1916.

QUEENSLAND.

SIXTEENTH 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.

ERNEST G. E. SCRIVEN,
Director.

Brisbane, 24th November, 1916.

This year's Annual Report includes :—

1. Introduction.
2. Approximate Estimates of the 1916 Cane Crop.
3. General Work with brief notices of the Various Sugar Districts.
4. New Varieties of Cane.
5. Work of the Central Sugar Experiment Station, Mackay.
6. Work of the Southern Sugar Experiment Station, Bundaberg.
7. Laboratory Work.
8. Variety Plots in Different Districts.
9. Work of the Division of Entomology.
10. Lime and Fertilisers.
11. Mill Work and Economics.
12. Increase of Southern Europeans in the Industry.

1.—INTRODUCTION.

Due to the present disturbed state of the Sugar Industry in Queensland and to the fact that war conditions render economy necessary, it has been decided to considerably curtail the Annual Report for this year. This can be more easily done seeing that Bulletins embodying advice and information for cane-growers are now frequently issued and widely circulated by this Bureau.

2. APPROXIMATE ESTIMATES OF THE 1916 CANE CROP.

The severe drought experienced last year caused a serious shortage which had to be made up by importations of foreign sugars. The total amount of sugar manufactured in Queensland during 1915 was 140,496 tons ; New South Wales manufactured 19,185 tons, and Victoria 560 tons. This left a deficiency of about 100,000 tons.

This drought also affected the 1916 cane crop, more particularly in the Lower Burdekin, Bundaberg, Childers, Mount Bauple, and Moreton Districts. The dry weather in these localities lasted practically till March. Cairns and Mackay also suffered, but not to the same extent. Good rains, however, fell during the autumn, winter, and spring months, and the cane in those Northern districts affected commenced to make rapid growth and materially increased the crops. In the Southern cane districts a marked improvement also took place, but the growth was not so vigorous as in the north, and in many of these areas the crop is still growing and has a remarkably green top. A large amount of this cane will stand over till next season.

In the first column of the following table are shown approximate estimates of the cane it was anticipated would have been crushed in Queensland if industrial matters had remained *in statu quo*. The second column shows the reduction in such estimates that may take place owing to the closing down for a period of nearly two months of the majority of the mills below Townsville, and the complete stoppage of others that were not crushing at the date of this report. The latter are shown in the third column :—

Mill.	Approximate Estimate at Commencement of Season.	Approximate Amount that may now be Crushed.	Remarks.
Mossman	70,000	70,000	
Mulgrave	72,000	70,000	
Hambledon	75,000	75,000	
Babinda	150,000	150,000	
Goondi	100,000	100,000	
Mourilyan	56,000	56,000	
South Johnstone	45,000	45,000	
Macknade and Victoria	210,000	210,000	
Kalamia	45,000	45,000	
Pioneer	65,000	100,000	
Inkerman	35,000		
Proserpine	60,000	45,500	
Plane Creek	54,000	44,000	
Homebush	45,000	41,000	
Cattle Creek	27,000	27,000	
North Eton	16,000	15,000	
Marian	42,000	35,000*	
Racecourse	38,000	35,000	
Palms	30,000	28,000	
Farleigh	70,000	60,000	
Pleystowe	45,000	35,000	
Baffle Creek	5,000	4,000	
Miara	4,000	2,000	
Waterloo	4,600	1,400	
Invicta	25,000	..	Not crushing
Qunaba	22,000	12,000	
Millaquin	34,000	28,000†	
Fairymead	52,000	26,000	
Gin Gin	21,000	21,000	
Bingera	55,000	40,000	
Doolbi	17,000	..	Not crushing
Childers	40,500	..	Not crushing
Isis Central	26,000	12,000	
Maryborough	11,000	9,000	
Mt. Bauple	25,000	20,000	
Moreton	24,000	24,000	
Marburg	2,000	1,500	
Nerang	10,000	8,500	
Steiglitz	3,500	3,500	
Junction	4,000	4,000	
Rocky Point	7,000	7,000	
Albert and Logan	2,000	2,000	
Eagleby	2,000	2,000	
Gramzow	2,300	2,300	
Totals	1,748,900	1,516,700	

Amount crushed last year (1915) .. .. 1,152,516 tons cane.

* Should weather conditions permit another 7,000 tons may be treated in January.

† Including 4,335 tons from the Pialba District.

These figures, it must be remembered, are only approximate at the present time, and are subject to alterations as the season goes on. Generally speaking, they show that if all the mills had worked full time and been supplied with the estimated amount of available cane there would have been some 1,748,900 tons crushed. This would have been equivalent to 205,752 tons of sugar at 8·5 tons of cane to one ton of sugar, and with 20,000 tons manufactured in New South Wales would have left a deficiency of 34,248 tons to be made up by importation. Under present conditions, however, the deficiency may possibly be in the region of 62,000 tons, but it is quite impossible to say what the actual shortage will definitely be until this year's crushing is completed. The price of raw sugar to Queensland manufacturers remains at £18 at this date.

The moist nature of the season has had an effect on the sugar content of the cane which is, in many districts, considerably lower than last year when it was the best on record. This factor may have a marked effect in decreasing the total yield of sugar.

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

The work of the General Superintendent and Field Assistant has continued upon the same lines as laid down in previous reports. In addition to the advising of growers on methods of cultivation, manuring, and rotation of crops, observations have also been made by the Field Assistant upon sugar farms generally, comprising notes on soils and their testing for alkalinity and acidity, details of crops, use of lime, green manures and fertilisers, drainage, irrigation, notes on weather, ploughing, planting, cultivation, harvesting, ratooning, labour, pests, varieties of cane, arrowing of cane, disposal of trash, &c. This will facilitate the giving of advice to growers by the General Superintendent in a marked degree.

So far reports upon 750 farms have been sent in. Upon these 73 farmers have used lime, 171 have practised green manuring, and 240 have used fertilisers. The percentage of growers using lime, green manures, and fertilisers is much higher on Northern sugar farms than it is in the South. In the cane soils submitted to the Agricultural Chemist for analysis, it is found that acidity is predominant.

The proportion of farmers using lime, green manures, and fertilisers is thus shown to be relatively small as far as the observations have gone.

The Field Assistant (Mr. A. P. Gibson) has recently enlisted with the Australian Imperial Forces, and leave of absence during the term of his military duties has been granted to him. He has carried out his duties with zeal and ability, and will be a loss to the Bureau while he is away.

Due to the General Superintendent being a member of the Board appointed by the Government to enquire into and report upon the position of the Sugar Industry in Australia in the early part of the present year he was unable to give as much attention as usual to some of the sugar districts. The remainder of his time has been fully taken up with correspondence, which largely consists of applications for advice in cane culture and treatment of lands, the general direction of the Central and Southern Sugar Experiment Stations, the moving round amongst cane farmers and the delivering of addresses on the cultivation of cane.

Brief Survey of Sugar Districts.

Mossman.—One mill. Crop has done well this year, and a large tonnage is expected. The variety known as D. 1135 is coming steadily into favour and is now being largely grown.

Cairns.—Three mills. The new mill at Babinda is working smoothly and an immense crop is being dealt with. The season, however, has been wet, and the density of the cane low in consequence. Drier conditions prevailed at Mulgrave and Hambledon, where the crops are lighter and the quality of the cane better.

Johnstone River.—Three mills. There is a large crop of cane in this district also. The new South Johnstone Mill, although not quite completed, is now crushing. Prospects for next year are excellent, provided favourable conditions ensue.

Herbert River.—Two mills. In 1915 the fine stand of young plant cane was commented on. This has ripened into a splendid crop, and with the ratoons will keep both mills fully employed this year. There have been large plantings made for next year, and, should the present trouble be overcome there will be a big crop for 1917. The settlement of Southern Europeans in this and the Johnstone River district continues to increase. Statistics are given at the end of this report.

Lower Burdekin.—Three mills. This is one of the districts that suffered most severely in the 1915 drought and the 1916 crop was in consequence affected. All the mills ceased operations after the Dickson Award for a term, but Pioneer and Kalamia have now resumed. At present it is doubtful if Inkerman will crush this year. The season since March has been a fine one and there is a large amount of young cane in evidence for next season.

Proserpine.—One mill. A good crop is being treated at this mill and the outlook for next year is good if conditions are favourable.

Mackay.—Nine mills. The crop at Mackay has improved wonderfully during the past few months and most of the mills were anticipating fair crushings. All the factories, however, were closed down for nearly two months at the commencement of the season and only resumed operations in October. The young plant cane for next year is good, and, if cultivated, should yield a fine return.

Bundaberg and Childers Districts.—Twelve mills. The cane in these districts was badly affected by the disastrous season of 1915. In February and March good rains set in which have continued, and, although the crops have not as a whole made the headway anticipated, they are healthy, green, and still growing. It will be possible to hold much of the cane over till next season and this will be done to a large extent. At present only nine mills out of the twelve are operating.

Maryborough and Mount Bauple.—These districts also suffered greatly from the effect of last year's drought. At Pialba the same conditions existed at the beginning of the year, but this locality made a quick recovery. Both the Maryborough and Mount Bauple Mills ceased operations but they have now resumed.

Moreton District.—One mill. The crop in this district also suffered from drought at the early part of the season, but recovered to a great extent after the rains. The mill is now operating.

Logan and Nerang.—Seven mills. These localities, the oldest cane-growing districts in Queensland, have raised good crops of cane this year, and scarcely any damage has been done by frost. All the mills are now working.

4.—NEW VARIETIES OF CANE.

During the year the following varieties have been introduced:—

To the Southern Sugar Experiment Station—

From Mauritius, by courtesy of the Director of Agriculture, No. 15^{04}, No. 29^{04}, No. 168^{04}, No. 222^{04}.

From Java, by courtesy of C. Bezoet de Bie, E.K. 1, E.K. 2, E.K. 28, No. 100 Bont, and No. 247 Generatie.

From Java, by courtesy of Fairymead Sugar Co., J. 247.

To the Central Sugar Experiment Station, Mackay—

From Fiji, by courtesy of the Colonial Sugar Refining Company, 8R31 and 7R428.

From the Mossman River, by courtesy of the Mossman Central Mill Company, a seedling like Badila.

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

The work of the Experiment Station at Mackay is for the present largely confined to the testing of the new Papuan canes introduced in 1912 through the medium of Mr. T. H. Wells. These now occupy so much of the available land at the Station that when provision has been made for areas of cane for distribution, there is not a great deal left for other purposes.

The Laboratory and Field testing is under the care of Mr. L. C. McCready, the Chemist in Charge who continues to carry out his duties in an efficient and praiseworthy manner. During the past year Mr. McCready has been assisted in the Laboratory by Messrs, Barke and Von Stieglitz, who have performed their duties with accuracy and care.

The portion of the report relating to this Station has to a large extent been prepared by the Chemist in Charge, additions and comments being added by the General Superintendent where considered necessary.

Meteorological.

In writing of crops planted on the Station last August, Mr. McCready says :—

" From a growing standpoint the year just ended has been remarkable owing to the number of checks to growth which the cane has received on account of dry periods. In August, 1915, a slight fall of rain occurred which had the effect of assuring an almost perfect germination. Drought conditions then followed until early in October, when another fall of 125 points revived the crop. The effects of the latter fall, however, quickly disappeared, and the cane was showing a wilted appearance when at the end of November a good fall of 5 inches or so occurred. Following this fall crops made good progress right into January, when the lack of moisture again caused a check to its growth, which was not relieved until the end of March. The crop at this stage was then somewhat backward on account of the repeated setbacks experienced ; however, good weather and an open winter following, most of the cane made good headway, and, as will be seen from tables further on in this report, final results compare favourably with former years. At present the outlook for the 1917 crop is highly promising, but the fact must not be overlooked that although good rains have fallen, there has as yet been insufficient to establish a surplus of moisture underground, since the severe drought of 1915."

