

1917.

QUEENSLAND.

SEVENTEENTH ANNUAL REPORT OF THE BUREAU OF SUGAR EXPERIMENT STATIONS

(AS REQUIRED BY "THE SUGAR EXPERIMENT STATIONS ACT OF 1900").

Presented to both Houses of Parliament by Command.

TO THE HONOURABLE THE SECRETARY FOR AGRICULTURE AND STOCK.

SIR,—I have the honour to submit the Annual Report of the General Superintendent of Sugar Experiment Stations up to 31st October, 1917.

ERNEST G. E. SCRIVEN,

Brisbane, 8th November, 1917.

Director.

The Annual Report of this Bureau for this year includes :—

1. Introduction.
2. Approximate Estimates of the 1917 Cane Crop.
3. General Work with Brief Summaries of the Various Sugar Districts.
4. New Varieties of Cane introduced.
5. Work of the Central Sugar Experiment Station, Mackay.
6. Work of the Southern Sugar Experiment Station, Bundaberg.
7. Laboratory Work.
8. Work of the Division of Entomology.
9. Variety Plots.
10. Lime and Fertilisers.
11. Economics.
12. General.

1.—INTRODUCTION.

The Queensland Sugar Industry during recent years has been passing through a disturbed period. In 1914 the action of the Southern Price of Commodities Boards at the outset of the war dealt the industry a blow in refusing to make any increase in the price of refined sugar to the consumer at a time when the local price was low and all other sugar-producing countries were participating in a general rise of prices. This difficulty was overcome the following year by agreement between the Federal authorities and the present Queensland Government whereby the whole of the raw sugar manufactured in this State was acquired at a much fairer price. Unfortunately, just as matters looked promising for the industry a severe drought was experienced, and the crops harvested were mostly small. The following year (1916), which was more satisfactory from a climatic standpoint, saw a large increase made in the cost of production, due to the award made by the Industrial Court, and this had the effect of closing up all sugar-mills below Townsville for a period of from six weeks to two months, with consequent loss to growers, and the standing over of large quantities of cane till the present (1917) season, while some mills did not crush at all. Early in this year a still better price for raw sugar was secured, and all conditions seemed favourable for the harvesting of a record crop. From almost every district word was received of the fine progress the cane was making, and before crushing was commenced an approximate estimate at 9 tons of cane to the ton of sugar showed the possible yield as 300,000 tons of sugar. Most of the mills made an early start and for a while everything went on well. Then came the industrial strife in the Southern States, which held up regular supplies of bags and lime to the mills and prevented the sending of ships for the conveying of sugar to the refiners. The district of Mackay has suffered most particularly, and the mills of that locality have already had to close completely on two occasions for several days for lack of sugar-bags, which had the effect of disorganising labour and causing a considerable number of men to leave the district. Due to the non-moving of the sugar, every wharf and store is now congested. Many of the mills have been obliged to add to their storage accommodation at a time when galvanised iron is almost unprocureable, and both it and timber are at a very high price. Some of the Northern mills have been obliged to store sugar within the mill itself, and the loss that is going to ensue from all this double handling, payments for insurance and storage, and the almost certain deterioration of

accumulated stocks of sugar when the wet season sets in will be high. Fortunately, the majority of growers have up to the present been able to harvest their cane, and as they have large crops, and the price is so much higher than in the immediately preceding years, they are generally doing much better this season and making up for the losses entailed through the drought and other causes. Now that the industrial disputes appear to be settled, there is a good chance of most of the Northern mills being able to crush the cane in sight. The exception will be on the Lower Burdekin, where, owing to lateness in starting, the closing up during the Northern railway dispute, and through stoppages for want of sugar-bags, there is bound to be a large amount of cane unharvested and which will have to stand over till next year.

2.—APPROXIMATE ESTIMATES OF THE 1917 CANE CROP.

Due to the large amount of standover cane in the Bundaberg and Childers districts and the general rains in all the sugar districts at the latter end of last year, combined with the favourable climatic conditions that have since ensued, the present year will bear away the palm for record crops in all districts save from Maryborough south. As previously mentioned, earlier estimates set the yield as high as 300,000 tons of sugar, the previous record (in 1913) being 242,837 tons. Since that year large areas of new land have been brought under crop, particularly in those districts supplying the three new up-to-date mills of Babinda, South Johnstone, and Inkerman. Heavy as the anticipated yield was at the commencement of the season, it is now estimated to be somewhat larger, due to the highly favourable growing season experienced since then, though a few mills show a reduction on the original rough estimate.

In the first column of the following table are shown the approximate estimates of the cane in the early part of the season and in the second column the amount that may now be crushed should conditions remain favourable.

Mill.	Rough Approximate Estimate made in March.	Approximate Estimate made in October of the Cane that may be Crushed for the Season.	Remarks.
	Tons.	Tons.	
Mossman	70,000	*80,000	
Babinda	150,000	165,000	
Hambleton	90,000	*100,000	
Mulgrave	90,000	109,700	
South Johnstone	100,000	85,000	Reduction caused by early arrowing.
Goondi	103,000	100,000	
Mourilyan	84,000	80,000	
Victoria and Macknade	250,000	287,000	
Kalamia	80,000	53,000	Decrease due to late start- ing and delays caused by railway and shipping disturbances.
Pioneer and Inkerman	318,000	203,000	Reduction caused mainly by industrial troubles.
Proserpine	80,000	85,000	
Plane Creek	75,000	78,000	
Homebush	70,000	80,000	
Cattle Creek	48,000	51,000	
North Eton	46,000	48,000	
Marian	80,000	87,000	
Farleigh	80,000	85,000	
Racecourse	70,000	80,000	
Palms	60,000	60,000	
Pleystowe	70,000	90,000	
Baffle Creek	8,000	9,000	
Miara	6,000	6,000	
Waterloo	10,000	10,000	
Qunaba	75,000	78,000	
Millaquin	120,000	129,200	
Bingera	80,000	90,000	
Fairymead and Goodwood	90,000	130,000	
Gin Gin	27,000	28,500	
Invicta	40,000	65,000	
Doolbi	48,000	55,000	
Childers	130,000	136,000	May be exceeded.
Isis Central	70,000	90,000	If crushing can go on till February, 1918.
Maryborough	19,000	20,000	
Mount Bauple	40,000	43,000	
Moreton	25,000	27,000	
Marburg	4,700	4,754	
Steiglitz	1,300	1,300	
Junction	2,000	2,000	
Rocky Point	4,000	2,500	
Albert and Logan	1,056	1,056	
Eagleby	1,300	1,300	
Gramzow	800	800	
Nerang	6,200	6,200	
Totals	2,823,356	†2,943,310	
Amount that may be crushed, 1917 .. .. .	.. .. .	2,943,310	
Amount crushed last year, 1916 .. .. .	.. .. .	1,579,514	

* Note.—Owing to the large amount of standover cane, this figure has been somewhat reduced at Mossman, while at Hambleton rain is stated to be delaying the mill.

† Since the above was written some Northern mills have been delayed by rain, and if this continues for any length of time it will reduce this estimate.

These figures are approximate only, as some of the mills failed to supply definite estimates, and their being realised will depend on the nature of the remainder of the season, and in some cases as to whether crushing can be continued for some time after the end of the year. Other matters will also need to go smoothly with the industry. If the amount of cane shown in the second column goes through the rollers, then somewhere in the region of 346,000 tons of sugar should be manufactured at 8.5 tons of cane to the ton of sugar. The sugar content of the cane this year, however, is so good that it is quite possible that the tons of cane to a ton of sugar will be less and the total yield of sugar more. Taking the approximate figures, with, say, 20,000 tons manufactured in New South Wales and 2,000 tons of beet sugar made in Victoria, the total yield for Australia may be 368,000 tons, which will give a surplus of about 100,000 tons over the estimated requirements of the Commonwealth. 346,000 tons of sugar at £21 per ton shows the value of the industry to Queensland as £7,266,000.

3.—GENERAL WORK AND BRIEF SUMMARY OF SUGAR DISTRICTS.

The work of the General Superintendent and his Field Assistant has continued upon the lines laid down in previous Reports.

Mr. A. P. Gibson, Field Assistant to the Bureau, has now rejoined the service after being some months absent on military duties, and he is at present making a complete round of the Northern sugar districts. Mr. Gibson carries out his work in a very satisfactory manner, and is able to give farmers a great deal of useful information on his periodical visits.

The writer also pays as many visits as he can to the various sugar districts, where the opportunity is taken of meeting farmers and, where possible, addressing meetings of growers. He has also to visit the Bundaberg and Mackay districts frequently in connection with Experiment Station details. The remainder of his time is fully taken up with correspondence, which largely consists of applications for advice in cane culture and soil treatment and the collection of data of interest to the sugar industry.

BRIEF SURVEY OF SUGAR DISTRICTS.

Mossman.—One mill. This mill was handicapped at the commencement by the large amount of standover cane from last year which had to be burnt before cutting. This has been put through and the mill is now operating on good sound cane. The plantings for next season are satisfactory, and if the climatic conditions are favourable, a good season should result. The seedling canes found in the Mowbray River were inspected and found to be of promising appearance. Arrangements were made with the directors of the mill to send plants of these to the Experiment Stations.

Cairns.—Three mills. At Cairns the heavy crops are coming off rapidly and all mills are working to their utmost capacity. The narrow valley between Aloomba and Babinda displays a scene of the greatest activity, planting, harvesting, and cultivation operations going on simultaneously, while large amounts of cane are being transferred to rail trucks at every siding. The Babinda Mill is now considerably more than half-way through its crop, which is expected to reach 165,000 tons of cane. In all parts of the Cairns district the planting for next season has been large and the germination and growth of young cane in every way highly satisfactory.

Johnstone River.—Three mills. In the Innisfail district the crops are on the whole good, but in some instances are not cutting out quite as well as originally estimated. This is attributed to the early arrowing of the Badila cane checking its growth, and also to the fact that the late cut ratoons did not come on too well. However, the crops are good. The plantings of young cane here are also excellent, and at the present time have a very fine appearance. Some cane had to be replanted owing to heavy rain in August solidifying the ground and preventing germination. The cultivation in this district is generally good. Meatworks manure is largely used, and lime, if it could be procured sufficiently cheaply, would be much availed of. A favourite method of ratooning in this district is by rolling the trash into every other row and thoroughly cultivating the bare interspaces. This gives good results. The new mill at South Johnstone is working well and doing fine crushing.

Herbert River.—Two mills. In the Herbert River district the plantings for next year are large. The strike is not quite so good as at Innisfail, but cultivation on the whole is fair to good. The Italians are present on this river in large numbers, and they are great believers in frequent cultivation subsequent to planting. This promotes the stirring of the surface soil frequently. The favourite cane in this district now is the Clark's seedling or H.Q. 426. At Macknade Plantation the manager (Mr. Wilkinson) is trying experiments in planting different portions of the stick of cane. The results so far are very interesting. There are here a large number of New Guinea varieties, together with some Rarawai (Fiji) seedlings. Some damage to cane is being caused by the New Guinea or weevil borer in this district. The crop of cane now being harvested on the Herbert River is enormous, and although the season is more than half-way through, it is difficult to see where the cane has been cut, there is so much of it.

Lower Burdekin.—Three mills. At the Lower Burdekin the crops present a splendid appearance and are cutting out well. Some heavy crops of H.Q. 426 on Messrs. Drysdale and Mackersie's farms were seen, and for the first time in this district this cane was noticed arrowing, though only slightly. A non-competitive exhibit at the Ayr Show, which attracted a great deal of attention, was a collection of new varieties grown by Mr. James Mackersie from sets supplied by the Bureau of Sugar Experiment Stations last year. Samples of these were analysed by the

Pioneer Mill in June last, and the commercial cane sugar found at that time of the year was surprisingly high. The following are the names of the varieties and the c.c.s. of each:—

Q. 903	14-74	Q. 1098	16-22
Badila Seedling	14-21	Q. 1121	15-69
Hybrid No. 1	13-74	Q. 970	16-62
Q. 813	16-50	Q. 855	17-21
Q. 15	14-55	Q. 1133	16-51

All the mills in this district are now crushing, but, first, the time of starting was too late and, secondly, delays due to industrial troubles took place, so that even if operations are continued well into next year (a course entirely subject to the weather) it is doubtful if the immense crop will be harvested. It was estimated that there were 400 000 tons of cane to be crushed upon the Lower Burdekin district in 1917, but it is quite possible that over 100,000 tons of this may have to stand over till next season. The Haughton River, between Ayr and Townsville, is supplying some 30,000 tons of cane this year to the Pioneer mill, and tramway facilities for bringing this cane to the railway are badly needed. There is a beautiful growth of young plant cane visible in the Lower Burdekin district, and while plantings have not been so large as in previous years, still a good season for next year is ensured if the weather conditions are favourable.

Proserpine.—One mill. There is also a large crop being harvested in this district, and prospects for next year appear good at the present time.

Mackay.—Nine mills. At Mackay a record crop is being harvested, and this district expects to turn out some 70,000 tons of sugar should all conditions now remain favourable. Plantings for next year generally have been good, though not so plentiful as in the localities north of Townsville. Rain is now required for the young cane. At the Experiment Station the cane has all been harvested and work for next season is well forward.

Bundaberg and Childers Districts.—Twelve mills. An enormous crop is being harvested in these districts, the bulk of it being standover. In 1916 large areas of cane in the Childers district looked to be dying, but after the rains it was amazing how they recovered and grew into large crops. The mills are fully taxed to deal with the enormous crops in these districts, and Goodwood Mill is again working to assist Fairymead. Surplus cane from the Woongarra is being sent as far as Nambour for treatment.

Maryborough, Pinalba, and Mount Bauple.—Two mills. The cane in these districts has also done remarkably well this year, though the crops grown around Maryborough are decreasing. Some remarkably heavy crops of D. 1135 standover were seen at Mount Bauple.

Nambour.—One mill. The crop in this locality was not so heavy as usual and a quantity suffered from frost. The mill has practically finished the local supply and is now taking cane from Bundaberg.

Logan and Nerang.—Seven mills. This district was also behind its usual average, and the Nerang Mill is due to close after next season.

Marburg.—This mill will also close down after the present season.

4.—NEW VARIETIES OF CANE.

During the year the following varieties have been introduced:—

To the Southern Sugar Experiment Station, Bundaberg—

From Hawaii, by courtesy of the Director of the Experiment Station of the Hawaiian Planters' Association, H 109, H 146, H 227.

From Childers, by courtesy of Mr. Cunningham, H.Q. 77.

From the Acclimatisation Society.—Forage cane.

From Mackay Sugar Experiment Station.—Reintroduced D. 1135.

To the Central Experiment Station, Mackay—

From the West Indies, by courtesy of the Director of the Imperial Department of Agriculture, B. 4030, B. 6450, B. 254, B. 4596, B. 6204, B. 4934, D. 109.

Some of these canes were dead on arrival, due to their being so long in transit. Unfortunately, the labels were destroyed, but the Imperial Department is being written to for particulars.

5.—WORK OF THE CENTRAL SUGAR EXPERIMENT STATION AT MACKAY.

Since the publication of the last Annual Report Mr. L. C. McCreedy has resigned his position as Chemist in Charge of the above station. Mr. McCreedy has been associated with the Sugar Bureau for many years, first at Bundaberg and latterly at Mackay. He was a capable chemist and field officer and rendered excellent service in the latter direction for a considerable time past. The position thus vacated has been filled by Mr. J. L. Foran, an officer with considerable experience in agricultural chemistry. Since his appointment he has, single handed, made all the analytical determinations and calculations which appear in the chemical tables appearing hereunder and which he has prepared for the Report. This has entailed a good deal of hard work, and the final analyses of cane varieties, which have hitherto been made by two chemists, had to be carried out under high pressure. The work was done cheerfully and well and Mr. Foran deserves much credit for his efforts. The thanks of the Bureau are also due to Mr. Wm. Millard, foreman, and the remainder of the staff for the service they have rendered during the year.

METEOROLOGICAL.

The ratoons of 1916-17 suffered a great deal in the Mackay district owing to their late cutting, followed by general rains, and the ratoon cane upon the Experiment Station was no exception to the rule. Due to the troubles caused by what is now known as the "Dickson Award," the mills were held up for a period of nearly two months, and the consequence was that a great deal of the ratoon experiments were not harvested till the end of November and early December, at a time when rain was falling every day. During December 24½ inches of rain were recorded. From then on till the end of April good rain fell every month, but the wet season was not prolonged, and dry weather set in, which had the effect of ripening up the cane. Due to the short period of growth, however, and the December conditions hampering ratooning, the late cut crops were not nearly so good as they should have been.

The weather conditions during the growing period will be found in the following interesting table :—

ABSTRACT OF METEOROLOGICAL OBSERVATIONS MADE AT THE SUGAR EXPERIMENT STATION, MACKAY, FROM 1ST SEPTEMBER, 1916, TO 31ST AUGUST, 1917, COVERING GROWTH OF EXPERIMENTAL CROPS.

Month.	Rainfall.	Highest Shade Maximum.	Lowest Shade Maximum.	Mean Shade Maximum.	Highest Shade Minimum.	Lowest Shade Minimum.	Mean Shade Minimum.	Mean Diurnal Range.	Mean Temperature.	Mean Relative Humidity of the Air, Saturation equaling 100 at 8 a.m.	Mean Daily Evaporation in Cubic Inches.
September	44	86.0	73.0	79.5	68.1	48.0	58.1	26.5	68.8	..	.207
October	6.08	89.4	85.0	87.2	59.2	52.0	55.6	30.2	71.4	..	.215
November	5.79	89.1	86.1	87.6	82.3	56.2	69.3	21.9	78.5	..	.207
December	24.44	88.2	80.0	84.1	71.2	62.0	66.6	18.4	75.3	89.0	.211
January	11.80	93.5	81.2	87.3	72.4	63.0	67.7	19.8	77.5	87.2	.165
February	14.80	92.0	79.2	85.6	72.5	66.0	69.3	16.5	77.4	76.0	.171
March	11.25	91.4	84.8	88.1	72.0	60.0	66.0	19.5	80.1	82.0	.150
April	5.24	92.0	80.0	86.0	70.5	49.5	60.0	19.9	73.0	77.3	.178
May	2.99	88.8	71.3	80.0	68.5	42.0	55.3	24.0	67.7	74.1	.157
June .. .. .	.64	79.2	62.0	69.6	62.0	35.8	48.9	26.1	59.3	82.0	.141
July .. .. .	..	88.0	71.6	79.8	58.0	39.8	48.9	28.5	64.4	71.8	.130
August	2.76	84.8	64.8	74.8	63.8	47.5	55.7	23.0	63.7	72.6	.100
Total	86.23										

The work of the Mackay Experiment Station latterly has been principally confined to the commercial testing of the large number of Papuan canes introduced in 1912-13. Many of these have been found to be duplicates of one another, while others have developed disease, mostly gum. This has reduced to a large extent the total number available for experiment. In addition to these trials, some interesting cultivation tests are being carried out, which will be referred to in due course.

