 27.9 degrees Fahr.

The effect was at once apparent, so no time was lost in cutting down the various varieties and stooking the crop for hay. The areas are as follow:—

Belatourka, $6\frac{3}{4}$ acres; average heights, 6 feet to 6 feet 6 inches.

Marshall's No. 3, $6\frac{3}{4}$ acres; average heights, 3 feet 6 inches to 4 feet 6 inches.

Marshall's No. 8, $6\frac{3}{4}$ acres; average heights, 3 feet to 3 feet 6 inches.

Budd's Early, $6\frac{3}{4}$ acres; average heights, 3 feet 6 inches to 4 feet 6 inches.

Cobb's Improved Allora Spring, $6\frac{3}{4}$ acres; average heights, 3 feet 6 inches to 4 feet.

Marshall's No. 3, 24 acres; average heights, 2 feet to 3 feet 9 inches.

This area was made up by six 4-acre blocks, sown at intervals of a month from February to July. It was apparent that wheat sown in February was not likely to mature grain on account of frosts during the flowering stage. The June and July blocks, although somewhat rusted, would have matured grain if the straw had not been so damaged by frost.

STUD AND NOMENCLATURE WHEATS.—Season 1899: My previous remarks with reference to the frost may bear further repetition, as the loss resulting therefrom has, unfortunately, completely changed the programme, whereby we anticipated increased quantities of seed of ninety-four selected and acclimatised varieties of wheats for further field trials, as well as valuable information with reference to the rust-resisting capabilities and characteristics of individual varieties and crosses.

We harvested matured grain of nomenclature wheats Nos. 1-364, detailed in last report, also those wheats obtainable from 100 of Farrer's new hybrids.

Only a portion of our stud blocks was saved, and these, together with a reduced and selected number of varieties and crosses, 206 in all, have been sown in the beginning of June this year, in rows 2 feet apart, seeds 6 inches apart.

BARLEY.—*Chevalier*.—An area of $6\frac{3}{4}$ acres was harvested in October, 1899, on account of frost affecting the grain.

Nepaul.—A similar area received the same treatment. This "skinless" variety affords a large quantity of green fodder, and deserves to be more in demand than it is at present.

Sea of Azov.—Three-quarters of an acre was harvested on 13th November, and yielded 592 lb. of grain.

Hallet's Improved Pedigree Chevalier.—From a small quantity— $\frac{1}{2}$ lb.—we obtained 59 lb. in 1899.

Season 1900.—Four acres of *Sea of Azov* have been sown with this variety at the rate of $\frac{3}{4}$ bushel to acre, drilled in with 150 lb. of Shirley's No. 3 cereal manure.

An acre and a-half of *Hallet's Improved Pedigree Chevalier* was sown on the 31st May, at the rate of $\frac{3}{4}$ bushel per acre.

MAMMOTH, RYE.—Area, 3 acres. Drilled in at rate of $\frac{3}{4}$ bushel of seed, with 150 lb. Shirley's No. 3 cereal manure to acre.

EXPERIMENTS WITH FERTILISERS.—These experiments embrace seven $\frac{1}{2}$ -acre blocks of land. Marshall's No. 3 drilled in at rate of half a bushel to acre, with different fertilisers deposited in the same drill as the grain, using at the rate of 2 cwt. per acre. For blocks 5, 6, and 7, half of the fertilisers were reserved and applied as a top dressing during spring. The seed was previously pickled by the Jensen hot water method. Depth of sowing, 3 inches; sown, 2nd June; germinated, 11th June; harvested, 13th November. No smut whatever appeared.

VARIOUS DEPTHS OF SOWING.

With Manure.				Without Manure.					
Block.	Manure.			Yield in lb. per $\frac{1}{2}$ Acre.	Block.	Manure.			Yield in lb. per $\frac{1}{2}$ Acre.
1	Unmanured	...	...	522	8	Seed drilled in 1 inch deep	...	...	341 $\frac{1}{2}$
2	Blood	...	...	381 $\frac{1}{2}$	9	" "	2 "	...	384 $\frac{1}{2}$
3	Bonedust	...	...	372 $\frac{1}{2}$	10	" "	3 "	...	*522
4	Superphosphate	...	...	374 $\frac{1}{2}$	11	" "	4 "	...	420
5	Nitrate of soda	...	...	370	12	" "	5 "	...	415
6	Sulphate of ammonia	...	...	456					
7	Kainit	...	...	449 $\frac{1}{2}$					

* No. 1 taken to complete series.

Different Quantities of Seed.—The same conditions as above were observed, except as to the amount of seed per acre. No manure was given. Block 1 taken to complete series—

Block.	Amount per Acre.	Yield in lb. per $\frac{1}{2}$ Acre.
13.	$\frac{1}{2}$ bushel per acre	522
14.	$\frac{3}{4}$ "	416
15.	1 "	389
16.	1 $\frac{1}{2}$ "	386

WHEAT SEASON, 1900.—The following list gives details of some further trials of a permanent character, to which further areas are proposed to be added, embodying a rotation of crops, the selection of which requires more time to test their adaptability to our soil and climate.

The variety of wheat used throughout was Marshall's No. 3, previously pickled by the "Jensen" hot water method. Blocks 5 ch. and 1 ch. ($\frac{1}{2}$ acre in area), with 15 feet roadway between each, so that field treatment may be given and the probability of the influence of different fertilisers be diminished. Treatment of land: Ploughed, 6 inches; cross-ploughed, 8 inches; ploughed, 6 inches; harrowed and rolled previous to drilling.

Block 1.—Sown 22nd March for the purpose of mowing down growth and treating with top-dressing of Shirley's No. 3 cereal manure, applied at the rate of 2 cwt. to block.

Block 2.—Sown 22nd March. Mown (no manure).

Block 3.—Allowed to grow. Sown 22nd March.

Monthly Sowings.—Half-acre blocks have been sown at the rate of half-a-bushel to the acre at the latter end of March, April, May, and June. The July block has yet to be sown. Nos. 4 to 8. No manure. Rolled after drill.

FERTILISER TESTS.—Areas of half-an-acre have been drilled in at the rate of three quarters of a bushel per acre, the fertiliser being put in with the seed. Nos. 9 to 21 sown June 1st to 4th. Remainder, 14th to 25th. Rolled after drilled.

Block.	Fertiliser.	Quantity per acre.	Block.	Fertiliser.	Quantity per acre.
		Lb.			Lb.
9.	Unmanured	—	17.	Sulphate of ammonia	50
10.	Sulphate of ammonia	50	17.	Australian potash	50
11.	Australian potash	50	17.	Superphosphate	200
12.	Superphosphate	200	18.	Sulphate of ammonia	100
13.	Sulphate of ammonia	50	18.	Australian potash	100
13.	Australian potash	50	18.	Superphosphate	200
14.	Sulphate of ammonia	50	19.	Bone dust	120
14.	Superphosphate	200	19.	Sulphate of ammonia	10
15.	Australian potash	50	19.	Australian potash	24
15.	Superphosphate	200	19.	Superphosphate	70
16.	Sulphate of ammonia	25	20.	Blood	60
16.	Australian potash	25	20.	Australian potash	20
16.	Superphosphate	200	20.	Superphosphate	144

BROADCAST <i>versus</i> DRILLED.				EXPERIMENTS IN CULTIVATION. Before sowing.			
Block.	Fertiliser.	Quantity per acre.	Method.	Block.	Fertiliser.	Quantity per acre.	Method.
		Lb.				Lb.	
21.	Shirley's No. 3 Cereal Manure	224	Drilled	23.	Shirley's No. 3 Cereal Manure	224	Land ploughed 6 inches deep
22.	Shirley's No. 3 Cereal Manure	224	Broadcast	24.	Shirley's No. 3 Cereal Manure	224	Land ploughed 10 inches deep
				25.	Shirley's No. 3 Cereal Manure	224	Subsoiled 16 inches deep

EXPERIMENTS IN CULTIVATION. After sowing. Areas 1 acre.				DIFFERENT QUANTITIES OF SEED PER ACRE. Drilled 3 inches. Rolled after drill.			
Block.	Fertiliser.	Quantity per acre.	Method.	Block.	Fertiliser.	Quantity per acre.	Amount of Seed per acre.
		Lb.				Lb.	
26.	Shirley's No. 3 Cereal Manure	224	Crop uncultivated; rolled after drill	30.	Shirley's No. 3 Cereal Manure	224	Quarter bushel
27.	Shirley's No. 3 Cereal Manure	224	Crop harrowed once, and rolled one month after germination	31.	Shirley's No. 3 Cereal Manure	224	Half bushel
28.	Shirley's No. 3 Cereal Manure	224	Crop harrowed twice, first and second month after germination; rolled	32.	Shirley's No. 3 Cereal Manure	242	Three-quarter bushel
29.	Shirley's No. 3 Cereal Manure	224	Crop harrowed thrice, first second and third month after germination; rolled	33.	Shirley's No. 3 Cereal Manure	224	One bushel
				34.	Shirley's No. 3 Cereal Manure	224	One and a-quarter bushels
				35.	Shirley's No. 3 Cereal Manure	224	One and a-half bushels

DIFFERENT DEPTHS OF SOWING SEED. Drilled three-quarter bushel to acre. Block 32 completes series.

Block.	Fertiliser.	Quantity per acre.	Depth of Sowing.
36.	Shirley's No. 3 Cereal Manure	224 lb.	1 inch
37.	Shirley's No. 3 Cereal Manure	224 lb.	2 inches
38.	Shirley's No. 3 Cereal Manure	224 lb.	4 inches
39.	Shirley's No. 3 Cereal Manure	224 lb.	5 inches

Canadian Blue-stem Wheat.—An area of 4½ acres of this recently imported cereal was drilled in at the rate of quarter bushel per acre; on 19th April, a further area of 3¾ acres being reserved and sown on 28th June.

MAIZE.—The following varieties were sown as field crops, with the object of testing the adaptability of the different varieties to our soil and climate, and improving, if possible, by selection the class of seed maize often sown:—Early, medium, and late sowings were made, with the result that the medium crop matured a better class of grain. Total area, 38 acres.

VARIETIES: *Iowa Silver Mine.*—A new importation, with an American record, grain white, somewhat soft texture; flat with square shoulders, medium sized, having thin pith. Matures early, with a fairly light stalk.

Hawkesbury Champion.—Originated from the district in New South Wales from which it derives its name. Very large, broad, flat, and fairly deep grain, with yellow tip, stalk stout. Matures late; but, given a favourable season, produces a heavy, showy, marketable corn.

Macleay River.—Originated from Macleay district in New South Wales. An amber and yellow-tipped grain, medium width, but deep, packed close at top, slight taper towards a thin pith.

Early Mastodon.—An amber and yellow grain, heavy, deep, somewhat brick-shaped, with characteristic, slight curve towards top; stalk stout, does not sucker much. Is not an early maturing variety with us.

Early Huon Dent.—Late sowings were made of this variety, but failed to stand the dry weather notwithstanding the scuffer being run through the rows six times in succession during growth. Grain small, reddish tinge, light yellow tip, broad at top with taper to an almost conical point; stalk light. Continuous cultivation from deep at first, gradually to shallow, was kept up during period of growth, with the object of retaining and attracting moisture, by capillary attraction; the effect of this was noticeable in the healthy green colour of the crop throughout growth till the approach of the critical "tasselling" stage, when the lower leaves faded for want of moisture.

Only half to a three-quarter crop was harvested, but from observation of uncultivated crops in the locality the probability of maturing a crop is decidedly in favour of constant stirring of the surface to produce a dry mulch.

Thirteen varieties of selected maize were sown in small lots for the purpose of comparison of results and increase of seed. Hooding and hand fertilisation was practised, in order to obtain pure seed. Pride of the North, Early Mastodon, and Hickory King are all good classes to grow. The latter, although a pale amber with white tip, is a good type, with a very small pith. Twenty-five varieties of sweet corn were sown, but most of the characteristics are so similar that a selection of the best will require further consideration.

SORGHUMS, &c.—An acre each of the following varieties were sown in drills 3 feet 6 inches apart with the Massey-Harris drill, and cultivated four times during growth:—*Sorghum Saccharatum*, Early Orange cane, Amber cane, Planter's Friend (impee), Red Kaffir corn, White Kaffir corn. Broom millet is appreciated in a mixture; did fairly well.

SETARIA.—One and a-quarter acre grown for intermediate crop of hay. Cut early and chaffed after curing. All of these produced a large quantity of fodder, the last-mentioned maturing some very good heads for broom-making, which require the necessary bending at the right stage.

COW PEAS.—An area of $7\frac{1}{2}$ acres was sown with Clay-coloured, Black, Black-eye, and Whip-poor-will, by means of the Moline corn drill following after the marker. When once established, these varieties stand a lot of dry weather, but must have rain about flowering time to insure the setting of the pods. Our crop of peas is a partial failure, but this is counteracted somewhat by the feeding value of chaff, which is relished by stock.

FIELD PEAS.—Half-an-acre of blue peas was tried as a catch crop, sown in December, and although stunted for want of rain, made a fair crop of good quality.

A further sowing of the same area, was made on 29th March with promising results.

Three acres of a new importation from Canada were sown on 23rd and 29th March by means of the Massey-Harris drill, in rows 28 inches apart. Germinated in eight days. Scuffled. The growth has been remarkable on account of favourable conditions, and if finally successful, should make a valuable rotation with the ordinary crops.

GARDEN PEAS.—An acre and-a-half has been sown on the 3rd and 4th of April, with the undermentioned varieties, seed being previously selected from former sowings:—Perfect Gem, Stanley, Daisy, Little Gem, The Queen, Echo, and Bliss Abundance.

TICK BEANS.—Area $1\frac{1}{2}$ acres, sown 1st December, 1899, with the object of procuring a crop, suitable for mixing with maize and sunflower heads if desired for "silage" making. Although cooler weather is more suitable for development, these beans grew fairly well. Harvested 27th April, 1900.

A further sowing of a quarter of an acre was made on 29th March, and satisfactory progress had since been made.

CANADIAN WONDER BEANS.—An acre was sown in drills 3 feet apart on 13th December. Scuffled three times during growth. Harvested 5th April, 1900. The seed generally commands a paying price, and if within reach of a market, the young beans are readily disposed of.

RUNNING LIMA.—A dwarf lima and bush lima beans were sown in small areas, the former giving very satisfactory results. Several varieties of garden beans were tried, conspicuous amongst the best being Anderson's Wonder and Black Waxpod. Small sowings of Mung and Narico beans were also made, the former doing fairly well, but the latter requires more moisture to mature.

VELVET BEAN.—Grown to secure seed for planting out to test the value of the plant as a green manure. Is somewhat slow at first, but with heat and moisture made good growth.

DOLICHOS LABLAB: "Ponga" or Madagascar Bean.—Grown close to and trained on a length of 16 chains of fence. This variety has given an extraordinary crop of edible beans, and surpasses all others for yield and quick of bearing.

DOLICHOS LABLAB, VARIETY (Purpurea).—Grown in a similar manner to above, and produced a heavy crop of beans and foliage.

SUNFLOWER: Large Russian: Half-an-acre in area; seed sown in drills 3 feet apart. Did well.

MANGEL WURZEL: Mammoth Long Red.—Quarter acre; sown in drills 3 feet apart on 14th December.

Yellow Globe Long Red: Quarter acre; sown in drills 3 feet apart on 14th December.

Both varieties have made an excellent growth, the roots being very even throughout.

SWEDES: Purple Top Mammoth.—An area of $\frac{3}{4}$ of an acre was lifted in September, and although grown on very stony land yielded at the rate of 6 tons to the acre. Sown 13th April at the rate of $\frac{1}{2}$ lb. per acre. Drills 3 feet apart. Scuffled twice and thinned out.

Anderson's Imperial Purple Top.—Area, $\frac{1}{4}$ acre. Drills 2 feet 4 inches apart. Sown 13th February, 1900. Doing well.

Aberdeen Green Top.—Doing well.

Imperial Purple Top.—Half acre sown broadcast at the rate of 4 lb. per acre on 31st May. Germinated well.