The weather conditions during the growing period from September, 1915, will be found in the following table :—

Abstract of Meteorological Observations made at the Sugar Experiment Station, Mackay, from 1st September, 1915, to 31st August, 1916, 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 equalling 100 at 9 a.m.	Mean Daily Evaporation in Cubic Inches.
September	·53	94·0	80·0	87·0	69·5	48·4	58·9	27·9	72·9	74·8	·211
October	1·61	92·0	82·0	87·0	66·9	53·0	59·9	28·4	73·4	50·1	·209
November	5·22	95·0	84·5	89·7	69·4	55·0	62·2	27·7	75·9	55·0	·240
December	8·37	91·0	81·0	86·0	71·0	59·0	65·0	20·2	75·5	63·8	·200
January	7·56	90·2	81·0	85·6	73·2	60·0	66·6	18·6	76·1	74·3	·207
February	6·42	94·0	86·0	90·0	74·0	63·0	68·5	19·7	79·2	66·0	·202
March	3·48	94·4	82·3	88·3	74·3	61·0	67·6	22·2	77·9	68·0	·199
April	8·03	90·4	78·3	84·3	71·0	55·0	63·0	20·4	73·6	80·4	·215
May	2·91	86·0	72·0	79·0	66·4	43·8	55·1	22·6	67·0	78·5	·190
June	2·10	83·0	72·0	77·5	59·0	33·2	46·1	31·0	61·8	79·0	·199
July	5·08	80·6	73·5	77·0	63·0	34·5	48·7	26·1	62·8	85·6	·196
August	1·30	84·1	76·0	80·0	57·0	34·5	45·7	30·1	62·8	86·8	·195

Experiments dealt with in this Section of the Report.

Cultivation Experiments.—A comparison of different methods of after tillage, in relation to its effects on the crops.

Analytical Tests.—A comparison of the sugar values of the varieties called Cheribon, Malabar, and Otamite, in competition with the varieties known as Badila, Goru, and Hambledon Queensland 426 (Clark's Seedling). Second ratoon stage.

Chemical and Commercial Testing of different varieties of Cane.—This is a matter to which too much attention cannot be given, more especially since the findings of the Cane Prices Board lay down that cane may in future be sold by sugar contents. It is gratifying to note that in many of the sugar districts of Queensland those canes which have been tested and distributed by the Experiment Stations are coming into prominence. These experiments comprise :—

Experiments with Papuan Canes (Wells Collection, First Selection).—The results of the plant crop of this experiemnt appeared in last year's report. In this report will be found those of the first ratoon crop.

Further experiments with Papuan Canes (Wells Collection).—This series of experiments was planted out last year, and particulars will be found detailed further on in the report.

Experiments having for their Object different methods of Cultivation between the Cane Rows.

Details concerning these experiments appear in the last two annual reports. Due to the fact that the mills were not crushing at Mackay when it was necessary to get the results of this experiment, the whole of the cane could not be weighed, and the best that could be done under the circumstances was to weigh an average length of cane from each plot and calculate out the results from these. As this method, however, can be misleading, it is intended to repeat the experiment. In the meantime the total crop results are given in the table following ; this year's figures (subject to the disabilities mentioned above) appearing under the heading of second ratoon crop, 1916.

Total Crop Results to date of Canes in the Cultivation Experiment, Plant, First and Second Ratoon Crops—1914, 1915, 1916.

Number of Plot.	Variety of Cane.	Method of Subsequent Cultivation.	Plant Crop, 1914.		First Ratoon Crop, 1915.		Second Ratoon Crop, 1916.		Total Yield—Three Crops.	
			Yield of Cane per Acre in English Tons.	Yield of Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Sugar per Acre in English Tons.
1	N.G. 24B	Shallow cultivation with duck foot hoes on Planet Junior Cultivator. Depth, 3 inches	54·4	8·6	19·6	3·35	31·3	4·8	105·3	16·75
2	N.G. 24B	Deeper cultivation, with digging hoes fitted on Planet Junior Cultivator. Depth, 4 inches	45·6	7·2	18·1	2·94	34·6	5·3	98·3	15·44
3	N.G. 24B	Combination of pony plough and Planet Junior Cultivator fitted with digging hoes. Depth, 6 inches	49·5	8·1	17·0	2·78	37·2	5·6	103·7	16·48
4	N.G. 24B	Spring tooth harrowed to depth of 6 inches	51·6	8·3	20·0	3·4	44·8	6·9	116·4	18·6
5	N.G. 24B	Cultivated with light drill harrow fitted with straight sharp tines. Depth, 3 inches	53·4	7·9	19·6	3·35	40·0	6·2	113·6	17·45

Analytical Tests of Malabar (Green Tanna), Otamite, and Cheribon, in Competition with New Guinea 15 (Badila), New Guinea 24 (Goru), and Hambledon Queensland 426 (Clark's Seedling).

As there is a great amount of controversy regarding the respective merits of the above varieties as sugar producers in the Mackay district, experiments were undertaken in 1913 to afford data upon this question. These were planted in two series ; one an early (March), and the other a late (August) planting. The results of the analyses of the plant crop from each of these were published last year. Analyses were made every month from June till December. In 1915 similar analyses were carried out of the first ratoon crop, and these from June to November were given in the last report. The analytical data for the month of December, 1915, appear below :—

Final Examination of Canes in the Analytical Test Experiments—First Ratoon Crop—December, 1915.

Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	P.O.C.S.	% Sucrose in Cane.	% Fibre in Cane.
Hambledon, Queensland 426	6-12-15	14 months	20·7	18·90	·14	91·3	15·0	16·86	10·8
Badila	6-12-15	do.	22·8	21·24	·10	93·1	17·1	19·16	9·8
Goru	6-12-15	do.	19·1	17·64	·28	92·3	14·1	15·74	10·8
Cheribon	6-12-15	do.	21·6	20·05	·30	92·8	16·1	17·74	11·5
Malabar	6-12-15	do.	21·2	19·16	·48	90·3	15·1	16·67	13·0
Otamite	6-12-15	do.	20·6	18·90	·60	91·7	15·1	16·82	11·0
Hambledon, Queensland 426	6-12-15	do.	21·7	20·40	·07	94·0	16·5	18·36	10·0
Badila	6-12-15	do.	21·5	20·06	·31	93·3	16·2	18·24	9·1
Goru	6-12-15	do.	19·4	17·90	·39	92·2	14·3	16·02	10·5
Cheribon	6-12-15	do.	21·3	19·50	·34	91·5	15·6	17·38	10·9
Malabar	6-12-15	do.	20·3	18·23	·61	89·8	14·4	15·95	12·5
Otamite	6-12-15	do.	20·2	18·13	·56	89·7	14·3	16·21	10·6

In order that these results may be quickly comprehended they have been summarised in the tables hereunder, and they confirm those of last year :—

ANALYTICAL TESTS OF FIRST RATOON CANE FROM EARLY PLANTING IN MARCH, 1913.

Variety.	JUNE, 8 MONTHS.		JULY, 9 MONTHS.		AUGUST, 10 MONTHS.		SEPTEMBER, 11 MONTHS.		OCTOBER, 12 MONTHS.		NOVEMBER, 13 MONTHS.		DECEMBER, 14 MONTHS.	
	Purity.	P.O.C.S.	Purity.	P.O.C.S.	Purity.	P.O.C.S.	Purity.	P.O.C.S.	Purity.	P.O.C.S.	Purity.	P.O.C.S.	Purity.	P.O.C.S.
H.Q. 426 ..	89·5	13·8	89·1	15·0	92·4	15·8	92·7	17·3	93·2	18·3	92·3	15·6	91·3	15·0
Badila ..	93·7	15·1	93·4	16·3	93·9	18·0	92·3	18·0	91·8	17·9	91·8	16·9	93·1	17·1
Goru ..	85·8	10·6	87·3	13·4	91·2	15·2	92·2	16·2	92·1	17·4	92·7	15·3	92·3	14·1
Cheribon ..	79·5	9·5	84·0	11·5	84·9	11·9	88·1	14·4	90·0	15·1	92·6	15·5	92·8	16·1
Malabar ..	69·1	7·2	85·?	12·4	84·7	13·2	87·5	13·8	86·7	14·4	90·6	14·3	90·3	15·1
Otamite ..	67·2	7·1	81·3	10·9	88·4	13·8	87·0	14·1	90·4	14·7	90·0	14·3	91·7	15·1

ANALYTICAL TESTS OF FIRST RATOON CANE FROM LATE PLANTING IN AUGUST, 1913.

Variety.	JUNE, 8 MONTHS.		JULY, 9 MONTHS.		AUGUST, 10 MONTHS.		SEPTEMBER, 11 MONTHS.		OCTOBER, 12 MONTHS.		NOVEMBER, 13 MONTHS.		DECEMBER, 14 MONTHS.	
	Purity.	P.O.C.S.	Purity.	P.O.C.S.	Purity.	P.O.C.S.	Purity.	P.O.C.S.	Purity.	P.O.C.S.	Purity.	P.O.C.S.	Purity.	P.O.C.S.
H.Q. 426 ..	87·9	13·2	92·1	15·2	93·6	16·6	92·7	17·6	94·4	17·4	93·0	16·5	94·6	16·5
Badila ..	88·1	13·5	92·4	15·7	90·0	14·3	92·4	17·4	93·2	18·4	91·0	16·8	93·3	16·2
Goru ..	78·6	9·6	86·0	12·2	89·2	13·4	92·4	16·9	92·3	16·1	92·0	16·0	92·2	14·3
Cheribon ..	78·1	8·9	82·8	11·1	79·9	12·2	86·8	14·2	90·1	15·5	91·7	15·9	91·5	15·6
Malabar ..	76·5	8·8	82·8	11·9	89·5	14·3	86·5	13·2	89·9	15·6	89·5	14·1	89·8	14·4
Otamite ..	78·6	9·4	80·0	10·2	89·3	13·4	88·2	13·9	92·7	14·4	88·9	13·9	89·7	14·3

For the purposes of comparison, we give the results of the average of seven months' analyses of the plant and first ratoon crops side by side :—

VARIETY.	PLANT CROP. AVERAGE 7 MONTHS' ANALYSES.		FIRST RATOON CROP. 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.
H.Q. 426	16·0	16·6	18·4	18·8
Badila	15·1	16·6	19·8	18·7
Goru	13·2	13·9	17·0	16·4
Cheribon	12·6	12·6	15·6	15·5
Malabar	11·8	11·8	15·0	15·3
Otamite	11·0	11·4	15·0	15·0

In the above table it will be noted that the general results from the first ratoon crop are a good deal higher than from the plant crop. This was no doubt caused by the dryness of the season which had a marked effect in increasing the density of the cane in almost every sugar district last year.

From the tables presented, the superiority of the first three varieties over the Cheribon, Malabar, and Otamite for the whole seven months is plainly seen. As in the results of 1914 the latter varieties do not begin to show up till September. For the last three months of the year they are fairly good. H.Q. 426, as pointed out last year, appears to lose sugar after October, thus bearing out its character as an early maturing cane.