EXPERIMENTS DEALT WITH IN FOLLOWING SECTION.

1. *Analytical Tests.*—Summary of Comparisons of Sugar Values of the varieties known as Cheribon, Malabar, and Otamite in competition with Badila, Goru, and H.Q. 426 (Clark's Seedling).

2. Experiments with Papuan canes in the first and second ratoon stages.

3. Tests to determine the action of fertilisers on plant crops and their effect on the succeeding ratoon crops.

4. New experiments in subsoiling *versus* ordinary cultivation.

SUMMARY OF TESTS MADE AT THE MACKAY SUGAR EXPERIMENT STATION FOR THE PURPOSE OF DETERMINING THE RELATIVE RICHNESS OF H.Q. 426 (CLARK'S SEEDLING), N.G. 15 (BADILA), N.G. 24 (GORU), CHERIBON, MALABAR, AND OTAMITE.

At the request of the Mackay Sugar Manufacturers' Association a series of analytical test plots were instituted at the Mackay Station in 1913 to determine the relative values of H.Q. 426, Badila, Goru, Cheribon, Malabar, and Otamite during the crushing period, June to December. The first series of these experiments were planted in the early part of the season, viz., March, and the second series in August of the same year. With the exception of time of planting, the conditions governing the experiments were the same in each case. Analyses of these two plant crops of different ages were commenced in June, 1914, and continued till December of the same year. In the following years, 1915 and 1916, the first and second ratoon crops were again tested over a similar period. The analytical results of these three years have already been published, but they will be found summarised in the table following. They show conclusively that over the seven months the H.Q. 426, Badila, and Goru were of considerably higher sugar content than Cheribon, Malabar, and Otamite. The latter canes show a low analyses for the first three months, but from September onwards they considerably improve.

IN THE TABLE FOLLOWING THE RESULTS HAVE BEEN AVERAGED FOR THE THREE YEARS SO THAT THE SUGAR CONTENTS IN THE TERMS OF P.O.C.S. ARE APPARENT AT A GLANCE.

Variety.	PLANT CROP, 1914.		FIRST RATOON CROP, 1915.		SECOND RATOON CROP, 1916.	
	AVERAGE 7 MONTHS' ANALYSES.		AVERAGE 7 MONTHS' ANALYSES.		AVERAGE 7 MONTHS' ANALYSES.	
	Early Planting. P.O.C.S.	Late Planting. P.O.C.S.	Early Planting. P.O.C.S.	Late Planting. P.O.C.S.	Early Planting. P.O.C.S.	Late Planting. P.O.C.S.
H.Q. 426 ..	16.0	16.6	18.4	18.8	14.9	15.0
Badila	15.1	16.6	19.8	18.7	14.9	14.5
Goru	13.2	13.9	17.0	16.4	12.7	12.2
Cheribon ..	12.6	12.6	15.6	15.5	12.4	11.7
Malabar ..	11.8	11.8	15.0	15.3	11.4	11.3
Otamite ..	11.0	11.4	15.0	15.0	11.5	11.0

Although the three latter canes are not much grown outside Mackay the results are generally interesting, particularly having regard to the action of the Central Sugar Cane Prices Board in fixing, in many instances, analyses as the basis of payment for cane.

1. PAPUAN CANES PLANTED OUT IN EXPERIMENT—FIRST SELECTION—SECOND RATOON CROP.

In the Annual Report for 1915 details of the plant crop of the first selection made from a number of Papuan canes was given. In 1916 the particulars relating to the first ratoon crop were published. It is unfortunate that these canes should have met with adverse conditions during nearly the whole of this period, but these serve to show the varieties that are capable of withstanding such checks. Due to late cutting of the first ratoon crop in 1916, the results are comparatively small in tonnage. The remainder of the Papuan canes mentioned in this Report were in the first ratoon stage prior to cutting this year.

The preliminary and final analyses of these canes were carried out on the dates shown in the tables which appear hereunder:—

FIRST PRELIMINARY EXAMINATION OF PAPUAN CANES (WELLS' COLLECTION)—SECOND RATOON CROP—JULY, 1917.

Division.	Variety of Cane.				Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.
Z—	N.G. 69	..	..	..	11-7-17	8 months..	15.6	11.39	2.46	7.80	73.0
	N.G. 74	..	..	..	11-7-17	do.	16.6	12.88	2.20	9.09	77.5
	N.G. 75	..	..	..	11-7-17	do.	17.3	14.11	1.92	10.39	81.5
	N.G. 77	..	..	..	11-7-17	do.	17.1	14.67	1.84	11.13	85.7
	N.G. 78	..	..	..	11-7-17	do.	18.3	16.69	1.00	13.35	91.2
	N.G. 79	..	..	..	11-7-17	do.	16.8	13.92	1.58	10.31	82.8
	N.G. 81	..	..	..	11-7-17	do.	15.4	11.83	2.08	8.28	76.8
	N.G. 82	..	..	..	11-7-17	do.	15.9	12.01	2.44	8.29	75.5
	N.G. 83	..	..	..	11-7-17	do.	18.0	15.76	1.24	12.08	87.6
	N.G. 87	..	..	..	12-7-17	do.	15.6	12.15	2.04	8.59	77.9
	N.G. 88	..	..	..	12-7-17	do.	17.5	14.59	1.36	10.90	83.3
	N.G. 89	..	..	..	12-7-17	do.	17.1	14.08	1.56	10.38	82.3
	N.G. 90	..	..	..	12-7-17	do.	17.5	14.32	1.92	10.56	81.8
	N.G. 91	..	..	..	12-7-17	do.	15.1	10.13	1.92	6.45	67.1
	N.G. 114	..	..	..	12-7-17	do.	16.0	12.35	2.20	8.86	77.2
	N.G. 123	..	..	..	12-7-17	do.	16.3	12.52	2.02	8.80	76.8
	N.G. 158	..	..	..	12-7-17	do.	18.0	14.29	1.92	10.26	79.4
	N.G. 161	..	..	..	12-7-17	do.	17.2	14.23	1.34	10.81	83.4

SECOND PROGRESSIVE EXAMINATION OF PAPUAN CANES (WELLS' COLLECTION)—SECOND RATOON CROP—AUGUST, 1917.

Z—	N.G. 69	..	..	..	13-8-17	9 months..	17.3	14.24	1.71	10.6	82.3
	N.G. 74	..	..	..	13-8-17	do.	17.8	17.53	.62	14.5	83.0
	N.G. 75	..	..	..	13-8-17	do.	19.8	18.96	1.30	15.3	95.7
	N.G. 77	..	..	..	13-8-17	do.	18.3	16.87	1.50	13.4	92.1
	N.G. 78	..	..	..	13-8-17	do.	17.3	15.71	1.34	12.4	90.8
	N.G. 79	..	..	..	13-8-17	do.	15.9	15.35	1.22	12.5	96.5
	N.G. 81	..	..	..	13-8-17	do.	17.1	16.00	.90	12.8	93.5
	N.G. 82	..	..	..	13-8-17	do.	17.9	15.28	1.78	10.6	85.3
	N.G. 83	..	..	..	13-8-17	do.	19.8	18.43	.46	14.7	92.6
	N.G. 87	..	..	..	13-8-17	do.	17.3	15.45	.68	12.0	89.3
	N.G. 88	..	..	..	13-8-17	do.	20.9	18.76	1.40	14.8	89.7
	N.G. 89	..	..	..	13-8-17	do.	19.9	18.82	.22	15.2	94.0
	N.G. 90	..	..	..	14-8-17	do.	18.8	17.34	.42	13.8	91.7
	N.G. 91	..	..	..	14-8-17	do.	17.9	15.01	.74	11.2	83.8
	N.G. 114	..	..	..	14-8-17	do.	19.5	17.57	.28	13.7	90.0
	N.G. 123	..	..	..	14-8-17	do.	17.9	17.15	.74	13.9	95.8
	N.G. 158	..	..	..	14-8-17	do.	20.1	15.25	.66	19.6	75.8
	N.G. 161	..	..	..	14-8-17	do.	18.9	18.19	.53	14.7	96.2

FINAL EXAMINATION OF PAPUAN CANES (WELLS' COLLECTION)—SECOND RATOON CROP—SEPTEMBER, 1917

Variety of Cane.						Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.	Fibre.
N.G. 69	..	..	..	..	..	17-9-17	10 months	16.5	14.47	.56	10.9	87.7	12.9
N.G. 74	..	..	..	..	..	17-9-17	do.	15.4	14.09	1.56	11.0	91.4	12.4
N.G. 75	..	..	..	..	..	17-9-17	do.	19.0	17.08	.23	13.4	92.0	13.0
N.G. 77	..	..	..	..	..	17-9-17	do.	19.6	18.44	.18	14.6	94.0	11.8
N.G. 78	..	..	..	..	..	17-9-17	do.	18.4	17.32	.30	13.7	94.1	11.5
N.G. 79	..	..	..	..	..	17-9-17	do.	18.6	16.38	.55	12.5	88.0	12.4
N.G. 81	..	..	..	..	..	17-9-17	do.	18.3	16.04	.77	12.1	87.3	13.0
N.G. 82	..	..	..	..	..	17-9-17	do.	19.3	17.04	.80	12.9	88.3	13.0
N.G. 83	..	..	..	..	..	17-9-17	do.	18.0	15.12	1.20	11.0	84.0	12.8
N.G. 87	..	..	..	..	..	17-9-17	do.	17.5	15.04	.61	11.1	86.0	13.0
N.G. 88	..	..	..	..	..	17-9-17	do.	20.0	18.20	.34	14.2	91.0	12.0
N.G. 89	..	..	..	..	..	17-9-17	do.	19.5	17.75	.46	13.6	91.0	12.5
N.G. 90	..	..	..	..	..	17-9-17	do.	18.1	17.51	.77	13.9	96.6	13.0
N.G. 91	..	..	..	..	..	17-9-17	do.	16.1	11.83	.77	7.8	73.4	12.8
N.G. 114	..	..	..	..	..	17-9-17	do.	18.2	16.35	.89	12.5	90.0	13.1
N.G. 123	..	..	..	..	..	17-9-17	do.	18.1	16.22	.81	12.9	95.8	12.6
N.G. 158	..	..	..	..	..	17-9-17	do.	19.5	18.00	.80	13.9	75.8	12.6
N.G. 161	..	..	..	..	..	17-9-17	do.	16.5	15.00	.77	11.5	96.2	12.5

The analytical results to date of the three crops—plant, first and second ratoons—are given below and will be found extremely useful for reference when combined with the total crop result table given a little further down :—

ANALYTICAL RESULTS TO DATE OF PAPUAN CANES (WELLS' COLLECTION)—PLANT, FIRST, AND SECOND RATOON CROPS—1915, 1916, AND 1917.

Variety of Cane.	PLANT CROP 1915.					FIRST RATOON CROP, 1916.					SECOND RATOON, CROP, 1917.					AVERAGE OF THREE YEARS.		
	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	C.C.S.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	C.C.S.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	C.C.S.	% Sucrose in Juice.	Purity of Juice.	C.C.S.
N.G. 67 ..	19.4	16.34	.88	84.2	12.3	17.9	15.71	.67	87.7	12.2	..	..	..	..	..	*16.02	85.9	12.3
N.G. 69 ..	18.4	15.58	1.04	84.6	11.7	16.6	14.04	1.25	84.5	10.5	16.5	14.47	.56	87.7	10.9	15.50	86.5	11.8
N.G. 74 ..	21.5	19.17	.41	89.1	15.0	19.1	16.29	.51	85.2	12.3	15.4	14.09	1.56	91.4	11.0	14.69	88.5	12.7
N.G. 75 ..	21.0	19.21	.35	91.4	15.5	18.5	17.09	.39	92.3	13.5	19.0	17.08	.23	92.0	13.4	17.52	91.9	14.1
N.G. 77 ..	20.2	18.89	.14	93.5	15.2	19.2	17.78	.28	92.6	14.3	19.6	18.44	.18	94.0	14.6	18.70	93.1	14.7
N.G. 78 ..	20.8	19.48	.30	93.6	15.5	17.4	15.34	.77	88.1	12.0	18.4	17.32	.30	94.1	13.7	17.38	91.9	13.7
GN. 79 ..	22.2	19.92	.33	89.7	15.5	18.5	15.79	.48	85.3	12.0	18.6	16.38	.55	88.0	12.5	17.36	87.6	13.3
N.G. 81 ..	21.0	18.95	.40	90.2	14.8	17.2	14.17	.67	82.3	10.3	18.3	16.04	.77	87.3	12.1	16.38	86.6	12.4
N.G. 82 ..	20.7	18.06	1.13	87.2	13.9	18.2	15.56	.69	85.4	11.8	19.3	17.64	.80	88.3	12.9	16.88	86.6	12.8
N.G. 83 ..	21.8	19.92	1.02	91.3	15.9	18.0	14.38	.89	79.8	10.3	18.0	15.12	1.20	84.0	11.0	16.46	85.0	12.4
N.G. 85 ..	20.4	17.48	.55	85.6	13.2	17.2	13.90	1.04	80.8	10.0	..	..	..	..	..	*15.64	83.2	11.6
N.G. 87 ..	21.8	19.51	.55	89.4	14.8	18.5	15.58	.97	84.2	11.6	17.5	15.04	.61	86.0	11.1	16.70	86.5	12.5
N.G. 88 ..	20.9	17.48	1.56	83.6	13.1	18.1	15.53	.83	85.8	11.9	20.0	18.20	.34	91.0	14.2	17.97	86.8	13.1
N.G. 89 ..	22.2	19.29	1.04	86.8	14.7	18.6	16.16	.68	86.8	12.4	19.5	17.75	.46	91.0	13.6	17.73	88.2	13.6
N.G. 90 ..	20.8	18.42	.76	88.5	14.4	6.1	13.31	.69	82.6	9.8	18.1	17.51	.77	91.6	13.9	16.43	87.6	12.7
N.G. 91 ..	21.4	19.17	.57	89.5	14.9	17.9	15.04	1.25	84.0	11.2	16.1	11.83	.77	71.4	7.8	15.35	81.6	11.3
N.G. 114 ..	20.7	18.57	.83	89.7	14.3	16.7	13.66	1.64	81.7	9.9	18.2	16.35	.89	90.0	12.5	16.19	87.1	12.2
N.G. 123 ..	19.9	17.44	.62	87.6	13.6	18.0	15.29	1.38	84.9	11.5	18.1	16.22	.81	95.8	12.9	15.31	89.4	12.7
N.G. 158 ..	20.1	17.70	.76	88.0	13.6	20.4	18.46	.46	90.4	14.5	19.5	18.00	.80	75.8	13.9	18.95	84.7	14.0
N.G. 161 ..	20.6	18.85	.13	91.5	15.0	18.2	15.98	.74	87.8	12.4	16.5	15.00	.77	94.2	11.5	16.61	91.8	12.9

* Average of two crops only.

The following tables provide the crop results, the first giving the results of the 1917 crop and the other the total crop results of the three years during which the trials have been running :—

CROP RESULTS OF PAPUAN CANES (WELLS' COLLECTION)—SECOND RATOON CROP—SEPTEMBER, 1917.

Country.					Variety of Cane.				Age of Cane.	Weight per Acre of Cane in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
New Guinea	..	..	..	..	N.G.	69	..	..	10 months	10.2	1.1
Ditto	..	..	..	..	N.G.	74	..	..	do.	5.8	.6
Ditto	..	..	..	..	N.G.	75	..	..	do.	27.8	3.7
Ditto	..	..	..	..	N.G.	77	..	..	do.	29.5	4.3
Ditto	..	..	..	..	N.G.	78	..	..	do.	8.8	1.2
Ditto	..	..	..	..	N.G.	79	..	..	do.	16.7	2.1
Ditto	..	..	..	..	N.G.	81	..	..	do.	38.1	4.6
Ditto	..	..	..	..	N.G.	82	..	..	do.	28.9	3.7
Ditto	..	..	..	..	N.G.	83	..	..	do.	34.4	3.8
Ditto	..	..	..	..	N.G.	87	..	..	do.	13.9	1.5
Ditto	..	..	..	..	N.G.	88	..	..	do.	23.1	3.3
Ditto	..	..	..	..	N.G.	89	..	..	do.	35.3	4.8
Ditto	..	..	..	..	N.G.	90	..	..	do.	35.3	4.9
Ditto	..	..	..	..	N.G.	91	..	..	do.	26.1	2.0
Ditto	..	..	..	..	N.G.	114	..	..	do.	24.8	3.1
Ditto	..	..	..	..	N.G.	123	..	..	do.	35.3	4.5
Ditto	..	..	..	..	N.G.	158	..	..	do.	28.5	4.0
Ditto	..	..	..	..	N.G.	161	..	..	do.	11.6	1.3

TOTAL CROP RESULTS OF PAPUAN CANES (WELLS' COLLECTION)—PLANT, FIRST, AND SECOND RATOON CROPS—1915 1916, AND 1917 (DIVISION Z).