THOUSAND-HEADED KALE.—Half acre broadcasted at the rate of 4 lb. to per acre on 31st May. Germinated well and thriving.

RAPE.—Half an acre of the broad-leaf Essex was ploughed in and maize sown on the block. This variety did well notwithstanding stony land. A similar area was broadcasted on 30th May, 1900, at the rate of 4 lb. of seed to per acre.

ONIONS.—Three-quarters of an acre were harvested on 16th January; variety, Brown Spanish. Crop light on account of dry weather.

Half-an-acre of Anderson's Silver Skin, sown 14th February, 1900. Doing well.

WHITE BELGIAN CARROT.—Two and a-quarter acre blocks have been sown—one in December, the other in February. The former seed did not germinate, but the latter crop, although thin, is making good progress.

HOLLOW-CROWN PARSNIP, beet, white turnips, and broad beans occupy another acre of land; the latter crop making good headway.

POTATOES.—Six $\frac{1}{4}$ -acre blocks of ground, ploughed deep, and brought to a fine tilth, were planted out with Brownell's Beauty potatoes as detailed below. This preliminary trial was influenced so much by dry weather that it was more of a struggle for existence than anything else. Date of planting, 13th and 14th September, 1899; dug, 30th January, 1900; amount of seed potatoes, 178 lb. to block of $\frac{1}{4}$ -acre.

Block.	Manure.	Rate per Acre.	Cut or Uncut.	Yield in lb. per Plot.
1.	Superphosphate	4 cwt.	cut	716
2.	Bonedust	4 cwt.	cut	704
3.	Blood	4 cwt.	cut	712
4.	Kainit	4 cwt.	cut	722
5.	Unmanured	...	cut	751
6.	Unmanured	...	uncut	708

The following varieties were planted out on 14th September, 1900, and are named in the order of maturing. Results were unsatisfactory on account of dry weather. Nos. 1 and 2 cropped well, but did not keep too well; 4, 5, 8, and 9 yielded a more even proportion of marketable potatoes. For the remainder, the season was unsuitable:—

- | | | |
|-------------------|----------------------|--------------------|
| 1. Early Rose | 6. Breese's Peerless | 11. Satisfaction |
| 2. Early Vermont | 7. Cambridge Kidney | 12. Circular Head |
| 3. Harbinger | 8. Emperor | 13. Blue Derwents. |
| 4. Magnum Bonum | 9. Federation | |
| 5. Irish Flounder | 10. Bliss's Triumph | |

These varieties, with the exception of Nos. 12 and 13, were replanted on 21st February, 1900, the best results being obtained from Magnum Bonum, Federation, and Emperor, with a more even lot of tubers.

Further areas of $2\frac{1}{2}$ acres of Early Rose, $\frac{1}{2}$ -acre Magnum Bonum, and $\frac{1}{2}$ -acre of Sussex Champion were planted out on 21st February, 1900. An early frost checked the plants. Yield, 2 tons per acre; 50 per cent. of tubers getting no chance to develop.

SWEET POTATOES.—One and a-half acres of large white were planted out in November from shoots previously raised for the purpose. Scuffed three times during growth. Has yielded abundantly, and deserves cultivating for bulk feed for pigs and stock.

TEOSINTE.—A small area was tried, but the rainfall was not sufficient for proper development. The plants stooled well, but were stunted.

TOBACCO.—One-quarter acre of Burley and Blue Pryor was planted out on the 15th of September, the plants being raised from home-saved seed, having been hooded to prevent cross fertilisation. Replanting this area had to be tackled again, on account of hot westerly winds. Although shaded, the second lot of plants were killed by frost. Failure.

LUCERNE.—This crop has not grown well on account of proximity of rock, which is found at a depth of 18 inches to 2 feet. At first the growth was abnormal on account of subsoiling and frequent working, but as the roots reached the rock, further progress was slow.

RED PERENNIAL CLOVER.—Dry, hot weather killed out 50 per cent. of the plants. The remainder only recovered as cooler weather approached and when rain fell.

FLAX.—Half-an-acre broadcasted 30th September, using at the rate of $\frac{3}{4}$ bushel per acre. Harrowed and rolled. Harvested 9th February, 1900. Crop short; seed pinched.

SALTBUSH.—Two varieties—*Atriplex nummularia* (Old Man Saltbush) and *Atriplex halimoides*. Both varieties did well, the former attaining a height of 6 feet. The latter, grown from a packet of seed sent by the Hon. A. J. Thynne, has a procumbent habit.

ECONOMIC PLANTS.—Small sowings of the following have been made:—*Arnica montana*, *Atropa belladonna*, *Conium maculatum*, *Hyoscyamus niger*, *Rheum palmatum*, and *Rheum officinale*.

Cuttings of hops were planted out in spring, and trained on wire netting, but failed to flower.

Sisal hemp plants have continued to thrive, and should be useful for growing in rocky situations, where soil is present in sufficient quantity to ensure good root hold.

CHICORY.—A small area of the large-rooted variety was sown, and has grown well.

MARROWS AND SQUASHES.—The collection grown comprised Delicata (s), White Custard (s), Golden Bush (s), Striped Vegetable Marrow, Long Yellow (m), Coyozelle (m), New Calhoun (m), Egg Marrow, Yellow Indian (m) Long Fruited Bush (m), Long White (m), White Pineapple (m), Custard (m), Bell-shaped (m), Boston (m) Turkish (m), Marblehead, and Hubbard Squash, also Early Orange and Turban.

The best quality being represented by Hubbard, Delicata, Marblehead, Early Orange, and Turban. The Long-fruited Bush Marrow being worthy of a place on account of prolificness and dwarf habit of growth. As this variety does not run, it is most suitable for small holdings.

PUMPKINS.—Area, 7 acres. Five varieties of cattle pumpkins were grown, with the result that the Mammoth Tower was the most prolific, and gave a greater weight per acre. Also keeps well. The Premium can also be recommended on account of prolific yield and hardiness, but the keeping qualities are poor; this pumpkin being soft skinned is readily disposed of by stock if fed whole.

In table pumpkins, three varieties were grown—Crown, Ironbark, and Button; the two latter keeping best but the Ironbark is the best marketable variety.

MELONS.—Water and Sugar varieties consisting of—Cuban Queen, Kobbs' Gem, The Dixie, Duke Jones, and Ruby Gold, named in the order of quality.

Rock Melons.—Eight varieties ranged according to quality also—viz., Montreal Market, Delmonica, Musk Rock, New Mammoth, Banquet, Shamam, Jenny Lind, and The Stranger.

TOMATOES.—Six varieties—Duke of York, Mikado, Crimson Cushion, Picture Rock, and Helvis. The first doing the best with us, all others having qualities to recommend them.

CABBAGES.—Several varieties have been grown, the best of which being Succession, Flat Dutch, and Schweinfurt.

Numerous classes of garden vegetables have been raised.

PRICKLY PEARS.—Further trials of "Morbine" have been made for the eradication of this pest, but the advertised strength, 1 to 16 gallons water, is not sufficiently concentrated for the purpose. Stronger solutions were then made with satisfactory results. Strong plants require a second dressing before they finally succumb.

IMPROVEMENTS: Water supply.—An aeromotor brought from Gatton has been erected over the 6-inch cased bore, and pipe connections made with the new 5,000-gallon tank, placed on a substantial tankstand 15 feet high, the piles being of round ironbark sunk on to rock and securely braced. A bathroom has been made under this for the farm employees. A pipe service has been carried to the house, also connected with a trough fitted with ball tap, a convenient arrangement for filling drays, and further extension is being provided.

Residence.—A veranda room has been added to the residence. Half the original office has been floored and ceiled, the remainder being made into a bathroom by the erection of a partition. Bath shower and pipe connections were afterwards made.

Stables.—Four temporary thatched stalls have been built on the western end of the building.

Machines.—A Clyde thatch-making machine has given us a valuable addition to present stock. Vast quantities of valuable fodder are lost annually from wet weather for want of a handy covering. This machine fills the gap.

An elevator, set of riddles, and an adjustable pulley have been added to our chaff-cutter.

The climatological station has been further improved by the setting-up of solar and terrestrial radiation thermometers; also a set of earth-tubes, 1 foot, 2 feet, 4 feet, and 6 feet, at respective depths.

Horses.—Two well-bred draught geldings have been purchased, and give satisfaction in the collar.

Fencing.—A length of 60 odd chains has been erected by contract, posts $\frac{1}{2}$ -chain apart—two plain and one barbed wire—three droppers between each post. This has given us a further cultivation and grazing area.

H. C. QUODLING.

REPORT OF THE STATE FARM, HERMITAGE.

I have the honour to submit the second Annual Report of the operations conducted on this farm during the year.

WEATHER CONDITIONS.—As you are already aware, the weather conditions played sad havoc with a number of the crops prior to last harvest. On 29th September the crops were badly "laid" through rains and wind. These were followed on the nights of the 1st, 2nd, and 3rd October by heavy frosts, the severest that had been registered for many a year. Wheat, barley, pumpkins, melons, and all other crops that had shown through the ground fell before the heavy visitation. In addition to this, all the growth on the fruit trees and vines was cut back to the old wood. Where the wheat was thinnest, it stood the frost best. This can be accounted for by the fact that the thinnest crop was not so badly "laid." The visitation is the more regrettable, because there never was promise of a better wheat harvest on the Darling Downs. As will be seen by the following weather notes, the rainfall was far below what is required by many crops, especially during the following season:—

	Inches.	No. of Wet Days.		Inches.	No. of Wet Days.		Inches.	No. of Wet Days.
July	2.507	7	November	0.860	3	March	0.710	4
August	0.930	5	December	2.825	9	April	1.610	7
September	2.260	8	January	2.165	2	May	2.220	6
October	2.650	11	February	4.290	6	June	0.985	8

Thus a total of 24.012 inches fell on 76 days.

THE SOIL.—In my previous report I mentioned my intention of making careful experiments with the soil on the farm. The better to do this, and to have the experiments based on scientific data, I sent some twenty-two samples of surface and subsoil to the Government Chemist at the Agricultural College for the purposes of analysis. The result was that Mr. Brännich recommended that I should try liming in its different forms. So far, I have tried stone lime, still lime, and gas lime. Up to the present there are no appreciable results from these experiments.

CEREALS—MAIN CROPS.

WHEAT HARVESTED.—Owing to the disastrous effects of the frosts the results of last year's planting, both in the experimental and general lines, resulted in very poor yields, and were very unsatisfactory, except that the severity of the season went towards indicating the hardiest varieties. The areas and varieties reaped were:—

Block.	Acres Sown.	Variety.	Acres Reaped.		Yield in Bushels.
			Grain.	Hay.	
1	24*	Marshall's No. 3	14	6	270
2	18	" " 8	9	9	110
3	4	Belatourka	4	...	40
4	4	Budd's Early	4	...	52
5	6	Marshall's No. 3	...	6	...
6	4	Allora Spring	...	4	...

* Four acres of this block were burnt. The last two blocks were sown on 25th July. All the grain saved was carefully graded, and has been disposed of for seed purposes.

With the exception of the Belatourka block (which had been eaten off with sheep), all the blocks were harrowed when about 6 inches high. The wind and rain having "laid" the wheat and an unusual quantity of moisture lodging round the recumbent stems, the frost completed the work of destruction by cutting the plant at the joint. Consequently it was even difficult to cut for hay. The havoc thus wrought and the comparative escape of some varieties naturally gave rise to the pronouncement of opinions as to which wheat was the hardiest of the various kinds grown in the district. The general consensus of opinion was, that Budd's Early had gone through the ordeal with the least damage. And this opinion was clearly borne out on the farm, but whenever the tips of the ears caught the first rays of the morning sun, they all suffered alike. It may be mentioned that half of No 1 block (Marshall's No. 3) was sown broadcast with one bushel to the acre, while the other half, as well as the remaining blocks were drilled in at the rate of three-quarter bushels to the acre. Owing to the ravages of cut-worms, the piece sown broadcast was the thinnest, yet it stood the weather best. Experience in working the farm has demonstrated that there are patches of soil in which seeds will not germinate as freely as in others. And on these spots, one bushel of wheat per acre will not produce as much as half a bushel on others. Therefore some discrimination has to be exercised in sowing.

STUD WHEAT.—Forty plots (occupying 14 acres) of these were reaped, but the yield was so poor that it was difficult to supply applicants for collections after reserving enough for our own wants. Of the forty varieties the following were the least affected by frost:—Early Para, Budd's Early, Steere's Early, Early Baart, 85.A.I.B.I. 84 BY., Armstrong, Farmer's Friend, Hudson's Early, White Lammas, and Battlefield. The last four were beginning to show rust.

NOMENCLATURE COLLECTION.—This collection contains 400 selected and hybrid wheats. The plot containing these is on the crown of the ridge, and, as it caught the first rays of the sun, suffered so much that the experiment was practically a failure so far as yield of grain was concerned. From the ingathering there was barely sufficient seed to make up three small collections of 180 varieties each for the other State farms over and above what was required for our own use. The majority of the varieties were absolutely worthless. Most of Farrar's hybrids were saved. These wheats have a fine upright stem, the grain held well in the ear, and many of them have so far proved themselves rust-resistant. It was noticeable this year that the Maccaroni wheats have deteriorated both in ear and stem. This may be attributable to the fact that they were grown on poorer soil this year than last year, when they were much better in comparison.

SOWINGS.—The month of May this year was the best seed-time we have had for years. Added to this, our land was ploughed early, and there was a fine tilth upon which to start operations. All the seed sown this year has been treated by the Jensen hot water method. Sowing was commenced on 7th May, when 20 acres were laid down in new forest land, which had previously been cleared, broken-up and cross-ploughed with a "rotary disc" plough to a depth of 6 inches. It was afterwards cultivated with a heavy Danish grubber, twice harrowed, and part of it drilled in 2 inches deep and the other part to a depth of 4 inches, the soil being dust dry at the time. The deepest sown had reached some moisture, and the germ had appeared just before the rain which fell on the 16th. All the rest had shown above ground by the 19th. The following table shows the quantities sown:—

No. of Block.	Acres.	Quantity Sown per Acre.	Variety.	No. of Block.	Acres.	Quantity Sown per Acre.	Variety.
1	1	1 1/4 bushels.	Marshall's No. 3.	5	6	1 bushel.	Marshall's No. 3.
2	1	1 "	"	6	6	1 "	" No. 8.
3	1	3/4 "	"	7	4	1 "	Blue Stem, Canadian.
4	1	1/2 "	"				

Different methods of after cultivation will be carried out on the above and a record kept.

The drilling in of the following forty-one varieties of stud wheats began on 12th May, the areas varying in size from half-an-acre downwards, according to the quantities of seed available from last harvest. The varieties cover an area of 15 acres. The soil is first-class wheat land, firm in texture without being sticky, and has wonderfully improved since it was broken up three seasons ago. To receive the present crop it was twice ploughed, harrowed deeply with a Danish harrow and afterwards by the ordinary method:—

1. Red Straw	15. Talavera D. Belvue	29. Indian Fife
2. Early Baart	16. White Lammas	30. Steinwedel
3. R.	17. The Blount	31. Yandilla Improved Indian
4. 85.A1.B1	18. White Tuscan	32. Leak's R.R.
5. Australian Talavera	19. Battlefield	33. Algerian
6. Australian Wonder	20. White Naples	34. Yandilla
7. Rattling Jack	21. Fillbag	35. Indian Early
8. Hudson's Early	22. Zealand	36. Indian D.
9. White Essex	23. White Fife	37. Indian F.
10. 84.BY	24. Armstrong	38. Clubbed Indian
11. Best Strain	25. Allora Spring Improved	39. Indian Z.
12. Steere's R.R.	26. Allora Spring	40. Duluth
13. Farmer's Friend	27. Aspen	41. King's Jubilee
14. Early Para	28. F1	

Forty other stud lots are sown in smaller areas next to the foregoing. This should prove an interesting experiment, as all the varieties are in the nomenclature collection, which is sown in quite different soil. The contrast should prove helpful.