These experiments were continued this season (1916) as a second ratoon crop, and analyses have so far been made every month from June to November. The results to date are set out in the tables appearing below, the analyses of the early planted cane appearing first :—

FIRST PRELIMINARY EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENTS—SECOND RATOON CROP—JUNE, 1916.

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.
Z. 2—	H.Q. 426	15-6-16	9 months	18·2	15·18	1·0	11·4	83·7
	Badila	15-6-16	do.	18·2	15·04	1·1	11·2	82·6
	Goru	15-6-16	do.	17·3	14·01	1·3	10·2	80·9
	Cheribon	15-6-16	do.	15·6	11·91	2·5	8·4	76·3
	Malabar	15-6-16	do.	14·6	9·99	2·7	6·3	68·4
	Otamite	15-6-16	do.	14·6	10·26	2·7	6·7	70·2
	H.Q. 426	15-6-16	do.	18·0	15·26	1·1	11·6	84·7
	Badila	15-6-16	do.	16·4	12·86	1·2	9·2	78·4
	Goru	15-6-16	do.	15·3	11·19	2·0	7·6	73·1
	Cheribon	15-6-16	do.	15·0	10·65	2·5	7·0	71·0
	Malabar	15-6-16	do.	14·4	9·29	2·7	5·6	64·5
	Otamite	15-6-16	do.	13·8	10·28	2·6	7·1	74·4

SECOND PROGRESSIVE EXAMINATION OF CANES FROM THE ANALYTICAL TEST EXPERIMENTS—SECOND RATOON CROP—JULY, 1916.

Z. 2—	H.Q. 426	12-7-16	10 months	20·2	18·50	·54	14·7	91·5
	Badila	12-7-16	do.	19·0	17·40	·74	13·9	91·5
	Goru	12-7-16	do.	18·1	15·18	1·25	11·4	83·8
	Cheribon	12-7-16	do.	17·8	14·46	1·58	10·6	81·2
	Malabar	12-7-16	do.	16·3	12·59	1·40	8·9	77·2
	Otamite	12-7-16	do.	16·0	12·08	1·40	8·4	75·5
	H.Q. 426	12-7-16	do.	20·0	18·18	·78	14·4	90·9
	Badila	12-7-16	do.	19·1	17·35	·89	13·8	90·8
	Goru	12-7-16	do.	17·6	14·33	1·50	10·5	81·4
	Cheribon	12-7-16	do.	16·8	13·26	2·00	9·6	78·8
	Malabar	12-7-16	do.	16·3	12·86	2·08	9·2	78·8
	Otamite	12-7-16	do.	15·9	11·75	2·10	8·1	73·9

THIRD PROGRESSIVE EXAMINATION OF CANES FROM THE ANALYTICAL TEST EXPERIMENTS—SECOND RATOON CROP—AUGUST, 1916.

Z. 2—	H.Q. 426	10-8-16	11 months	21·4	19·65	·17	15·7	91·8
	Badila	10-8-16	do.	20·6	18·85	·36	15·0	91·5
	Goru	10-8-16	do.	18·8	16·82	·52	13·2	89·4
	Cheribon	10-8-16	do.	18·6	16·21	·78	12·5	87·1
	Malabar	10-8-16	do.	18·2	15·37	·76	11·6	84·4
	Otamite	10-8-16	do.	17·7	14·54	1·13	10·8	82·1
	H.Q. 426	10-8-16	do.	20·2	18·63	·41	14·9	92·2
	Badila	10-8-16	do.	19·8	18·23	·70	14·6	92·0
	Goru	10-8-16	do.	18·4	16·11	·61	12·5	87·5
	Cheribon	10-8-16	do.	17·3	13·93	1·38	10·1	80·5
	Malabar	10-8-16	do.	18·1	15·31	·81	11·6	84·5
	Otamite	10-8-16	do.	15·3	11·00	2·50	7·3	71·8

FOURTH PROGRESSIVE EXAMINATION OF CANES FROM THE ANALYTICAL TEST EXPERIMENTS—SECOND RATOON CROP—SEPTEMBER, 1916.

Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.	Fibre.
H.Q. 426	13-9-16	12 months	22·0	20·45	·16	16·5	92·9	10·6
Badila	13-9-16	do.	21·5	19·73	·45	15·8	91·7	10·5
Goru	13-9-16	do.	18·7	16·75	·52	13·3	89·5	9·6
Cheribon	13-9-16	do.	18·3	16·26	·69	12·6	88·8	11·5
Malabar	13-9-16	do.	18·2	15·58	·54	11·6	85·6	13·0
Otamite	13-9-16	do.	18·4	16·21	·62	12·6	88·0	11·3
H.Q. 426	13-9-16	do.	21·4	19·91	·14	16·2	93·0	10·2
Badila	13-9-16	do.	20·5	18·99	·34	15·4	92·6	10·0
Goru	13-9-16	do.	18·5	16·21	·91	12·7	87·6	9·8
Cheribon	13-9-16	do.	18·1	15·53	·93	11·9	85·8	11·0
Malabar	13-9-16	do.	18·4	16·24	·54	12·4	88·2	13·0
Otamite	13-9-16	do.	18·8	16·71	·89	13·1	88·8	11·0

FIFTH PROGRESSIVE EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENTS—SECOND RATOON CROP—OCTOBER, 1916.

Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.
H.Q. 426	9-10-16	13 months	21·4	19·83	·16	15·9	92·6
Badila	9-10-16	do.	21·6	19·91	·20	16·0	92·1
Goru	9-10-16	do.	18·9	16·98	·48	13·4	89·8
Cheribon	9-10-16	do.	19·5	17·32	·62	13·5	88·8
Malabar	9-10-16	do.	19·3	17·21	·54	13·5	89·1
Otamite	9-10-16	do.	19·8	17·49	·60	13·6	88·3
H.Q. 426	9-10-16	do	22·0	20·48	·15	16·5	93·0
Badila	9-10-16	do.	22·3	20·52	·18	16·4	92·0
Goru	9-10-16	do.	19·2	17·30	·58	13·6	90·1
Cheribon	9-10-16	do.	19·9	17·88	·64	14·1	89·8
Malabar	9-10-16	do.	19·6	17·52	·66	13·7	89·3
Otamite	9-10-16	do.	20·2	17·83	·56	13·9	88·2

SIXTH PROGRESSIVE EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENTS—SECOND RATOON CROP—NOVEMBER, 1916.

Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.
H.Q. 426	3-11-16	14 months	21·2	19·45	·10	15·5	91·7
Badila	3-11-16	do.	23·1	21·10	·09	16·8	91·3
Goru	3-11-16	do.	20·6	18·99	·18	15·2	92·1
Cheribon	3-11-16	do.	20·7	19·08	·28	15·3	92·1
Malabar	3-11-16	do.	20·1	18·05	·46	14·2	89·8
Otamite	3-11-16	do.	20·2	18·11	·78	14·2	89·6
H.Q. 426	3-11-16	do.	22·0	20·36	·12	16·3	92·5
Badila	3-11-16	do.	23·0	21·05	·10	16·8	91·5
Goru	3-11-16	do.	21·8	19·88	·19	15·8	91·1
Cheribon	3-11-16	do.	21·8	19·82	·38	15·7	90·9
Malabar	3-11-16	do.	20·1	17·86	·50	14·0	88·8
Otamite	3-11-16	do.	20·2	17·30	·66	13·8	88·1

It will be seen that the H.Q. 426, Badila, and Goru are still in the lead. In view of the action of the Cane Prices Board these results are worth noting by the Mackay growers.

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

In last year's report details of the plant crop of a number of the varieties introduced from Papua were given. Immediately following harvesting the cane was ratooned in the usual manner, the resulting crop furnishing the data which appears below.

Weather conditions interfered with the crop in its early stages but the latter part of the season has been all that could be desired, and, as a consequence, the cane made good growth, and some of the varieties have produced a heavier yield than the plant crop.

A few of these canes show promise. If this is continued in the second ratoon crop and they are free from disease, such canes will be distributed.

As in former years the usual preliminary and final analyses of these canes have been carried out, and data will be found in the following tables, together with the analytical results of the two crops :—

First Preliminary Examination of Papuan Canes (Wells Collection)—First Ratoon Crop—June, 1916.

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity of Juice.
Z—	N.G. 67	14-6-16	9 months..	13·9	9·34	2·5	5·9	67·1
	N.G. 69	14-6-16	do.	13·5	8·84	2·6	5·4	65·4
	N.G. 74	14-6-16	do.	15·6	11·24	2·6	7·5	72·0
	N.G. 75	14-6-16	do.	14·0	9·85	2·4	6·5	70·3
	N.G. 77	14-6-16	do.	13·6	9·22	2·5	5·8	67·7
	N.G. 78	14-6-16	do.	14·1	10·23	2·2	6·9	72·5
	N.G. 79	14-6-16	do.	14·7	10·80	2·6	7·3	73·4
	N.G. 81	14-6-16	do.	15·9	12·35	1·9	8·8	77·6
	N.G. 82	14-6-16	do.	15·1	11·05	2·0	7·5	73·1
	N.G. 83	14-6-16	do.	14·9	11·05	2·4	7·6	74·1
	N.G. 85	14-6-16	do.	13·1	8·50	2·9	5·1	64·8
	N.G. 87	14-6-16	do.	12·8	8·09	3·1	4·7	63·2
	N.G. 88	14-6-16	do.	15·1	11·86	2·1	8·5	78·5
	N.G. 89	14-6-16	do.	15·0	11·05	2·7	7·5	73·6
	N.G. 90	14-6-16	do.	16·6	13·57	1·7	10·0	81·7
	N.G. 91	14-6-16	do.	14·7	10·64	2·4	7·2	72·3
	N.G. 114	14-6-16	do.	15·4	11·61	2·0	8·1	75·3
	N.G. 123	14-6-16	do.	15·0	11·05	2·1	7·1	73·6
	N.G. 158	14-6-16	do.	14·7	11·07	2·5	7·7	75·3
	N.G. 161	14-6-16	do.	15·0	11·64	2·0	8·3	77·6

Second Progressive Examination of Papuan Canes (Wells Collection)—First Ratoon Crop—July, 1916.

Z—	N.G. 67	7-7-16	10 months	17·8	14·38	1·56	10·5	80·7
	N.G. 69	7-7-16	do.	16·5	12·32	2·08	8·5	74·6
	N.G. 74	7-7-16	do.	16·0	11·67	2·50	7·9	72·9
	N.G. 75	7-7-16	do.	15·0	10·51	2·45	6·9	70·0
	N.G. 77	7-7-16	do.	16·8	14·90	1·04	11·6	88·6
	N.G. 78	7-7-16	do.	16·6	12·05	2·50	8·1	72·5
	N.G. 79	7-7-16	do.	17·0	13·21	1·38	9·4	77·7
	N.G. 81	7-7-16	do.	17·0	14·30	1·30	10·7	84·1
	N.G. 82	7-7-16	do.	18·0	15·66	1·26	12·1	87·0
	N.G. 83	7-7-16	do.	16·0	11·67	2·40	7·9	72·9
	N.G. 85	7-7-16	do.	16·4	12·59	2·08	8·9	76·7
	N.G. 87	7-7-16	do.	14·7	10·26	2·50	6·7	69·7
	N.G. 88	7-7-16	do.	15·6	11·94	1·86	8·4	76·5
	N.G. 89	7-7-16	do.	15·7	12·53	1·73	9·1	79·7
	N.G. 90	7-7-16	do.	17·0	14·37	1·00	10·8	84·5
	N.G. 91	7-7-16	do.	15·5	11·56	2·08	8·0	74·5
	N.G. 114	7-7-16	do.	16·0	12·35	1·37	8·8	77·1
	N.G. 123	7-7-16	do.	15·7	12·50	1·73	9·1	79·6
	N.G. 158	7-7-16	do.	18·4	16·06	1·00	12·4	87·2
	N.G. 161	7-7-16	do.	18·5	16·16	1·00	12·5	87·3

Third Progressive Examination of Papuan Canes (Wells Collection)—First Ratoon Crop—August, 1916.