Country.	Name or Number of Variety.	PLANT CROP, 1915.		FIRST RATOON CROP, 1916.		SECOND RATOON CROP, 1917.		TOTAL YIELD: THREE CROPS.	
		Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
New Guinea	N.G. 67	23.7	2.9	26.8	3.2	..	..	*50.5	6.1
Ditto	N.G. 69	29.9	3.5	33.4	3.5	10.2	1.1	73.5	8.1
Ditto	N.G. 74	26.0	3.9	30.4	3.7	5.8	.6	62.2	8.2
Ditto	N.G. 75	20.3	3.1	28.5	3.8	27.8	3.7	76.6	10.6
Ditto	N.G. 77	17.6	2.6	26.4	3.7	29.5	4.3	73.5	10.6
Ditto	N.G. 78	26.7	4.1	37.0	4.4	8.8	1.2	73.5	9.7
Ditto	N.G. 79	28.1	4.3	22.6	2.7	16.7	2.1	67.4	9.1
Ditto	N.G. 81	33.6	4.9	48.3	4.9	38.1	4.6	120.0	14.4
Ditto	N.G. 82	22.5	3.1	35.1	4.1	28.9	3.7	86.5	10.9
Ditto	N.G. 83	26.7	4.2	28.9	2.9	34.4	3.8	90.0	10.9
Ditto	N.G. 85	25.0	3.3	25.7	2.5	..	..	*50.7	5.8
Ditto	N.G. 87	29.1	4.3	37.0	4.3	13.9	1.5	80.0	10.1
Ditto	N.G. 88	26.3	3.4	36.4	4.3	23.1	3.3	85.8	11.0
Ditto	N.G. 89	22.9	3.3	33.4	4.1	35.3	4.8	91.6	13.3
Ditto	N.G. 90	24.6	3.5	29.9	2.9	35.3	4.9	89.8	11.3
Ditto	N.G. 91	18.4	2.7	27.4	3.0	26.1	2.0	71.9	7.7
Ditto	N.G. 114	21.9	3.1	32.5	3.2	24.8	3.1	79.2	9.4
Ditto	N.G. 123	20.6	2.8	33.0	3.8	35.3	4.5	88.9	11.1
Ditto	N.G. 158	22.9	3.1	32.5	4.7	28.5	4.0	83.9	11.8
Ditto	N.G. 161	18.7	2.8	24.8	3.0	11.6	1.3	55.1	7.1

* Total of two crops only.

This experiment is now finished, and the results obtained, combined with their general behaviour regarding germination, growth, and susceptibility to disease, will afford the means of selecting certain varieties for ultimate distribution to growers.

2. PAPUAN CANES PLANTED OUT IN EXPERIMENT—FIRST RATOON CROPS.

In former reports details of a number of canes introduced from Papua were supplied. With the exception of the twenty-seven varieties last mentioned as having been planted out in experiment, all those canes which had failed to provide sufficient seed, or else, on account of lack of space, it had been impossible to get out under experimental conditions, were again planted out in September, 1914. By August of 1915 there was sufficient cane ready for planting out in field competition. Owing to the number of canes to be tested and the limited amount of land available, it has been found impossible to put all these canes on the same block of ground. They have therefore been planted in three different series on Divisions A, B, and D.

Prior to planting out, a rigorous inspection of the canes was made, in consequence of which a number of the varieties were thrown out on account of the gumming disease being detected. The numbers of these canes were as follows :—Numbers 97, 99, 104, 109, 112, 120, 127, 136, 137, 150, 151, 154, 158, 162, 163, 166, 169, 170, 171, 172, 179, 180, 181, and 183. This manifestation of disease appears inherent in the canes themselves, as many of these numbers developed gum at the Bundaberg Station also.

The varieties finally planted out were as follows :—

Division A.—Numbers 92, 93, 94, 95, 96, 98, 100, 101, 102, 103, 104A, 105, 106, 107, 108, 110, 111, 113, 115.

Division B.—Numbers 116, 117, 118, 119, 122, 125, 126, 128, 129, 130, 131.

Division D.—Numbers 133, 134, 135, 138, 139, 140, 141, 142, 143, 144, 146, 147, 148, 149, 152, 153, 156, 164, 159, 160, 157, 165, 168, 173, 167, 175, 176, 174, 178, 184, 185, 186.

Details of the plant crop of these canes appeared in last year's report.

As in all trials of large numbers of varieties, the greatest difference exists between them. One plot germinates rapidly, the next may be several weeks in appearing. One plot gives a high tonnage of cane, the next may be extraordinarily low. This will be amply borne out when the crop results are scanned.

The usual analytical data being secured, it was tabulated and is given below according to the respective divisions upon which the cane was planted, including a table of analytical results to date.

FIRST PRELIMINARY EXAMINATION OF PAPUAN CANES (WELLS' COLLECTION)—FIRST RATOON CROP—JULY, 1917.

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.
A—	N.G. 92	13-7-17	8 months ..	12.7	8.20	2.40	4.9	64.6
	N.G. 93	13-7-17	do.	14.2	12.34	1.80	9.5	86.8
	N.G. 94	13-7-17	do.	15.7	9.52	2.70	5.3	60.6
	N.G. 95	13-7-17	do.	13.7	10.59	2.06	7.4	77.3
	N.G. 96	13-7-17	do.	15.9	13.06	1.44	9.6	82.2
	N.G. 98	13-7-17	do.	15.0	11.83	1.60	8.4	78.8
	N.G. 100	13-7-17	do.	13.7	10.33	2.50	7.1	75.4
	N.G. 101	13-7-17	do.	14.0	10.84	1.08	7.6	77.5
	N.G. 102	13-7-17	do.	16.6	15.23	1.30	12.1	91.7
	N.G. 103	13-7-17	do.	17.0	12.66	2.46	8.6	74.4
	N.G. 104A	13-7-17	do.	14.5	10.50	2.26	7.0	72.4
	N.G. 105	13-7-17	do.	15.1	10.61	3.72	6.9	74.3
	N.G. 106	14-7-17	do.	14.1	8.85	3.70	5.1	62.8
	N.G. 107	14-7-17	do.	17.8	15.34	1.28	11.7	88.2
	N.G. 108	14-7-17	do.	17.4	14.96	1.94	11.9	85.9
	N.G. 110	14-7-17	do.	17.1	16.04	1.98	12.8	93.8
	N.G. 111	14-7-17	do.	16.4	15.94	2.16	12.9	97.2
	N.G. 113	14-7-17	do.	16.0	14.60	1.30	11.5	91.2
	N.G. 115	14-7-17	do.	15.7	13.28	2.46	10.0	84.6

SECOND PROGRESSIVE EXAMINATION OF PAPUAN CANES (WELLS' COLLECTION)—FIRST RATOON CROP—AUGUST, 1917

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.
A—	N.G. 92	15-8-17	9 months ..	17.3	15.84	.40	12.6	91.6
	N.G. 93	15-8-17	do.	18.0	16.64	.91	13.2	92.3
	N.G. 94	15-8-17	do.	17.3	12.64	3.44	8.7	73.1
	N.G. 95	15-8-17	do.	17.2	15.21	1.23	11.8	88.3
	N.G. 96	15-8-17	do.	13.1	9.53	1.60	6.6	72.7
	N.G. 98	15-8-17	do.	14.7	12.80	1.86	9.9	87.1
	N.G. 100	15-8-17	do.	15.8	13.93	2.00	10.8	88.2
	N.G. 101	15-8-17	do.	13.3	10.82	1.94	7.9	81.3
	N.G. 102	15-8-17	do.	19.1	17.21	.62	13.5	90.0
	N.G. 103	15-8-17	do.	18.1	15.81	1.86	12.2	87.3
	N.G. 104A	15-8-17	do.	18.1	14.35	1.94	10.4	79.3
	N.G. 105	15-8-17	do.	14.6	12.12	1.44	9.0	83.3
	N.G. 106	15-8-17	do.	15.2	11.02	2.12	7.4	72.4
	N.G. 107	15-8-17	do.	18.2	17.02	.64	13.8	93.4
	N.G. 108	15-8-17	do.	19.5	17.97	.73	14.2	92.2
	N.G. 110	15-8-17	do.	17.1	16.14	.84	13.0	94.3
	N.G. 111	15-8-17	do.	19.0	17.34	1.06	13.7	91.2
	N.G. 113	15-8-17	do.	17.0	16.31	1.06	13.2	95.4
	N.G. 115	15-8-17	do.	17.8	15.15	.80	11.5	85.0

FINAL EXAMINATION OF PAPUAN CANES (WELLS' COLLECTION), DIVISION A—FIRST RATOON CROP—SEPTEMBER, 1917.

Variety of Cane.							Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.	Fibre.
N.G. 92	..	..	..	..	..	..	17-9-17	10 months	17.0	15.75	.46	12.4	92.5	11.8
N.G. 93	..	..	..	..	..	..	17-9-17	do.	15.8	13.79	.51	10.4	87.4	12.8
N.G. 94	..	..	..	..	..	..	17-9-17	do.	14.7	12.07	1.25	8.7	82.1	12.6
N.G. 95	..	..	..	..	..	..	17-9-17	do.	17.8	15.18	1.18	11.3	85.3	11.8
N.G. 96	..	..	..	..	..	..	17-9-17	do.	15.1	13.85	.80	10.6	91.7	13.8
N.G. 98	..	..	..	..	..	..	17-9-17	do.	15.7	14.09	.74	10.9	89.7	11.8
N.G. 100	..	..	..	..	..	..	17-9-17	do.	16.1	14.78	.51	11.7	91.8	11.2
N.G. 101	..	..	..	..	..	..	17-9-17	do.	17.9	16.35	.68	12.9	91.3	11.0
N.G. 102	..	..	..	..	..	..	17-9-17	do.	14.2	10.84	1.86	7.5	76.3	11.5
N.G. 103	..	..	..	..	..	..	17-9-17	do.	16.7	13.23	1.56	9.1	79.3	13.8
N.G. 104A	..	..	..	..	..	..	17-9-17	do.	18.4	15.78	.92	12.0	85.8	11.3
N.G. 105	..	..	..	..	..	..	17-9-17	do.	15.8	12.52	1.56	9.0	79.2	10.8
N.G. 106	..	..	..	..	..	..	17-9-17	do.	14.7	12.39	1.95	9.2	83.3	10.6
N.G. 107	..	..	..	..	..	..	17-9-17	do.	19.5	17.97	.54	13.9	92.2	12.8
N.G. 108	..	..	..	..	..	..	17-9-17	do.	17.8	16.35	.78	12.8	91.8	11.8
N.G. 110	..	..	..	..	..	..	17-9-17	do.	18.8	17.26	.51	12.4	91.8	14.8
N.G. 111	..	..	..	..	..	..	17-9-17	do.	16.9	13.20	1.12	9.4	78.2	11.3
N.G. 113	..	..	..	..	..	..	17-9-17	do.	18.7	17.17	.31	12.4	91.8	14.8
N.G. 115	..	..	..	..	..	..	17-9-17	do.	18.7	16.71	.62	12.7	89.4	13.3

FIRST PRELIMINARY EXAMINATION OF PAPUAN CANES (WELLS' COLLECTION)—FIRST RATOON CROP—JULY, 1917.

Division.	Variety of Cane.						Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.
B—	16-7-17	8 months ..	17.1	14.88	1.26	11.4	87.1
							16-7-17	do.	16.0	13.52	2.30	10.2	84.4
							16-7-17	do.	15.6	14.61	.40	11.7	93.7
							16-7-17	do.	15.3	12.69	1.60	9.7	82.8
							16-7-17	do.	16.2	14.91	.40	11.8	92.0
							16-7-17	do.	15.9	14.25	2.10	11.1	89.7
							16-7-17	do.	16.2	13.17	1.42	9.6	81.3
							16-7-17	do.	13.0	11.11	2.32	8.0	85.4
							16-7-17	do.	12.4	8.77	1.74	5.8	70.7
							16-7-17	do.	16.7	13.95	1.40	10.4	84.6
							16-7-17	do.	16.3	13.95	1.28	10.6	85.6

SECOND PROGRESSIVE EXAMINATION OF PAPUAN CANES (WELLS' COLLECTION)—FIRST RATOON CROP—AUGUST, 1917.

B—	..	..	..	..	..	..	16-8-17	9 months ..	20.1	18.77	.47	15.0	92.9
							16-8-17	do.	17.7	15.23	1.50	11.6	86.1
							16-8-17	do.	15.9	14.78	.60	11.8	92.9
							16-8-17	do.	14.5	13.33	.82	10.6	91.8
							17-8-17	do.	16.7	15.37	.81	12.2	92.0
							17-8-17	do.	17.0	15.94	.75	12.8	93.8
							17-8-17	do.	17.0	15.83	1.04	12.7	93.2
							17-8-17	do.	14.3	11.66	.90	8.7	81.7
							17-8-17	do.	14.8	11.50	2.38	8.1	77.7
							17-8-17	do.	19.1	17.67	.69	14.0	92.4
							17-8-17	do.	18.0	15.81	1.60	12.2	87.8

FINAL EXAMINATION OF PAPUAN CANES (WELLS' COLLECTION), DIVISION B—FIRST RATOON CROP—
SEPTEMBER, 1917.

Variety of Cane.							Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.	Fibre.
N.G. 116	..	..	..	..	..	..	18-9-17	10 months	19.0	17.21	.77	13.5	90.6	10.8
N.G. 117	..	..	..	..	..	..	18-9-17	do.	17.0	14.94	1.08	11.4	87.9	12.0
N.G. 118	..	..	..	..	..	..	18-9-17	do.	16.7	15.00	.86	11.7	89.8	10.8
N.G. 119	..	..	..	..	..	..	18-9-17	do.	14.0	12.45	.94	9.7	88.9	10.8
N.G. 122	..	..	..	..	..	..	18-9-17	do.	16.4	15.27	.94	12.3	93.2	10.3
N.G. 125	..	..	..	..	..	..	18-9-17	do.	16.9	15.72	1.02	12.6	93.1	10.8
N.G. 126	..	..	..	..	..	..	19-9-17	do.	17.3	15.71	.86	12.2	90.7	11.8
N.G. 128	..	..	..	..	..	..	19-9-17	do.	17.8	15.68	.71	11.7	88.2	12.8
N.G. 129	..	..	..	..	..	..	19-9-17	do.	15.3	11.53	1.52	8.0	75.3	11.0
N.G. 130	..	..	..	..	..	..	19-9-17	do.	17.5	15.18	.75	11.4	86.8	11.8
N.G. 131	..	..	..	..	..	..	19-9-17	do.	17.7	15.18	.80	11.5	86.7	11.4

FIRST PRELIMINARY EXAMINATION OF PAPUAN CANES (WELLS' COLLECTION)—FIRST RATOON CROP—JULY, 1917.

Division.	Variety of Cane.						Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.
D—	N.G. 133	..	..	17-8-17	8 months ..	17.3	15.26	2.28	11.7	88.2
				N.G. 134	..	..	17-8-17	do.	13.3	10.61	2.78	7.7	79.7
				N.G. 135	..	..	17-8-17	do.	13.6	9.63	3.22	6.3	70.8
				N.G. 138	..	..	17-8-17	do.	9.9	2.59	5.26	..	26.8
				N.G. 139	..	..	17-8-17	do.	11.4	2.62	5.88	..	23.0
				N.G. 140	..	..	17-8-17	do.	14.4	9.29	2.78	5.5	64.5
				N.G. 141	..	..	17-8-17	do.	14.0	9.58	3.02	6.0	68.4
				N.G. 142	..	..	17-8-17	do.	14.0	8.61	2.56	4.8	61.4
				N.G. 143	..	..	17-8-17	do.	12.3	7.48	3.34	4.1	60.6
				N.G. 144	..	..	17-8-17	do.	13.6	11.47	3.72	8.6	83.3
				N.G. 146	..	..	17-8-17	do.	14.2	5.98	2.44	1.8	42.2
				N.G. 147	..	..	17-8-17	do.	15.1	12.64	2.64	9.5	83.7
				N.G. 148	..	..	18-8-17	do.	18.4	16.22	1.34	12.6	88.2
				N.G. 149	..	..	18-8-17	do.	14.9	12.84	1.76	9.9	86.2
				N.G. 153	..	..	18-8-17	do.	14.4	11.17	2.22	7.9	77.6
				N.G. 156	..	..	18-8-17	do.	13.5	9.25	2.70	5.9	68.5
				N.G. 157	..	..	18-8-17	do.	17.2	14.80	.98	11.3	86.1
				N.G. 159	..	..	18-8-17	do.	16.4	13.36	1.22	9.7	81.4
				N.G. 160	..	..	18-8-17	do.	15.2	11.59	2.04	8.0	76.3
				N.G. 164	..	..	18-8-17	do.	17.4	16.01	.78	12.7	91.9
				N.G. 165	..	..	18-8-17	do.	16.1	14.66	.62	13.0	91.1
				N.G. 167	..	..	18-8-17	do.	11.9	7.87	3.84	4.8	66.1
				N.G. 168	..	..	18-8-17	do.	16.1	13.79	2.28	10.4	85.7
				N.G. 173	..	..	19-8-17	do.	18.2	15.54	1.26	11.7	85.4
				N.G. 174	..	..	19-8-17	do.	17.4	15.31	1.42	11.8	87.9
				N.G. 175	..	..	19-8-17	do.	15.2	12.15	2.44	8.7	79.8
				N.G. 176	..	..	19-8-17	do.	15.7	12.64	2.56	10.7	80.5
				N.G. 178	..	..	19-8-17	do.	14.0	9.88	2.86	6.4	70.7
				N.G. 184	..	..	19-8-17	do.	17.0	14.70	1.52	11.0	86.4
				N.G. 185	..	..	19-8-17	do.	13.7	8.70	4.06	5.0	63.4

SECOND PROGRESSIVE EXAMINATION OF PAPUAN CANES (WELLS' COLLECTION)—FIRST RATOON CROP—SEPTEMBER, 1917.