The nomenclature collection includes 180 varieties saved on the farm, and 200 of Farrar's "New Hybrid" and pedigree wheats received this season. The first lot was planted on May 16th, in drills which had been previously opened in dry weather. The 200 lot was put in on the 21st, and all are now doing well. The soil in which these 380 varieties are planted is a clayey loam, rather poor, but was well worked down to a fine tilth in dry weather. The most careful methods are used to determine the rust-resisting properties of these wheats, which when once established to satisfaction are transferred to the studs.

Seven acres of Budd's Early and 6 acres of Marshall's No. 3 were sown during the last week in May. The latter came up well from the start, while the former made its appearance very tardily.

The subjoined experiments are being made with Budd's Early, which was drilled in (at the rate of half-a-bushel to the acre) with the following fertilisers, except in the instances where gas and stone lime were used, which were broadcasted as a top-dressing.

Block.	Acres Sown.	Fertilisers—Quantity Mixed in Lb.	Quantity used per $\frac{1}{4}$ -Acre.	Block.	Acres Sown.	Fertilisers—Quantity Mixed in Lb.	Quantity Used per $\frac{1}{4}$ -Acre.
			Lb.				Lb.
1	1	Heavy top-dressing of gas lime ...		4	$\frac{1}{4}$	Bone meal 112	
2	$\frac{1}{4}$	Dried blood 112	50			Nitrate of soda 28	50
		Nitrate of soda 28				Sulphate of potash 28	
3	$\frac{1}{4}$	Kainit 28	50	5	$\frac{1}{4}$	Kainit, alone	50
		Superphosphate 65		6	$\frac{1}{4}$	Superphosphate, alone	50
		Kainit 32		7	$\frac{1}{4}$	Nitrate of soda, alone	28
		Sulphate of potash 32		8	$\frac{1}{4}$	Top-dressing, stone lime, alone ...	180

*This is to receive another top-dressing.

The drills run through a variety of soils—clayey, loamy, alkali, and good black loam.

Five acres of Belatourka were sown on 30th May, and 3 $\frac{1}{2}$ acres of Allora Spring on 29th June.

BARLEY.—Most of last year's harvest was a failure. The ground for this year's sowings was prepared in a similar manner to the wheat lands, except that the Osborne spring-tooth harrow was used instead of the Danish harrow.

Acres.	Variety.	When Sowing Finished.	First Appearance of Germ.
10 Drilled	Old Fashioned English	2nd June	13th June
10 Drilled...	S-a of Azov	2nd June	13th June
2 $\frac{1}{4}$ Broadcast	Chilian	12th June	26th June
1 $\frac{1}{4}$ Drilled...	Nepaul	12th June	26th June

Two and a-half acres of rye have also been sown.

MAIZE.—Eight acres of Early Mastodon were planted on 25th September, the ground for which, having been ploughed 8 inches deep by two ploughs (one following the other), was cross-ploughed, and afterwards harrowed. The drills were drawn out by a single-furrow plough, the seed then hand-dropped 4 feet apart each way, diagonally. Three days later a block of White Queen variety was planted on a distant part of the farm. The object in planting different sorts so far apart is to keep the seed as pure as possible. The White Queen is made the earlier of these two sorts. The Early Mastodon would have yielded much better if it had received sufficient moisture at the time of tasselling. The cobs which did set were of fair average size. As a result of the deep cultivation and the after surface cleanings, there was a great growth of stalk in this crop. On 30th October, 5 acres of Huon Dent was dropped in drills 5 feet apart, and at intervals of 16 inches. The ground was treated in the ordinary way, and kept in good surface tilth with horse-hoes, but the growth was comparatively slow, although the cobs set better than those of the former varieties. The lowest stubble land after being once deeply ploughed, was cultivated with the heavy Danish harrow, and 40 acres of Ninety Day maize dropped in drills 4 feet 8 inches apart, but owing to want of moisture, this crop was nearly a failure. Two small sowings, each of 24 varieties of table maize were also made, neither of which proved very satisfactory.

LUCERNE.—Twenty acres are under this crop, five acres of which, owing to failure, were re-sown on 1st June. Three light cuttings were made during the year. After each cutting the land was well harrowed in dry weather. Of the foregoing area, 4 acres were subsoiled two years ago, but so far there is no perceptible difference. This is attributable to the deficiency of moisture throughout the subsoil.

PUMPKINS.—The first sowings were destroyed by the frost, and another sowing was made immediately after. This comprised the following varieties:—Cut yellows netted (large yellow-netted fruit), Premiums (large bright yellow), Ironbark, Long Mammoth, Button, Crown, Turk's Cap, Potiron, and Japanese. The crop, in the main, was a moderate one. The two yellow varieties have proved the best yielders during the past two years in dry weather. A few Grammas and Rios were grown, but the rains came too late for them to properly mature. The Gramma (sometimes called the Bugle Pumpkin), besides being an excellent food for stock, is used both in sweet and savoury cookery. The same remarks will apply to the Mexican Rio, which is a pear-shaped variety of the above.

POTATOES.—A new collection was received and planted here on the 17th January. They all started well, but the weather proved too severe, and they all withered back before maturing. However, none were lost, and sufficient tubers have been saved for a spring planting. The varieties are:—

1. Beauty of Hebron: Fair sized tubers and good yield.
2. Sutton's A1: Small, poor yield.
3. Black Congou: Very small, poor yield.
4. Large White Fir Apple: Very small, poor yield.
5. Large Red Fir Apple: Moderate sized tubers.
6. Flour Ball: Small.
7. Reading Russet: Fair sized tubers, good yield.
8. Ringleaders: Small, moderate yield.

The following were planted on 13th February, the seed having been saved from the previous crop. They were also checked in growth from the same causes, but not to the same extent as the "new" collection ones:—

1. Bliss Triumph: Splendid early, red, round tubers, very prolific.
2. Harbingses: Brown-skinned early potato, excellent quality.
3. Extra Early Vermont: Very early, strong grower; stands drought well, heavy cropper.
4. Irish Flounder: Flat, oval, white skins, fair yield.
5. Myatt's Ashleaf Kidney: Useless here.
6. Cambridge Kidney: Small, fair yield. Should be eaten as new potatoes.
7. Federation: Red skins, deep eyes. Two crops a year can be grown of this variety, but with me it has never been very prolific.
8. Satisfaction: A grand potato to resist drought, a sure cropper, round brown skin.
9. Centennial: This variety also did first-class.
10. The Bruce: Produced a heavy crop of medium-sized tubers. Boils well.
11. Magnum Bonum: Same remarks apply.
12. Snowdrop: Medium size, good quality.
13. Brownell's Beauty and
14. Snowflake were very poor.
15. Manhattan: Worthless.
16. Imperator: Wonderfully prolific, hardy, very robust, stands dry weather, very large tubers.
17. Bruce's Peerless: Yield heavy, excellent quality, good size.
18. Improved Early Rose: Early, moderate crop.
19. Freeman: Medium size, poor yield, succumbs to dry weather.

This collection has now been grown for four successive seasons (summer and autumn crops), on a change of soil each time, and, as a result of my observations, I can recommend for general purposes Nos. 1, 3, 9, 16, and 17.

MILLETS AND SORGHUMS.—Two sowings, each of nine varieties, were made during the year. The land was cultivated the same as for maize. The weather was very dry at sowing time, and much of the seed failed to germinate; consequently, the crops were patchy. Amber-cane and sorghum yielded by far the best fodder, but none of the group returned more than half a crop of seed. The following under this head were grown:—Amber-cane, Early Orange cane, *Sorghum sacharatum*, Planter's Friend, Brown Dhowra, Broom millet, Red Kaffir corn, White Kaffir corn, and Jerusalem corn.

MISCELLANEOUS CROPS.—Five acres of cow pea were sown in October, which yielded quite up to the average of fodder, but the pods did not fill well. Half-an-acre of mangel-wurzel was sown, which came up very thin, and when up in the first rough leaf the frost cut it back. However, the crop demonstrates its hardiness, and it almost defies dry weather on deeply-worked land. A sowing of carrots was practically a failure. Two blocks of Canadian field peas have been sown on different parts of the farm, one in light-brown loam and the other in heavy black soil. These were sown on 2nd June, and were growing vigorously up to a few days ago, when the recent frosts checked them, especially the crop in the black soil, which is the most affected. Onions were again tried, but were not a success, neither were the sowings of "Baisin" (Egyptian clover), and *Paspalum dilatatum*. A small plot of "Sulla" is doing well. This plant gives an immense amount of good green fodder, and is also an excellent bee plant.

BEANS.—Three sowings were made (September, November, December) of all the follow varieties, the results of the first two sowings were poor. The December sowing, although small, proved the best:—

1. Yosemite Mammoth: Long yellow fleshy pods, stringless, prolific; branches rather brittle.
2. The Startler: Beautiful fleshy, stringless pods, hanging well above the ground.
3. Anderson's Wonder: Strong grower, very productive.
4. Mohawk: Very large bean, green pod, should be gathered young.
5. Zion House: Did not do well.
6. Waxdale: Short green pod, moderate yield, excellent flavour.
- White Canada: Very prolific; a good sort for cooking when dry.
- Dwarf Canterbury: A fine, green-podded bean; should be gathered very young; soon gets stringy.
- Canadian Wonder: Unsurpassed as a green-podded bean; branches rather brittle.
- 100 for One: Grows an immense amount of foliage, and would no doubt be a good crop to grow for green manuring, but as a culinary bean it is not to be compared with some of the above sorts.
- Tall Lima, King of the Garden: I consider this the best of the Limas.
- Burpee's Lima: A splendid dwarf variety of the above.

MELONS.—Successional sowings of water and rock melons were made throughout the season and heavily mulched. I find that this is the only way to succeed with melons when water is not available, the mulch keeping the soil about the roots cool and moist until the foliage covers it. Flowers of sulphur was several times dusted over the plants as a preventive to mildew (*Oidium*), which is so disastrous to the successful culture of this family. The following are the varieties, and nearly all of them turned out magnificent specimens, the flavour of which could not be excelled. The weather conditions seemingly suited these crops.

Water Melons.—

1. Black-eyed Susan: Large oblong, dark rind, thin stripe, colour of flesh and flavour good.
2. McIvor's Sugar: Strong-growing vine, very prolific, broad light-green markings, bright, red flesh.
3. Cuban Queen: } These are two excellent melons. They are early, prolific, with a thin rind and
4. Cole's Early: } delicious flavour.
5. Ice Cream: Did well, and is certainly one of the best flavoured.
6. Volga: Does not do as well as I could wish. Such fruits as were gathered were of the very highest quality; round, medium size; very bright crimson, flesh, glaucous-green rind, no thicker than that of an orange.
7. Mammoth Ironclad: } And are two very large melons, and of good quality. The latter is a good
8. Kolb's Gem: } market sort, as it will bear a lot of handling.

Rock Melons.—

1. Hackensack; A very early, delicious, green-fleshed melon.
2. The Banquet: The handsomest variety in the collection; orange-coloured flesh; splendid flavour.
3. Perfected Delmonico: Slate-coloured fruit, netted, yellow when ripe; fine foliage, covers the fruit well.
4. Jenny Lind: Rather small, but one of the most prolific and delicious melons in the group.
5. New Musk: Smooth, slate-coloured skin, fine-grained flesh, rich flavour.
6. Winter Naples: A large oblong, green-fleshed melon of excellent flavour; smooth, dark-green skin.
7. Peponi: Similar in shape and quality to the above, but most beautifully marked with light-grey network.

These two last-named varieties are from the vicinity of the Mediterranean, and have the same characteristic growth, producing robust vines with large foliage, which serves to some extent to protect the fruit from the strong rays of the sun. All rock melons should be protected from sun and rain to preserve both flavour and appearance, and more especially with these two varieties, or they are sure to scald as soon as the fruit begins to show above the foliage. Their keeping qualities are wonderful. A specimen of each has kept sound up to this date.

SQUASHES.—Six varieties were grown. Early Golden Bush and Early White Custard are compact growers, very prolific, and most suitable for small gardens. Moore's Vegetable Cream and Delicata are the two best of the runners. The best winter squashes are Boston Marrow (deep orange, cocoon-shaped), and Hubbard (dark green). They are both good keepers. The latter boils very dry.

TOMATOES.—This crop did exceedingly well.

1. Mikado: Very large, red fruit; heavy bearer; fruit ripens well round to the stem.
2. Tucker's Favourite: A large variety of the Peach, colours well, good dessert variety, brisk sub-acid flavour.
3. Dwarf Champion: Medium-sized fruit, crimson solid flesh; a good packer; sturdy plant, requires no staking.
4. Maiden's Blush: Large yellow, sunny side turning pink.
5. Ponderosa: Grows to an immense size but does not ripen evenly.

CABBAGE AND CAULIFLOWER.—The plot in which these have been transplanted has been deeply worked by spade husbandry. A heavy dressing of stable manure was dug in, and after the plants were well established, a dressing of superphosphate and sulphate of potash was applied in the proportion 4 parts of the former to 1 of the latter. The varieties are all new quick-growing kinds. They were planted out the first week in April, after 1½ inches of rain, and only 2½ inches of rain fell from that time until the first cutting, which was on the 22nd May.

Cabbage.—

1. Sutton's Earliest: Dwarf, compact habit, white cone-shaped heart; crisp and tender; first cutting, 22nd May.
2. Miniature Marrow: A perfectly distinct type of cabbage. A dainty little plant, nearly all heart; first cutting, 1st June.
3. Main Crop: A good-sized cabbage, white, crisp heart; first cutting, 18th June.

Cauliflower.—

1. Universal: Robust grower, beginning to button, 18th June.
2. First Crop: Dwarf habit, beautiful white, compact flower, very few leaves and very early; first cutting, 3rd June.
3. Improved Autumn Giant: Nearly as early as First Crop.
4. King of Cauliflowers: A late variety, not buttoning yet.
5. Autumn Protecting Brocoli: Very robust, too early for this variety to show signs of flowering yet.

Four varieties of Turnips are being grown, viz.: White model, white Nepaul, long white, and scarlet kashmyr. The last-named is the earliest to mature; it is a very mild and excellent flavoured sort.

ASPARAGUS.—Conover's Colossal and Purple Argentueil are grown in one plantation of three rows, 2½ chains long and 4 feet apart. This distance gives plenty of room for cultivating with horse hoes.

The following garden crops have also been grown:—Artichokes, beets, cucumbers, endive, kohlrabi, chillis, capsicums, egg plant, lettuce, parsnips, parsley, rhubarb, salsafy, sea kale, spinach, and some medicinal plants.

THE ORCHARD.—The orchard has been ploughed five times during the year, and the ground has been continuously scarified to keep the surface loose and to check weed growth. The soil is of such a nature that if the intervals of stirring the surface are too long, it would very soon settle down to one compact mass. Hand-hoeing, and digging out couch, stopping suckers, are persistently carried on. Last winter the trees were pruned by Mr. Voller, and under his supervision the trees have been sprayed three times.

VINEYARD.—The vines since they were cut back by the frost have made a thick mass of growth. They have just been pruned. The whole of the vines were staked in the spring. Mr. Rainford (under whose supervision this branch is) does not intend at present to trellis them.

IMPROVEMENTS.—One hundred chains of fencing have been completed as follows:—83 chains, posts 16 feet apart, 4 plain wires and 2 barbs drawn through the posts, and one Lochrin dropper pinned on between; 17 chains of cross fencing, posts 20 feet apart, with two barb wires drawn through the posts; 130 chains of boundary fence on the "New Hermitage" have been repaired. Five new gates have been made, erected, and painted. One well, 121 feet (at which depth water was not obtainable), and another 26 feet (where a good supply of water was struck), have been sunk during the year. In connection with the manager's residence, the kitchen has been lined, and a bathroom, with all necessary fittings, has been erected. The new property—called "New Hermitage"—of 192 acres, has been purchased and added to the farm. On this, 20 acres have been cleared of forest, broken up, cropped, and fenced. An improved gate entrance to the creek end of the farm lane has been completed. Three new implements have been added to the farm plant—viz., one three-furrow Massey-Harris gang plough, one Osbourne reaper and binder, and one Howard Martin winnower.