Z—	N.G. 67	5-8-16	11 months	17·4	14·79	·69	11·2	85·0
	N.G. 69	5-8-16	do.	15·0	10·78	1·83	7·2	71·8
	N.G. 74	5-8-16	do.	18·1	15·04	·67	11·2	83·0
	N.G. 75	5-8-16	do.	16·5	13·80	1·20	10·3	83·6
	N.G. 77	5-8-16	do.	14·9	12·01	1·03	8·8	80·6
	N.G. 78	5-8-16	do.	16·4	13·40	1·60	9·9	81·7
	N.G. 79	5-8-16	do.	17·5	14·62	·89	10·9	83·5
	N.G. 81	5-8-16	do.	16·4	13·40	·90	9·9	81·7
	N.G. 82	5-8-16	do.	15·9	12·56	1·02	9·1	78·9
	N.G. 83	5-8-16	do.	17·6	14·41	·81	10·6	81·8
	N.G. 85	5-8-16	do.	18·2	15·45	·85	11·7	84·8
	N.G. 87	7-8-16	do.	17·2	14·44	·78	10·8	83·9
	N.G. 88	7-8-16	do.	17·8	15·58	·69	12·0	87·5
	N.G. 89	7-8-16	do.	17·7	14·89	·89	11·2	84·1
	N.G. 90	7-8-16	do.	17·8	14·91	·84	11·2	83·7
	N.G. 91	7-8-16	do.	16·7	13·13	1·64	9·5	78·6
	N.G. 114	7-8-16	do.	16·0	12·29	1·76	8·7	76·8
	N.G. 123	7-8-16	do.	16·3	12·67	·82	9·0	77·7
	N.G. 158	7-8-16	do.	18·2	15·50	·91	11·8	85·1
	N.G. 161	7-8-16	do.	18·4	15·79	·54	12·1	85·8

FINAL EXAMINATION OF PAPUAN CANES (WELLS COLLECTION)—FIRST RATOON CROP—SEPTEMBER, 1916.

Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.	Fibre.
N.G. 67	8-9-16	12 months	17·9	15·71	·67	12·2	87·7	10·6
N.G. 69	8-9-16	do.	16·6	14·04	1·25	10·5	84·5	12·0
N.G. 74	8-9-16	do.	19·1	16·29	·51	12·3	85·2	11·4
N.G. 75	8-9-16	do.	18·5	17·09	·39	13·5	92·3	12·0
N.G. 77	8-9-16	do.	19·2	17·78	·28	14·3	92·6	10·8
N.G. 78	8-9-16	do.	17·4	15·34	·77	12·0	88·1	10·5
N.G. 79	8-9-16	do.	18·5	15·79	·48	12·0	85·3	11·4
N.G. 81	8-9-16	do.	17·2	14·17	·67	10·3	82·3	12·0
N.G. 82	8-9-16	do.	18·2	15·56	·69	11·8	85·4	12·0
N.G. 83	8-9-16	do.	18·0	14·38	·89	10·3	79·8	11·8
N.G. 85	8-9-16	do.	17·2	13·90	1·04	10·0	80·8	12·0
N.G. 87	8-9-16	do.	18·5	15·58	·97	11·6	84·2	12·0
N.G. 88	8-9-16	do.	18·1	15·53	·93	11·9	85·8	11·0
N.G. 89	8-9-16	do.	18·6	16·16	·68	12·4	86·8	11·5
N.G. 90	8-9-16	do.	16·1	13·31	·69	9·8	82·6	12·0
N.G. 91	8-9-16	do.	17·9	15·04	1·25	11·2	84·0	11·8
N.G. 114	8-9-16	do.	16·7	13·66	1·64	9·9	81·7	12·1
N.G. 123	8-9-16	do.	18·0	15·29	1·38	11·5	84·9	11·6
N.G. 158	8-9-16	do.	20·4	18·46	·46	14·5	90·4	11·6
N.G. 161	8-9-16	do.	18·2	15·98	·74	12·4	87·8	11·5

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

Variety of Cane.	Plant Crop, 1915.					First Ratoon Crop, 1916.					Average of the Two Years.		
	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	P.O.C.S.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	P.O.C.S.	% Sucrose in Juice.	Purity.	P.O.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	14·81	84·6	11·2
N.G. 74	21·5	19·17	·41	89·1	15·0	19·1	16·29	·51	85·2	12·3	17·73	87·3	13·7
N.G. 75	21·0	19·21	·35	91·4	15·5	18·5	17·09	·39	92·3	13·5	18·15	91·9	14·5
N.G. 77	20·2	18·89	·14	93·5	15·2	19·2	17·78	·28	92·6	14·3	18·33	93·0	14·7
N.G. 78	20·8	19·48	·30	93·6	15·5	17·4	15·34	·77	88·1	12·0	17·41	91·1	13·8
N.G. 79	22·2	19·92	·33	89·7	15·5	18·5	15·79	·48	85·3	12·0	17·85	87·7	13·8
N.G. 81	21·0	18·95	·40	90·2	14·8	17·2	14·17	·67	82·3	10·3	16·56	86·7	12·7
N.G. 82	20·7	18·06	1·13	87·2	13·9	18·2	15·56	·69	85·4	11·8	16·81	86·4	12·9
N.G. 83	21·8	19·92	1·02	91·3	15·9	18·0	14·38	·89	79·8	10·3	17·15	86·1	13·1
N.G. 85	20·4	17·48	·55	85·6	13·2	17·2	13·90	1·04	80·8	10·0	15·69	83·4	11·7
N.G. 87	21·8	19·51	·55	89·4	14·8	18·5	15·58	·97	84·2	11·6	17·54	87·0	13·5
N.G. 88	20·9	17·48	1·56	83·6	13·1	18·1	15·53	·93	85·8	11·9	16·50	84·6	12·5
N.G. 89	22·2	19·29	1·04	86·8	14·7	18·6	16·16	·68	86·8	12·4	17·72	86·8	13·7
N.G. 90	20·8	18·42	·76	88·5	14·4	16·1	13·31	·69	82·6	9·8	15·86	85·9	12·1
N.G. 91	21·4	19·17	·57	89·5	14·9	17·9	15·04	1·25	84·0	11·2	17·10	87·0	13·2
N.G. 114	20·7	18·57	·83	89·7	14·3	16·7	13·66	1·64	81·7	9·9	16·11	86·1	12·4
N.G. 123	19·9	17·44	·62	87·6	13·6	18·0	15·29	1·38	84·9	11·5	16·36	86·3	12·6
N.G. 158	20·1	17·79	·76	88·0	13·6	20·4	18·46	·46	90·4	14·5	18·08	89·2	14·2
N.G. 161	20·6	18·85	·13	91·5	15·0	18·2	15·98	·74	87·8	12·4	17·41	89·7	13·5

In the following tables will be found details of the first ratoon crop results, and also a table of crop results to date of both plant and first ratoon crops :—

CROP RESULTS OF PAPUAN CANES (WELLS COLLECTION)—FIRST RATOON CROP—SEPTEMBER, 1916.

Country.	Variety of Cane.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Pure Obtainable Cane Sugar per Acre in Pounds.	Yield of Pure Obtainable Cane Sugar per Acre in English Tons.
New Guinea	N.G. 67	11 months	26·8	7,333	3·2
Ditto	N.G. 69	do.	33·4	7,866	3·5
Ditto	N.G. 74	do.	30·4	8,394	3·7
Ditto	N.G. 75	do.	28·5	8,624	3·8
Ditto	N.G. 77	do.	26·4	8,471	3·7
Ditto	N.G. 78	do.	37·0	9,966	4·4
Ditto	N.G. 79	do.	22·6	6,098	2·7
Ditto	N.G. 81	do.	48·3	11,156	4·9
Ditto	N.G. 82	do.	35·1	9,286	4·1
Ditto	N.G. 83	do.	28·9	6,670	2·9
Ditto	N.G. 85	do.	25·7	5,778	2·5
Ditto	N.G. 87	do.	37·0	9,634	4·3
Ditto	N.G. 88	do.	36·4	9,710	4·3
Ditto	N.G. 89	do.	33·4	9,290	4·1
Ditto	N.G. 90	do.	29·9	6,574	2·9
Ditto	N.G. 91	do.	27·4	6,895	3·0
Ditto	N.G. 114	do.	32·5	7,216	3·2
Ditto	N.G. 123	do.	33·0	8,515	3·8
Ditto	N.G. 158	do.	32·5	10,569	4·7
Ditto	N.G. 161	do.	24·8	6,913	3·0

TOTAL CROP RESULTS TO DATE OF PAPUAN CANES (WELLS COLLECTION)—PLANT AND FIRST RATOON CROPS—1915 AND 1916.

Country.	Name or Number of Variety.	Plant Crop, 1915.		First Ratoon Crop, 1916.		Total Yield: Two Crops.	
		Yield of Cane per Acre in English Tons.	Yield of Pure Obtainable Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Pure Obtainable Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Pure Obtainable 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	63·3	7·0
Ditto	N.G. 74	26·0	3·9	30·4	3·7	56·4	7·6
Ditto	N.G. 75	20·3	3·1	28·5	3·8	48·8	6·9
Ditto	N.G. 77	17·6	2·6	26·4	3·7	44·0	6·3
Ditto	N.G. 78	26·7	4·1	37·0	4·4	63·7	8·5
Ditto	N.G. 79	28·1	4·3	22·6	2·7	50·7	7·0
Ditto	N.G. 81	33·6	4·9	48·3	4·9	81·9	9·8
Ditto	N.G. 82	22·5	3·1	35·1	4·1	57·6	7·2
Ditto	N.G. 83	26·7	4·2	28·9	2·9	55·6	7·1
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	66·1	8·6
Ditto	N.G. 88	26·3	3·4	36·4	4·3	62·7	7·7
Ditto	N.G. 89	22·9	3·3	33·4	4·1	56·3	7·4
Ditto	N.G. 90	24·6	3·5	29·9	2·9	54·5	6·4
Ditto	N.G. 91	18·4	2·7	27·4	3·0	45·8	5·7
Ditto	N.G. 114	21·9	3·1	32·5	3·2	54·4	6·3
Ditto	N.G. 123	20·6	2·8	33·0	3·8	53·6	6·6
Ditto	N.G. 158	22·9	3·1	32·5	4·7	55·4	7·8
Ditto	N.G. 161	18·7	2·8	24·8	3·0	43·5	5·8

PAPUAN CANES PLANTED OUT IN EXPERIMENT ; PLANT CROP.

In former reports details of a number of canes introduced from Papua were supplied. With the exception of the 27 varieties lastmentioned 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 last year 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 preparation of the land in every case has been identical with the usual work of the Station. Due to its being necessary to conserve space, these experiments have been laid out in three row plots, so that when results are calculated the data are obtained from the middle row only, the outside rows acting as guardians. This will do away with the necessity for interspaces which cannot be spared at present, and eliminate expenditure in keeping these spaces clean, besides approximating more nearly to large field trials.