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.
D—	N.G. 133	18-8-17	9 months ..	19.6	17.97	.53	14.2	91.6
	N.G. 134	18-8-17	do.	18.8	15.35	.70	11.3	81.6
	N.G. 135	18-8-17	do.	15.7	13.28	1.39	9.9	84.5
	N.G. 138	18-8-17	do.	9.6	3.31	4.70	..	34.4
	N.G. 139	18-8-17	do.	14.7	9.02	2.79	5.0	61.3
	N.G. 140	18-8-17	do.	16.2	12.61	1.96	9.0	77.8
	N.G. 141	18-8-17	do.	16.1	12.98	2.21	10.0	80.6
	N.G. 142	18-8-17	do.	14.3	10.63	2.20	7.2	74.3
	N.G. 143	20-8-17	do.	12.4	7.75	3.00	4.4	62.5
	N.G. 144	20-8-17	do.	16.2	13.39	2.22	9.9	82.6
	N.G. 146	20-8-17	do.	13.7	8.82	2.68	5.3	64.3
	N.G. 147	20-8-17	do.	18.1	16.69	1.20	13.2	92.2
	N.G. 148	20-8-17	do.	16.9	15.61	1.30	12.4	92.3
	N.G. 149	20-8-17	do.	16.1	14.16	1.40	10.9	87.9
	N.G. 153	20-8-17	do.	15.8	13.25	1.96	9.9	83.8
	N.G. 156	20-8-17	do.	15.1	11.84	.72	8.5	78.4
	N.G. 157	20-8-17	do.	16.0	14.09	2.32	10.9	88.1
	N.G. 159	20-8-17	do.	16.2	14.88	1.36	11.8	91.8
	N.G. 160	20-8-17	do.	17.8	16.08	1.87	12.6	90.3
	N.G. 164	21-8-17	do.	16.1	14.38	.92	11.2	89.3
	N.G. 165	21-8-17	do.	18.4	16.98	.71	13.4	92.3
	N.G. 167	21-8-17	do.	17.4	15.04	1.86	11.5	86.4
	N.G. 168	21-8-17	do.	18.1	16.53	1.30	13.1	91.3
	N.G. 173	21-8-17	do.	19.0	18.09	1.20	14.7	95.3
	N.G. 174	21-8-17	do.	19.2	18.01	1.56	14.4	93.7
	N.G. 175	21-8-17	do.	14.8	12.44	1.90	9.4	84.1
	N.G. 176	21-8-17	do.	17.0	12.93	2.26	9.0	76.2
	N.G. 178	21-8-17	do.	16.0	12.98	2.31	9.5	81.1
	N.G. 184	21-8-17	do.	16.4	15.59	1.56	12.6	95.0
	N.G. 185	21-8-17	do.	15.7	12.42	2.41	9.0	79.2

FINAL EXAMINATION OF PAPUAN CANES (WELLS' COLLECTION), DIVISION D—FIRST RATOON CROP—SEPTEMBER, 1917.

Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.	Fibre.
N.G. 133	19-9-17	10 months	19.8	18.20	.60	14.4	91.8	11.3
N.G. 134	19-9-17	do.	18.0	16.18	.64	12.1	89.9	11.0
N.G. 135	19-9-17	do.	17.6	15.90	.83	12.3	90.4	11.8
N.G. 138	19-9-17	do.	12.0	5.45	4.00	..	45.5	10.8
N.G. 139	19-9-17	do.	13.8	9.17	2.50	5.7	66.0	11.2
N.G. 140	19-9-17	do.	16.1	12.98	1.57	9.5	80.7	11.0
N.G. 141	19-9-17	do.	18.7	16.58	.95	13.0	88.6	10.4
N.G. 142	19-9-17	do.	15.5	11.78	2.15	8.1	76.0	11.8
N.G. 143	19-9-17	do.	15.0	11.83	1.66	8.5	78.8	10.6
N.G. 144	19-9-17	do.	17.1	13.81	1.56	10.2	80.8	10.4
N.G. 146	19-9-17	do.	16.0	11.78	1.80	8.0	73.7	11.3
N.G. 147	19-9-17	do.	19.8	17.63	1.56	13.7	84.5	10.8
N.G. 148	19-9-17	do.	18.7	16.71	1.20	13.0	88.9	11.3
N.G. 149	19-9-17	do.	18.0	15.81	.83	11.9	87.8	12.9
N.G. 153	19-9-17	do.	16.2	12.71	1.66	9.1	78.4	10.6
N.G. 156	19-9-17	do.	18.0	14.61	.60	10.5	81.2	11.8
N.G. 157	19-9-17	do.	16.4	14.17	1.25	10.7	86.4	11.8
N.G. 159	19-9-17	do.	18.3	15.51	1.01	11.7	84.8	11.1
N.G. 160	19-9-17	do.	16.9	14.41	.80	11.0	85.2	10.3
N.G. 164	19-9-17	do.	18.1	17.02	.62	13.6	94.0	10.6
N.G. 165	19-9-17	do.	18.4	16.84	.75	13.3	91.5	10.8
N.G. 167	19-9-17	do.	19.0	17.48	.92	13.8	92.0	10.8
N.G. 168	19-9-17	do.	19.0	17.07	1.10	13.2	89.9	11.8
N.G. 173	19-9-17	do.	18.3	16.31	1.30	12.2	88.2	13.8
N.G. 174	19-9-17	do.	20.0	18.46	.80	14.8	92.3	10.4
N.G. 175	19-9-17	do.	16.0	14.73	1.76	11.2	92.1	14.3
N.G. 176	19-9-17	do.	17.4	14.77	1.50	11.8	84.8	13.3
N.G. 178	19-9-17	do.	16.8	14.41	1.25	11.0	85.8	10.8
N.G. 184	19-9-17	do.	17.5	14.13	1.76	10.3	80.7	10.8
N.G. 185	19-9-17	do.	18.7	16.31	1.00	12.4	87.3	12.3

ANALYTICAL RESULTS TO DATE OF THE THREE PRECEDING SERIES OF PAPUAN CANFS—PLANT AND
FIRST RATOONS—1916 AND 1917.

Division.	Variety of Cane.	PLANT CROP, 1916.						FIRST RATOON CROP, 1917.					
		Date of Analysis.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity.	
A—	N.G. 92	11-9-16	17.4	15.67	.62	12.3	90.0	17.0	15.75	.46	12.4	92.5	
	N.G. 93	11-9-16	18.3	16.53	1.51	12.9	90.3	15.8	13.79	.51	10.4	87.4	
	N.G. 94	11-9-16	16.6	12.80	1.60	9.0	77.1	14.7	12.07	1.25	8.7	82.1	
	N.G. 95	11-9-16	13.7	10.03	2.08	6.9	73.2	17.8	15.18	1.18	11.3	85.3	
	N.G. 96	11-9-16	16.9	13.77	1.21	9.9	81.4	15.1	13.85	.80	10.6	91.7	
	N.G. 98	11-9-16	16.5	14.20	1.25	10.8	86.0	15.7	14.09	.74	10.9	89.7	
	N.G. 100	11-9-16	10.5	5.49	3.12	2.4	53.2	16.1	14.78	.51	11.7	91.8	
	N.G. 101	11-9-16	15.1	11.43	1.73	8.1	75.6	17.9	16.35	.68	12.9	91.3	
	N.G. 102	11-9-16	16.5	12.99	2.01	9.5	78.7	14.2	10.84	1.86	7.5	76.3	
	N.G. 103	11-9-16	15.9	13.15	.51	9.6	82.7	16.7	13.23	1.56	9.1	79.3	
	B.G. 104A	11-9-16	11.9	6.19	2.15	2.7	52.0	18.4	15.78	.92	12.0	85.8	
	N.G. 105	11-9-16	13.6	9.79	1.78	6.6	71.9	15.8	12.52	1.56	9.0	79.2	
	N.G. 106	11-9-16	13.2	7.87	4.16	4.3	59.6	14.7	12.39	1.95	9.2	83.3	
	N.G. 107	11-9-16	17.6	15.69	.45	12.2	89.1	19.5	17.97	.54	13.9	92.2	
	N.G. 108	11-9-16	16.5	13.26	1.66	9.7	80.3	17.8	16.35	.78	12.8	91.8	
B -	N.G. 110	11-9-16	17.6	14.99	.93	11.0	85.1	18.8	17.26	.51	12.4	91.8	
	N.G. 111	11-9-16	17.5	14.87	1.38	11.3	84.9	16.9	13.20	1.12	9.4	78.2	
	N.G. 113	11-9-16	18.6	16.21	.73	12.1	87.1	18.7	17.17	.31	12.4	91.8	
	N.G. 115	11-9-16	15.3	12.48	1.92	9.1	81.5	18.7	16.71	.62	12.7	89.4	
	N.G. 116	6-9-16	18.2	15.71	1.01	12.2	86.3	19.0	17.21	.77	13.5	90.6	
	N.G. 117	6-9-16	16.5	13.51	1.56	10.0	81.8	17.0	14.94	1.08	11.4	87.9	
	N.G. 118	6-9-16	14.7	11.69	1.38	8.6	79.5	16.7	15.00	.86	11.7	89.8	
	N.G. 119	6-9-16	13.9	9.60	1.78	6.3	69.0	14.0	12.45	.94	9.7	88.9	
	N.G. 122	6-9-16	13.2	10.05	2.77	7.1	76.1	16.4	15.27	.94	12.3	93.2	
	N.G. 125	6-9-16	15.9	12.61	1.22	9.3	79.3	16.9	15.72	1.02	12.6	93.1	
	N.G. 126	6-9-16	16.1	13.42	1.64	10.0	83.3	17.3	15.71	.86	12.2	90.7	
	N.G. 128	6-9-16	15.9	13.61	1.04	10.3	85.5	17.8	15.68	.71	11.7	88.2	
	N.G. 129	6-9-16	14.6	9.99	2.60	6.5	68.3	15.3	11.53	1.52	8.0	75.3	
	N.G. 130	6-9-16	15.4	11.83	1.60	8.4	76.8	17.5	15.18	.75	11.4	86.8	
	N.G. 131	6-9-16	18.1	15.76	.84	12.2	87.0	17.7	15.18	.80	11.5	86.7	
D—	N.G. 133	4-9-16	15.3	12.69	1.01	9.5	82.9	19.8	18.20	.60	14.4	91.8	
	N.G. 134	4-9-16	15.1	12.94	1.56	10.0	85.6	18.0	16.18	.64	12.1	89.9	
	N.G. 135	4-9-16	16.0	12.82	1.60	9.4	80.1	17.6	15.90	.83	12.3	90.4	
	N.G. 138	4-9-16	12.6	7.12	3.12	3.6	56.5	12.0	5.45	4.00	..	45.5	
	N.G. 139	4-9-16	16.2	11.16	2.50	7.4	68.8	13.8	9.17	2.50	5.7	66.0	
	N.G. 140	4-9-16	14.7	9.83	2.71	6.2	66.8	16.1	12.98	1.57	9.5	80.7	
	N.G. 141	4-9-16	16.0	12.72	1.83	9.4	79.5	18.7	16.58	.95	13.0	88.6	
	N.G. 142	4-9-16	14.3	10.37	2.65	7.0	72.5	15.5	11.78	2.15	8.1	76.0	
	N.G. 143	4-9-16	13.3	8.61	2.31	5.3	64.7	15.0	11.83	1.66	8.5	78.8	
	N.G. 144	4-9-16	14.9	12.40	2.40	9.4	83.2	17.1	13.81	1.56	10.2	80.8	
	N.G. 146	4-9-16	13.1	8.03	2.90	4.5	61.2	16.0	11.78	1.80	8.0	73.7	
	N.G. 147	4-9-16	17.4	15.48	1.01	12.2	88.9	19.8	17.63	1.56	13.7	84.5	
	N.G. 148	4-9-16	15.5	12.48	1.38	9.1	80.5	18.7	16.71	1.20	13.0	88.9	
	N.G. 149	4-9-16	16.0	13.06	1.22	9.6	81.6	18.0	15.81	.83	11.9	87.8	
	N.G. 152	4-9-16	16.6	14.20	1.38	10.9	85.5	..	..	..	..	..
	N.G. 153	4-9-16	15.6	12.23	1.92	8.9	78.3	16.2	12.71	1.66	9.1	78.4	
	N.G. 156	4-9-16	16.1	13.31	1.04	9.9	82.6	18.0	14.61	.60	10.5	81.2	
	N.G. 157	4-9-16	16.3	13.26	.85	9.8	81.3	16.4	14.17	1.25	10.7	86.4	
	N.G. 159	4-9-16	16.1	13.07	1.56	9.7	81.1	18.3	15.51	1.01	11.7	84.8	
	N.G. 160	5-9-16	14.5	11.88	2.77	8.9	81.9	16.9	14.41	.80	11.0	85.2	
	N.G. 164	5-9-16	17.0	13.77	1.25	10.1	81.0	18.1	17.02	.62	13.6	94.0	
	N.G. 165	5-9-16	14.6	11.88	1.34	8.9	81.3	18.4	16.84	.75	13.3	91.5	
	N.G. 167	5-9-16	16.9	14.17	1.05	10.7	83.8	19.0	17.48	.92	13.8	92.0	
	N.G. 168	5-9-16	18.4	15.95	.73	12.3	86.6	19.0	17.07	1.10	13.2	89.9	
	N.G. 173	5-9-16	17.6	15.48	.92	11.7	87.9	18.3	16.31	1.30	12.2	88.2	
	N.G. 174	5-9-16	16.0	13.06	1.22	9.8	81.6	20.0	18.46	.80	14.8	92.3	
	N.G. 175	5-9-16	17.3	15.42	.67	11.8	89.1	16.0	14.73	1.76	11.2	92.1	
	N.G. 176	5-9-16	15.0	10.89	2.35	7.2	72.6	17.4	14.77	1.50	11.8	84.8	
	N.G. 178	5-9-16	14.6	9.72	2.60	6.1	66.5	16.8	14.41	1.25	11.0	85.8	
	N.G. 184	5-9-16	15.0	12.40	2.08	9.4	82.6	17.5	14.13	1.76	10.3	86.7	
	N.G. 185	5-9-16	15.6	10.76	2.31	6.9	68.9	18.7	16.31	1.00	12.4	87.3	
	N.G. 186	5-9-16	14.2	11.30	1.52	8.2	79.5	..	..	..	..	..

After weighing, the crop results were obtained and appear in the table of Crop Results to date set out below under the heading of "First Ratoon Crop, 1917."

CROP RESULTS TO DATE OF THE THREE PRECEDING SERIES OF PAPUAN CANES—PLANT AND FIRST RATOONS—1916
AND 1917.

Division.	Name or Number of Variety.	PLANT CROP, 1916.			FIRST RATOON CROP, 1917.		
		Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
A— ..	N.G. 92	13 months	25.2	3.1	10 months	11.1	1.4
	N.G. 93	do.	42.3	5.4	do.	4.1	.4
	N.G. 94	do.	37.0	3.3	do.	12.2	1.1
	N.G. 95	do.	42.1	2.9	do.	32.6	3.7
	N.G. 96	do.	44.3	4.3	do.	9.0	1.0
	N.G. 98	do.	58.3	6.3	do.	8.8	.9
	N.G. 100	do.	49.7	1.1	do.	10.8	1.2
	N.G. 101	do.	28.7	2.3	do.	29.0	3.7
	N.G. 102	do.	56.1	5.3	do.	10.2	.8
	N.G. 103	do.	48.8	4.6	do.	35.3	3.2
	N.G. 104A	do.	46.2	1.2	do.	43.5	5.2
	N.G. 105	do.	34.3	2.2	do.	14.2	1.3
	N.G. 106	do.	52.5	2.2	do.	23.5	2.2
	N.G. 107	do.	30.7	3.7	do.	16.3	2.3
	N.G. 108	do.	50.6	4.9	do.	25.9	3.3
	N.G. 110	do.	35.9	3.9	do.	15.4	1.9
	N.G. 111	do.	53.6	6.0	do.	22.5	2.1
	N.G. 113	do.	46.5	5.6	do.	16.3	2.0
	N.G. 115	do.	47.1	4.2	do.	23.5	3.0
B— ..	N.G. 116	13 months	23.5	2.8	10 months	30.1	4.1
	N.G. 117	do.	31.2	3.1	do.	9.5	1.1
	N.G. 118	do.	24.8	2.1	do.	21.7	2.5
	N.G. 119	do.	20.3	1.2	do.	2.7	.2
	N.G. 122	do.	37.3	2.6	do.	40.1	5.0
	N.G. 125	do.	50.0	4.6	do.	34.4	4.3
	N.G. 126	do.	28.0	2.8	do.	34.4	4.1
	N.G. 128	do.	28.5	2.9	do.	22.6	2.6
	N.G. 129	do.	31.8	2.0	do.	7.5	.6
	N.G. 130	do.	36.8	3.0	do.	43.5	5.0
	N.G. 131	do.	28.5	3.4	do.	13.6	1.6
D —..	N.G. 133	13 months	53.0	5.0	10 months	29.0	4.2
	N.G. 134	do.	53.5	5.3	do.	37.5	4.5
	N.G. 135	do.	40.4	3.8	do.	12.0	1.5
	N.G. 138	do.	45.1	1.6	do.	21.7	..
	N.G. 139	do.	51.0	3.7	do.	33.5	1.9
	N.G. 140	do.	33.0	2.0	do.	3.6	.3
	N.G. 141	do.	43.0	4.0	do.	21.7	2.7
	N.G. 142	do.	46.1	3.2	do.	20.2	1.6
	N.G. 143	do.	49.0	2.5	do.	18.1	1.5
	N.G. 144	do.	55.7	5.2	do.	22.2	2.2
	N.G. 146	do.	29.8	1.3	do.	7.9	.6
	N.G. 147	do.	39.1	4.7	do.	21.7	3.0
	N.G. 148	do.	44.5	4.0	do.	20.8	2.7
	N.G. 149	do.	48.4	4.6	do.	19.3	2.3
	N.G. 152	do.	25.0	2.7	..	..	..
	N.G. 153	do.	35.7	3.1	10 months	9.0	.8
	N.G. 156	do.	28.0	2.7	do.	12.1	1.2
	N.G. 157	do.	41.2	4.0	do.	14.5	1.5
	N.G. 159	do.	41.2	3.9	do.	19.9	2.3
	N.G. 160	do.	46.1	4.1	do.	12.0	1.3
	N.G. 164	do.	23.0	2.3	do.	6.8	.9
	N.G. 165	do.	42.1	3.7	do.	18.6	2.5
	N.G. 167	do.	34.4	3.6	do.	15.6	2.1
	N.G. 168	do.	39.1	4.8	do.	11.4	1.5
	N.G. 173	do.	33.4	3.9	do.	5.7	.7
	N.G. 174	do.	33.9	3.3	do.	16.3	2.4
	N.G. 175	do.	37.8	4.4	do.	15.0	1.7
	N.G. 176	do.	39.0	2.8	do.	6.3	.7
	N.G. 178	do.	22.1	1.3	do.	10.8	1.2
	N.G. 184	do.	24.6	2.3	do.	12.0	1.2
	N.G. 185	do.	24.8	1.7	do.	9.0	1.1
	N.G. 186	do.	20.3	1.6	..	..	..

These tests will be carried on for another season through the second ratoon stage, when the data accumulated during the three crops will serve as a guide in selecting canes for future propagation and distribution.

Descriptions of all the above canes appear in the Annual Report for last year, to which the reader is referred, it not being deemed necessary to reproduce them, owing to the desire to keep this Report as short as possible during the war period.

MISCELLANEOUS CANES.

The following varieties have been introduced to the Experiment Station at different periods and are now under examination, viz., Hambledon Queensland Seedling 458, Gingila (a graft of Badila and Mauritius Gingham), Petite Senneville. A striped sport of Mauritius 1900 Seedling produced at the Station has also been included.