According to your instructions, I attended, with a large exhibit of the products of the farm, at the Brisbane, Warwick, and Allora Shows. I also attended the Tenterfield Show in the capacity of judge.

The two principal visits to the farm were the college staff and students on 12th May, and the agricultural delegates on 8th June.

C. ROSS, Manager.

REPORT OF THE STATE FARM, BIGGENDEN.

I have the honour to lay before you my report on the work and progress of the farm during the financial year ending 30th June, 1900.

Taken as a whole, the year has not been, in this district, a favourable one for the agriculturist. The spring and early summer up to the end of December, has been very dry, which has greatly militated against a good growth of crops. The year ended with a heavy downpour, which, however, soon dried up, and was followed by an unprecedented dry spell extending over the usually wet months of January, February, March, and April, during which large cracks appeared in the ground, even in the subsoiled land. Only in May have we had a normal rainfall of about 3 inches. But it was already late for most autumn crops, all of which are now retarded for from six to eight weeks.

That adverse weather has served to illustrate the advantage of growing crops on a land deeply ploughed and thoroughly cultivated. In a good season, our climate is so genial that fair crops can be grown almost anywhere, and without much trouble. But in a dry season, good crops are to be seen only where great care and proper methods have been applied.

Last year we had broken up 22 acres of forest land. Out of these we have this year subsoiled 13 acres to a depth of from 18 to 20 inches, by the means and implements described in my article on "Maize" in the *Queensland Agricultural Journal*.

It is on that subsoiled land that we have obtained the best results, especially with grape vines, maize, pumpkins, and cow peas.

VINEYARD.—On the last week in August (1899) a start was made for a vineyard by planting a little under one acre of subsoiled and well pulverised land, with the following varieties:—Black Cluster, Black Hermitage (Petite Syrrah), Elsingburgh, Clairette (or Verdelho), Red Muscat, White Syrian, White Portugal, Doradillo, Gordo Bianco, Rasin de Dames, White Solferino, Tardent's Curative Roussette.

The rows are 9 feet apart, and the vines 6 feet apart in the rows. Although our land is rather sticky for vines, as will appear in a wet season, most of the varieties have made a vigorous growth.

In January, after a soaking rain, a fungoid disease appeared on a few varieties. Mr. Tryon diagnosed it as *Spaeloma Ampelinum*. The disease was kept well under control by dusting the vines with equal parts of flower of sulphur and unslacked lime.

From personal observation here, I believe that in the district, grapegrowing has a bright future, especially further west in the direction of Gayndah. By going in for early varieties, especially of the American species, which seem more congenial to the climate and less liable to fungoid and other pests, the crop would be ripe in time to reach the Christmas and New Year markets.

The vineyard is under the direction of the Government Viticulturist, Mr. Rainford, who has visited it twice during the year.

ORCHARD.—The 3 acres set apart for an orchard have been subsoiled from 18 to 20 inches deep, then sown with cow peas, then again ploughed from 12 to 15 inches deep, and are now being pulverised ready to receive trees at any time with every chance of success.

MAIZE.—Of maize, one or two rows of the following varieties were sown on deeply-ploughed, but not subsoiled loam, on the 24th of July, 1899:—Golden King, Hawkesbury Champion, Macleay Riv. r, Red Nibbed, Early Yellow Flint, Ninety Day, Early French, Iowa Silver Mine, and over twenty varieties of sweet and pop corns.

They came up on the 11th of August, and made at first a rather poor growth. This confirms the well-known fact that for most crops it is useless to sow too early before the soil has had time to get warm. The seeds of sweet corn were poor and weevily, and came up unevenly. But we had enough plants to save a few seeds of nearly all the varieties.

The main sowing of Golden King was made on the 9th August, and another on the 28th September, which included a few rows of Early Mastodon. The rows were 4 feet 6 inches apart, and the seeds dropped by hand about 15 to 18 inches apart in the row. Every fifth row was left empty to receive pumpkins and other Cucurbitaceæ. The plants came up at once and made a good start. In the subsoiled land they found stored moisture in sufficient quantity to sustain them during the dry weather. The tall and beautifully even stalks were the picture of a healthy and well-grown crop when, on the 31st December, they were laid flat on the ground by a gust of wind following a soaking downpour. This, of course, prevented any further cultivation. The crop, however, had been greatly benefited by the welcome rain. It gradually recovered, and it regained a nearly erect position.

At harvesting, in February and March, the cobs were well filled, even, and of fine shape. In quantity as well as in quality the crop was superior to that of last year.

On the acre occupied by Cucurbitaceæ we got three tons of pumpkins which, at £2 per ton, is equal to a return of £6 per acre. Many of our pumpkins turn the scale at from 40 to 60 lb.

I have here often inquiries for an early ripening corn which would be ready to catch the November and Christmas market when prices run usually high. I regret not being able to recommend either Ninety Day or Early Yellow Flint. The general impression is that those flinty varieties do not do so well here as the members of the horse tooth variety. I am anxious to experiment next season with the earliest of them—the Early Yellow Dent, which was imported a few years ago by the Department from America. It does not grow high and can be planted closer; but the pith is small and the grain deep seated. I have obtained good results from it both on the Downs and out West, and it might perhaps answer the purpose here, too.

For the main crops most of the horsetooth varieties are the best, including allied varieties, such as Golden King, Hawkesbury Champion, Early Mastodon, &c. The last three have leafy and juicy stalks which make them good to feed green or to cure in the silo.

There was no disease on our corn worth mentioning, except perhaps weevils, which began their depredations in the field. For another season I beg to recommend the erection of a well ventilated corncrib after the plan of the one described in my article on maize, in the *Queensland Agricultural Journal*, and the use of airtight tanks for the storage of the grain.

In my monthly report for March, I described the improvements made on the Invincible cornsheller, by means of which the small corngrower can grade his corn and put a high-class article on the market.

COW PEA.—This plant maintains its reputation as a hardy and profitable crop, and as a good nitrogenous fertiliser for the soil. It forms an excellent rotation with wheats and other exhausting crops. It enriches the soil, keeps it friable and free from weeds.

In spite of the dry weather, our returns from four acres were as follow:—

To 5 bags of seed at 10s. per bush-l	...	...	...	...	...	...	...	£8 15 0
To 5 tons of chaff, with mixed broken barley, at £3	...	...	...	...	...	...	...	15 0 0
Total	...	...	...	...	...	...	...	£23 15 0
Less expenses—								
Ploughing	...	...	...	...	...	...	...	£2 0 0
Harrowing	...	...	...	...	...	...	...	0 6 0
Sowing	...	...	...	...	...	...	...	0 15 0
Cultivating and hand chipping	...	...	...	...	...	...	...	2 6 6
Harvesting, carting, stacking	...	...	...	...	...	...	...	3 13 6
Thrashing and chaffing	...	...	...	...	...	...	...	2 9 0
Cleaning and bagging	...	...	...	...	...	...	...	0 14 0
								£12 4 0
Balance	...	...	...	...	...	...	...	£11 11 0

or, in round numbers, a net profit of £3 per acre after having paid £3 expenses.

In an ordinary season these returns would have been more than doubled. As it is, they have been obtained with a catch crop mostly grown in lieu of weeds between two crops of wheat.

This being one of the crops for which I have most inquiries from all parts of the colony, I will explain in a few words how we went about it.

The seeds were sown by means of a Planet Junior hand-seed drill in rows 3 feet apart, the machine being set to drop from one to two seeds 18 inches apart in the row. It took 8 lb. of seeds to the acre. When the plants were about 6 inches high they received a light harrowing, which destroyed every little weed, loosened the earth

round the roots, and made of the soil a nice layer of mulch 2 or 3 inches thick. A fortnight later they were scarified with a Planet Junior horsehoe, after which the crop took care of itself and covered the whole cornfield.

The crop was harvested in February by means of hoes and reaping hooks—a good man cutting about 1 acre per day. It was left to dry for three or four days on the field, then carted to the barn and stacked out of doors.

On the 4th May the stack was opened, and found sweet and fragrant throughout.

Thrashing with the flail we find injures a good many leaves, and totally spoils the chaff. The best means we have so far devised is to pass the stuff through the chaffcutter, regulated to cut in half-inch lengths, and with the pressure lever *unweighted*. The knives practically rub off the leaves from the pods in such a way that hardly any get injured. We then pass the chaff through the winnower. The leafy part is easily separated and blown off.

WHEATS AND BARLEYS.—Farmers and others have taken a considerable interest in our experiments with these cereals.

We had over 100 varieties tested in the nomenclature, stud, and seed wheats plots, in quantities varying from half chain rows up to one acre in area.

The sowings were made on the 24th and 25th April, but owing to dry weather the seeds came up only in the first week in June.

For details I beg to refer to the following table. To facilitate comparisons the wheats are there tabulated under the same numbers as they occupy in the catalogue published by the Department.

The degree of rustiness is expressed in the figures—0 representing entire absence of rust, and 40 a plant rotten with rust; E., early; M, medium; L, late.

RECORD OF THE WHEATS GROWN AT THE STATE FARM, BIGGENDEN, DURING SEASON, 1899.

No.	Name of Wheat.	Height of Straw.	Length of Ears.	Time of Maturing.	Rust on 15th Sept.	Rust on 1st Oct.	Rust on 1st Nov.	Remarks.
		Ft. in.	Inches.					
1.	Egyptian E	3 6	5	M	0	0	1	Good plump seed, flinty
2.	Sicilian Baart	4 4	4	M	0	0	1	Grain very dark, hard, and flinty
3.	Forella	4 8	4	M	0	0	0	Very dark, longish, flinty grain
5.	Medeah	4 0	3½	M	0	0	0	Huge flinty grain
7.	Egyptian C 2	3 8	3	M	0	0	0	Very fair hard grain
8.	Do. D	3 2	3	M	0	0	0	Grain pinched
9.	Do. A 1	3 6	4½	M	0	0	0	Fair
11.	Young's Bearded	4 10	5	M	0	0	1	Huge flinty grain; good yielder
12.	Paros	4 6	4	M	0	3	3	
13.	Atlanti	4 6	4	L	0	2	2	Grain fair but pinched
15.	Cretan	3 6	4	L	0	3	3	Pinched
21.	Hebron	4 0	4	L	0	3	3	Poor
24.	White-eared Mummy	4 6	5	L	0	1	4	Rotten with rust
25.	Brown-eared Mummy	5 7	2½	L	0	2	2	Huge grain, but pinched, and very dark
26.	Egyptian B	2 9	3	L	0	2	2	Poor
29.	Bancroft	5 0	4	M	0	2	2	Fair cropper; longish, dark, flinty grain
31.	Laidley	4 6	3	L	0	2	2	Huge flinty grain, with deep crease
36.	Rural New Yorker (rye wheat)	2 6	4	L	0	2	4	No seed
43.	Gharaf	2 6	5	M	0	2	4	Useless; very liable to rust
45.	Ironclad	3 0	5	L	0	2	3	Small pinched grain, very dark
49.	Champlain	3 7	6	L	0	2	3	Poor
50.	Port Germain	4 3	5	M	0	2	2	
55.	Winter Nigger	2 3	4	L	0	2	3	No good
60.	Penguin Island	2 3	5	L	0	3	3	
61.	Pringle's No. 5	2 0	5	L	0	2	3	
62.	Shelton's Russian	2 3	4	L	0	2	3	Useless winter wheat
66.	Deitz	2 6	4	L	0	2	3	do.
72.	Saratof	4 0	7½	L	0	2	3	Stools well but rusty
81.	Beal	2 3	4	L	0	2	2	Pinched
83.	Dutoit	2 6	5	M	1	2	2	Poor
85.	Early Bearded	2 6	4	M	1	2	2	Poor
86.	African	2 3	5	M	1	2	3	
90.	Champlain's Hybrid	2 9	5½	M	1	2	2	
91.	Uncle Tommy	2 8	6	L	2	2	3	
92.	Soft Algerian	2 3	5	L	0	2	3	
93.	Californian Genessee	2 6	4	L	2	2	3	
96.	Canning Downs	3 9	3	M	1	3	3	Poor sample, pinched
98.	Gore's Indian No 1	3 9	3	M	2	3	3	Dark elongated grain, pinched
99.	Indian Clubbed	3 6	3½	M	2	3	3	Dark elongated grain, pinched
118.	Indian Fife	4 0	5	M	1	3	3	
129.	Rattling Jack	2 3	3½	M	2	2	3	
131.	The Blount	3 0	5	L	2	2	3	
135.	Fillbag	3 0	4½	M	2	2	3	
136.	Rattling Tom	2 6	4½	L	2	2	3	
139.	Yacinth	3 0	5	M	2	2	3	
157.	Lake Bathurst	4 9	4	L	2	2	3	
161.	White Essex	5 3	4½	L	1	1	3	
163.	Green Mountain	4 6	6	L	1	1	3	
166.	White Lammas	4 9	5	L	1	2	3	
167.	Australian Talavera	5 0	5	M	1	2	3	
169.	Talavera de Belle Vue	4 1	5½	M	1	2	3	
173.	Purple Vermont	4 0	3½	L	1	2	3	
177.	White Essex	5 0	6	L	1	2	3	
201.	Blount's R R.	4 6	6	L	0	2	3	
210.	North Carolina	4 6	5	L	0	2	3	
213.	Anderson's R R.	3 9	5	M	1	2	3	
224.	Scotch Fife	4 1	4½	L	1	2	3	
228.	Nimitybelle	3 7	4	L	1	2	3	
237.	Sapphire	4 7	6	L	1	1	3	Dark grain, slightly pinched (20 bushels per acre)

RECORD OF THE WHEATS GROWN AT THE STATE FARM, BIGGENDEN, DURING SEASON 1899—continued.

No.	Name of Wheat.	Height of Straw.	Length of Ears.	Time of Maturing.	Rust on 15th Sept.	Rust on 1st Oct.	Rust on 1st Nov.	Remarks.
		Ft. in.	Inches.					
254.	Clark's R.R.	5 0	5	L	1	2	2	
259.	Leak's Defiance	4 0	6	L	1	3	3	
263.	Murray River	4 9	4½	L	1	2	2	
297.	Clubbed Indian	4 0	2½	M	1	2	2	Somewhat pinched.
299.	Budd's Early	4 7	5	M	1	1	2	A coming wheat.
301.	Odesa Sans Barbe	3 7	4½	M	1	1	2	
308.	Ward's Prolific	5 3	6	M	1	1	2	Slightly pinched but good grain (average 25 bushels).
314.	Robins R.R.	4 7	5	M	1	1	2	Pinched, hardy, deep crease.
322.	Willett's	2 9	3	L	1	1	3	
326.	McGhee's White	2 6	2½	L	1	1	3	
328.	German Emperor	3 0	4	L	1	1	3	No good.
330.	Early Genessee	2 6	3	L	1	1	3	
332.	Ryewheat	2 9	4½	L	2	3	3	Rotten with rust.
333.	Tuscan Island	2 6	3	L	1	1	3	
336.	White Tenterfield	2 8	3	L	1	1	3	
Group Farrar of Artificially Crossbred Wheats.								
345.	R.	3 9	5	M	0	0	0	
349.	(84 BY)	3 6	4¼	E	0	1	1	
350.	(85 BY 86 A1)	3 6	4	E	0	0	0	Good plump grain, inclined to be hard. Good yielder.
351.	(85 BY 2 86 A1)	3 0	5	E	1	1	1	Round plump grain, like Allora Spring but harder and darker (average 25 bushels).
352.	(85 A1 B1)	3 3	4	E	1	1	1	Small but plump grain (20 bushels).
353.	(85 AB)	3 6	4½	M	1	1	1	
354.	(Y)	3 6	5	M	0	0	1	A darkish little grain, hardy, and good yielder.
355.	(85 D2)	3 6	4½	M	1	1	1	Slightly elongated, plump grain, good yielder.
356.	(84 C1 D)	3 6	5	M	1	1	1	Nice plump round grain (25 bushels).
357.	(84 C1 D best)	3 6	5	M	1	1	1	Round plump grain, very promising (30 bushels).
358.	(Bald Canning Downs)	3 0	4	M	0	0	2	
360.	Nagar Red	3 3	4	M	0	0	0	
361.	Bold Perezopore	3 6	3½	M	0	0	0	
362.	Do. White	3 6	4	M	1	1	1	
363.	Petsi Exdam	3 0	4	E	2	2	3	
364.	Do. 2	3 0	5	M	1	1	2	
365.	Moulton Hard	3 6	4½	M	1	1	2	
366.	(1)	3 0	4	M	1	1	2	
367.	(2)	3 0	4	M	1	1	2	
368.	Yandilla 1	3 0	4	M	1	1	1	Good plump grain, hard
370.	Do 3	3 2	5	M	1	1	1	Round plump, little grain
371.	Restrel	3 0	5	L	1	1	1	Nuggety grain, rather hard (average 20 bushels)
373.	Do. 3	3 6	4	E	1	1	1	Slightly pinched, dark, deep crease (15 bushels)
387.	Aspen	3 6	5	M	1	1	1	Pinched
391.	Yandilla (imp.) Indian	3 0	5	M	1	1	1	Small dark grain, pinched
403.	Selected Armstrong	3 0	5	M	0	1	1	Good plump grain (20 bushels)