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.

Division A.

During the whole of the season the plot of Papuan canes on this Division has been the show place of the Station, and has excited great interest amongst visiting farmers and others.

With respect to growth, several canes appear promising, and careful watch is being kept over these.

Others are apparently of a thin spindly nature, and under present conditions, will probably not be of any economic value.

The usual preliminary and final analyses of the Papuan varieties planted on Division A are set out below :—

First Preliminary Examination of Papuan Canes (Wells Collection)—Plant Crop—June, 1916.

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix.)	Sucrose in Juice.	Glucose in Juice.	P.O.C.S.	Purity.
A—	N.G. 92	14-6-16	10 months	14·4	10·80	2·2	7·5	75·0
	N.G. 93	14-6-16	do.	15·1	11·18	2·6	7·7	74·0
	N.G. 94	14-6-16	do.	14·1	8·56	3·0	4·8	60·7
	N.G. 95	14-6-16	do.	10·9	5·97	2·9	2·8	54·7
	N.G. 96	14-6-16	do.	13·4	8·94	2·6	5·6	60·6
	N.G. 98	14-6-16	do.	13·8	8·93	2·5	5·4	64·7
	N.G. 100	14-6-16	do.	13·8	8·93	2·8	5·4	64·7
	N.G. 101	14-6-16	do.	13·6	8·67	2·7	5·1	63·7
	N.G. 102	14-6-16	do.	12·7	7·35	3·0	4·3	57·8
	N.G. 103	14-6-16	do.	13·8	9·20	2·6	5·7	66·6
	N.G. 104A	14-6-16	do.	10·1	3·71	4·1	..	36·7
	N.G. 105	14-6-16	do.	13·4	9·36	2·5	6·1	69·8
	N.G. 106	14-6-16	do.	12·6	7·18	3·1	3·7	56·9
	N.G. 107	14-6-16	do.	11·4	6·97	3·1	3·9	61·1
	N.G. 108	14-6-16	do.	15·9	12·61	2·0	9·1	79·3
	N.G. 110	14-6-16	do.	16·1	13·20	1·5	9·8	81·9
	N.G. 111	14-6-16	do.	15·6	11·83	2·0	8·3	75·8
	N.G. 113	14-6-16	do.	15·5	11·67	2·1	8·1	75·2
	N.G. 115	14-6-16	do.	11·3	6·28	3·1	3·1	55·5

Second Progressive Examination of Papuan Canes (Wells Collection)—Plant Crop—July, 1916.

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix.)	Sucrose in Juice.	Glucose in Juice.	P.O.C.S.	Purity.
A—	N.G. 92	9-7-16	11 months	16·2	13·50	1·83	10·1	83·3
	N.G. 93	9-7-16	do.	16·9	13·42	2·01	9·8	79·4
	N.G. 94	9-7-16	do.	15·1	9·97	2·30	6·2	66·0
	N.G. 95	9-7-16	do.	13·8	10·82	2·50	7·8	78·4
	N.G. 96	9-7-16	do.	13·9	9·74	2·49	6·4	70·0
	N.G. 98	9-7-16	do.	13·4	10·03	3·04	7·0	74·8
	N.G. 100	9-7-16	do.	15·1	11·86	2·84	8·5	78·5
	N.G. 101	9-7-16	do.	12·1	6·62	3·78	3·1	54·6
	N.G. 102	9-7-16	do.	12·8	9·12	3·10	6·0	71·2
	N.G. 103	9-7-16	do.	14·0	9·74	2·96	6·3	69·5
	N.G. 104A	9-7-16	do.	16·1	13·42	2·27	10·0	83·3
	N.G. 105	9-7-16	do.	14·0	9·74	3·12	6·3	69·5
	N.G. 106	9-7-16	do.	13·3	9·07	3·09	5·8	68·1
	N.G. 107	9-7-16	do.	14·0	9·95	2·90	6·6	71·0
	N.G. 108	9-7-16	do.	11·0	7·39	4·16	4·6	67·1
	N.G. 110	9-7-16	do.	16·5	13·99	2·48	10·5	84·7
	N.G. 111	9-7-16	do.	18·1	15·78	2·20	12·2	87·1
	N.G. 113	9-7-16	do.	17·2	14·25	2·00	10·6	82·8
	N.G. 115	9-7-16	do.	16·2	11·81	2·50	8·0	72·9

THIRD PROGRESSIVE EXAMINATION OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—AUGUST, 1916.

Division	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.
A—	N.G. 92	8-8-16	12 months	17·4	15·64	·62	12·3	89·8
	N.G. 93	8-8-16	do.	15·9	12·46	1·38	9·0	78·3
	N.G. 94	8-8-16	do.	15·8	11·54	1·98	7·8	73·0
	N.G. 95	8-8-16	do.	14·3	11·12	1·35	8·0	77·7
	N.G. 96	8-8-16	do.	17·7	15·96	·62	12·6	90·1
	N.G. 98	8-8-16	do.	16·9	13·82	1·13	10·1	81·7
	N.G. 100	8-8-16	do.	9·2	3·72	3·77	..	40·4
	N.G. 101	8-8-16	do.	13·7	9·33	2·50	5·9	68·1
	N.G. 102	8-8-16	do.	15·8	12·35	1·78	8·9	78·1
	N.G. 103	8-8-16	do.	16·2	13·20	1·38	9·8	81·4
	N.G. 104A	8-8-16	do.	12·1	6·30	3·04	2·7	52·0
	N.G. 105	9-8-16	do.	14·2	10·90	1·25	7·7	76·7
	N.G. 106	9-8-16	do.	11·9	7·09	3·20	3·9	59·5
	N.G. 107	9-8-16	do.	16·8	14·57	1·52	11·2	86·7
	N.G. 108	9-8-16	do.	18·2	16·14	·81	12·6	88·6
	N.G. 110	9-8-16	do.	15·4	12·37	1·38	9·1	80·3
	N.G. 111	9-8-16	do.	16·8	14·06	1·40	10·5	83·6
	N.G. 113	9-8-16	do.	16·8	14·55	·59	11·2	86·6
	N.G. 115	9-8-16	do.	15·0	10·89	1·78	7·3	72·6

FINAL EXAMINATION OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—SEPTEMBER, 1916.

Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix.).	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.	Fibre.
N.G. 92	11-9-16	13 months	17·4	15·67	·62	12·3	90·0	11·0
N.G. 93	11-9-16	do.	18·3	16·53	1·51	12·9	90·3	12·0
N.G. 94	11-9-16	do.	16·6	12·80	1·60	9·0	77·1	11·8
N.G. 95	11-9-16	do.	13·7	10·03	2·08	6·9	73·2	11·0
N.G. 96	11-9-16	do.	16·9	13·77	1·21	9·9	81·4	13·0
N.G. 98	11-9-16	do.	16·5	14·20	1·25	10·8	86·0	11·0
N.G. 100	11-9-16	do.	10·5	5·49	3·12	2·4	52·2	10·4
N.G. 101	11-9-16	do.	15·1	11·43	1·73	8·1	75·6	10·2
N.G. 102	11-9-16	do.	16·5	12·99	2·01	9·5	78·7	10·7
N.G. 103	11-9-16	do.	15·9	13·15	·51	9·6	82·7	13·0
N.G. 104A	11-9-16	do.	11·9	6·19	2·15	2·7	52·0	10·5
N.G. 105	11-9-16	do.	13·6	9·79	1·78	6·6	71·9	10·0
N.G. 106	11-9-16	do.	13·2	7·87	4·16	4·3	59·6	9·8
N.G. 107	11-9-16	do.	17·6	15·69	·45	12·2	89·1	12·0
N.G. 108	11-9-16	do.	16·5	13·26	1·66	9·7	80·3	11·0
N.G. 110	11-9-16	do.	17·6	14·99	·93	11·0	85·1	14·0
N.G. 111	11-9-16	do.	17·5	14·87	1·38	11·3	84·9	10·5
N.G. 113	11-9-16	do.	18·6	16·21	·73	12·1	87·1	14·0
N.G. 115	11-9-16	do.	15·3	12·48	1·92	9·1	81·5	12·5

Following on the final analyses the varieties were cut and weighed. From the data secured the table of crop results was prepared and is given hereunder :—

CROP RESULTS OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—DIVISION A—SEPTEMBER, 1916.

Country.	Name or Number of Variety.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Pure Obtainable Cane Sugar per Acre in Pounds.	Yield of Pure Obtainable Cane Sugar per Acre in English Tons.
New Guinea	N.G. 92	13 months	25·2	6,965	3·1
Ditto	N.G. 93	do.	42·3	12,249	5·4
Ditto	N.G. 94	do.	37·0	7,474	3·3
Ditto	N.G. 95	do.	42·1	6,512	2·9
Ditto	N.G. 96	do.	44·3	9,832	4·3
Ditto	N.G. 98	do.	58·3	14,113	6·3
Ditto	N.G. 100	do.	49·7	2,676	1·1
Ditto	N.G. 101	do.	28·7	5,221	2·3
Ditto	N.G. 102	do.	56·1	11,945	5·3
Ditto	N.G. 103	do.	48·8	10,510	4·6
Ditto	N.G. 104A	do.	46·2	2,799	1·2
Ditto	N.G. 105	do.	34·3	5,079	2·2
Ditto	N.G. 106	do.	52·5	5,057	2·2
Ditto	N.G. 107	do.	30·7	8,397	3·7
Ditto	N.G. 108	do.	50·6	11,013	4·9
Ditto	N.G. 110	do.	35·9	8,848	3·9
Ditto	N.G. 111	do.	53·6	13,585	6·0
Ditto	N.G. 113	do.	46·5	12,614	5·6
Ditto	N.G. 115	do.	47·1	9,619	4·2

Division B.

The Papuan canes planted out in this Division consisted of the following varieties :—New Guinea numbers 116, 117, 118, 119, 122, 125, 126, 128, 129, 130, and 131.

The growth of the crop was interfered with to a certain extent by the checks previously referred to, which were not thrown off until June, and, even at time of cutting, the crop was somewhat backward.

A few of these varieties are also promising. Numbers 116, 118, 119, 122, and 128 appear poor and of a thin nature.

In the following tables will be found details of the preliminary and final analyses of the canes on Division B :—

First Preliminary Examination of Papuan Canes (Wells Collection)—Plant Crop—June, 1916.

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.
B—	N.G. 116	9-6-16	10 months	11·9	7·15	2·5	3·9	60·0
	N.G. 117	9-6-16	do.	12·0	6·99	2·5	3·7	58·2
	N.G. 118	9-6-16	do.	10·7	5·76	2·7	2·7	53·8
	N.G. 119	9-6-16	do.	10·5	5·35	3·0	2·2	50·0
	N.G. 122	9-6-16	do.	9·9	3·25	4·1	..	32·8
	N.G. 125	9-6-16	do.	9·9	4·81	3·5	1·8	48·5
	N.G. 126	9-6-16	do.	11·6	7·10	3·4	4·0	61·2
	N.G. 128	9-6-16	do.	11·2	6·30	2·4	3·1	56·2
	N.G. 129	9-6-16	do.	9·8	3·30	4·1	..	33·6
	N.G. 130	9-6-16	do.	10·9	5·20	2·7	1·9	47·7
	N.G. 131	9-6-16	do.	12·7	7·35	2·9	3·9	57·9

Second Progressive Examination of Papuan Canes (Wells Collection)—Plant Crop—July, 1916.