The details of the plant crop and descriptions of the varieties appear in last year's Report.

Analytical tests were made as usual and are given hereunder, including the tests made to date :—

FIRST PRELIMINARY EXAMINATION OF MISCELLANEOUS CANES—FIRST RATOON CROP—JULY, 1917.

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.
D—	Gingila	19-7-17	8 months..	20.5	19.30	1.06	15.5	92.7
	Striped Sport, 1900 Seedling	19-7-17	do.	20.2	19.27	.80	15.5	95.4
	H.Q. 458	19-7-17	do.	19.1	17.26	.86	13.5	90.4
	N.G. 16	19-7-17	do.	18.9	16.46	1.24	12.6	87.2
	Petite Senneville	19-7-17	do.	17.2	15.51	.81	12.2	90.2

SECOND PROGRESSIVE EXAMINATION OF MISCELLANEOUS CANES—FIRST RATOON CROP—AUGUST, 1917.

D—	Gingila	22-8-17	9 months..	22.1	20.15	.50	16.0	91.1
	Striped Sport, 1900 Seedling	22-8-17	do.	21.4	19.97	.92	17.7	93.3
	H.Q. 458	22-8-17	do.	19.4	18.00	.69	14.4	92.7
	N.G. 16	22-8-17	do.	18.3	17.10	.81	15.1	93.4
	Petite Senneville	22-8-17	do.	19.1	17.91	.80	14.4	93.7

FINAL EXAMINATION OF MISCELLANEOUS CANES—FIRST RATOON CROP—SEPTEMBER, 1917.

Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity.	Fibre.
Gingila	20-9-17	10 months	21.9	20.67	.32	16.4	94.7	11.9
Striped Sport, 1900 seedling	20-9-17	do.	21.7	20.40	.21	16.3	94.0	10.8
H.Q. 458	20-9-17	do.	20.2	18.78	.20	15.1	91.6	9.8
N.G. 16	20-9-17	do.	20.5	19.61	.27	16.1	95.6	10.4
Petite Senneville	20-9-17	do.	19.9	18.16	.46	14.1	91.3	12.0

ANALYTICAL RESULTS TO DATE OF MISCELLANEOUS CANES (DIVISION C)—PLANT AND FIRST RATOON CROPS—1916 AND 1917.

Variety of Cane.	PLANT CROP, 1916.					FIRST RATOON CROP, 1917.				
	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.
Gingila	15.7	13.31	.89	10.1	84.7	21.9	20.67	.32	16.4	94.7
Striped Sport, 1900 Seedling	17.5	15.64	.69	12.4	89.3	21.7	20.40	.21	16.3	94.0
H.Q. 458	18.0	15.92	.83	12.6	88.4	20.2	18.78	.20	15.1	91.6
N.G. 16	16.9	14.33	.86	11.0	84.7	20.5	19.61	.27	16.1	95.6
Petite Senneville	17.0	14.44	.49	10.9	84.9	19.9	18.16	.46	14.1	91.3

The crop results for this year will be found in the following table of Crop Results under the heading "First Ratoon Crop, 1917" :—

CROP RESULTS TO DATE OF MISCELLANEOUS CANES—PLANT AND FIRST RATOONS—1916 AND 1917.

Country.	Name or Number of Variety.	PLANT CROP, 1916.			FIRST RATOON CROP, 1917.		
		Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
Queensland	Hambledon Seedling 458 ..	13 months	36.6	4.6	10 months	32.4	4.9
Ditto ..	Gingila	do.	33.9	3.4	do.	12.6	2.0
Ditto ..	Striped Sport, 1900 Seedling ..	do.	39.4	4.8	do.	17.1	2.8
Mauritius ..	Petite Senneville	do.	38.8	4.2	do.	13.6	1.9
New Guinea	New Guinea 16	do.	46.1	5.0	do.	13.6	2.2

H.Q. 458 appears to be a most promising cane. N.G. 16 does well on the Northern Rivers of New South Wales, but does not appear to ratoon too well at Mackay. These canes will go on to a second ratoon crop.

DATES OF ARROWING OF ABOVE CANES.

N.G. 140	8th June	N.G. 144	8th June
Gingila	10th June	N.G. 185	18th June
Sport of 1900 Seedling ..	18th June	N.G. 128	8th June
Petite Senneville	18th June	N.G. 79	8th June
N.G. 146	10th June	N.G. 74	8th June
N.G. 133	18th June		

TESTS TO DETERMINE THE ACTION OF FERTILISERS ON PLANT CROPS OF CANE AND THEIR EFFECT ON SUCCEEDING RATOON CROPS.

During the course of a number of manurial experiments at this Station, the fact has frequently been noted that where the land has been treated with lime and green manure the subsequent application of fertilisers has not increased the yield notably. When the cost of the manures is taken into consideration, the fact cannot be overlooked that the fertilising of a plant crop may not be a payable proposition as far as the plant crop itself is concerned.

There is, however, another aspect of the question, which is that extremely payable results are obtained in the succeeding ratoon crops, where results often show an increase of 15 tons per acre due to the use of manures on this class of crop. The question arises: Is the action of the manure alone responsible for this increase or does the application of fertiliser to plant cane result in a more vigorous stooling, and, in consequence, being of higher vitality, causes it to throw a stronger and more robust ratoon? In order to arrive at this point, two plots have been planted out with the cane known as New Guinea 24B, which have been treated as follows :—

Plot 1.—Not fertilised in the plant crop, but all succeeding ratoon crops will be manured.

Plot 2.—Will receive manure in both plant and ratoons.

The plant crop was harvested in October, and details of the analytical and crop results appear hereunder :—

EXPERIMENTS AS TO THE VALUE OF FERTILISERS APPLIED TO A PLANT CROP AND THEIR SUBSEQUENT EFFECT ON THE YIELD OF RATOONS—PLANT CANE N.G. 24 B—1917.

Plot.	Treatment.	Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	C.C.S.	Purity of Juice.	Fibre in Cane.
1	No fertiliser applied to plant crop, but succeeding ratoon crops will be fertilised	20-9-17	13 months	19.5	18.38	.50	14.5	93.3	11.8
2	Plant crop treated with mixed fertilisers, and ratoon crops will also be fertilised	20-9-17	do.	19.0	17.61	.46	13.8	92.7	11.8

EXPERIMENTS AS TO THE VALUE OF FERTILISERS APPLIED TO A PLANT CROP AND THEIR SUBSEQUENT EFFECT UPON THE YIELD OF RATOONS—PLANT CANE N.G. 24 B—1917.

Plot.	Treatment.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
1	No fertilisers applied to plant crop, but succeeding ratoon crops will be fertilised	13 months	48.2	7.0
2	Plant crop treated with mixed fertilisers, and ratoon crops will also be fertilised	do.	48.6	6.7

From the above table it will be seen that the application of fertilisers has had little or no effect upon the plant crop. It will now be interesting to note whether any difference will be found in the succeeding ratoon crops, the first of which will come to hand next year.

TESTS TO DETERMINE THE VALUE OF SUBSOILING RATOON CROPS.

The method of ratooning cane in vogue in this Station may be briefly described as follows:—Centres of drills are split with a swing plough and subsoiled, the stools are then cut away from and also subsoiled, manure is applied to the stools, and the centres immediately worked down with scuffler. As this method is somewhat slow, and the cost of cultivation has now to be seriously studied, in some cases where the cane is not under experiment, such as that for propagation and distribution purposes, the ratooning has been confined to simply loosening the soil. In some cases the only treatment received has been a deep double cultivation with the riding spring tooth cultivator. In watching the results, the latter method has often compared favourably with the former, and it may be that a well-fertilised cane stool growing on ground which has been previously deeply cultivated before planting may possess sufficient vitality to produce a flourishing ratoon crop without further treatment other than a loosening of the surface hard pan.

In the preparation of land for planting it has been noticed that where land has previously been subsoiled the subsoil, even after a lapse of as long as four years, is of a considerably more friable and porous nature than where no subsoiling has been given. This is borne out when rain falls, as during harvesting often great trouble is experienced through teams bogging on such land. On subsoiled ground, apparently, the only setting of the land occurs in the first 9 inches of soil, whilst below this depth the soil is in a comparatively loose condition. As the point is of considerable value in lowering the cost of production, it fully justifies experiment. To this end plots will be treated as follows:—

Plot 1.—Plant and ratoon crops will be subsoiled.

Plot 2.—Plant crop will be subsoiled, but ratooning will be carried out with the spring-tooth cultivator only.

The plant crop from these plots has been harvested and the results from the experiments with the ratoon crop will be given in next year's Report.

LIST OF CANES INTRODUCED TO THE MACKAY EXPERIMENT STATION SINCE 1911, WITH THE TREATMENT ACCORDED EACH.

In 1911 a list was published of the canes introduced to the Mackay Station since its inception. Since that time a further number have been introduced, many of which are now undergoing commercial testing. Others have been discarded on account of disease or for other reasons. The following table gives the canes introduced and what has happened to each one:—

LIST OF CANE VARIETIES INTRODUCED, EXAMINED, DISCARDED, AND UNDER EXAMINATION AT THE SUGAR EXPERIMENT STATION, MACKAY, SINCE 1911.

Country.	Number or Name of Variety.	Final Results of Variety in Question.
Queensland	Queensland Seedling No. 6	Discarded.
Do.	do. 30	Discarded.
Do.	do. 102	Discarded.
Do.	do. 116	Retained.
Do.	do. 121	Retained, but finally discarded.
Do.	do. 176	Discarded.
Barbadoes	Barbadoes Seedling No. 147	Retained.
Mauritius	Malagache	Retained.
Queensland	Hambledon Seedling No. 426	Retained.
Do.	do. 452	Died out.
Mauritius	Mauritius 1900 Seedling	Retained.
Do.	Couvé	Discarded.
Barbadoes	Barbadoes Seedling No. 208	Died out with Striped Leaf Disease.
Mauritius	Mauritius Seedling No. 189	Retained.
Queensland	Sport of New Guinea 40	Discarded.
Do.	do. 64	Discarded.
Do.	Cassilis	Discarded.
Louisiana	Trinidad Seedling No. 211	Discarded.
Do.	Louisiana Striped	Discarded.
Do.	Louisiana Purple	Discarded.
Mauritius	Mauritius Seedling No. 55	Retained.
Do.	do. 87	Retained.
Do.	do. 89	Retained.
Do.	do. 779	Retained, but finally discarded.
Do.	do. 998	Retained, but finally discarded.
Do.	do. 1002	Discarded.
Do.	do. 1201	Died out.
Do.	do. 1237	Died out.
Do.	do. 1474	Retained.

LIST OF CANE VARIETIES INTRODUCED, EXAMINED, DISCARDED, AND UNDER EXAMINATION AT THE SUGAR EXPERIMENT STATION, MACKAY, SINCE 1911—*continued.*

Country.	Name or Number of Variety.	Final Results of Variety in Question.
Queensland	Sport of New Guinea No. 41	Discarded.
Do.	Queensland Seedling No. 999	Discarded.
Do.	do. 997	Discarded.
Do.	do. 995	Discarded.
Do.	do. 992	Discarded.
Do.	do. 928	Discarded.
Do.	do. 987	Discarded.
Do.	do. 803	Failed.
Do.	do. 811	Stunted, and was not examined.
Do.	do. 812	Discarded.
Do.	do. 813	Retained.
Do.	do. 815	Discarded.
Do.	do. 820	Discarded.
Do.	do. 822	Retained.
Do.	do. 830	Died out.
Do.	do. 840	Discarded.
Do.	do. 849	Discarded.
Do.	do. 854	Died out.
Do.	do. 855	Retained.
Do.	do. 795	Discarded.
Do.	do. 794	Died out.
Do.	do. 793	Died out.
Do.	do. 792	Discarded.
Do.	do. 787	Died out.
Do.	do. 779	Retained.
Do.	do. 777	Died out.
Do.	do. 768	Discarded.
Do.	do. 767	Discarded.
Do.	do. 764	Died out.
Do.	do. 763	Discarded.
Do.	do. 750	Discarded.
Do.	do. 748	Discarded.
Do.	do. 747	Discarded.
Do.	do. 745	Retained.
Do.	do. 682	Died out.
Do.	do. 684	Discarded.
Do.	do. 694	Discarded.
Do.	do. 695	Retained.
Do.	do. 698	Retained, but finally discarded.
Do.	do. 704	Died out.
Do.	do. 717	Died out.
Do.	do. 719	Discarded.
Do.	do. 721	Discarded.
Do.	do. 794	Died out.
Do.	do. 795	Discarded.
Do.	do. 121	Retained, but finally discarded.
Do.	do. 116	Retained.
Do.	do. 115	Discarded.
Do.	do. 112	Discarded.
Barbadoes	Barbadoes Seedling No. 147	Retained.
Do.	do. 176	Discarded.
Do.	do. 224	Discarded.
Do.	do. 3747	Retained.
Do.	do. 1529	Discarded.
Do.	do. 3412	Discarded.
Do.	do. 6450	Died out.
Do.	do. 3922	Retained.
Demerara	Demerara Seedling No. 115	Retained.
Do.	do. 145	Discarded.
Do.	do. 1135	Retained.
Do.	do. 306	Discarded.
Do.	do. 1483	Discarded.
Queensland	New Guinea 24B Seedling	Died out.
Do.	New Guinea 15 Seedling	Retained.
Do.	Queensland Seedling No. 162	Died out.
Do.	do. 155	Died out.
Do.	do. 137	Retained.
Do.	Queensland Hybrid No. 1	Retained.
Do.	Queensland Seedling No. 558	Discarded.
Do.	do. 554	Discarded.
Do.	do. 437	Discarded.
Do.	do. 430	Died out.
Do.	do. 363	Died out.
Do.	do. 452	Discarded.
Do.	do. 422	Died out.
Do.	do. 365	Retained, but finally discarded.
Do.	do. 328	Discarded.
Do.	do. 285	Died out.
Do.	do. 174	Discarded.
Do.	do. 6	Discarded.
Do.	do. 59	Discarded.
Do.	do. 64	Died out.
Do.	do. 30	Died out.
Do.	do. 65	Died out.
Do.	do. 58	Discarded.
Do.	do. 286	Discarded.

LIST OF CANE VARIETIES INTRODUCED, EXAMINED, DISCARDED, AND UNDER EXAMINATION AT THE SUGAR
EXPERIMENT STATION, MACKAY, SINCE 1911—*continued*,

Country.	Name or Number of Variety.				Final Results of Variety in Question.
Queensland	Queensland Seedling No.	303	Discarded.
Do.	do.	307	Retained, but finally discarded.
Do.	do.	80	Died out.
Do.	do.	102	Discarded.
Do.	do.	103	Died out.
Do.	do.	126	Died out.
Do.	do.	135	Retained.
Do.	do.	153	Died out.
Do.	do.	8	Died out.
Do.	do.	25	Died out.
Do.	do.	45	Died out.
Do.	do.	1046	Discarded.
Do.	do.	1048	Discarded.
Do.	do.	1049	Discarded.
Do.	do.	1052	Discarded.
Do.	do.	1070	Died out.
Do.	do.	1071	Discarded.
Do.	do.	1074	Discarded.
Do.	do.	1078	Discarded.
Do.	do.	1079	Discarded.
Do.	do.	1084	Discarded.
Do.	do.	1086	Discarded.
Do.	do.	1092	Retained.
Do.	do.	1095	Discarded.
Do.	do.	1098	Retained.
Do.	do.	1102	Discarded.
Do.	do.	1103	Discarded.
Do.	do.	1133	Retained.
Do.	do.	1121	Retained.
Do.	do.	1115	Discarded.
Do.	do.	1113	Discarded.
Do.	do.	1112	Discarded.
Do.	do.	1110	Discarded.
Do.	do.	1108	Discarded.
Do.	do.	865	Died out.
Do.	do.	866	Died out.
Do.	do.	881	Discarded.
Do.	do.	884	Discarded.
Do.	do.	886	Died out.
Do.	do.	887	Discarded.
Do.	do.	889	Discarded.
Do.	do.	891	Discarded.
Do.	do.	899	Discarded.
Do.	do.	900	Discarded.
Do.	do.	903	Retained.
Do.	do.	918	Discarded.
Do.	do.	979	Discarded.
Do.	do.	977	Discarded.
Do.	do.	976	Died out.
Do.	do.	1035	Discarded.
Do.	do.	970	Retained.
Do.	do.	1025	Discarded.
Do.	do.	1023	Discarded.
Do.	do.	962	Discarded.
Do.	do.	1019	Discarded.
Do.	do.	1013	Discarded.
Do.	do.	1009	Discarded.
Do.	do.	1004	Discarded.
Do.	do.	1001	Discarded.
Papua	New Guinea No.	67	Under examination.
Do.	do.	68	Discarded.
Do.	do.	69	Under examination.
Do.	do.	70	Discarded.
Do.	do.	71	Discarded.
Do.	do.	72	Discarded.
Do.	do.	73	Discarded.
Do.	do.	74	Under examination.
Do.	do.	75	Under examination.
Do.	do.	76	Discarded.
Do.	do.	77	Under examination.
Do.	do.	78	Under examination.
Do.	do.	79	Under examination.
Do.	do.	80	Discarded.
Do.	do.	81	Under examination.
Do.	do.	82	Under examination.
Do.	do.	83	Under examination.
Do.	do.	84	Discarded.
Do.	do.	85	Under examination.
Do.	do.	86	Discarded.
Do.	do.	87	Under examination.
Do.	do.	88	Under examination.
Do.	do.	89	Under examination.
Do.	do.	90	Under examination.
Do.	do.	91	Under examination.
Do.	do.	92	Under examination.

LIST OF CANE VARIETIES INTRODUCED, EXAMINED, DISCARDED, AND UNDER EXAMINATION AT THE SUGAR
EXPERIMENT STATION, MACKAY, SINCE 1911—*continued*.