The following stud and seed-wheats have been mowed down for hay:—

16.	Belatourka	6 0	6	M	1	1	3	
304.	Marshall's 3	4 2	6	L	1	1	2	
305.	Do. 5	4 0	6	L	1	1	2	
289.	Budd's Early	4 6	5¼	M	1	1	2	
23.	Algerian				1	1	2	
82.	Early Baart				1	2	2	
121.	Indian Early				1	2	2	
122.	Do. F				6	2	2	
123.	Do. Z				1	2	2	
125.	Early Piara				1	1	2	
126.	King's Jubilee				2	2	3	
128.	Steinwedel				2	2	3	
137.	Red Straw				2	2	2	
138.	Hudson's Early				2	2	2	
141.	Steer's Early				2	2	2	
158.	White Naples				1	2	2	
165.	Leake's R.R.				2	2	2	
170.	Zealand				2	2	2	
298.	Indian D.				1	2	1	
303.	Australian Wonder				1	2	2	
338.	(Cobb's 51)				1	1	1	
339.	Gayndah				1	2	3	
341.	Yandilla				1	1	1	
Barleys—								
	Chevalier	3 9	6	M	1	1	1	
	Sea of Azov	3 6	5	M	1	1	1	
	Hallett's Improved	4 0	6½	M	1	1	1	
	Nepaul or Skinless	3 6	5	M	1	2	3	

From the foregoing table it would appear that, taken all round, the straw was taller and the ears longer than on the Southern experiment stations; that rust was very prevalent, putting all the varieties to a severe test; that the best results were obtained from the hard flinty Egyptian and Indian wheats usually known under the name of Maccaroni wheats; that from amongst the bread wheats the best results were obtained from the selected and artificially crossbred wheats of Mr. Farrer's collection; that it is from amongst these latter that we are likely to find the variety most suitable and best adapted to the varying districts of the colony.

In all probability the best results will be reached with some early maturing wheats sown early. Should they make too much headway, as is sometimes the case when the autumn and winter are mild and moist, they should be mowed down, or, still better, browsed down with sheep, which are perfect for the purpose. They eat close to the ground both weeds and wheat, make with their tramping the soil firm round the roots, and act at the same time as very efficient manure-producing and distributing machines.

Taking now the table from a practical point of view, we might say that a farmer who would have sown his field with any of the following varieties would have had no crop at all to repay his labours:—White-eared Mummy, Egyptian B, Rural New Yorker, Gharaf, Ironclad, Champlain, Port Germain, Winter Nigger, Penguin Island, Pringle's No. 5 Shelton's Russian Deitz Saratof, Dutoit, Early Bearded, African, Uncle Tommy, Soft Algerian, Californian Genessee, Indian Fife, Raking Jack, The Blount, Fillbag, Jacinth, Lake Bathurst, White Essex, Green Mountain, White Lammas, Australian Talavera, Talavera-de-Belle-Vue, Purple Vermont, North Carolina, Anderson's R.R., Scotch Fife, Nimitybelle, Clark's R.R., Leak's Defiance, Murray River, Odessa-sans-barbe, Willett's, McGhee's White, German Emperor, Early Ghenessee, Rye Wheat, Tuscan Islander, and White Tenterfield.

With the following varieties, he would have had a medium crop of from 10 to 22 bushels per acre:—Egyptian E, Sicilian Baarf, Egyptian C2, Egyptian D, Egyptian A1, Paros, Atlanti, Cretan, Brown-eared Mummy, Bancroft, Laidley, Beal, Canning Downs, Gore's Indian No. 1, Indian Clubbed, White Essex B, Budd's Early, Robin's R.R.

And with the following varieties he would have got a full crop of from 20 to 30 bushels per acre:—Forella, Medeah, Young's Bearded, Sapphire, Ward's Prolific, and nearly the whole of the numerous collection of the wheats artificially crossed by Mr. Marshall and Mr. Farrer in the southern colonies.

Of barleys we had only four varieties: The Hallet's Improved, the Chevalier, the Sea of Azov, and the Nepaul, or Skinless. They all did well in grain, but the last-named was rather severely affected with rust, both on the flag and on the stem. No doubt good malting barley can be grown in nearly all Southern Queensland. Where wheats give but doubtful results on account of rust it would perhaps be worth while to give a trial to barley-growing.

SORGHUMS AND MILLETS.—We did not go in largely for these excellent summer crops, having here no use for them. But we have grown experimentally a couple of rows of some twenty different varieties. They nearly all did well, and would have been a great stand-by to a dairy farmer, although on account of dry weather most of them did not reach by 1 to 2 feet their usual height. The Undendibule, the Early Orange Cane, the Brown Dhourra did best; whilst the Kaffirs, both white and red, and the Soudan Millet were rather stunted. The *Setaria* (*Panicum italicum*) was fully 4 to 5 feet high. It is hard to beat as a quick-growing summer green fodder, not forgetting that its seeds are excellent to rear young chickens on.

As is usual in a newly settled district, the birds were most destructive on that family of plants. In fact, in some varieties we could not save seed enough for distribution.

The broom corn gave excellent fibre worth fully from 20s. to 25s. per cwt. As the returns range between 7 and 10 cwt. per acre, it seems that a few enterprising farmers could do worse than go in for it, and grow at least enough to supply the Australian market, which is yet to a great extent dependent on the fibre imported from California and from Italy.

GRASSES.—Of grasses I have not yet here as many varieties as I would like, as I consider that the preservation and restoration of our pastures is of most vital importance to the colony.

The White Dutch clover was not much of a success, probably on account of drought and heat.

The Red Perennial clover did much better. Should it continue to thrive thus it could be profitably used to establish in this district a well paying and much needed branch of agriculture—the fattening of store sheep.

The Mitchell grass (*Astrelba pectinata*), a native of Western Queensland, and one of the best fattening and drought-resisting grasses in the world, did here remarkably well, grown from seed on a small plot. From what I know of the plant, I think it would do well on our chocolate soils, and in general on all well-drained paddocks. It fears excess of moisture and low swampy places.

Our best results were obtained, however, from the now renowned *Paspalum dilatatum*.

Like all good fodders, it is likely to prove somewhat troublesome in the cultivation paddock. But to the dairyman, the cattle, sheep, and horse-owner in general it will be an invaluable acquisition. It is extremely hardy, standing well the frost, also both in drought and in wet season, but, like most plants, it withers away in stagnant water. It is not very particular about soils, but does best on alluvial loam, also on black and chocolate forest lands.

According to accounts in agricultural papers, it is considered as a grass difficult to grow from seed, and had better be propagated by the transplanting of roots set from 3 to 4 feet apart. We have been here successful with both methods, hardly any seed having failed to germinate. It can be sown or transplanted at any time during the year when the soil is warm and the weather favourable. The seeds sometimes remain for months uninjured in the soil, and then come up after a beneficial shower.

The farmers of the southern colonies reckon that they get from 18 to 20 tons of green stuff per acre. We found our return here a good deal higher, showing how our climate and soils are congenial to the plant.

It is eminently a grass to be grazed down in the paddock, but it furnishes also an excellent leafy hay and chaff, although it gets somewhat oxidised, and turns dark during the drying in the sun. Most likely it would do well in the silo, too. It is greatly relished by all sorts of stock, and gives good results both in the pail and in the boiling-down pot.

I am very anxious to continue and extend next year these experiments with native and imported grasses, in a special paddock, as distant as possible from our ordinary cultivation.

TOMATOES.—We had this year over twenty varieties under observation. The vines were healthy and strong, but the fruits have much suffered from the attacks of insects and by various diseases.

The New Peach and the large, juicy varieties in general have been the worst affected, whilst King Humbert was practically free from any disease, and did well throughout the year.

That excellent variety which I have also received from seedsmen under the names of Ficcarazzi and Wonder of Italy, is perhaps the best all-round tomato in existence.

It is both early and late. It is extremely hardy and prolific. Its handy size, attractive red colour, elegant plum shape, firm, savoury flesh make of it an excellent table variety. It is well liked by the jam, sauce, and chutney manufacturers. Its firm, smooth skin makes it insect-proof, a good carrier, and a good keeper.

Next to it come the Rival and the All-The-Year-Round, which are allied varieties not quite so hardy, but bear a more showy berry of larger size. For size and beauty of shape we had the best results from the Golden Queen, the Crimson Cushion, the Duke of York, and especially the Democrat, which excelled all others.

The Autocrat was a dead failure. Two varieties of the Egg Plant, the white and the purple, did well, but did not attain a large size for the want of moisture and manure required by such vegetables.

POTATOES.—A small quantity of about fifteen varieties of English potatoes were planted on the 25th February, but on account of the dry weather they came up only in April. As can be expected in such circumstances, a good many seeds perished from dry rot. We expect, however, to be able to save seeds from nearly every variety. They are still in the ground at the time of writing, and keep growing during the relatively mild weather we are now enjoying.

On a larger plot planted on 9th March, nearly every plant of the Early Rose came up, whilst among the Circular Heads the misses are very numerous. This emphasises the well-known fact that in our climate the early maturing crops have usually a better chance to succeed than those which require a long time to ripen.

For the main crop the different varieties of Blue Skins remain the favourites with both the grower and the consumer, being responsive as to both quantity and quality.

SWEET POTATOES.—Our experiments with this valuable esculent were carried out with five different varieties, and proved of an extremely interesting nature. We treated the crop exactly in accordance with the directions contained in my article on the subject (*Q. & Journal*, Vol. I., Part 2, August, 1897). That is, we used the heat produced by the fermentation of fresh horse manure mixed with straw chaff to hasten in the spring the sprouting of the tubers.

Our cuttings were transplanted as early as September, when all danger from late frost was considered to be over. When once rooted they can stand a great deal of dry weather without injury.

At Christmas the tubers were already of marketable size.

At present the crop amounts to from 14 to 16 tons per acre, with numerous tubers turning the scale at from 10 lb. to 14 lb. Such results were obtained in an adverse season, and, like all other crops on the farm, without any manure or irrigation, by the simple agencies of the natural soil and climate, supplemented by a good tillage of the land.

In beans, peas, beets, carrots, and other vegetables, we had some fine specimens, but nothing calling for special mention in this report, except, perhaps, the mangel-wurzels, some of which grew to 28 lb. in weight, showing that, contrary to an existing prejudice, such crops could be grown profitably by the dairy farmer.

CANAIGRE.—We have made a start, on a small scale with this tanning plant. Unfortunately, our roots for seed reached us in November, which is much too early for planting in these latitudes. A good many plants have perished from heat and dry weather, but we have saved enough to plant next season a small plot at the proper time—say in March or April.

The culinary Rhubarb, which belongs, I believe, to the same family, did not do well so far, the roots having a tendency to rot in the ground.

The Asparagus are healthy, and have begun to furnish very fair roots after suitable rains.

Pea-nuts have been much retarded by the dry weather and are not yet quite ripe. No doubt a lighter soil would suit them better.

The Jerusalem Artichokes remained for eight months dormant in the ground, and then came up and gave a fair crop of tubers of good quality, though small. It is undoubtedly a profitable crop, being hardy and prolific. It forms an excellent food for pigs and for dairy cattle, and is very acceptable as a dish when fried in butter. But it should be handled with care, as it could easily become a pest amongst the other crops.

We had a very fair success with a few sub-tropical plants, such as teosinte, Job's tears, arrowroot, pine-apples, and sugar-cane. Of the latter we have about fifteen varieties under observation. Although our land, rainfall, latitude, and exposition are not considered, by men competent to judge, of the best for sugar-growing, we have obtained good results from the Batoe, the Rappoe, and the Striped Singapore. These two last varieties are said to possess a good density, and seem to be well adapted to grow in this district.

No great permanent improvements have been made during the year, the principal being the putting down of a well; the erection of a windmill, with elevated stand and tank, from which the water runs by gravitation to the stables; and some small jobs, such as the painting of sheds, &c.

A few excellent implements have been added to our stock, such as a pegdrum thrasher, a chaffcutter, a winnower, an American wagon, &c.

Of farm animals there are four good draught horses and a little saddle mare. We keep also a couple of hives of bees, mostly for inoculating purposes. They did fairly well as honey-producers, too. I am glad to see bee-keeping coming into favour, several farmers having made a start with it of late.

In spite of the adverse season, agriculture has made good progress within newly-settled districts. Many farms are extremely well kept and a credit to their owners.

During the year I have, by request, delivered in Biggenden a few well-attended and well-received lectures on various agricultural subjects. To my regret, I had to decline invitations to deliver similar lectures in other parts of the district, such as Gayndah, Childers, &c.

HENRY A. TARDENT.

REPORT OF THE STATE FARM, GINDIE.

I have the honour to submit herewith my report of the work done and experiments carried on for the year ending 30th June, 1900.

MAIZE.—Twenty-two acres of maize harvested last season yielded a fair crop. It would have been much heavier had it not been attacked by caterpillars just as the silk was showing on the cob. Owing to this there were a great number of blind cobs. Nevertheless it yielded 450 bushels of grain of excellent quality, a good portion of which was sold for seed to farmers at Yeppoon, Rockhampton, Capella, and in the Springsure district. Part of the balance was sold to the best advantage, and a portion retained for horse-feed.

LUCERNE.—During the cooler months of the year three good cuttings were taken off the 7 acres growing here, and converted into hay, part of which was sold. The balance was retained for feed. Owing to the soil being very shallow where this crop is, it grows very indifferently during the hot months of the year. A great number of the roots have died out during the hot summer which we have experienced, but at present date the remainder is looking well and will soon be fit to cut.

PANICUM.—About 8 tons of this fodder were made into hay. About $\frac{1}{2}$ -acre of Swede turnips was planted, and did very well. These were sold as vegetables.

PUMPKINS.—Five tons were grown amongst the maize. Those that were fit for table use were sold for that purpose, but as they were principally cattle varieties, a part of them were not used as the horses here would not eat them.

Cow PEAS.—Three acres were grown notwithstanding the fact that they were planted in land that I considered too dry to allow the seed to germinate, yet fully half the seed planted came up. Though this crop had to contend against dry, hot weather for months, it yielded a very fair cutting, which has been chaffed up with wheaten straw and fed to the horses.

WHEAT.—Sixty acres of the following varieties were harvested:—

Marshall's No. 8, Marshall's No. 3, Budd's Early, Allora Spring, and Belatourka; also $3\frac{1}{2}$ acres of malting barley. The varieties that did best here were Marshall's Nos. 8 and 3 and Budd's Early. Owing to the land being too wet to work properly, and having to contend against a thick crop of weeds while ploughing, the land occupied by the Belatourka, Allora Spring, and barley did not get the working it should have had to assure a crop. The barley, though a light crop, yielded a grain of excellent quality, as did also the Belatourka. The Allora Spring was almost a failure, owing to rust. I attribute the failure of this variety partly to its being sown so late in the season—namely, 3rd June. In this district it should be sown at least a month earlier if practicable. The partial failure of the Belatourka, Allora Spring, and barley seriously affected the general average. About three weeks before harvesting operations were commenced we were visited by a heavy wind-storm, which "lodged" a large portion of the best of the crop and made it very difficult to harvest. This also caused a considerable loss of grain. The total yield of grain for the $63\frac{1}{2}$ acres was 312 bags. A considerable quantity of seed has been sold all over the district, from points extending from Barcaldine to Pandora and Springsure.