B—	N.G. 116	7-7-16	11 months	12·0	6·38	3·1	2·9	53·1
	N.G. 117	7-7-16	do.	14·0	9·12	2·7	5·5	65·1
	N.G. 118	7-7-16	do.	12·4	7·07	3·1	3·6	57·0
	N.G. 119	7-7-16	do.	13·4	8·67	2·8	5·2	64·7
	N.G. 122	7-7-16	do.	11·6	5·19	4·0	1·5	44·7
	N.G. 125	7-7-16	do.	13·2	7·81	3·0	4·2	59·1
	N.G. 126	7-7-16	do.	14·7	10·64	2·5	7·1	72·3
	N.G. 128	7-7-16	do.	12·0	7·63	2·9	4·5	63·5
	N.G. 129	7-7-16	do.	12·0	5·95	4·1	2·3	49·5
	N.G. 130	7-7-16	do.	14·3	9·54	2·7	5·9	66·7
	N.G. 131	7-7-16	do.	15·0	9·73	2·5	5·9	64·8

Third Progressive Examination of Papuan Canes (Wells Collection)—Plant Crop—August, 1916.

B—	N.G. 116	4-8-16	12 months	16·4	12·86	1·60	9·2	78·4
	N.G. 117	4-8-16	do.	15·1	11·67	1·73	8·3	77·2
	N.G. 118	4-8-16	do.	13·2	8·96	1·79	5·7	67·8
	N.G. 119	4-8-16	do.	16·9	15·16	2·55	11·9	89·7
	N.G. 122	4-8-16	do.	12·4	6·61	2·31	3·0	53·3
	N.G. 125	4-8-16	do.	14·1	10·33	1·50	7·0	73·2
	N.G. 126	4-8-16	do.	14·8	11·45	1·56	8·2	77·3
	N.G. 128	4-8-16	do.	14·6	12·09	1·34	9·0	82·8
	N.G. 129	4-8-16	do.	13·9	9·14	2·60	5·6	65·7
	N.G. 130	4-8-16	do.	17·1	14·01	1·31	10·3	81·9
	N.G. 131	4-8-16	do.	18·5	16·75	·79	13·3	90·5

Final Examination of Papuan Canes (Wells Collection)—Plant Crop—September, 1916.

Variety of Cane.	Date of Analysis	Age of Cane.	Total Solids (Brix.)	Sucrose in Juice.	Glucose in Juice.	P.O.C.S.	Purity.	Fibre.
N.G. 116	6-9-16	13 months	18·2	15·71	1·01	12·2	86·3	10·0
N.G. 117	6-9-16	do.	16·5	13·51	1·56	10·0	81·8	11·2
N.G. 118	6-9-16	do.	14·7	11·69	1·38	8·6	79·5	10·0
N.G. 119	6-9-16	do.	13·9	9·60	1·78	6·3	69·0	10·0
N.G. 122	6-9-16	do.	13·2	10·05	2·77	7·1	76·1	9·5
N.G. 125	6-9-16	do.	15·9	12·61	1·22	9·3	79·3	10·0
N.G. 126	6-9-16	do.	16·1	13·42	1·64	10·0	83·3	11·0
N.G. 128	6-9-16	do.	15·9	13·61	1·04	10·3	85·5	12·0
N.G. 129	6-9-16	do.	14·6	9·99	2·60	6·5	68·3	10·2
N.G. 130	6-9-16	do.	15·4	11·83	1·60	8·4	76·8	11·0
N.G. 131	6-9-16	do.	18·1	15·76	·84	12·2	87·0	10·6

The crop was then harvested. From the weights and analytical data the table of crop results has been compiled which is set out hereunder :—

CROP RESULTS OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—DIVISION B—SEPTEMBER, 1916.

Country.	Name or Number of Variety.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Pure Obtainable Cane Sugar per Acre in Pounds.	Yield of Pure Obtainable Cane Sugar per Acre in English Tons.
New Guinea	N.G. 116	13 months	23·5	6,447	2·8
Ditto	N.G. 117	do.	31·2	6,998	3·1
Ditto	N.G. 118	do.	24·8	4,795	2·1
Ditto	N.G. 119	do.	20·3	2,872	1·2
Ditto	N.G. 122	do.	37·3	5,938	2·6
Ditto	N.G. 125	do.	50·0	10,424	4·6
Ditto	N.G. 126	do.	28·0	6,272	2·8
Ditto	N.G. 128	do.	28·5	6,580	2·9
Ditto	N.G. 129	do.	31·8	4,644	2·0
Ditto	N.G. 130	do.	36·8	6,927	3·0
Ditto	N.G. 131	do.	28·5	7,794	3·4

DIVISION D.

The following is a list of the canes planted in this Division, the working of which was identical with Divisions A and B.

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

On the whole the growth of these varieties has been good and a number are promising.

The preliminary and final analyses of these varieties were carried out in the usual manner, and the results appear below :—

FIRST PRELIMINARY EXAMINATION OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—JUNE, 1916.

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.
D—	N.G. 133	5-6-16	10 months	12·1	12·00	2·7	4·4	62·6
	N.G. 134	5-6-16	do.	12·3	5·67	4·1	1·9	46·0
	N.G. 135	5-6-16	do.	14·0	8·79	3·5	5·1	62·7
	N.G. 138	5-6-16	do.	11·6	3·63	3·9	..	31·2
	N.G. 139	5-6-16	do.	12·2	5·59	3·9	1·8	45·8
	N.G. 140	5-6-16	do.	10·9	3·56	3·5	..	32·6
	N.G. 141	5-6-16	do.	10·7	7·19	1·9	4·5	67·1
	N.G. 142	5-6-16	do.	13·2	7·76	3·1	4·1	50·8
	N.G. 143	5-6-16	do.	10·8	5·32	4·1	2·0	49·2
	N.G. 144	5-6-16	do.	10·5	4·29	4·1	·9	40·8
	N.G. 146	5-6-16	do.	11·4	4·18	3·6	..	36·6
	N.G. 147	5-6-16	do.	12·9	7·46	3·1	3·9	57·7
	N.G. 148	5-6-16	do.	11·1	5·47	3·5	2·1	49·2
	N.G. 149	5-6-16	do.	9·7	3·58	2·6	..	36·8
	N.G. 152	5-6-16	do.	12·0	8·07	2·5	5·1	67·2
	N.G. 153	5-6-16	do.	14·9	10·51	2·2	6·9	70·5
	N.G. 156	5-6-16	do.	13·0	8·00	2·5	4·5	61·5
	N.G. 157	5-6-16	do.	14·3	10·04	2·0	6·5	70·2
	N.G. 159	5-6-16	do.	11·5	6·48	2·6	3·2	56·3
	N.G. 160	5-6-16	do.	12·9	7·60	2·5	4·0	58·9
	N.G. 164	5-6-16	do.	12·0	8·07	2·6	5·0	67·2
	N.G. 165	5-6-16	do.	13·7	8·89	2·9	5·3	64·8
	N.G. 167	5-6-16	do.	12·8	7·28	2·9	3·7	56·8
	N.G. 168	5-6-16	do.	12·6	8·16	2·4	4·9	64·7
	N.G. 173	5-6-16	do.	13·7	8·99	2·6	5·5	65·5
	N.G. 174	6-6-16	do.	11·6	5·46	3·4	2·0	47·2
	N.G. 175	6-6-16	do.	11·7	5·19	4·1	1·5	47·7
	N.G. 176	6-6-16	do.	11·7	5·68	4·1	2·1	48·5
	N.G. 178	6-6-16	do.	11·7	5·19	5·0	1·5	44·3
	N.G. 184	6-6-16	do.	11·4	5·19	3·1	1·7	45·5
	N.G. 185	6-6-16	do.	14·9	10·83	2·0	7·3	72·6
	N.G. 186	6-6-16	do.	12·1	7·25	2·5	4·9	59·9

SECOND PROGRESSIVE EXAMINATION OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—JULY, 1916.

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.
D—	N.G. 133	3-7-16	11 months	12·8	7·00	2·5	3·3	54·6
	N.G. 134	3-7-16	do.	14·0	8·66	2·6	5·0	61·8
	N.G. 135	3-7-16	do.	13·2	8·15	2·5	4·6	61·7
	N.G. 138	3-7-16	do.	15·0	10·91	2·3	7·4	72·7
	N.G. 139	3-7-16	do.	13·6	7·70	3·1	3·9	56·6
	N.G. 140	3-7-16	do.	12·9	6·29	4·1	2·4	48·7
	N.G. 141	3-7-16	do.	19·3	16·49	2·4	12·5	85·4
	N.G. 142	3-7-16	do.	12·5	6·43	3·5	2·8	51·4
	N.G. 143	3-7-16	do.	13·4	9·68	2·4	6·5	72·2
	N.G. 144	3-7-16	do.	13·2	7·82	3·3	4·2	59·2
	N.G. 146	3-7-16	do.	10·9	4·44	4·1	·9	40·7
	N.G. 147	3-7-16	do.	16·1	12·46	3·4	8·9	77·3
	N.G. 148	3-7-16	do.	16·4	12·86	1·5	9·2	78·4
	N.G. 149	3-7-16	do.	14·3	9·78	2·5	6·2	68·3
	N.G. 152	3-7-16	do.	12·9	7·33	3·5	3·7	56·8
	N.G. 153	3-7-16	do.	12·9	7·87	2·5	4·4	61·0
	N.G. 156	3-7-16	do.	12·1	6·35	2.4	2·8	52·4
	N.G. 157	3-7-16	do.	14·0	8·93	2·5	5·3	63·7
	N.G. 159	4-7-16	do.	15·6	11·56	2·4	7·9	74·1
	N.G. 160	4-7-16	do.	13·1	7·25	2·8	3·5	55·3
	N.G. 164	4-7-16	do.	15·1	10·99	2·4	7·4	72·7
	N.G. 165	4-7-16	do.	13·7	9·65	2·5	6·3	70·4
	N.G. 167	4-7-16	do.	12·9	7·93	3·1	4·5	61·4
	N.G. 168	4-7-16	do.	16·1	12·61	2·4	9·0	78·3
	N.G. 173	4-7-16	do.	13·1	7·87	3·5	4·3	60·0
	N.G. 174	4-7-16	do.	12·6	6·45	4·1	2·7	51·1
	N.G. 175	4-7-16	do.	15·0	10·94	2·7	7·4	72·9
	N.G. 176	4-7-16	do.	15·6	11·42	2·5	7·8	73·2
	N.G. 178	4-7-16	do.	14·0	8·79	2·9	5·1	62·7
	N.G. 184	4-7-16	do.	14·8	10·78	3·1	7·3	72·8
	N.G. 185	4-7-16	do.	14·0	8·93	2·5	5·3	63·7
	N.G. 186	4-7-16	do.	13·7	9·65	3·1	6·3	70·4

THIRD PROGRESSIVE EXAMINATION OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—AUGUST, 1916.