Country.			Name or Number of Variety.				Final Results of Variety in Question.
Papua	..	..	New Guinea No.	93	..	..	Under examination.
Do.	..	..	do.	94	..	..	Under examination.
Do.	..	..	do.	95	..	..	Under examination.
Do.	..	..	do.	96	..	..	Under examination.
Do.	..	..	do.	97	..	..	Discarded.
Do.	..	..	do.	98	..	..	Under examination.
Do.	..	..	do.	99	..	..	Discarded.
Do.	..	..	do.	100	..	..	Under examination.
Do.	..	..	do.	101	..	..	Under examination.
Do.	..	..	do.	102	..	..	Under examination.
Do.	..	..	do.	103	..	..	Under examination.
Do.	..	..	do.	104	..	..	Discarded.
Do.	..	..	do.	104A	..	..	Under examination.
Do.	..	..	do.	105	..	..	Under examination.
Do.	..	..	do.	106	..	..	Under examination.
Do.	..	..	do.	107	..	..	Under examination.
Do.	..	..	do.	108	..	..	Under examination.
Do.	..	..	do.	109	..	..	Discarded.
Do.	..	..	do.	110	..	..	Under examination.
Do.	..	..	do.	111	..	..	Under examination.
Do.	..	..	do.	112	..	..	Discarded.
Do.	..	..	do.	113	..	..	Under examination.
Do.	..	..	do.	114	..	..	Under examination.
Do.	..	..	do.	115	..	..	Under examination.
Do.	..	..	do.	116	..	..	Under examination.
Do.	..	..	do.	117	..	..	Under examination.
Do.	..	..	do.	118	..	..	Under examination.
Do.	..	..	do.	119	..	..	Under examination.
Do.	..	..	do.	120	..	..	Discarded.
Do.	..	..	do.	121	..	..	Discarded.
Do.	..	..	do.	122	..	..	Under examination.
Do.	..	..	do.	123	..	..	Under examination.
Do.	..	..	do.	124	..	..	Discarded.
Do.	..	..	do.	125	..	..	Under examination.
Do.	..	..	do.	126	..	..	Under examination.
Do.	..	..	do.	127	..	..	Discarded.
Do.	..	..	do.	128	..	..	Under examination.
Do.	..	..	do.	129	..	..	Under examination.
Do.	..	..	do.	130	..	..	Under examination.
Do.	..	..	do.	131	..	..	Under examination.
Do.	..	..	do.	132	..	..	Discarded.
Do.	..	..	do.	133	..	..	Under examination.
Do.	..	..	do.	134	..	..	Under examination.
Do.	..	..	do.	135	..	..	Under examination.
Do.	..	..	do.	136	..	..	Discarded.
Do.	..	..	do.	137	..	..	Discarded.
Do.	..	..	do.	138	..	..	Under examination.
Do.	..	..	do.	139	..	..	Under examination.
Do.	..	..	do.	140	..	..	Under examination.
Do.	..	..	do.	141	..	..	Under examination.
Do.	..	..	do.	142	..	..	Under examination.
Do.	..	..	do.	143	..	..	Under examination.
Do.	..	..	do.	144	..	..	Under examination.
Do.	..	..	do.	145	..	..	Discarded.
Do.	..	..	do.	146	..	..	Under examination.
Do.	..	..	do.	147	..	..	Under examination.
Do.	..	..	do.	148	..	..	Under examination.
Do.	..	..	do.	149	..	..	Under examination.
Do.	..	..	do.	150	..	..	Discarded.
Do.	..	..	do.	151	..	..	Discarded.
Do.	..	..	do.	152	..	..	Under examination.
Do.	..	..	do.	153	..	..	Under examination.
Do.	..	..	do.	154	..	..	Discarded.
Do.	..	..	do.	155	..	..	Discarded.
Do.	..	..	do.	156	..	..	Under examination.
Do.	..	..	do.	157	..	..	Under examination.
Do.	..	..	do.	158	..	..	Under examination.
Do.	..	..	do.	159	..	..	Under examination.
Do.	..	..	do.	160	..	..	Under examination.
Do.	..	..	do.	161	..	..	Under examination.
Do.	..	..	do.	162	..	..	Under examination.
Do.	..	..	do.	163	..	..	Under examination.
Do.	..	..	do.	164	..	..	Under examination.
Do.	..	..	do.	165	..	..	Under examination.
Do.	..	..	do.	166	..	..	Discarded.
Do.	..	..	do.	167	..	..	Under examination.
Do.	..	..	do.	168	..	..	Under examination.
Do.	..	..	do.	169	..	..	Discarded.
Do.	..	..	do.	170	..	..	Discarded.
Do.	..	..	do.	171	..	..	Discarded.
Do.	..	..	do.	172	..	..	Discarded.
Do.	..	..	do.	173	..	..	Under examination.
Do.	..	..	do.	174	..	..	Under examination.
Do.	..	..	do.	175	..	..	Under examination.
Do.	..	..	do.	176	..	..	Under examination.
Do.	..	..	do.	177	..	..	Discarded.
Do.	..	..	do.	178	..	..	Under examination

LIST OF CANE VARIETIES^a INTRODUCED, EXAMINED, DISCARDED, AND UNDER EXAMINATION AT THE SUGAR EXPERIMENT STATION, MACKAY, SINCE 1911—*continued*.

Country.			Name or Number of Variety.				Final Results of Variety in Question.
Papua	..	..	New Guinea No.	179	..	..	Discarded.
Do.	..	..	do.	180	..	..	Discarded.
Do.	..	..	do.	181	..	..	Discarded.
Do.	..	..	do.	182	..	..	Discarded.
Do.	..	..	do.	183	..	..	Discarded.
Do.	..	..	do.	184	..	..	Under examination.
Do.	..	..	do.	185	..	..	Under examination.
Do.	..	..	do.	186	..	..	Under examination.
Queensland	..	..	Gingila	..	..	..	Under examination.
Do.	..	..	Hambledon Seedling No.	458	..	..	Under examination.
Do.	..	..	Gingor	..	..	..	Under examination.
Do.	..	..	Gingraya	..	..	..	Under examination.
Papua	..	..	New Guinea 16	..	..	..	Under examination.
Mauritius	..	..	Petite Senneville	..	..	..	Under examination.

DISTRIBUTION OF CANE VARIETIES AT MACKAY.

The free distribution of cane varieties was carried out as usual and, in addition to the large number of Mackay growers receiving cane plants of approved varieties, cane was also sent to outside farmers and associations.

6.—WORK OF THE SOUTHERN SUGAR EXPERIMENT STATION AT BUNDABERG.

The chemist in charge of the Sugar Experiment Station at Bundaberg is Mr. James Pringle, whose work during the past twelve months has been of a highly satisfactory nature. In addition to his field duties, Mr. Pringle has carried on the whole of the analyses of the varieties upon the Station and has made close upon one thousand tests of farmers' canes. Credit is also due to Messrs. Rasmussen, foreman, and Evans, assistant, for field work. The crop on the Station this year is exceptionally heavy, due to so much of the cane being allowed to stand over as mentioned in last year's Report.

METEOROLOGICAL.

The past season from a climatic standpoint has been all that could be desired. Following a mild and fairly moist winter, the weather from October, 1916, up to the end of the wet season was for the most part hot and muggy, inducing a fine growth of cane. The rainfall was also well distributed, as will be seen from the following table :—

RAINFALL AT SOUTHERN SUGAR EXPERIMENT STATION, BUNDABERG.

The following table gives the rainfall recorded at the Experiment Station during the growing period from August, 1916, to October, 1917 :—

Month.	Rainfall.	Month.	Rainfall.
August, 1916	2-720	May, 1917	1-410
September, 1916	4-230	June, 1917	0-070
October, 1916	5-667	July, 1917	2-240
November, 1916	5-950	August, 1917	1-720
December, 1916	5-530	September, 1917	4-660
January, 1917	7-915	October, 1917	2-590
February, 1917	8-835		
March, 1917	10-980	Total	65-237
April, 1917	2-720		

The rainfall for the same period last year was 41-897 in. and from October, 1916, to May, 1917, 49-007 in., being an average of 6.125 in. per month.

EXPERIMENTS DEALT WITH IN THE FOLLOWING SECTION.

In last year's Report it was stated that it had been decided, in common with the rest of the district, to stand over the greater proportion of the cane growing upon the Experiment Station. This was done, and most of the cane has now been cut, the weights providing, with the analyses, the data from which the crop results appearing hereafter have been compiled :—

- Experiments with standover second ratoons of D 1135. Tests of different methods of ratooning, *i.e.*, ratooned by ploughing interspaces with four furrows *versus* ordinary cultivation by three furrows, and also by allowing ratoons to volunteer.
- Manurial experiments. Standover second ratoons of D. 1135, with and without mixed manures, ordinary cultivation.
- Liming, cultivation, and manurial trials with standover first ratoons of D. 1135.
- Experiments with Badila cane, planted in different widths of rows, standover first ratoons, the widths between the rows being 5 ft., 6 ft., and 7 ft. apart.

- (e) Standover first ratoons of Badila cane, of which the tops only, middles only, and bottoms only, were separately planted.
- (f) Analytical and crop results of H.Q. 426 as a standover first ratoon cane.
- (g) Analytical results of miscellaneous canes.
- (h) Analytical results of new variety from Mauritius.
- (i) Analytical results of new varieties from Java.
- (j) Analytical results of new variety from India.
- (k) Analytical results of Papuan canes.

In last year's Report it was stated that new experiments upon a large field scale had been initiated to test the yields of cane planted by hand *versus* cane planted by the horse machine ; also plots to test the efficacy of subsequent intertillage between the cane rows against no such subsequent cultivation. Two plots had also been planted for the purpose of ratoon experiments—No. 1 to be volunteered and in No. 2 the trash to be relieved. An ordinary cultivation plot was also provided. These tests were planted in March, 1916, and the standard variety of the district, viz., D. 1135, was used.

These plots made fine progress and were much admired by visiting farmers. Unfortunately, owing to the slowness with which the cane is being harvested in the Woongarra district the results for this year will not come to hand in time for this Report. The crop results of other experiments will also have to be held over till next year for the same reason.

(a) EXPERIMENTS WITH RATOONING—STANDOVER SECOND RATOONS.

The volunteer portion of this experiment came away remarkably well and maintained a lead over the other plots till the rains came at the end of February, 1916, when cultivation began to tell. Analyses of these trials were carried out in August, 1917, and the results are given below :—

ANALYTICAL RESULTS FROM DIFFERENT METHODS OF RATOONING—STANDOVER SECOND RATOONS, D 1135—AUGUST, 1917.

Plot Number.	Variety of Cane.	Method of Ratooning.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	C.C.S. in Cane.
1	D 1135	Ratooned by ploughing four furrows between rows 9 in. deep	23 months	14-8-17	17.9	16.91	.32	94.4	15.05	13.61
2	D 1135	Ratooned by ploughing three furrows between rows 9 in. deep, this being the ordinary cultivation given to ratoons in the district	23 months	14-8-17	18.9	17.91	.25	94.7	15.94	14.47
3	D 1135	Cane allowed to volunteer through trash	23 months	14-8-17	18.7	17.79	.23	94.8	15.83	14.40

The crop was then cut, yielding some 218 tons from the entire field on which these experiments were carried out. It will be noted that the three-furrow method gave the best results, though why this should be so it is extremely hard to say, save that the red soils appear to possess all sorts of peculiarities. Even the crop with no cultivation at all—i.e., "volunteered"—did nearly as well as the rest, and certainly from a monetary standpoint paid a great deal better, because absolutely no expenditure was incurred in ratooning. The results follow :—

CROP RESULTS FROM DIFFERENT METHODS OF RATOONING—STANDOVER SECOND RATOONS, D 1135—1917.

Plot Number.	Method of Ratooning.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
1	Ratooned by ploughing four furrows between rows 9 in. deep	23 months	38.76	5.27
2	Ratooned by ploughing three furrows between rows 9 in. deep, this being the ordinary cultivation given to ratoons in the district.	23 months	41.93	6.07
3	Cane allowed to volunteer through trash	23 months	36.94	5.32

This field will now be ploughed out and got ready for future trials. Experiments will, however, be continued in ratooning upon other areas.

(b) MANURIAL EXPERIMENTS—STANDOVER SECOND RATOONS D. 1135.

Portion of the field just referred to was used for the trial of mixed manures *versus* none. Hitherto the use of manures on the Station red soils has not given any startling results, but this year, owing to the entirely favourable nature of the season, much better yields for the use of fertilisers have been obtained. Analytical tests were made in August, followed by the cutting of the crop. Tables comprising the results are appended :—

ANALYTICAL RESULTS FROM THE APPLICATION OF FERTILISERS—D 1135, SECOND RATOONS (STANDOVER) AUGUST, 1917.

Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	C.C.S. in Cane.
1	D 1135	4 cwt. mixed manure applied, consisting of 1 cwt. Sulphate of Ammonia, 1 cwt. Nitrate of Soda, and 2 cwt. Meat-works manure	23 months	14-8-17	17-6	16-55	43	94-0	14-73	13-31
2	D 1135	No manure used	23 months	14-8-17	18-0	17-08	27	94-5	15-20	13-68

CROP RESULTS FROM THE APPLICATION OF FERTILISERS—D 1135, STANDOVER SECOND RATOONS.

Plot Number.	Treatment.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
1	4 cwt. mixed manures applied, consisting of 1 cwt. Sulphate of Ammonia, 1 cwt. Nitrate of Soda, and 2 cwt. Meat-works manure	23 months	55-37	7-37
2	No manure used	23 months	48-74	6-67

Considering the small quantity of fertiliser applied, the additional yield of 6-63 tons is satisfactory.

(c) LIMING CULTIVATION AND MANURIAL EXPERIMENTS.

The results from the plant crops of these experiments appear in the 1915 Report. Due to the 1915 drought and the smallness of the cane last year, together with the brief crushing period, the first ratoons were allowed to stand over. The past season being so favourable, great growth ensued during the last twelve months. These experiments run in series, but, for the sake of convenience, the analytical tables and crop results are now given together :—

ANALYSIS OF LIMING EXPERIMENTS WITH AND WITHOUT SUBSOILING—D 1135, STANDOVER FIRST RATOONS—SEPTEMBER, 1917.

Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Density of Juice (Brix.).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	C.C.S. in Cane.
1	D 1135	Subsoiled ; Lime applied before plant crop, 1 ton per acre	25 months	19-9-17	18-9	17-99	37	95-1	16-01	14-58
2	D 1135	Not subsoiled ; Lime as in Plot 1	25 months	19-9-17	18-7	17-78	41	93-1	15-82	14-35

CROP RESULTS FROM LIMING EXPERIMENTS WITH AND WITHOUT SUBSOILING—STANDOVER FIRST RATOONS, D 1135—1917.

Plot Number.	Treatment.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
1	Subsoiled ; Lime applied before plant crop, 1 ton per acre ..	25 months	57-56	8-39
2	Not subsoiled ; Lime as in Plot 1	25 months	58-54	8-40

FINAL ANALYSIS OF LIMING EXPERIMENTS WITH AND WITHOUT MANURES—D 1135, STANDOVER FIRST RATOONS—
SEPTEMBER, 1917.

Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	C.C.S. in Cane.
1	D 1135	Mixed manure, consisting of Sulphate of Ammonia 1 cwt., Nitrate of Soda 1 cwt., Sulphate of Potash 1 cwt., and Meatworks manure 1 cwt. Lime at the rate of 1 ton per acre applied before plant crop	25 months	19-9-17	18.2	16.76	.69	92.1	14.92	13.29
2	D 1135	No manure but Lime to to plant crop as in Plot 1	25 months	19-9-17	18.8	17.54	.66	93.3	15.61	14.02

CROP RESULTS FROM LIMING WITH AND WITHOUT MIXED MANURES, STANDOVER FIRST RATOONS—D 1135—
1917.

Plot Number.	Treatment.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
1	Mixed manure, consisting of Sulphate of Ammonia 1 cwt., Nitrate of Soda 1 cwt., Sulphate of Potash 1 cwt., and Meatworks manure 1 cwt. Lime at the rate of 1 ton per acre applied before plant crop	25 months	77.63	10.32
2	No manure, but Lime to plant crop as in Plot 1	25 months	64.50	9.04

FINAL ANALYSIS OF EXPERIMENTS WITH AND WITHOUT MANURES—D 1135, STANDOVER FIRST RATOONS—
SEPTEMBER, 1917.

Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	C.C.S. in Cane.
1	D 1135	Mixed manure, consisting of Sulphate of Ammonia 1 cwt., Nitrate of Soda 1 cwt., Sulphate of Potash 1 cwt., and Meatworks manure 1 cwt. No Lime; no subsoiling	25 months	19-9-17	19.4	18.46	.39	95.1	16.43	14.91
2	D 1135	No manure; no Lime; no subsoiling	25 months	19-9-17	20.3	19.19	.31	94.5	17.08	15.45

CROP RESULTS FROM EXPERIMENTS WITH AND WITHOUT MANURES—STANDOVER FIRST RATOONS, D 1135—
1917.

Plot Number.	Treatment.	Age of Cane.	Weight per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
1	Mixed manure, consisting of Sulphate of Ammonia 1 cwt., Nitrate of Soda 1 cwt., Sulphate of Potash 1 cwt., and Meatworks Manure 1 cwt. No Lime or subsoiling	25 months	80.75	12.04
2	No manure; no Lime; no subsoiling	25 months	60.54	9.66

The yields from the above experiments are exceedingly high, and go to show how profitable standover crops in this district can be when seasons such as 1913 and 1917 are experienced. Coming to the actual crop results, it will be noticed in the first series that the subsoiling has had no effect on the limed plots. This is in practical keeping with the results obtained from the plant crop, which were almost identical. The application of mixed manures in the second and third series has been highly successful, though it is difficult to understand why the plots without lime responded more notably to the action of the manures. It will be seen, as is usually the case, that the sugar content is somewhat higher in the unmanured plots. These trials will be continued into a second ratoon crop.

(d) BADILA CANE PLANTED IN ROWS OF DIFFERENT WIDTHS.

These interesting experiments have been harvested, and confirm the results obtained, not only from the plant crop, but also in previous trials carried out at the Mackay Sugar Experiment Station and in other countries, which is, that close planting gives better results in normal seasons than wide planting. These experiments will go on to a second ratoon crop. The analytical and crop results are given below :—

FINAL ANALYSIS OF CANE PLANTED IN ROWS HAVING DIFFERENT WIDTHS—N.G. 15 (BADILA), STANDOVER FIRST RATOONS,—SEPTEMBER, 1917.