A small packet of Stud Chevalier Barley supplied by your Department did remarkably well. There was only sufficient seed to plant an area 11 feet square. It was drilled in, and yielded at the rate of 43 bushels to the acre. The whole of the resulting seed has been sown this season.

During December 30 acres of maize of the undermentioned varieties were planted—Ninety Day, Hawkesbury Champion, Early Mastodon, Yellow Flint, and Iowa Silver Mine. The land planted with maize had been well worked and was in splendid tith, but there was not sufficient moisture to bring the seed up, consequently the planting was a failure. Sowings of Arnica, Belladonna, Hemlock, Red Panicum, *Paspalum dilatatum*, a number of vegetable seeds and 3 acres of pumpkins were also made, the failure of which may also be attributed to the absence of sufficient rain.

The areas under cereals for this season are as under:—

	Acres.
American Blue Stem	8.14
Marshall's No. 8	10.86
Allora Spring	9.61
Budd's Early	12.37
Marshall's No. 3	38.50
Malting Barley	9.70
Rye	1.05
Oats	1.30

In addition to the above, 1 acre is under stud wheat, comprising 225 varieties.

Three acres of Canadian Field Peas have also been planted, which are up and are looking well. The total area under crop, including 7 acres of lucerne, is 107.43 acres. Ten acres of land have been prepared for fruit trees, and that area is now ready for planting. As some of the trees have arrived, I expect this work to be accomplished within a week or two. Eight acres have been cleared and partly got ready for a vineyard. This land is situated about two miles from the homestead.

The improvements carried out during the year have been the erection of four miles of netting fence, enclosing a sheep paddock; one mile of the same description of fence has been erected round the vineyard. As this portion of land is pretty well surrounded by scrub, this was necessary to protect the vines from the attacks of the marsupials. This brings the total length of the fencing erected on the farm to about 22 miles. The other improvements consist in the sinking of two wells, one of which was sunk by the farm hands. A fair supply of water was struck at 15 feet, the water rising 8 feet 6 inches in the shaft. A windmill and a 4,000-gallon tank have just been erected at this well. This is one of the most necessary and valuable of the improvements that have been made during the year, as it gives the cattle and horses the run of 1,500 acres of good grass land, which was comparatively useless before this well was sunk. The other well mentioned is now being put down in the sheep paddock. This is being done by contract.

On the 9th March I purchased 184 head of mixed cattle, which have done very well considering the scarcity of grass and the long distance they had to travel for water. This difficulty has now been removed by the sinking of the well before mentioned, as it has enabled me to shift them on to good grass within easy reach of the water.

In May, 200 sheep were purchased by the inspector. They have done well since being here, but it is a matter of regret that at least double that number could not have been purchased at that time, as they have advanced in price, and should they be required to graze off any of the wheat, the number is too small to be of much service. I should recommend that another 200 or 300 be purchased, as, in any case, they will be a source of revenue to the farm.

The implements and machinery added to the farm's list during the year comprise:—One maize cultivator, one two-furrow plough. A threshing plant, made by Marshall and Son, consists of a 5 horsepower engine and a thresher with 3 by 6 drum. The machine does its work perfectly, and has been used wherever required to thresh for the farmers in the district, for which a charge of 1s. per bag has been made.

ROBERT JARROTT.

REPORT OF THE CHIEF INSPECTOR OF STOCK AND REGISTRAR OF BRANDS FOR THE YEAR 1899.

SIR,—I have the honour to submit the following report of the working of this branch of the Department of Agriculture for the year 1899.

DISEASES IN SHEEP ACTS.

The number of sheep in the colony on 31st December last, adapted to the various pastoral districts from the returns made under "The Stock Returns Act of 1893," together with the increase or decrease in each district on the previous year, are shown in the following tables:—

DISTRICT.	1899.	1898.	INCREASE.	DECREASE.
Burke	2,227,212	1,852,459	374,753	...
Burnett	26,531	30,232	...	3,701
Cook	193	511	...	318
Darling Downs	1,946,479	1,819,148	127,331	...
Gregory North	1,327,922	1,757,172	...	429,250
Gregory South	359,363	391,971	...	32,608
Kennedy	815,728	655,303	160,425	...
Leichhardt	552,868	307,863	245,005	...
Maranoa	1,303,845	1,779,764	...	475,919
Mitchell	4,440,517	5,927,038	...	1,486,521
Moreton	19,855	7,277	12,578	...
Port Curtis	39,574	11,669	27,905	...
Warrego	2,160,316	3,008,109	...	847,793
Wide Bay	6,076	4,092	1,984	...
Total	15,226,479	17,552,608	949,981	3,276,110

This shows a decrease for the year of 2,326,129, or 13.2 per cent. It has to be remarked, however, that the decrease shown above does not by any means represent the actual losses up to the present, as in the Western and North-western districts the greatest mortality occurred subsequently to the date on which the returns were rendered. On the other hand, the increases shown in the Eastern districts are made up of sheep sent temporarily for agistment from the drought-stricken districts.

The arrivals from the southern colonies during the year were—

	No.	Value.
By sea	11,667	£42,705
By the borders	188,856	77,776
	<u>200,523</u>	<u>£120,481</u>

The numbers of sheep exported during the year were—

	No.	Value.
By sea	1,150	£764
By the borders	462,126	180,525
	<u>463,276</u>	<u>£181,289</u>

The numbers operated on at the various meat establishments were as under—

Frozen—

Lake's Creek	49,738
Queensport	44,909
Birt and Co., Limited	41,562
Eagle Farm	20,341
Gladstone	5,234
Ross River	2,716
Mooraree	10

Canned—

Lake's Creek	103,973	164,510
Eagle Farm	17,908	
Queensport	12,193	
Ross River	9,826	
Oakey Creek	1,926	

Extract—

Longreach	94,166	145,826
Oakey Creek	641	

Boiled—

Westbourne	86,053	94,807
Torrens Creek	19,837	
Blythdale	8,633	
Raceview	2,878	
Ross River	1,577	
Gladstone	245	
Oakey Creek	35	

Total	119,258
Exported by sea	1,150
Exported by the borders	462,126

Total output 987,677

The flocks in the colony continue to maintain a remarkable immunity from disease. Malignant foot-rot is unknown in the colony, and fluke, so prevalent in some other portions of Australia, has only appeared in a few isolated areas. The long continued drought has had the effect of checking improvement of the flocks by the infusion of fresh blood, as fewer stud sheep were introduced during the year than in any similar period in the history of many years past.

Many protests have been received as to sheep travelling from the Western to Eastern districts on account of the drought. As in previous periods of severe drought the Department has recognised the saving of the lives of the sheep as a primary necessity. As against individual cases of hardship from travelling sheep must be set the national loss that would occur if some latitude were not allowed during such trying times as the present.

DISEASES IN STOCK ACTS.

The number of cattle at 31st December last, arranged according to the various pastoral districts, was as under:—

DISTRICT.	1899.	1898.	INCREASE.	DECREASE.
Burke	909,344	985,699	...	76,355
Burnett	420,151	448,797	...	28,646
Cook	196,608	236,062	...	39,454
Darling Downs	260,995	280,406	...	19,411
Gregory North	496,453	559,684	...	63,231
Gregory South	217,030	253,896	...	36,866
Kennedy	612,231	662,365	...	50,134
Leichhardt	642,895	679,435	...	36,540
Maranoa	248,266	275,300	...	27,034
Mitchell	135,064	168,610	...	33,546
Moreton	363,389	360,401	2,988	...
Port Curtis	277,602	290,616	...	13,014
Warrego	146,878	237,477	...	90,599
Wide Bay	126,930	132,544	...	5,614
Total	5,053,836	5,571,292	2,988	520,444

This shows a decrease of 517,456, or 9·2 per cent. on the previous year, and it will be seen that the most severe losses have occurred in the Western and North-western districts. It has to be noted however, that in the case of several of the largest herds the numbers were given by approximation as the state of the country and stock prevented mustering.

As in the case of the sheep the most severe losses have occurred subsequently to the period embraced in this report.

The number of cattle introduced during the year was—

	No.	Value.
By sea	101	£1,618
By the borders	16,871	44,546
	16,972	£46,164

The number of cattle exported during the year was—

	No.	Value.
By sea	673	£2,194
By the borders	204,570	707,626
	205,243	£709,820

The number of cattle put through the various meatworks were—

Frozen—

Eagle Farm	30,613
Ross River	22,616
Gladstone	20,747
Queensport	17,403
Birt and Co., Limited	16,644
Bowen	14,048
Lake's Creek	12,431
Redbank	910
Mooraree	67
	135,479

Canned—

Lake's Creek	39,574
Eagle Farm	18,991
Queensport	14,233
Broadsound	12,606
Alligator Creek	12,250
Ross River	11,234
Gladstone	6,162
Oakey Creek	3,541
Redbank	2,652
Dr. T. L. Bancroft (Burpengary)	224
Mooraree	152
Cardwell	68
	121,687

Extract—

Alligator Creek	...	...	...	...	27,263
Hughenden	...	...	...	...	22,427
Burdekin	...	...	...	...	17,420
Gavial Park	...	...	...	...	11,200
Torrens Creek	...	...	...	...	11,159
Mackay	...	...	...	...	10,020
Bowen	...	...	...	...	9,011
Gladstone	...	...	...	...	3,448
Cairns	...	...	...	...	3,050
Cardwell	...	...	...	...	2,107
Ross River	...	...	...	...	2,100
Eagle Farm	...	...	...	...	2,055
Longreach	...	...	...	...	1,979
Broadsound	...	...	...	...	1,424
Oakey Creek	...	...	...	...	1,180
Redbank	...	...	...	...	592
					————— 126,435

Boiled—

Ross River	...	...	...	...	2,512
Gladstone	...	...	...	...	620
Redbank	...	...	...	...	592
Eagle Farm	...	...	...	...	510
Cardwell	...	...	...	...	463
Lake's Creek	...	...	...	...	353
Raceview	...	...	...	...	308
Oakey Creek	...	...	...	...	257
Blythdale	...	...	...	...	174
Broadsound	...	...	...	...	153
Bowen	...	...	...	...	53
					————— 5,995

Total	...	...	...	...	389,596
Exported by sea	...	...	...	...	673
Exported by the borders	...	...	...	...	204,570

Total output 594,839

The health of the cattle stock, apart from deaths by starvation and ticks, has been satisfactory. Fewer cases of pleuro-pneumonia have been reported than in the preceding year; while the reports of the meat inspectors show that tuberculosis among cattle slaughtered for export and home consumption is by no means so prevalent as was generally believed to be the case. Until a general system of dairy inspection has been organised, it will be impossible to arrive at even an approximate percentage of cases of tuberculosis in the dairy herds of the colony; but many dairymen are now adopting the tuberculin test as diagnostic of the disease, and there is cause for hope that, by that means, not only will doubtful animals be eliminated from the herds, but that the test will ultimately be adopted in the case of all fresh additions to the herds. I am advised that the test so far has practically been found to be infallible here.

In what is known as the tick-infested zone, the losses from ticks have been very much below that of any previous year since their introduction into the colony. This has been due to the following causes:—(1) The Northern herds, through which the pest first passed, are now immune to the disease; (2) inoculation has been very largely practised in the more southerly districts; and (3) dipping, which has now been so extensively adopted, has greatly checked the mortality from anæmia, the result of gross infestation.

Coming upon us as the ticks did, without our having any previous knowledge of them, or their effects on stock, we were unable to discriminate between the mortality occasioned by Texas fever and anæmia (the latter the result of gross infestation, and now popularly known as "tick poverty" and "tick worry"). Now, however, that the inspectors and others in the infested districts have become familiar with the symptoms and *post-mortem* appearances of the two conditions, there appears but little room to doubt that, before dipping was so extensively resorted to, a large percentage of deaths attributed to Texas fever were due to anæmia, the result of parasitism. In my earliest experience of scab in sheep, which is caused by the action of the very minute acari, deaths from anæmia were not uncommon in sheep where proper treatment had not been adopted.

Our extended experience of inoculation fully endorses public faith in it as a prophylactic. A considerable number of deaths amongst inoculated cattle have been reported from the Bundaberg and Gladstone districts. Without a knowledge of the condition of the blood used, and the care with which the operation was performed, it would be impossible to pronounce on the cause of the reported mortality; but the marked success that has attended so many of the tests by Mr. Pound and Dr. Hunt here, Dr. Tidswell, of New South Wales, and the experts of the Bureau of Animal Industry of America, leaves little doubt as to the effectiveness of inoculation. It has never been contended that it will protect every animal in a herd, even assuming the operation to have been carefully carried out on each individual beast. Some subjects are liable to a second attack in almost all febrile diseases, and we are without reliable *post-mortem* examinations to guide us as to whether, in the reported cases referred to, the cause of death was attributable to Texas fever or anæmia.

With the permission of the Minister, a series of practical experiments is being carried out to test the efficacy of different dipping materials. So many owners and agents of proprietary dips have pressed the Department for an official test of their dips, assuring us of their efficiency in the destruction of all tick life, that it was deemed advisable to construct a dipping vat at the Indooroopilly Quarantine Grounds, at which these and other dips might be tested under the surveillance of myself or some accredited officer

of the Department, the owners of the dips supplying the ingredients free of charge, we providing labour and infested cattle for the tests. Several dips have already been tested with encouraging results, but it is deemed advisable to defer reporting on them for the present. Meantime it may be stated that the medicaments composing what is known as Christian's dip have, when properly prepared, been found to be the most reliable of any tested up to the present. It has been found that this dip is greatly improved by the addition of soap.

The following is the formula of Christian's dip—the soap being added as just explained:—

Arsenic	...	...	10 lb.	Soda ash	...	...	28 lb.
Soap	...	...	5 lb.	Stockholm tar	...	...	7½ gallons.
		and Water	...	...	...	...	400 gallons.

As there has been some uncertainty as to whether or not the whole of the liquid in the bath should be boiled—some having asserted that such is the case—Mr. M. M. Christian has been good enough to supply me with details as to how he prepares the mixture, and which are here given for general information:—

“To make the matter (of mixing) more plain, I give you the way I myself mix the specific. Our dip holds 3,200 gallons, or eight 400-gallon tanks full. I put seven tanks full of water into the dip, then boil sufficient quantity of arsenic and soda for the whole 3,200 gallons, and put into the eighth tank, and add the tar necessary for the whole of the 3,200 gallons. Then pour in water, stirring well all the time. Then this mixture (in the eighth tank) is run off into the dip, keeping that in the tank and that in the dip well stirred. The whole in the dip must be well stirred before putting the cattle through. Always keep an extra tank full of the specific on hand, so as to keep the dip up to the same height. I timed, with a stop watch, our cattle going through the dip, and the average was five seconds. Our dip at Willangie is too short, being only 28 feet long.”

In a special test made by the Department with this dip, cattle twice dipped in the solution at an interval of ten days between the dippings, and trucked immediately after the second dipping to a clean paddock, were found to have been completely freed from ticks. In a similar experiment, however, with the same mixture, one dipping proved a failure.

Some of the cattle that were put through this mixture were purposely put back on their infested pasture and carefully watched with the intention of discovering how long the cattle were proof against reinfestation. It was found that they became reinfested in from four to six days, so that, if intended to be taken to clean country, they should be moved immediately after the second dipping. The only means of freeing pasture from ticks would be to keep up a periodical dipping at intervals of not more than three weeks, and then only by prohibiting fresh infestation.