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.
D—	N.G. 133	1-8-16	12 months	16·4	13·53	2·77	10·1	82·5
	N.G. 134	1-8-16	do.	16·6	13·29	2·01	9·7	80·0
	N.G. 135	1-8-16	do.	16·3	12·00	2·45	8·2	73·6
	N.G. 138	1-8-16	do.	11·5	5·46	3·12	2·0	47·4
	N.G. 139	1-8-16	do.	14·0	9·33	1·00	5·8	66·6
	N.G. 140	1-8-16	do.	13·7	8·94	3·20	5·5	65·2
	N.G. 141	1-8-16	do.	13·5	9·33	1·89	6·0	69·1
	N.G. 142	1-8-16	do.	14·1	8·79	2·27	5·3	62·3
	N.G. 143	1-8-16	do.	12·1	7·09	2·77	3·8	58·5
	N.G. 144	1-8-16	do.	13·6	8·45	2·60	4·8	62·1
	N.G. 146	1-8-16	do.	13·3	7·94	3·12	4·3	59·6
	N.G. 147	1-8-16	do.	16·0	12·72	2·71	9·2	79·5
	N.G. 148	2-8-16	do.	16·0	13·23	1·62	9·9	82·6
	N.G. 149	2-8-16	do.	14·1	10·22	3·28	6·9	72·4
	N.G. 152	2-8-16	do.	13·9	8·82	1·52	5·2	63·4
	N.G. 153	2-8-16	do.	15·3	11·03	1·86	7·5	72·0
	N.G. 156	2-8-16	do.	16·7	14·28	1·68	10·9	85·5
	N.G. 157	2-8-16	do.	15·3	12·69	1·04	9·5	82·9
	N.G. 159	2-8-16	do.	16·4	13·40	1·68	9·9	81·7
	N.G. 160	2-8-16	do.	14·7	10·04	2·01	6·4	68·2
	N.G. 164	2-8-16	do.	16·8	14·44	1·73	11·0	86·0
	N.G. 165	2-8-16	do.	15·3	12·37	3·67	9·1	80·8
	N.G. 167	2-8-16	do.	16·2	12·82	1·71	9·3	79·1
	N.G. 168	2-8-16	do.	17·5	15·48	1·30	12·0	88·4
	N.G. 173	2-8-16	do.	15·1	10·89	3·12	7·4	72·1
	N.G. 174	3-8-16	do.	14·6	10·80	2·40	7·4	73·9
	N.G. 175	3-8-16	do.	16·6	13·66	·92	10·1	82·2
	N.G. 176	3-8-16	do.	15·4	11·19	3·90	7·4	72·6
	N.G. 178	3-8-16	do.	14·1	8·93	·96	5·3	63·3
	N.G. 184	3-8-16	do.	19·3	16·60	2·04	12·7	86·0
	N.G. 185	3-8-16	do.	15·2	10·13	2·08	6·3	66·6
	N.G. 186	3-8-16	do.	14·4	10·91	3·90	7·6	75·7

FINAL EXAMINATION OF PAPUAN CANES—(WELLS COLLECTION)—PLANT CROP—SEPTEMBER, 1916.

Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids (Brix.).	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.	Fibre.
N.G. 133	4-9-16	13 months	15·3	12·69	1·01	9·5	82·9	10·5
N.G. 134	4-9-16	do.	15·1	12·94	1·56	10·0	85·6	10·2
N.G. 135	4-9-16	do.	16·0	12·82	1·60	9·4	80·1	11·0
N.G. 138	4-9-16	do.	12·6	7·12	3·12	3·6	56·5	10·0
N.G. 139	4-9-16	do.	16·2	11·16	2·50	7·4	68·8	10·4
N.G. 140	4-9-16	do.	14·7	9·83	2·71	6·2	66·8	10·2
N.G. 141	4-9-16	do.	16·0	12·72	1·83	9·4	79·5	9·6
N.G. 142	4-9-16	do.	14·3	10·37	2·65	7·0	72·5	11·0
N.G. 143	4-9-16	do.	13·3	8·61	2·31	5·3	64·7	9·8
N.G. 144	4-9-16	do.	14·9	12·40	2·40	9·4	83·2	9·6
N.G. 146	4-9-16	do.	13·1	8·03	2·90	4·5	61·2	11·5
N.G. 147	4-9-16	do.	17·4	15·48	1·01	12·2	88·9	10·0
N.G. 148	4-9-16	do.	15·5	12·48	1·38	9·1	80·5	11·5
N.G. 149	4-9-16	do.	16·0	13·06	1·22	9·6	81·6	12·1
N.G. 152	4-9-16	do.	16·6	14·20	1·38	10·9	85·5	10·4
N.G. 153	4-9-16	do.	15·6	12·23	1·92	8·9	78·3	9·8
N.G. 156	4-9-16	do.	16·1	13·31	1·04	9·9	82·6	11·0
N.G. 157	4-9-16	do.	16·3	13·26	·85	9·8	81·3	11·0
N.G. 159	4-9-16	do.	16·1	13·07	1·56	9·7	81·1	10·3
N.G. 160	5-9-16	do.	14·5	11·88	2·77	8·9	81·9	9·5
N.G. 164	5-9-16	do.	17·0	13·77	1·25	10·1	81·0	9·8
N.G. 165	5-9-16	do.	14·6	11·88	1·34	8·9	81·3	10·0
N.G. 167	5-9-16	do.	16·9	14·17	1·05	10·7	83·8	10·0
N.G. 168	5-9-16	do.	18·4	15·95	·73	12·3	86·6	11·0
N.G. 173	5-9-16	do.	17·6	15·48	·92	11·7	87·9	13·0
N.G. 174	5-9-16	do.	16·0	13·06	1·22	9·8	81·6	9·6
N.G. 175	5-9-16	do.	17·3	15·42	·67	11·8	89·1	13·5
N.G. 176	5-9-16	do.	15·0	10·89	2·35	7·2	72·6	12·5
N.G. 178	5-9-16	do.	14·6	9·72	2·60	6·1	66·5	10·0
N.G. 184	5-9-16	do.	15·0	12·40	2·08	9·4	82·6	10·0
N.G. 185	5-9-16	do.	15·6	10·76	2·31	6·9	68·9	11·5
N.G. 186	5-9-16	do.	14·2	11·30	1·52	8·2	79·5	11·4

Early in October these Papuan canes were harvested and weighed. From the data obtained and the analytical figures, the following table of crop results was prepared :—

CROP RESULTS OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—DIVISION D—SEPTEMBER, 1916.

Country.	Name or Number of Variety.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Pure Obtainable Cane Sugar per Acre in Pounds.	Yield of Pure Obtainable Cane Sugar per Acre in English Tons.
New Guinea	N.G. 133	13 months	53·0	11,283	5·0
Ditto	N.G. 134	do.	53·5	11,993	5·3
Ditto	N.G. 135	do.	40·4	8,516	3·8
Ditto	N.G. 138	do.	45·1	3,638	1·6
Ditto	N.G. 139	do.	51·0	8,466	3·7
Ditto	N.G. 140	do.	33·0	4,591	2·0
Ditto	N.G. 141	do.	43·0	9,062	4·0
Ditto	N.G. 142	do.	46·1	7,236	3·2
Ditto	N.G. 143	do.	49·0	5,817	2·5
Ditto	N.G. 144	do.	55·7	11,737	5·2
Ditto	N.G. 146	do.	29·8	3,005	1·3
Ditto	N.G. 147	do.	39·1	10,699	4·7
Ditto	N.G. 148	do.	44·5	9,090	4·0
Ditto	N.G. 149	do.	48·4	10,426	4·6
Ditto	N.G. 152	do.	25·0	6,109	2·7
Ditto	N.G. 153	do.	35·7	7,133	3·1
Ditto	N.G. 156	do.	28·0	6,209	2·7
Ditto	N.G. 157	do.	41·2	9,059	4·0
Ditto	N.G. 159	do.	41·2	8,957	3·9
Ditto	N.G. 160	do.	46·1	9,200	4·1
Ditto	N.G. 164	do.	23·0	5,220	2·3
Ditto	N.G. 165	do.	42·1	8,399	3·7
Ditto	N.G. 167	do.	34·4	8,265	3·6
Ditto	N.G. 168	do.	39·1	10,787	4·8
Ditto	N.G. 173	do.	33·4	8,765	3·9
Ditto	N.G. 174	do.	33·9	7,456	3·3
Ditto	N.G. 175	do.	37·8	10,005	4·4
Ditto	N.G. 176	do.	39·0	6,293	2·8
Ditto	N.G. 178	do.	22·1	3,029	1·3
Ditto	N.G. 184	do.	24·6	5,186	2·3
Ditto	N.G. 185	do.	24·8	3,847	1·7
Ditto	N.G. 186	do.	20·3	3,738	1·6

It will be noticed from the above figures that the analytical results of a number of these canes are exceedingly low. Allowing for the moist nature of the autumn and winter this year and its marked effect on the sugar contents of the cane, there is no doubt that, as was fully anticipated, the larger number of these varieties will eventually prove worthless as commercial canes. However, if only two or three are secured, the collection and testing of these varieties will have been well worth while. Further comment must be reserved until the canes have passed through ratoon trials.*

Brief Description of the above Papuan Canes.

New Guinea 92.—Thin light-green-coloured erect cane, joints 2 to 4 in., slightly barrel-shaped, eyes round and full, foliage medium, stool and germination good.

New Guinea 93.—Light yellow-coloured cane with green stripe, medium thickness, erect habit, joints 3 to 5 in., parallel-sided, eyes round and full, foliage medium,l eaf sheath striped, stool and germination good.

New Guinea 94.—Light green-coloured cane of fair thickness, semi-erect habit, joints 4 to 6 in., telescopic at nodes, eyes flat, acute, and running in deep groove, foliage broad and heavy, stool and germination good.

New Guinea 95.—Purple-coloured cane with claret stripe, heavily waxed, medium stoutness, erect habit, joints 2 to 4 in., barrel-shaped, eyes large, full, and acute, stool and germination good, brown flesh.

New Guinea 96.—Stout purple-black-coloured cane, erect habit, joints 3 to 4 in., parallel-sided, eyes small, flat, acute, running in groove, stool and germination good, foliage broad and heavy.

New Guinea 98.—Apparently same cane as Number 96.

New Guinea 100.—Stout reddish-black-coloured cane of semi-erect habit, joints 3 to 5 in., barrel-shaped, eyes full and slightly acute, green annular ring, foliage broad and heavy, stool and germination good.

New Guinea 101.—Thin olive-green-coloured cane with red blush, semi-erect habit, joints 4 to 7 in., parallel-sided, eyes full and acute, foliage medium, stool and germination good.

New Guinea 102.—Light-green to yellow-coloured cane of fair stoutness, black waxed, semi-erect habit, joints 5 to 7 in., parallel-sided, bulging at nodes, eyes large, full, and acute, running in groove, foliage broad and heavy, stool and germination good.

New Guinea 103.—Dirty olive-green-coloured cane with light red to brown coloured stripe, medium stoutness, heavily waxed, erect habit, joints 3 to 5 in., barrel-shaped, eyes medium, full, and acute, foliage medium, germination and stool very good.

New Guinea 104A.—Light brown cane inclining to thin and of semi-erect habit, joints 4 to 6 in., parallel-sided, eyes large, full, and acute, foliage light, germination and stool good, a rapid grower.

New Guinea 105.—Purple-coloured cane with indistinct dark stripe, medium stoutness, semi-erect habit, joints 4 to 6 in., barrel-shaped, eyes large, full, acute, running in groove, foliage medium and heavy, germination and stool good.

New Guinea 106.—Very stout cane olive-green colour with red blush and heavy black wax, erect habit, joints 3 to 5 in., slightly barrel-shaped, eyes large, full, and acute, foliage medium and heavy, germination and stool good.

New Guinea 107.—Thin light-green-coloured cane, white waxed at nodes, semi-erect habit, joints 4 to 6 in., parallel-sided, eyes medium, full, and acute, foliage medium, germination good, stool fair.