Plot Number.	Variety of Cane.	Distance between Rows.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	C.C.S. in Cane.
1	Badila	5 feet ..	25 months	14.9.17	21.8	21.10	15	96.7	19.20	17.64
2	Ditto	6 feet ..	25 months	14.9.17	21.4	20.43	25	95.4	18.59	16.93
3	Ditto	7 feet ..	25 months	14.9.17	22.1	21.11	17	95.5	19.21	17.51

CROP RESULTS FROM CANE PLANTED IN ROWS HAVING DIFFERENT WIDTHS—STANDOVER FIRST RATOON CANE, N.G. 15 (OR BADILA)—1917. NO FERTILISERS USED.

Plot Number.	Distance between Rows.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
1	5 feet	25 months	64.50	11.38
2	6 feet	25 months	53.88	9.12
3	7 feet	25 months	49.06	8.52

The high commercial cane sugar in this series is worthy of note as well as the high tonnages for two years old Badila in the Bundaberg district. No fertiliser was applied to these experiments.

(e) STANDOVER FIRST RATOONS OF BADILA IN WHICH THE TOPS, MIDDLES, AND BOTTOMS WERE SEPARATELY PLANTED.

This crop shows the plots in which the seed used was top plants only to be still in the lead.

The analytical and crop results follow :—

FINAL ANALYSIS OF EXPERIMENTS IN PLANTING TOPS, MIDDLES, AND MIDDLES AND BOTTOMS OF CANES—STANDOVER FIRST RATOONS, N.G. 15 (BADILA).—SEPTEMBER, 1917.

Plot Number.	Variety of Cane.	Seed Used.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	C.C.S. in Cane.
1	Badila ..	Tops only planted ..	25 months	21.9.17	21.4	20.26	35	94.6	18.23	16.31
2	Ditto ..	Middles only planted	25 months	21.9.17	21.2	20.16	22	95.1	18.15	16.25
3	Ditto ..	Bottoms and middles planted	25 months	21.9.17	22.2	21.33	24	96.0	19.20	17.32

CROP RESULTS FROM EXPERIMENTS IN PLANTING TOPS, MIDDLES, AND MIDDLES AND BOTTOMS OF CANES—STANDOVER FIRST RATOONS, N.G. 15 (OR BADILA).—SEPTEMBER, 1917.

Plot Number.	Seed used.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
1	Tops only planted	25 months	50.52	8.14
2	Middles only planted	25 months	42.47	6.90
3	Bottoms and middles planted	25 months	42.18	7.31

(f) ANALYTICAL AND CROP RESULTS OF STANDOVER FIRST RATOONS OF CLARK'S SEEDLING H.Q. 426.

ANALYSIS OF H.Q. 426—FIRST RATOON STANDOVER—SEPTEMBER, 1917.

Country.	Name or Number of Variety.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	C.C.S. in Cane.
Hambledon, Queensland	H.Q. 426	25 months	21-9-17	21.6	20.27	.24	93.8	18.24	16.24

CROP RESULTS OF H.Q. 426—FIRST RATOON STANDOVER.

Variety of Cane.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
Hambledon Queensland 426	25 months	44.07	7.16

(g, h, i, and j) THE FOLLOWING TABLES COMPRISE THE ANALYTICAL RESULTS OF SEVERAL NEW VARIETIES INTRODUCED TO THE BUNDABERG EXPERIMENT STATION. THEY WILL ULTIMATELY BE PLANTED OUT FOR CROP TRIALS :—

ANALYTICAL RESULTS OF MISCELLANEOUS CANES—PLANT CROP—OCTOBER, 1917.

Country.	Name or Number of Variety.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	C.C.S. in Cane.
Queensland ..	Badila Seedling	14 months	10-10-17	22.4	21.53	.13	96.1	19.16	17.50
Ditto ..	Hybrid No. 1	do.	10-10-17	21.6	20.73	.11	95.9	18.45	16.83
Ditto ..	Gingila	do.	10-10-17	21.7	20.93	.10	96.4	18.63	17.04
Hambledon Q.	H.Q. 458	do.	10-10-17	20.5	19.56	.44	95.4	17.40	15.83
Queensland ..	Gingor	do.	10-10-17	21.4	20.40	.17	95.3	18.15	16.49
Ditto ..	Gingraya	do.	10-10-17	19.8	18.86	.37	95.7	16.78	15.25

ANALYSIS OF NEW VARIETY FROM MAURITIUS—PLANT CANE—OCTOBER, 1917.

Country.	Name or Number of Variety.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	C.C.S. in Cane.
Mauritius ..	168 ⁰⁴	17 months	4-10-17	20.5	19.16	.31	93.4	17.05	15.33

PRELIMINARY ANALYSIS OF FIVE NEW JAVA CANES—PLANT CROP—OCTOBER, 1917.

Country.	Name or Number of Variety.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	C.C.S. in Cane.
Java ..	E.K. 1	12 months	6-10-17	20.6	19.66	.29	95.4	17.49	15.92
Ditto ..	E.K. 2	do.	6-10-17	18.4	16.50	1.00	89.6	14.68	12.90
Ditto ..	E.K. 28	do.	6-10-17	20.5	19.56	.15	95.4	17.41	15.84
Ditto ..	247 Generatie	do.	6-10-17	20.4	19.06	.17	93.4	16.96	15.23
Ditto ..	100 Bont	do.	6-10-17	20.0	19.00	.16	95.0	16.91	15.35

FINAL ANALYSIS OF NEW CANE FROM INDIA—PLANT CANE—SEPTEMBER, 1917.

Country.	Name of Variety.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	C.C.S. in Cane.
India ..	Shahjahanpur No. 10 ..	13 months	24-9-17	20.7	19.53	.25	94.3	17.38	15.71

(k) ANALYTICAL RESULTS OF NEW PAPUAN VARIETIES.

Owing to the season last year it was not possible to replant these varieties till late in the year. Consequently, they will have to stand over till next season. In the meantime, chemical tests have been made, the outcome of which appears hereunder: A number of these canes have developed the gumming disease, viz., N.G. 74, 76, 84, 86, 92, 97, 109, 112, 132, 142, 144, 158 166, and 182:—

FINAL ANALYSIS OF PAPUAN CANES (WELLS' COLLECTION)—PLANT CROP—OCTOBER, 1917.

Country.	Name or Number of Variety.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	% Fibre in Cane.	C.C.S. in Cane.
New Guinea ..	N.G. 69 ..	14 months	4-10-17	18.5	16.66	1.14	90.0	14.66	12.0	12.88
Ditto ..	N.G. 72 ..	do.	4-10-17	20.2	19.23	.26	95.2	16.92	12.0	15.37
Ditto ..	N.G. 73 ..	do.	4-10-17	18.6	17.60	.29	94.5	15.57	11.5	14.09
Ditto ..	N.G. 74 ..	do.	4-10-17	19.5	18.23	.32	93.4	16.22	11.0	14.59
Ditto ..	N.G. 75 ..	do.	4-10-17	20.2	19.16	.17	94.8	17.24	10.0	15.48
Ditto ..	N.G. 76 ..	do.	4-10-17	20.0	19.16	.17	95.8	17.05	11.0	15.54
Ditto ..	N.G. 77 ..	do.	4-10-17	21.6	20.70	.11	95.8	18.42	11.0	16.79
Ditto ..	N.G. 78 ..	do.	4-10-17	21.5	20.46	.15	95.1	18.00	12.0	16.33
Ditto ..	N.G. 79 ..	do.	4-10-17	20.8	19.23	.48	92.4	16.92	12.0	15.13
Ditto ..	N.G. 80 ..	do.	4-10-17	20.6	19.66	.20	95.4	17.38	11.6	15.89
Ditto ..	N.G. 81 ..	do.	4-10-17	19.7	18.63	.33	94.5	16.49	11.5	14.91
Ditto ..	N.G. 82 ..	do.	4-10-17	21.0	20.16	.23	96.0	17.94	11.0	16.37
Ditto ..	N.G. 83 ..	do.	4-10-17	21.5	20.63	.24	95.9	18.36	11.0	16.73
Ditto ..	N.G. 84 ..	do.	4-10-17	19.2	18.13	.38	94.4	16.04	11.5	14.50
Ditto ..	N.G. 86 ..	do.	4-10-17	17.8	16.30	1.00	91.5	14.21	12.8	12.60
Ditto ..	N.G. 90 ..	do.	4-10-17	20.2	17.80	.36	88.2	15.95	10.5	14.32
Ditto ..	N.G. 92 ..	do.	4-10-17	20.1	19.03	.31	94.6	16.94	11.0	15.33
Ditto ..	N.G. 94 ..	do.	4-10-17	19.8	17.83	1.79	90.0	15.73	11.8	13.79
Ditto ..	N.G. 95 ..	do.	4-10-17	17.7	16.43	.64	92.8	14.62	11.0	13.11
Ditto ..	N.G. 96 ..	do.	4-10-17	20.0	19.33	.23	96.6	16.82	13.0	15.69
Ditto ..	N.G. 97 ..	do.	4-10-17	18.0	16.20	.92	90.0	14.42	11.0	12.70
Ditto ..	N.G. 98 ..	do.	8-10-17	20.3	19.26	.17	94.8	17.14	11.0	15.54
Ditto ..	N.G. 99 ..	do.	8-10-17	20.3	19.23	.19	94.7	17.11	11.0	15.52
Ditto ..	N.G. 100 ..	do.	8-10-17	18.8	17.86	.18	95.0	15.89	11.0	14.42
Ditto ..	N.G. 102 ..	do.	8-10-17	20.1	18.90	.46	94.0	16.88	10.7	14.92
Ditto ..	N.G. 103 ..	do.	8-10-17	20.2	19.23	.30	95.3	16.73	13.0	15.18
Ditto ..	N.G. 104 ..	do.	8-10-17	20.3	19.26	.25	94.8	17.24	10.5	15.63
Ditto ..	N.G. 105 ..	do.	8-10-17	17.4	15.93	.45	91.5	14.34	10.0	12.79
Ditto ..	N.G. 107 ..	do.	8-10-17	18.9	16.63	.36	87.9	14.63	12.0	12.70
Ditto ..	N.G. 108 ..	do.	8-10-17	20.4	19.56	.26	95.8	17.41	11.0	15.86
Ditto ..	N.G. 109 ..	do.	8-10-17	17.8	15.80	.53	89.3	13.90	12.0	12.13
Ditto ..	N.G. 110 ..	do.	8-10-17	19.9	18.86	.32	94.7	16.21	14.0	14.64
Ditto ..	N.G. 112 ..	do.	8-10-17	20.0	18.86	.55	94.3	16.78	11.0	15.15
Ditto ..	N.G. 113 ..	do.	8-10-17	20.8	19.56	.17	94.0	16.82	14.0	15.11
Ditto ..	N.G. 114 ..	do.	8-10-17	19.9	18.66	.45	93.7	16.23	13.0	14.60
Ditto ..	N.G. 115 ..	do.	8-10-17	20.2	18.76	.52	93.8	16.42	12.5	14.63
Ditto ..	N.G. 116 ..	do.	8-10-17	21.6	20.46	.17	94.7	18.41	10.0	16.68
Ditto ..	N.G. 117 ..	do.	8-10-17	20.3	19.23	.38	94.7	17.07	11.2	15.46
Ditto ..	N.G. 122 ..	do.	8-10-17	18.7	17.10	.59	91.4	15.22	11.0	13.50
Ditto ..	N.G. 123 ..	do.	8-10-17	20.0	18.40	.70	92.0	16.37	11.0	14.60
Ditto ..	N.G. 124 ..	do.	8-10-17	20.7	19.36	.26	93.5	17.23	11.0	15.50
Ditto ..	N.G. 125 ..	do.	8-10-17	19.6	18.74	.43	95.5	16.86	10.0	15.87
Ditto ..	N.G. 126 ..	do.	8-10-17	20.4	19.10	.43	93.6	16.99	11.0	15.30
Ditto ..	N.G. 128 ..	do.	8-10-17	19.2	17.85	.31	92.9	15.83	12.0	14.08
Ditto ..	N.G. 129 ..	do.	9-10-17	18.3	16.23	1.95	88.6	14.45	11.0	12.63
Ditto ..	N.G. 130 ..	do.	9-10-17	20.3	19.40	.28	95.5	17.27	11.0	15.71
Ditto ..	N.G. 131 ..	do.	9-10-17	20.8	19.90	.44	95.7	17.79	10.6	16.21
Ditto ..	N.G. 132 ..	do.	9-10-17	17.7	16.20	.52	91.5	14.09	13.0	12.50
Ditto ..	N.G. 133 ..	do.	9-10-17	20.4	19.43	.26	95.2	17.39	10.5	16.00
Ditto ..	N.G. 134 ..	do.	9-10-17	19.3	18.18	.17	94.2	16.32	10.2	14.65
Ditto ..	N.G. 136 ..	do.	9-10-17	18.4	16.73	.94	90.9	14.89	11.0	13.18
Ditto ..	N.G. 137 ..	do.	9-10-17	19.8	18.42	.19	93.0	16.40	11.0	14.71
Ditto ..	N.G. 138 ..	do.	9-10-17	13.1	8.00	3.91	61.0	7.20	10.0	4.50
Ditto ..	N.G. 139 ..	do.	9-10-17	19.0	15.38	2.23	80.9	13.78	10.4	11.30
Ditto ..	N.G. 141 ..	do.	9-10-17	19.2	18.00	.52	93.7	16.27	9.6	14.67
Ditto ..	N.G. 142 ..	do.	9-10-17	18.2	16.46	.94	90.4	14.65	11.0	12.91
Ditto ..	N.G. 143 ..	do.	9-10-17	16.7	13.70	1.56	82.0	12.36	9.8	10.20
Ditto ..	N.G. 144 ..	do.	9-10-17	19.0	16.70	1.25	87.7	15.66	9.6	13.09
Ditto ..	N.G. 147 ..	do.	9-10-17	21.3	20.30	.31	95.3	18.27	16.0	16.61
Ditto ..	N.G. 148 ..	do.	9-10-17	20.3	19.39	.25	95.1	17.08	11.5	15.49
Ditto ..	N.G. 149 ..	do.	9-10-17	19.8	18.43	.32	93.1	16.20	12.1	14.51
Ditto ..	N.G. 151 ..	do.	9-10-17	20.0	18.73	.18	93.5	16.67	11.0	15.52
Ditto ..	N.G. 158 ..	do.	9-10-17	19.8	18.26	.78	92.2	16.25	11.0	14.50
Ditto ..	N.G. 164 ..	do.	9-10-17	19.3	18.30	.22	94.8	16.82	9.8	14.94
Ditto ..	N.G. 165 ..	do.	9-10-17	20.9	20.03	.21	95.8	18.03	10.0	16.46
Ditto ..	N.G. 166 ..	do.	10-10-17	20.1	19.06	.41	94.5	16.91	11.0	15.28
Ditto ..	N.G. 167 ..	do.	10-10-17	19.4	18.43	.31	94.8	16.58	10.0	15.07
Ditto ..	N.G. 168 ..	do.	10-10-17	19.7	18.53	.43	94.0	16.49	11.0	14.88
Ditto ..	N.G. 171 ..	do.	10-10-17	19.6	18.70	.34	95.4	16.27	13.0	14.70
Ditto ..	N.G. 173 ..	do.	10-10-17	19.8	18.33	.39	95.1	16.66	11.0	15.23
Ditto ..	N.G. 175 ..	do.	10-10-17	19.2	18.36	.12	95.6	15.87	13.5	14.42
Ditto ..	N.G. 176 ..	do.	10-10-17	22.6	21.60	.19	96.5	19.07	12.5	17.42
Ditto ..	N.G. 177 ..	do.	10-10-17	21.1	20.36	.12	96.4	18.26	10.6	16.56
Ditto ..	N.G. 178 ..	do.	10-10-17	19.9	18.43	.62	92.6	16.58	10.0	14.85
Ditto ..	N.G. 181 ..	do.	10-10-17	17.3	16.26	.36	93.9	14.47	11.0	13.05
Ditto ..	N.G. 182 ..	do.	10-10-17	20.3	19.30	.43	95.1	17.18	11.6	15.56
Ditto ..	N.G. 183 ..	do.	10-10-17	19.6	18.50	.51	94.3	16.76	11.0	14.88
Ditto ..	N.G. 185 ..	do.	10-10-17	19.0	17.16	1.56	89.3	15.18	11.5	13.47

“ COMMERCIAL CANE SUGAR.”

The expression “ Commercial Cane Sugar ” is one that has been adopted by the Queensland Cane Prices Board and is calculated as follows :—

$$\text{Total soluble solids in juice} \times \frac{100 - (3 + \text{Fibre})}{100} = \text{total soluble solids in cane.}$$

$$\text{Sucrose in juice} \times \frac{100 - (5 + \text{Fibre})}{100} = \text{Sucrose in cane.}$$

$$\text{Total soluble solids in cane} - \text{Sucrose in cane} = \text{Impurities in cane.}$$

$$\text{Sucrose in cane} \frac{\text{Impurities in cane}}{2} = \text{Commercial cane sugar.}$$

DISTRIBUTION OF CANE AT BUNDABERG.

A distribution of cane took place at the Experiment Station during August of this year. About fifty growers availed themselves of the opportunity of securing a few good varieties, and packages of cane were sent to various mills, farmers' associations, and farmers along the railway lines north and south of Bundaberg. Altogether, it is estimated that over one hundred farmers received varieties, and the number would have been greater had harvesting operations not been in full swing at the time. The canes most applied for were M. 55, 87, 89, Q. 813, 1092, 1098, 855, H.Q. 426, 285, 114, Badila, Mahona, and Gingila.

Canes were also sent to East Africa, England, and Argentina.

NEW EXPERIMENTS.

A piece of uniform land has been planted this year with Badila and D. 1135. It has been maintained that if allowed to grow for two years the Badila would yield an amount of cane equal to two crops of D. 1135. The latter cane will therefore be harvested each year and the Badila every two years to ascertain if this contention will be borne out.

Cane is also to be planted upon land that has been growing lucerne for a number of years. Many farmers in the Woongarra district maintain that on the red soils cane will not grow after lucerne. An area is being prepared which will be divided into three parts, each of which will be treated as under :—

1. Plot treated with lime and green manure before planting.
2. Plot treated with lime only.
3. No lime or green manure.

In other respects the treatment of this land will be identical.

FIELD DAY.

A most successful Field Day was held at the Station on 1st June last, at which a large number of farmers attended.

7.—LABORATORY WORK.