Exception has been taken to the use of arsenic in cattle dips. From my experience of the baneful effects of arsenical dips in the early days, in the treatment of sheep scab, not only on the sheep, but on the men employed at the dips, and the fact that scab was not exterminated in Australia until after arsenic had been superseded by the more effective tobacco and sulphur, and lime and sulphur dips, I was strongly inclined to join with those who denounced the use of that agent in cattle dipping. While I still would advocate the exercise of great caution in its use, recent experiments have shown that arsenic in some form seems to be one of the most reliable agents in the destruction of tick life with which we are at present acquainted; or to put the matter in another form, several medicaments, fatal to ordinary ticks, but unsuccessful in the direction of cattle ticks, have, by the addition of arsenic, dissolved by means of soda, proved effective as cattle dips.

It is evident that the dipping tanks in general use are much too short, and that some of the medicaments in use would give much better results if the cattle could be kept in the bath for some considerable time longer than is the case with the present vats. Mr. Christian has shown that cattle pass through the fluid in his vat in five seconds. In the dip constructed by me at Indooroopilly, which is 36 feet over all in length, the time occupied by cattle in passing through it is twelve seconds, but the time occupied in swimming before they secure foothold at the exit is only from six to eight seconds. Before we can expect the best results from any dipping solution, the cattle ought to remain in the bath from 40 to 50 seconds at least. In the case of sheep scab, we insist on 80 seconds in the bath—less than that has been found unreliable. A cattle-dip from 60 to 80 feet long would, of course, require a much larger quantity of liquid, but, on the other hand, many of the dips now in use are unnecessarily wide, and a considerable saving in liquid would be gained by limiting the width to, say, 3 feet 6 inches at top, and 1 foot 6 inches at the bottom. Judging also from sheep dipping, I am convinced that if the dipping liquid could be heated to a temperature of, say, 100 degrees to 110 degrees Fahrenheit, the results would be much more satisfactory. An experiment to test this will be undertaken at an early date.

It has been observed that with the southward advance of the ticks, there has been a large migration southward of the birds known as the Peewit, or Magpie Lark (*Grallina picata*), and the Wagtail, or Black Fantail (*Sauroprocta motasilloides*), which continually hover around tick-infested cattle, frequently perching on their backs, and feeding on the ticks. No doubt they also feed on many of the matured female ticks which drop off the cattle. Both these birds are protected under the Native Birds Protection Act; but, notwithstanding this, they fall a prey in hundreds to the muskets and catapults of boys, and I recommend that linen posters, cautioning persons against their destruction, be distributed and posted in conspicuous places in all tick-infested areas. A slight experiment made by myself a few months ago showed that ants play a not unimportant part in the destruction of tick life. A phial containing sixty fully-developed ticks was left at this office. These I scattered by twos and threes at a time, a short distance from an antbed, and carefully watched them. Every tick was attacked, partly demolished, and the remains carried away towards the antbed.

NOTE.—Since writing this report, a circumstance has been reported to me by the Hon. John Dean, M.L.C., which may have an important bearing on the tick question and stimulate further investigation on the subject. Mr. Dean found, by repeated observations, that matured female ticks, taken at the Selheim Meatworks, from cattle brought to the works from country on which the cattle had become naturally immune, when kept under (to them) favourable conditions invariably failed to deposit ova, while similar ticks taken from cattle from clean country, but which had become infested en route to the works, never failed to deposit ova, when kept under the same conditions. This may be found to account for the gradual disappearance of ticks in parts of the Gulf country in which the ticks first disappeared and caused such havoc in the herds of the district.

HORSES.

The number of horses in the colony, as at 31st December, was 479,127, distributed into the various pastoral districts as under:—

Burke	...	...	44,349	Leichhardt	...	...	44,912
Burnett	...	...	28,824	Maranoa	...	...	22,248
Cook	...	...	26,605	Mitchell	...	...	28,060
Darling Downs	...	...	51,850	Moreton	...	...	61,131
Gregory North	...	...	29,776	Port Curtis	...	...	29,323
Gregory South	...	...	9,879	Warrego	...	...	16,682
Kennedy	...	...	66,758	Wide Bay	...	...	18,730

The number at the end of 1898 was 480,469, and thus there has been a decrease on the year of 1,342, or 0·28 per cent.

BRANDS ACTS.

The number of brands registered up to 31st December was 40,026; the number registered during the past year, 833; the number transferred during the year, 504; and the total number transferred up to the end of 1899, 7,220.

The Regulations for the working of the amendment of the Brands Act, passed during the session of 1898, have been published, and symbol brands may now be issued, along with the ordinary three-piece brands and corresponding earmarks. All earmarks are now issued by the registrar, and not by district inspectors, as was the case prior to the passage of the Amending Act. The necessary preliminaries have been taken, under the provisions of that Act, to purge the register of all brands that have gone into disuse, and to reissue all cancelled brands.

"THE MARSUPIAL BOARDS ACT, 1897."

Again there has been a very large destruction during the year ending 30th June, 1899, 1,735,207 scalps of marsupials and dingoes having passed the receivers and been destroyed, at a cost of £44,392 Os. 8d. Notwithstanding this, however, the pest is now more numerous than ever.

The inability of Boards, owing to lack of funds, to maintain a continuous destruction enables the marsupials, in some degree, to recover the ground lost by the energetic action of a Board during portion of the year. In one district (Barcoo) alone, 183,097 scalps of marsupials and dingoes were destroyed in six months and eleven days, costing the Board £4,557 13s. 2d., and necessitating the suspension of operations. With this state of affairs, to which must be added the decrease of stock in many of the districts—and corresponding reduction in Boards' revenue—the outlook for the future, in spite of the increased assistance in the shape of Government endowment, looks anything but hopeful. I sincerely trust, however, that some scheme will be suggested which will remove these difficulties and result in the marsupials being brought within bounds.

The heaviest work done during the year was in the Darling Downs district, where 232,643 scalps (mostly wallabies), were destroyed. The greatest expenditure, however, in the same period was that of the Paroo Board (£4,783 6s. 2d.), which includes payment for 180,844 kangaroo scalps.

As usual, a statement of each Board's operations is appended hereto. On this occasion, the cost of destruction is also given.

STATEMENT OF OPERATIONS FOR YEAR ENDING, 30TH JUNE, 1899.

Board.	SCALPS DESTROYED.					Cost.
	Kangaroo and Wallaroo.	Wallaby.	Others.	Dingo.	Total.	
Aramac	140,149	16,362	603	634	157,748	£ 4,203 19 6
Barcoo	114,663	66,844	451	1,139	183,097	4,681 15 9
Belyando	27,439	11,796	27	...	39,262	927 17 9
Booringa	14,028	88,103	4,881	1,284	108,296	2,158 10 2
Boulia	554	3	...	424	981	165 18 11
Bowen	2,986	8,121	130	388	11,625	268 10 4
Bulloo	42,863	...	...	3,295	46,158	2,612 11 6
Bungil	1,503	30,160	2,042	629	34,334	785 18 4
Burnett	9,893	35,227	1,202	2,460	48,782	1,151 19 2
Camooeweal	167	2	...	322	491	77 11 8
Clermont	17,204	76,281	3,858	...	97,343	1,791 13 2
Cloncurry	658	16	13	545	1,232	153 1 6
Condamine	1,654	16,516	153	...	18,323	402 6 6
Dalrymple	3,302	5,728	57	491	9,578	402 18 3
Darling Downs	251	224,957	6,273	1,162	232,643	4,318 5 10
Dawson	7,336	11,212	86	...	18,634	371 14 0
Diamantina	...	...	...	300	300	78 12 0
Gogango	9,804	18,894	1,186	1,241	31,125	725 0 0
Gregory	29,759	706	2	219	30,686	788 12 2
Hughenden	18,077	2,366	262	928	21,633	957 0 0
Leichhardt East	5,760	9,573	211	...	15,544	360 5 11
Leichhardt South	6,513	32,236	2,623	2,281	43,653	1,198 5 6
Mitchell West	53,277	93	...	325	53,695	1,487 19 6
Paroo	180,844	5	25	309	181,183	4,783 6 2
St. George	28,056	19,353	1,026	1,394	49,829	1,727 5 0
Waggamba	6,177	44,708	559	944	52,388	1,295 8 9
Warrego	56,188	52,632	877	1,787	111,484	3,190 0 4
Western Downs	2,209	50,804	1,338	463	54,814	1,144 12 2
West Moreton	2,331	28,093	8,242	565	39,231	839 5 6
Windorah	40,055	231	11	918	41,215	1,341 15 4
	823,700	851,022	36,138	24,447	1,735,307	44,392 0 8

LIVE STOCK AND MEAT EXPORT ACT.

The reports of the various inspectors under this Act are appended hereto.

SLAUGHTERING ACT.

Monthly reports are received from the inspectors of slaughter-houses, in which are recorded details of each day's work, the number of stock slaughtered and number condemned for food, and from these it appears that the slaughtering of stock is well supervised in those districts in which the Act has been brought into operation. In the initiation of the work the officers were instructed to carefully explain to the slaughtermen the duties required of them under the Act and Regulations, and that while absolute cleanliness in slaughter-yards and surroundings was to be enforced, they were not to insist on the construction of new buildings where improvements in flooring, drainage, water supply, &c., would render existing buildings and yards sufficient.

From the monthly reports it is evident that tuberculosis is not so prevalent in the herds of the colony as it has been made to appear, unless we are to assume that the knowledge that all diseased stock would be condemned has been the means of consigning to the pots animals that previously would have gone into consumption.

IMPOUNDING ACT.

I would again direct attention to my previous recommendations that the public pounds be placed under the control of the municipalities, shires, and divisional boards. This would remove many chances of abuse possible at present. This recommendation was adopted by the Conference of Local Authorities held in Brisbane some years ago.

P. R. GORDON.

APPENDICES.

REPORT OF STAFF INSPECTOR.

During the year 1899 every inspector (of whatever grade) has been visited at least once, and, wherever practicable, two or three times, and a thorough examination made of the work performed by each. A rigid adherence to the general instructions issued by you has been enforced, with a marked effect upon the general efficiency of the staff. Very much more work would have been done had the season been favourable, but the drought interfered greatly with anything like systematic patrol in almost all districts, whilst in some it prevented inspectors from travelling except upon business of an urgent nature.

DISEASES IN STOCK ACT.

The abolition of the harassing restrictions on the movements of stock coastwards in the quarantined area has relieved the inspectors of a large amount of work, and allowed them to devote their time to the maintenance of the quarantine lines, and the protection of clean country. Were it practicable to remove the restriction on horses in actual work crossing the lines, coastal inspectors and assistants would be able to patrol more, and keep closer watch on the movements of cattle than is at present possible; nor does it appear that there would be any danger in the abolition of these restrictions, since the removal of the guards, employed to inspect and disinfect horses, has been followed by no spread of the ticks. In fact, the opinion is gaining ground that ticks carried by horses either do not live to deposit their ova, or the eggs are infertile.

Inspectors at Maryborough, Bundaberg, and Rockhampton have afforded many owners advice *re* dipping and inoculation. Inspectors stationed in the North and West have been principally occupied in inspecting stock travelling for grass and water.

The Southern line (Schedule O) has been far more strictly maintained since it was manned by Queensland officers.

DISEASES IN SHEEP ACT.

There is still no "disease" as defined by the Act in Queensland, but the provisions relating to branding and marking sheep have been carefully enforced, and inspectors have been much employed in examination of starving sheep going coastwards for grass.

Owing to the low condition of these animals, large numbers have been dropped, picked up by other mobs, and, perhaps, dropped again, and it is to be feared that when rain falls, many cases of disputed ownership will result.

BRANDS ACT.

A thorough and complete examination of all brands and distinctive marks in use in the colony is necessary, as in many districts inspectors have been very lax in enforcing the minor provisions of the Act. This work has been pressed forward wherever practicable; but the drought has seriously interfered with the efforts of the inspectors. There is reason to believe that the meatworks offer a ready means of disposal for stolen stock, and a careful examination of the brands of all stock killed at such establishments is advisable.

The work of preparing lists of disused brands for cancellation and reissue (as ordered by you), is being carried out in all districts, but there is considerable difficulty in ascertaining what brands are actually out of use, since owners repeatedly change their addresses without notifying the Department. To such an extent does this practice obtain, that in going through the brands in one district, two-thirds of the addresses appearing in the directory were found to be incorrect.

IMPOUNDING ACT.

The pounds have received a fair share of attention during the past year, and though no laxity has been discovered of sufficient importance to necessitate legal proceedings, the inspectors have, in some instances, prevented the re-election of careless or inefficient poundkeepers by making statements of the cases to the local benches.

SLAUGHTERING ACT.

A very great improvement is perceptible in the condition of the slaughter-houses wherever this Act is in force, especially in the larger towns.

In several instances, whole yards have been condemned, and in others such alterations have been made in draining, flooring, water supply, and pig pens as to render the sanitary condition of the yards fairly satisfactory, although much remains to be done before the requirements of the Act are fully complied with.

The shops in all districts are now in a satisfactory condition. The practice of "blowing" meat has been put a stop to, as has the sale of immature veal; whilst the inspection of meat exposed for sale is as close as is possible, while the staff is so small and the districts so large.

F. H. SHEPHERD, Staff Inspector.

MEAT INSPECTION REPORT OF THE BRISBANE DISTRICT.

(INSPECTOR QUINNELL.)

EAGLE FARM WORKS.

(QUEENSLAND MEAT EXPORT AND AGENCY COMPANY, LIMITED.)

Stock.	Slaughtered.	Condemned for—	Bodies.	Quarters.	Total rejected.	Per cent.
Bullocks	51,923	Tuberculosis	102	683 fores ; 48 hinds ...	1,551	2·988
		Other diseases	205	6 fores	209	0·403
Cows	1,747	Tuberculosis	11	31 fores ; 24 hinds ...	67	3·835
		Other diseases	23	...	23	1·315
Sheep	18,574	Abscesses, &c.	14	...	14	0·028
Pigs	135	Tuberculosis ... ..	...	...	...	...
		Other diseases ... ..	...	...	...	...
Calves	94	Unfitness ... ..	...	...	...	...

QUEENSPORT WORKS.

(MESSRS. BAYNES BROS.)

Stock.	Slaughtered.	Condemned for—	Bodies.	Quarters.	Total rejected.	Per cent.
Bullocks	32,871	Tuberculosis	29	112 fores ; 13 hinds. ...	373	0·830
		Other diseases	16	93 fores ; 89 hinds ...	72	0·219
Cows	9,401	Tuberculosis	33	120 fores ; 14 hinds ...	194	2·063
		Other diseases	21	137 fores ; 53 hinds ...	109	1·053
Sheep	89,743	Abscesses, &c.	291	...	291	0·324
Pigs	1,374	Tuberculosis	7	5 fores ; 5 hinds ...	12	0·873
		Other diseases	4	2 fores ; 5 hinds ...	11	0·800
Calves	800	Unfitness	23	...	23	2·875

This table includes stock slaughtered and inspected for the firm's town supply.

REDBANK WORKS.

(QUEENSLAND CHILLING AND EXTRACT COMPANY, LIMITED.)

Stock.	Slaughtered.	Condemned for—	Bodies.	Quarters.	Total rejected.	Per cent.
Bullocks	7,550	Tuberculosis	12	84 fores ; 8 hinds ...	77	1·019
		Other diseases	2	2 fores	3	0·039
Cows	2,524	Tuberculosis	40	72 fores ; 7 hinds ...	51	2·020
		Other diseases	2	...	2	0·026

These works were closed down during the months of September, October, and November, 1899.

MOORAREE WORKS.

(UHLMANN BROTHERS.)

Stock.	Slaughtered.	Condemned for—	Bodies.	Quarters.	Total rejected.	Per cent.
Bullocks	2,428	Tuberculosis	5	8 fores	10	0·411
		Other diseases ... ..	...	...	...	...
Cows	185	Tuberculosis	1	3 fores	3	1·621
		Other diseases ... ..	...	...	...	...
Sheep	8,666	Abscesses ... ..	...	...	...	...
Pigs	425	Tuberculosis	2	...	2	0·470
		Other diseases ... ..	...	...	...	...
Calves	357	Unfitness	7	...	...	1·960

OAKY CREEK WORKS.

(HOGARTH AUSTRALIAN MEAT PRESERVING COMPANY, LIMITED.)

Stock.	Slaughtered.	Condemned for—	Bodies.	Quarters.	Total rejected.	Per cent.
Bullocks	2,389	Tuberculosis	24	23 fores ; 5 hinds ...	44	1·423
		Other diseases	3	1 hind	4	0·167
Cows	4,786	Tuberculosis	63	51 fores ; 2 hinds ...	161	3·157
		Other diseases	5	2 fores	6	0·125

These works closed down in August, 1899.

BELMONT MEATWORKS.
(MESSRS. F. O. HEDGER AND Co.)

Stock.	Slaughtered.	Condemned for—	Bodies.	Quarters.	Total rejected.	Per cent.
Bullocks	419	Tuberculosis	3	4 fores	5	1·193
		Other diseases	1	...	1	0·238
Cows	104	Tuberculosis	2	2 fores	3	2·923
		Other diseases ... ..	...	...	...	...
Sheep	1,937	Abscesses ... ..	...	...	...	...
Pigs	124	Tuberculosis	1	...	1	0·806
		Other diseases ... ..	...	...	...	...
Calves	98	Unfitness ... ..	...	...	...	...

ZILLMERE BACON FACTORY.
(J. C. HUTTON.)

Stock.	Slaughtered.	Condemned for—	Bodies.	Quarters.	Total rejected.	Per cent.
Pigs	43,133	Tuberculosis	78	56 fores; 38 hinds ...	125	0·289
		Other diseases ... ..	...	5 fores; 7 hinds ...	11	0·025

OXLEY BACON FACTORY.
(QUEENSLAND MILD CURE COMPANY, LIMITED.)

Stock.	Slaughtered.	Condemned for—	Bodies.	Quarters.	Total rejected.	Per cent.
Pigs	16,634	Tuberculosis	70	24 fores; 9 hinds ...	89	0·535
		Other diseases ... ..	...	5 fores; 5 hinds ...	5	0·030

OX TONGUES CONDEMNED.			PIGS' HEADS CONDEMNED.		
Works.	Tongues.	Per cent.	Works.	Heads.	Per cent.
Eagle Farm	1,389	2·588	Zillmere	3,151	7·305
Queensport	1,498	3·543	Oxley	1,342	8·067
Redbank	685	6·809	Eagle Farm	12	8·888
Moraree	17	0·650	Queensport	24	1·746
			Moraree	66	15·529

NOTE.—Tongues and pigs' heads were condemned for tubercular, actinomycotic, and ordinary abscesses. Rejects constitute stock not absolutely sound, though fit for human food. For example, in a case of localised tuberculosis affecting one or more of the viscera, or if the lesions are confined to the carcass itself, such a body is immediately rejected for freezing or shop; then, when on a careful examination of the glands and other parts the carcass is found to be quite healthy, the diseased portions are removed and destroyed, and the rest of the carcass is permitted to be utilised for preserving only, thus ensuring thorough cooking and sterilisation.

It will be seen from the table given below that the percentage of pigs' heads condemned for glandular disease has been more than doubled during the past twelve months. This matter is under investigation, which, when completed, will constitute the subject of a special report.

Works.	1898-99	1899-1900.
Zillmere	3·834	7·305
Oxley	3·666	8·067

GENERAL.

I.—GATTON COLLEGE.

During the past year I have visited the college weekly (Wednesdays), and on each occasion I delivered three lectures or demonstrations on veterinary science.

In October last, four students—viz., Messrs. Redmond, Anderson, McIlwraith and Webb—presented themselves for examination in Animal Anatomy and Physiology, held under the auspices of the Brisbane Technical College. It is satisfactory to state that they all passed, and three of them with credit.

The annual examination was held on 25th May, the result of which was duly reported to the Principal.

II.—SLAUGHTERING ACT OF 1898.

The Brisbane district being placed under its operation, the supervision was entrusted to me from June to August.

The inspectors subsequently appointed received their training from me, first at the Brisbane Technical College in Animal Anatomy and Physiology, and secondly in the inspection of meat at the various meatworks.

III.—QUEENSLAND AGRICULTURAL JOURNAL.

Since May, 1899, I have contributed a series of articles on the principal diseases of the horse. In so doing it has been my intention to convey to the reader the essence of the subject. By using simple language, avoiding technicalities, I hope to have succeeded in instructing owners of horses in the detection and appropriate treatment of maladies, where professional aid could not be obtained.

IV.—THE BRISBANE TECHNICAL COLLEGE.

(a.) The council decided to hold another class in Animal Anatomy and Physiology, and I was again appointed lecturer. The course extended from 11th July to the end of October, 1899. The lectures were held on Tuesday and Friday evenings of each week, and holidays were utilised for practical demonstrations at various slaughtering establishments.

Of the fifty-three students that enrolled, thirty-three succeeded in qualifying.

(b.) The council initiated classes in Sanitary Science for the preparation of candidates for the position of inspectors of meat, dairies, and other establishments connected with public health. The position of lecturer in section B, "Foods and their Inspection," was offered me, which, with the consent of the Hon. the Minister for Agriculture, I accepted.

Sixty-two students have been enrolled, and an examination is to be held in June.

V.—During the last twelve months I have examined and issued certificates for 370 horses shipped to India.

In accordance with instructions received, I have visited various districts where outbreaks of disease have been reported.

From time to time I have given professional advice upon matters and correspondence submitted to me by the Department.

W. C. QUINNELL, M.R.C.V.S.

LAKE'S CREEK.

(INSPECTOR BARNES.)

Cattle.—The total number slaughtered during the year was 52,358. Of these, 4·079 per cent. were condemned, the diseases on account of which they were rejected being apportioned as follows:—Tuberculosis, 3·449 per cent.; tick fever, 101 per cent.; pleuro-pneumonia, 330 per cent.; while sundry diseases, consisting of jaundice, hydatids, actinomycosis, mortified bruises, pregnancy, and cancer showed only 199 per cent.

Sheep.—The total number slaughtered was 153,711, the percentage rejected being very slight—namely, 012 per cent., and consisting of the following:—Tuberculosis, 005 per cent.; lymphadenoma, 004 per cent.; hydatids, 002 per cent.; and abscess, 001 per cent.

Pigs.—The total number of pigs slaughtered amounted to 1,460, the percentage rejected being 3·218, mostly from tuberculosis, which showed 2·397 per cent., while cancer reached 021 per cent.; and sundry diseases, consisting of ulcerated skin, tumours, pleurisy, 800 per cent.

GAVIAL PARK.

Cattle.—During the year 11,191 cattle were slaughtered, the percentage of condemned being very slight—namely, 1·411 per cent., tuberculosis being the principal cause, with 1·072 per cent., the remainder, 339 per cent., being rejected for various diseases, such as tick fever, pleuræ, jaundice, and cancer.

A. W. BARNES, M.R.C.V.S.

ROSS RIVER MEATWORKS.

The number of cattle and sheep slaughtered at the above works during the year 1899 from the 11th April to the 18th December will be seen from the following table:—

Slaughtered.	Condemned for—	Bodies.	Quarters.	Per cent.
Cattle—39,054	Tuberculosis	408	127	1·04
	Acute Tick Fever	51	...	0·13
	Pleuro-pneumonia	17	...	0·05
	Bruises	85	...	0·22
	Abscess	17	6	0·05
	Colour	44	...	0·11
				1·60
Sheep—14,129	Of these, only 19 per cent. (2,716) were passed for freezing, 70 per cent. (9,826) were used as preservers, and 11 per cent. (1,587) were boiled down in the pots.			

C. A. CALVERT, F.R.C.V.S.

BOWEN MEATWORKS.

Number of cattle passed through the works, 23,007, not including 105 passed through the pots for tallow.

CONDEMNED.

Disease.	Carcass.	Halves.	Quarters.	Total Number of Bodies Condemned.	Per cent.
Tubercle	1,474	100	377 fores; 86 hinds	1,644 $\frac{3}{4}$	7·145
Redwater or Texas Fever... ..	475	...	...	475	2·064
Pleurisy and Pleura ... ..	...	223	579 fores	256 $\frac{1}{2}$	1·112
Plainness, Poverty, and Unfitness	4,477	13	83 fores; 21 hinds	4,509 $\frac{1}{2}$	19·597
Bruises, &c.	324	79	106 fores; 856 hinds	604	2·625
Other Diseases	215	...	...	215	0·932

NOTE.—"Other diseases" consisted of the following, with their respective condemnations:—Actinomycosis, 94 bodies; abscesses in kidneys, 11; abscesses in liver, 16; abscesses in scrotum, 15; cows parturient, 13; effusion in tissues, 4; overheated, 4; gangrene, 2; high colour, &c., 42; melanosis 3; tumours, 2; intestinal tumours, 6; cancer, 3.

TOTAL CONDEMNED.

	Per cent.
Tuberculosis	7·145
Texas Fever	2·064
Pleurisy and Old Pleura	1·112
Plainness, Poverty, Bruises, and Unfitness	22·222
Other Diseases	0·932
	33·475

A few pigs were killed during the season for rations and the boats, of which 2 were condemned for tuberculosis.

BEN. O. MEEK, M.R.C.V.S.

GLADSTONE MEATWORKS.

(INSPECTOR STANDEN.)

The total number of cattle treated during the season 1899 (commencing 1st February, and finishing on 5th October) was 28,750. The number and percentage condemned are as follows:—

Disease.	Number.	Percentage.
Tuberculosis	379	1.322
Ill-condition, arising from Bad Feed and Functional Disorder, &c.	141	0.5
Texas Fever	33	0.11
Localised Lesions, Bruises, Cancers, Tumour Faction, Abscesses, and Visceral Disease	30½	0.108
Total	583½	2.02

JAMES STANDEN, M.R.C.V.S.

ALLIGATOR CREEK MEATWORKS.

(INSPECTOR O'BOYLE.)

Of 39,443 cattle slaughtered at the above works during the year 1899, the following is an average percentage of all cattle condemned by me as unfit for human food, viz.:—0.994 per cent. Of these, 0.612 per cent. were condemned for tuberculosis, 0.174 per cent. for Texas fever, and 0.093 per cent. for pneumonia. The remaining 0.105 per cent. were condemned for other diseases, as actinomycosis, abscesses, &c.

HENRY O'BOYLE, M.R.C.V.S.

MACKAY MEATWORKS.

(INSPECTOR AUSTIN.)

Stock.	Slaughtered.	Condemned for—	Bodies.	Quarters.	Per cent.
Bullocks	4,640	Tuberculosis	52	106 fores from 53 bodies ...	2.283
		Abscess ... ..	...	9 fores from 9 bodies; 1 hind	0.001
		Texas Fever (last stage)	7	...	0.001
		Tuberculosis ... ..	...	127 tongues	2.737
		Actinomycosis ... ..	...	18 tongues	0.003
		Unfit ... ..	...	4	0.0006
Cows	1,730	Tuberculosis	27	66 fores from 33 bodies ...	3.468
		Abscess ... ..	...	4 fores from 4 bodies ...	0.002
		Tuberculosis ... ..	...	63 tongues	3.641
		Actinomycosis ... ..	...	2 tongues	0.001
		Abscess ... ..	...	1 tongue	0.0005

The company resumed killing for extract and tongues on the 14th March, 1899; and from then to the 27th June, 1899—when the works closed down for the year, for the purpose of putting in a preserving plant—4,640 bullocks and 1,730 cows were slaughtered.

COLIN AUSTIN, Inspector.

SELLHEIM MEATWORKS.

(INSPECTOR CROFT.)

No. of—	Diseases.	Tongues.	Quarters.	Bodies.	Per cent.	
Bullocks—11,703 ...	Tuberculosis	63	...	...	0.54
	...	...	63	46	0.53
	Texas Fever	49	...	...	0.41
	...	...	...	49	0.41
	Unfit ... ..	...	...	4	0.03
	Abscess	10	...	...	0.08
	Actinomycosis	185	...	...	1.58
Cows—5,717 ...	Cancered Jaw	83	...	...	0.70
	Other Diseases ... ..	...	...	5	0.04
	Tuberculosis	36	...	...	0.62
	...	...	48	28	0.66
	Texas Fever	36	...	...	0.62
	...	...	36	36	0.78
	Pregnant ... ..	...	...	8	0.14
Abscess	}	2	...	...	0.03
		...	4	...	0.01	
		Actinomycosis	27	0.47
		Cancered Jaw	6	0.10

H. H. M. CROFT, Inspector.

HUGHENDEN MEATWORKS.

(INSPECTOR HARNEY.)

This company started killing for extract, tongues, and corned beef on the 20th March, 1899. Inspection under the Act commenced on the same date, from which time till the 30th September, 1899, the total number of cattle killed was 22,385 head. The attached schedule shows in detail the number condemned, and the principal diseases to account for condemnation:—

Number.	Disease.	Bodies.	Quarters.	Per cent.
Bullocks—14,431...	Tuberculosis	28	78	0·332
	Texas Fever	41	...	0·284
	Abscess ... ..	...	18	0·125
	Tuberculosis ... ..	...	296 tongues	2·051
	Texas Fever ... ..	...	41 "	0·284
	Actinomycosis ... ..	...	108 "	0·755
	Unfit	4	...	0·027
Cows—7,945	Tuberculosis	81	46	1·170
	Abscess ... ..	...	9	0·113
	Texas Fever	4	...	0·050
	Tuberculosis ... ..	...	148 tongues	1·860
	Texas Fever ... ..	...	4 "	0·050
	Actinomycosis ... ..	...	54 "	0·657
	Pregnancy	3	...	0·037
	Unfit	8	...	0·100

P. F. HARNEY, Inspector.

BROADSOUND MEATWORKS.

(INSPECTOR HOLT.)

Stock Slaughtered.	Condemned for—	Quarters from.	Bodies.	Per cent.
Bullocks—11,312	Tuberculosis ... ..	...	31	0·274
	"	29	19	0·167
	Unfitness ... ..	...	27	0·137
	Actinomycosis ... ..	...	1	0·008
	Redwater ... ..	...	3	0·026
	Abscess ... ..	...	4	0·035
	Cancer ... ..	...	1	0·008
Cows—2 871	Tuberculosis ... ..	...	17	0·591
	"	6	4	0·139
	Unfitness ... ..	...	33	1·149
	Actinomycosis ... ..	...	2	0·069
	Redwater ... ..	...	3	0·104
	Abscess ... ..	...	8	0·278

These works slaughtered on an average of 50 head per day, exclusive of Sundays, from the 20th February to the 31st December, and then shut down; the cattle being for the most part prime cattle, purchased by the company's buyer in the Broadsound district.

G. R. HOLT, Inspector.

BURKETOWN MEATWORKS.

(INSPECTOR MYDDLETON.)

The company started killing for extract 20th April, 1899, and finished 11th November, 1899, having killed 14,002 head of cattle.

Inspection under the Act commenced 1st August, 1899, and continued to end of season. During the period of inspection 6,117 bullocks and 1,769 cows were slaughtered.

Number.	Disease.	Bodies.	Quarters.	Per cent.
Bullocks—6,117	Tuberculosis	56	80	2·23
	Actinomycosis	2	...	0·003
	Abscesses ... ..	...	7	0·114
	Unfit for food	37	...	0·6
	Pleurisy	2	...	0·003
Cows—1,769	Tuberculosis	32	48	4·444
	Actinomycosis	4	...	0·022
	Abscess ... ..	...	4	0·022
	Cancer	1	...	0·005
	Unfit for food	15	...	0·083
	Pleurisy	3	...	0·016

F. H. MYDDLETON, Inspector.

CARDWELL MEATWORKS.

(INSPECTOR WALKER.)

Inspection under the Act commenced at the above works on the 2nd August, 1899, and from that date to 30th September, 1899, 1,828 head of cattle have been slaughtered.

The schedule below shows in detail the number condemned and the principal diseases on account of which they were condemned:—

Number.	Diseases.	Bodies.	Quarters.	Per cent.
1,828	Tuberculosis	19	24	1.367
	Actinomycosis	8	...	0.437
	Pleuro-pneumonia	46	51	3.227
	Tick Fever	3	...	0.164
	Cancer	1	...	0.054
	Abscess	1	...	0.054

HARRY A. WALKER, Inspector.

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