The Chemical Tables in this Report show a great amount of useful work accomplished. It is impossible to rate too highly this portion of the work of the Bureau. Not only are the tables compiled in connection with the field experiments of the greatest service in enabling the commercial value of varieties to be ascertained, but the Laboratories are of direct help to growers in the analyses of their soils, waters, limestones, fertilisers, and sugar-canes. In the latter connection the large number of analyses carried out at the Bundaberg Experiment Station by Mr. Pringle deserves attention. The largest number received on any one day was forty-two but the daily average was about twenty-seven. The canes submitted were generally of from fair to excellent quality. The following tables show the amount of chemical work performed :—

DETAILED REPORT OF ANALYTICAL WORK PERFORMED IN THE LABORATORY OF THE SUGAR EXPERIMENT STATION,
MACKAY, FROM 1ST JULY, 1916, TO 30TH JUNE, 1917.

Materials.	Number of Samples Analysed.	Number of Analyses.
SOILS—		
Agricultural method	2	4
Nitrogen determinations	2	4
Humus determinations	2	4
Mechanical analyses	2	4
Citric method	2	4
Sugar-canes for farmers	90	90
Sugar-cane juices (Station)	450	900
Sugar-cane fibres	92	92
Total	642	1,002

CANE AND JUICE ANALYSES CARRIED OUT AT THE SUGAR EXPERIMENT STATION LABORATORY, BUNDABERG,
SEASON, 1917.

Materials.	Number of Samples Analysed.
Sugar cane and juices for farmers	835
Sugar cane and juices for Agricultural Show at Bundaberg	42
Sugar cane and juices for Experiment Station	211
Total	1,088

In addition to the above, the following analyses have been made for the Bureau by the Agricultural Chemist, to whom thanks are due for the work done :—

Materials.	Number of Analyses.
Sugar-canes]	13
Molasses	1
Soils	11
Limestones	1
Syrup	1
Megass ash	1
Carbonised molasses	1
Jelly sugar	3
Total	32

8.—WORK OF THE DIVISION OF ENTOMOLOGY.

The entomological research and practical work now being carried on in North Queensland is of the highest importance to every sugar producer. Since the retirement of Mr. Girault the investigations have been carried on by Mr. Edmund Jarvis in an exceedingly capable manner up till 31st May of the present year. On 1st June, Dr. James Franklin Illingworth, who had been previously engaged by the Queensland Government for three years, arrived and immediately took up his duties at Meringa, near Cairns. Dr. Illingworth was connected with the College of Hawaii as Professor of Entomology before coming to Australia, and he previously had a great deal of experience in America. He has also carried out special investigations for the Colonial Sugar Refining Company in Fiji. Mr. Edmund Jarvis remains as assistant to Dr. Illingworth. The new buildings at Meringa, comprising residences and laboratory, have now been erected and are in occupation.

In the following Report a brief survey of the year's work is given by Mr. Jarvis, supplemented by a few remarks from Dr. Illingworth :—

Meringa, near Cairns,
10th October, 1917.

To the General Superintendent,
Bureau of Sugar Experiment Stations.

SIR,—I have the honour to submit the following Annual Report, embodying a short account of research work instituted at Gordonvale Laboratory whilst Acting Entomologist during the past nine months ending 31st May, 1917 :—

CANE-BEETLE CONTROL.

Experimental work has been confined for the most part to a study of various poison-baits as being a possible means of destroying the grub form of our greyback cane-beetle; and to investigations relating to parasitic enemies attacking the larval and imago forms of this insect, and to its egg stage.

POISON BAITS.

A series of experiments were conducted last December in order to determine the action of arsenious acid and copper arsenate on growing roots of cane. In pot experiments the poison was—(1) sprinkled in a layer about 2 inches below "sets"; (2) dusted on cowpea leaves buried in a similar position to the foregoing; and (3) mixed uniformly with the soil in which "sets" were planted. Rows of cane exhibiting various stages of growth—from seed just sprouting to stools a foot or more high—were utilised for outside tests, the undiluted arsenicals in each case being liberally dusted over cowpea foliage, which was then placed in contact with the growing roots. These experiments yielded results of a most encouraging nature, the treated plants being not only uninjured but making better growth than those in control pots, and apparently deriving benefit from absorption by their roots of minute quantities of copper salts. Details of these experiments were published in the "Australian Sugar Journal," vol. VIII. p. 741.

The great importance of experimentation in connection with poison baits as a promising control method was early recognised, and kept in view throughout the course of preliminary researches instituted in 1915. As a result of numerous experiments made last season, it was found that larvæ of *Lepidiota albohirta* would devour many kinds of roots, &c., and evinced a decided liking for the leaves of such leguminous plants as the cowpea and Mauritius bean.

Foliage of the former plant dusted with copper arsenate in experiment cages at the laboratory was readily eaten by the grubs, and caused a mortality of 100 per cent. in 15 days. A full account of the above research work will be found in Bulletin No. 4 of this office, so need not be enlarged on at present.

It may be mentioned, however, that field tests in this connection were carried out by us last season on half an acre of cane land at Meringa, while at Innisfail Mr. F. L. Sugden treated a couple of acres on the Johnstone River. Owing to the scarcity of grubs, however, no damage to his crops was perceptible either on this area or untreated immediately adjoining cane land, so that the result of the experiment is left in doubt.

"One important point," writes Mr. Sugden "appears to be definitely proved, that the application of even a heavier dose of paris green than you advised has had no injurious effect, but rather the reverse, on the growth of the crop." Unfortunately, a similar scarcity of grubs rendered the results of our half-acre plot at Meringa inconclusive.

Early in March the cane on each side of this test plot was treated by Mr. Draper with bisulphide of carbon, but in June the plants on our experiment area were fully 8 feet high and quite as flourishing as cane growing on soil that had been fumigated.

INSECT PARASITISM.

A new species of tachinid fly was bred by the writer at Gordonvale last January from a specimen of the greyback beetle. A female of *Lepidiota albohirta* infested by a single maggot of this parasite was able, notwithstanding, to mature and deposit fourteen eggs before succumbing to its injuries.

Our greyback cockchafer appears very liable to victimisation by dipterous parasites, owing probably to the habit of remaining on the feeding trees all day in a motionless semi-torpid state, fully exposed to the assaults of such insect enemies. The only other dipterous bred at Gordonvale from the adult form of *albohirta* was a small fly five-sixteenths of an inch long, which was first noticed in 1914 but has not yet been identified. It belongs to the *Tachinidae* and is evidently an abundant species.

Other parasites bred by us during the past two years include eight species of *Dexiidae*, four of *Asilidae*, and three *Scoliidae* wasps.

Descriptions of the abovementioned tachinid flies, together with other details in this connection, were published last May. ("Australian Sugar Journal," vol. IX., p. 121.)

THE EGG STAGE OF *L. albohirta*, Water.

Details relative to the egg stage of this beetle formed subject for report last January, when data regarding the method of deposition, appearance, and number of eggs laid were duly described ("Queensland Agricultural Journal," vol. VII., p. 83).

It may be mentioned here that the eggs of this insect are placed in a flattened mass on the floor of a chamber excavated 6 inches or more below ground levels, of irregular shape, and fully an inch in diameter, with sides firmly compacted. At the time of deposition the egg is of a creamy white colour, about 4.25 mm. long, but during development gradually swells, until just prior to hatching it is 6.30 mm. in length. With regard to the maximum number of eggs that may be produced by a single beetle, the results obtained last season verified the correctness of previous opinions expressed by the writer in this connection in 1916 ("Australian Sugar Journal," vol. VII., p. 902).

Judging from numerous dissections made at that time, it was concluded from the structure of the ovarian tubes that an individual beetle, although often laying from 24 to 30 eggs, was capable of producing as many as three dozen—a number by the way much in excess of that given by other entomologists, who have stated the maximum to be 24 or 25. During last season, however, (December, 1916, to January, 1917) a female beetle of this species caged at the laboratory actually deposited on the 8th January a batch of 36 eggs, and from the ovary of another specimen a similar number was taken fully grown and almost fit for exclusion. In addition to the above high records, two beetles laid 34 eggs each, while other lots—obtained from chambers formed in cages of damp earth—comprised eight batches of 30 eggs, three of 29, one of 28, one of 27, seven of 26, three of 25, and eight of 24.

The seventy-three females used in the above experiments produced altogether 1,537 eggs.

EXPERIMENTS WITH LIGHT TRAP.

Additional data of an interesting nature regarding the phototropism of *Lepidiota albohirta*, Water, and *L. frenchi*, Blackb., was obtained last season. The former insect appeared in smaller numbers than usual, and as emergence was not followed by showery weather, the aerial activity of the beetles decreased very noticeably day by day in proportion as the soil became gradually drier, until on the 23rd November (nine days subsequent to the first appearance of this insect) not a single specimen was heard flying at the usual hour, although the dry bulb registration was 78° F. and other conditions were eminently favourable.

Lepidiota frenchi, Blackb., made its usual biennial emergence *en masse*, and many specimens found their way into the light trap.

Unlike *albohirta*, however, this species is not attracted to artificial light during its short period of flight—which takes place in the twilight and lasts for about a quarter of an hour—but after darkness has set in beetles that happen to be resting on cane leaves within the area of illumination are apparently roused from their sleepy condition and react towards the light.

PUBLICATIONS.

"Notes on the Life History and Metamorphosis of *Lepidiota frenchi*, Blackburn." Edmund Jarvis (Qld. Bur. Sug. Exp. Stat., Div. Ent., Bull., No. 5, 1917).

"Monthly Progress Reports," August, 1916, to August, 1917. Edmund Jarvis ("Australian Sugar Journal," vols. VIII, 1916, IX, 1917).

I have, &c.,

EDMUND JARVIS,

ADDITIONAL NOTES BY DR. ILLINGWORTH.

May I add a few notes to this Report by Mr. Jarvis, bringing the record of our activities down to date.

NEW LOCATION.

Our Station at Meringa is nearing completion and we are, at last, getting settled in our new quarters. Though the buildings are commodious and convenient, we must still pass through a considerable period of pioneering before we can get the grounds in condition for experimentation, covered as they are with second-growth forest. The new insectary, which is covered with fly-proof screen, is proving a great convenience in the breeding of parasites.

FIELD EXPERIMENTS.

As Mr. Jarvis has indicated, work was begun along this line last season; but, shortly after my arrival, I decided that the time was ripe for more extensive field experiments. This decision came not only from the fact that laboratory experiments with poisons had proved highly satisfactory, but also from the desire to make a practical test of various cultural methods in the control of the grubs. Naturally, the location for such tests should be in fields worst attacked, and we were fortunate in securing plots both at Meringa Farm and on the Greenhills Estate.

The Meringa experiments have an area of 10 acres, divided up into fifteen plots, which should give us a basis for judgment as to the best method of applying poisons; also, supply data as to the effects of lime, green manure, and commercial fertilisers in grub-control.

The Greenhills experiments are on a more extensive scale, ranging in area from 1 acre upwards. Including the checks, there are about a dozen plots. While part of these are to secure additional data in regard to the effects of poisons, the principal experiments are along the line of cultural methods in their relation to grub-control.

BREEDING OF PARASITES.

It is a noteworthy fact that though the parasites of the grubs are rather numerous in Queensland they do not appear to materially decrease this pest. This lack of efficiency is due, as has been pointed out several times, to the fact that there are numerous secondary parasites in this field. No parasite can ever be effective as long as it is itself continually set upon by some other parasitic foe.

It was with a desire to find out something further in regard to the interrelation of these parasites that we began breeding-work in the laboratory with the principal parasites of the grubs. If they could be multiplied abundantly, under such conditions that they would be free from the attacks of their enemies, they might be liberated with advantage in the field. At least two species of the wasps, which prey upon the grubs, are now abundant in the field—at a time when there are no *albohirta* grubs available. It has been found to be an easy matter, however, to get them to oviposit on other nearly-related grubs, which they probably use in the field, to tide them over until *albohirta* appears.

As was indicated in a previous report, we feel that there is considerable promise in the use of the fungous diseases for the control of these pests, particularly since the grubs are most active during the wet season, under conditions most favourable for the development of fungi. It is found that the muscardine fungus, which is often so fatal to the grubs, can be easily multiplied under laboratory conditions, and it only remains to determine the best method of application of this disease. It should certainly be distributed to every infested district.

THE INSECT COLLECTION.

I have had the scope of the collection greatly increased, and Mr. Jarvis has been spending considerable time in arranging it. In any field of economic work it is necessary to know, not only the specific subject that one is dealing with, but also all related subjects. This is particularly true in economic entomology. Even a rather complete collection of the insects which are known to injure sugar-cane is of comparatively little value unless it is supplemented by the addition of the numerous related species found in the district, any one of which might, at any time, turn its attention to sugar-cane. Furthermore, it is very convenient to have these recorded insects whenever specimens are sent in from the field for determination.

J. F. ILLINGWORTH,

9.—VARIETY PLOTS IN DIFFERENT DISTRICTS.

The variety plots established have so far done well and free cane distributions have been made from the plots upon the farms of Messrs. James Mackersie, Ayr, H. E. Hollins, Ingham, and N. Jacobsen, Yerra. Varieties are also growing upon the nursery at Mossman Mill, from which a distribution was to have been made recently.

10.—LIME AND FERTILISERS.

The necessity for the use of lime in our canefields is every year becoming more marked, but unfortunately the price does not show any tendency to decrease. A great deal of interest is being manifested in coral sand and coral lime in North Queensland. Machines for pulverising these materials are upon the market, and their use would be of great advantage to cane farmers generally in combination with green manures. Correspondence has taken place with the Railway Department as to lowering the freights on the carriage of lime, and, although so far the Bureau has not been successful in obtaining reduced railage for burnt lime, the Department has agreed to carry pulverised limestone for agricultural purposes for distances of 25 miles and over at the rate of $\frac{1}{2}$ d. per ton per mile. This is a great concession, and it is hoped that the Railway Department may yet be persuaded to carry burnt lime for agricultural purposes at the same rate, provided a certificate is given by the consignee that it is to be used solely for agricultural purposes. This is done in Victoria, and is found to work well.

Fertilisers are still advancing in price and potash is almost unprocureable, except small lots in mixtures. Meatworks manure is being very largely used at the present time, and the addition of nitrate of soda to this renders it a good all-round manure to use.

11.—ECONOMICS.

During 1916 the mills from the Lower Burdekin south lost practically from six weeks to two months' crushing, due to the "Dickson Award." All the mills above Townsville, however, continued, and put through large tonnages of cane.

Due to the larger crops in the North, the shortage of sugar was considerably smaller than in the previous year, the total yield being 176,973 tons, an increase of 36,477 tons over 1915. This, however, still left a large deficiency (even taking the yield of New South Wales into account), which had to be provided for by importation. This again draws attention to the urgent necessity for the encouragement of the sugar industry in Queensland by every possible means, so that the consumption in Australia may be yearly provided for and the drain of gold leaving the country to purchase this staple be stopped.

The total acreage under cane in 1916 was estimated by the Government Statistician to be 167,221 acres, an increase of 14,194 compared with 1915. Of this area, cane from 75,914 acres was crushed, leaving a balance of 91,307 acres, which included standover cane, cane cut for plants, and cane planted for 1917. This is a much larger unproductive area than in most other years, and is accounted for by the large area allowed to stand over till the following season. The amount of cane produced from the area crushed was 1,579,514 tons, being an average of 20.81 tons per acre. The yield of sugar was 176,973 tons of 94 net titre or 2.33 tons per acre.

The amount of cane taken to produce 1 ton of sugar was 8.93 tons, a much higher figure than that in recent years. This was accounted for by the comparatively low density of the cane, due to the wetness of the crushing season. The previous season of 1915 was an abnormally dry one and the tonnage of cane to a ton of sugar was lower than at any time previously recorded, viz., 8.2. The yield of cane per acre for the whole State was good, but in the Wide Bay district, where the effects of the drought were most severely felt, the average tonnage of cane per acre was only 14.13.

The price of raw sugar during the 1916 season remained at £18 a ton, which was far too low in view of the increased price of labour and commodities. This has now been fixed at practically £21 per ton.

The prospects at the commencement of the present season were excellent. Due to the favourable nature of climatic conditions towards the end of last and the early part of the present year, the cane made wonderful growth, as, indeed, it always does after a period of drought. Added to this is the large amount of standover cane from last season. Together they were expected to make up a record crop. The largest tonnage of sugar so far produced in Queensland was in 1913, when the yield reached 242,837 tons. Since that year three new large mills have commenced operations, viz., Inkerman, Babinda, and South Johnstone, capable of manufacturing an additional 45,000 tons of sugar.

This season almost all the sugar-mills are working up to their full capacity, a state of affairs not often realised. The yield, if conditions remain favourable, will therefore exceed the estimated consumption of Australia, some 265,000 tons. Supposing that the estimated tonnage given in the earlier portion of this report is harvested and crushed, the sugar to be produced should reach the value of £7,266,000, which is almost equal to the total Australian wheat crop of 1914-15, and twice the value of the Queensland dairying output this year.

The quantity of molasses run to waste is generally estimated as being about one-third of the total product, but the actual amount is probably a good deal in excess of this, as the Government Statistician points out, for the reason that many of the mills do not make any return of the amount used or wasted. A factory at Brisbane is now being erected for the Commonwealth Government which will deal with a portion of the unused molasses. Much greater interest is being taken in the possible utilisation of this substance than formerly, and it is quite probable that means will be adopted to prevent the enormous waste that now goes on.

12.—GENERAL.

It is proposed to establish a new Experiment Station at South Johnstone, which will serve the Northern sugar districts.

The older varieties of cane sent to the Kairi State Farm some years ago have been inspected and found to be doing well. It is hoped that next year these may be brought down from the Atherton Tableland and distributed to those farmers requiring same. The Manager of the State Farm, Mr. Olive, has given a good deal of care and attention to these varieties and deserves hearty thanks for his work in this connection.

Motor tractors for ploughing and other agricultural purposes are coming rapidly into use in North Queensland, and are stated to be doing good work at a cheap rate for fuel and labour.

Before closing this Report, the writer desires to thank the various farmers' associations and their officers and the managers and officers of the Queensland sugar-mills for many acts of courtesy and attention ; also for their extreme readiness to assist in every way the work of the Bureau.

Thanks are also due to the metropolitan and country Press for the dissemination of general information and reports. The "Australian Sugar Journal" has on every occasion helped the Bureau by giving a great deal of space to its operations and by specially illustrating articles upon occasions.

The Bureau is also indebted to the Government Printer for the care taken in printing technical and other bulletins, and the promptitude with which these are published.

HARRY T. EASTERBY,
General Superintendent.

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