New Guinea 108.—Thin light-green-coloured cane with heavy white wax, semi-erect habit, joints 4 to 6 in., barrel-shaped, eyes large, flat, acute, foliage medium, germination and stool good. Apparently same cane as original New Guinea 66.

New Guinea 110.—Practically the same cane as 108, the only difference being that 110 has a reddish blush.

New Guinea 111.—Thin light-green-coloured cane with light-brown stripe, erect habit, joints 4 to 6 in., barrel-shaped, eyes medium, full, and acute, foliage sparse, germination and stool good.

New Guinea 113.—Salmon-coloured to bright red cane with olive-green stripe, erect habit, joints 3 to 5 in., parallel-sided, eyes medium, full, and acute, foliage light with striped leaf sheath, germination and stool fair, brown flesh.

New Guinea 115.—Apparently the same cane as 102.

New Guinea 116.—Claret-coloured cane with yellow to green coloured stripe, thin nature, erect habit, joints 2 to 4 in., parallel-sided, eyes medium, full, and acute, foliage medium showing striped leaf sheath, germination and stool fair.

New Guinea 117.—Apparently the same cane as 102 and 115.

* Note.—Analyses made in November show that the majority of these varieties had made considerable improvement.

New Guinea 118.—Thin blue to black-coloured cane, heavily waxed, and showing white sun blotches, brown flesh, erect habit, joints 3 to 5 in., barrel-shaped, eyes medium, full, and acute, running in groove, foliage medium, germination and stool good.

New Guinea 119.—Apparently same cane as 118.

New Guinea 122.—Thin light-yellow to green-coloured cane, erect habit, joints 4 to 6 in., parallel-sided, eyes small, flat, and acute, foliage medium, germination and stool fair.

New Guinea 125.—Dark brown-coloured cane with indistinct claret stripe, medium stoutness, erect habit, joints 4 to 6 in., barrel-shaped, eyes medium, full, and acute, foliage heavy, germination and stool good.

New Guinea 126.—Apparently same cane as 117.

New Guinea 128.—Apparently same cane as 92.

New Guinea 129.—Stout yellow-coloured cane with olive-green stripe and red blush, brown flesh, erect habit, joints 2 to 4 in., parallel-sided, eyes medium, round, and full, foliage broad and heavy, germination and stool good.

New Guinea 130.—Olive-green-coloured cane with light red stripe, medium thickness, erect habit, joints 3 to 5 in., staggered, eyes large, full, and acute, foliage medium, germination good, stool fair.

New Guinea 131.—Brown to red coloured cane with dark-green stripe, medium stoutness, semi-erect habit, joints 4 to 5 in., staggered, eyes medium, full, and round, foliage broad and heavy, germination and stool good.

New Guinea 133.—Same cane as Number 103.

New Guinea 134.—Somewhat thin olive-green-coloured cane with longitudinal skin cracks and brown blotches, semi-erect habit, joints 4 to 6 in., parallel-sided, eyes large, full, and acute, foliage medium, germination and stool good. Practically identical with the old N.G. 4, but a slightly, more robust cane.

New Guinea 135.—Olive-green to light-brown coloured cane with reddish blush, stout nature, erect habit, joints 3 to 5 in., parallel-sided, eyes small and round, foliage medium, germination and stool good.

New Guinea 138.—Dark-red cane with dark claret stripe, brown flesh, medium stoutness, lodging habit, joints 4 to 8 in., barrel-shaped, eyes large, full, and acute, foliage medium, germination and stool good, fast grower but crop very much tangled.

New Guinea 139.—Same cane as Number 94.

New Guinea 140.—Light-green to yellow coloured cane with broad light-red stripe, medium stoutness, erect habit, joints 4 to 6 in., parallel-sided and staggered, eyes medium, full, and acute running in slight groove, foliage medium, germination and stool good.

New Guinea 141.—Light-green to yellow coloured cane with broad pink stripe, medium stoutness, semi-erect habit, joints 3 to 6 in., parallel-sided, eyes round and full, foliage medium with striped leaf sheath, germination and stool good.

New Guinea 142.—Salmon to red coloured cane with broad green stripe, medium stoutness, semi-erect habit, joints 5 to 7 in., slightly staggered, eyes large, full, and acute, foliage medium with striped leaf sheath, germination and stool good.

New Guinea 143.—Brown-coloured cane with broad claret stripe, medium stoutness, erect habit, joints 4 to 6 in., barrel-shaped and staggered, eyes medium, full, and acute, foliage medium, germination and stool good.

New Guinea 144.—Yellow cane with green stripe and slight pink blush, medium stoutness, semi-erect habit, joints 4 to 6 in., parallel-sided, eyes medium, full, and acute, foliage medium, germination and stool good.

New Guinea 146.—Light-green-coloured cane with red blush and purple stripe, medium stoutness, erect habit, joints 4 to 8 in., parallel-sided, eyes, medium full, acute, grooved, foliage medium with striped leaf sheath, germination and stool good.

New Guinea 147.—Same as Number 144.

New Guinea 148.—Same as Number 125.

New Guinea 149.—Same as Number 125.

New Guinea 152.—Purple-black-coloured cane with white wax ring round nodes, medium stoutness, erect habit, joints 2 to 4 in., parallel-sided, eyes large, flat, acute, running in deep groove, foliage medium, germination and stool good ; similar to 96 and 98, only smaller.

New Guinea 153.—Stout olive-green-coloured cane, similar to 167 with exception of eyes, which in this variety are flat and acute, running in groove, joints are also slightly staggered.

New Guinea 156.—Light-green-coloured cane with broad black to purple stripe, white waxed, stout nature, erect habit, joints 2 to 4 in., barrel-shaped and staggered, eyes medium, full acute, foliage medium and heavy, germination and stool fair.

New Guinea 157.—Orange-coloured cane with bright green stripe, stout nature, erect habit, joints 5 to 7 in., barrel-shaped, eyes large, full, and acute, foliage heavy with striped leaf sheath, germination good, stool fair ; very similar to Hitau.

New Guinea 159.—Pink-coloured cane with olive-green stripe, white waxed, medium stoutness, erect habit, joints 3 to 5 in., parallel-sided and staggered, eyes small and round, foliage medium with striped leaf sheath, germination and stool good.

New Guinea 160.—Very stout white waxed blue-black cane with green stripe, brown flesh, semi-erect habit, joints 2 to 4 in., barrel-shaped, eyes full, medium, and round, foliage medium and sparse, germination good, stool fair.

New Guinea 164.—Green-coloured cane, heavily waxed with black wax, medium stoutness, semi-erect habit, joints 4 to 6 in., parallel-sided, eyes medium, full, acute, foliage medium, germination and stool good.

New Guinea 165.—Same cane as original New Guinea 40.

New Guinea 168.—Green-coloured cane with longitudinal skin cracks and rusty blotches, medium stoutness, erect habit, joints 2 to 4 in., contracted centres, eyes large, prominent, and round, foliage medium, germination and stool good.

New Guinea 167.—Same as Number 135.

New Guinea 173.—Bright-red-coloured cane with broad olive-green stripe, stout nature, erect habit, joints 1½ to 3 in., staggered and bulging at nodes, eyes large, full; round, and protuberant, foliage medium with striped leaf sheath, germination and stool good.

New Guinea 174.—Same as original New Guinea No. 4.

New Guinea 175.—Same as Number 92.

New Guinea 176.—Same as Number 129.

New Guinea 178.—Pink-coloured cane with green stripe, thin nature, erect habit, joints 2 to 4 in., parallel-sided, eyes medium, full, and slightly acute, running in groove, foliage heavy, germination and stool fair.

New Guinea 184.—Stout olive-green to brown-coloured cane, similar to 167, with exception of eyes, which in this variety are flat and acute, running in groove, joints are also slightly staggered.

New Guinea 185.—Variety very similar to Number 94 with the exception that joints are not telescopic ; in all other particulars it is identical.

New Guinea 186.—Same as Numbers 118 and 119.

Miscellaneous Canes.

The following varieties have been introduced to the Experiment Station at different periods recently, 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.

These canes were planted out on land prepared in the manner described in previous reports. The analytical trials are set out below :—

First Preliminary Examination of Miscellaneous Canes—Plant Crop—June, 1916.

Division.	Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids. (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.
D—	Gingila	6-6-16	10 months	12·3	7·12	2·5	3·7	57·8
	Striped 1900 Seed	6-6-16	do.	14·5	9·83	2·6	6·2	67·7
	H.Q. 458	6-6-16	do.	11·9	7·20	3·0	4·0	60·5
	N.G. 16	6-6-16	do.	12·2	6·82	2·6	3·3	55·9
	Petite Senneville	6-6-16	do.	12·8	7·28	3·1	3·7	56·8

Second Progressive Examination of Miscellaneous Canes—Plant Crop—July, 1916.

D—	Gingila	4-7-16	11 months	13·1	7·87	2·8	4·3	60·0
	Striped Sp. 1900 Seed ..	4-7-16	do.	14·4	9·58	1·8	5·9	66·5
	H.Q. 458	4-7-16	do.	15·2	11·18	2·7	7·6	73·5
	N.G. 16	4-7-16	do.	13·9	8·24	3·1	4·5	59·2
	Petite Senneville	4-7-16	do.	15·7	11·29	2·8	7·5	71·9

Third Progressive Examination of Miscellaneous Canes—Plant Crop—August, 1916.

D—	Gingila	3-8-16	12 months	17·3	12·81	·91	8·8	74·0
	Striped Sport. 1900 Seedling	3-8-16	do.	15·2	11·05	2·40	7·4	72·6
	H.Q. 458	3-8-16	do.	16·9	13·90	1·98	10·2	82·2
	N.G. 16	3-8-16	do.	16·6	13·79	·96	10·2	83·0
	Petite Senneville	3-8-16	do.	16·5	13·77	1·29	10·2	83·4

FINAL EXAMINATION OF MISCELLANEOUS CANES—PLANT CROP—SEPTEMBER, 1916.

Variety of Cane.	Date of Analysis.	Age of Cane.	Total Solids. (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	P.O.C.S.	Purity.	Fibre.
Gingila	5-9-16	13 months	15·7	13·31	·89	10·1	84·7	11·1
Striped Sp. 1900 Seed.	5-9-16	do.	17·5	15·64	·69	12·4	89·3	10·0
H.Q. 458	5-9-16	do.	18·0	15·92	·83	12·6	88·4	9·0
N.G. 16	5-9-16	do.	16·9	14·33	·86	11·0	84·7	9·6
Petite Senneville	5-9-16	do.	17·0	14·44	·49	10·9	84·9	11·2

After the canes were harvested and weighed, the crop results were prepared, and are furnished hereunder :—

CROP RESULTS OF MISCELLANEOUS CANES—PLANT CROP—SEPTEMBER, 1916.

Country.	Name or Number of Variety.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Pure Obtainable Cane Sugar per Acre in Pounds.	Yield of Pure Obtainable Cane Sugar per Acre in English Tons.
Queensland	Hambledon Seedling 458 ..	13 months	36·6	10,354	4·6
Ditto	Gingila	do.	33·9	7,684	3·4
Ditto	Striped Sport 1900 Seedling	do.	39·4	10,946	4·8
Mauritius	Petite Senneville	do.	38·8	9,496	4·2
New Guinea	New Guinea 16	do.	46·1	11,372	5·0

The following are brief descriptions of these varieties :—

Hambledon Queensland 458.—Stout brown-coloured cane, heavily waxed, erect habit, joints 4 to 5 in., parallel-sided and slight bulge at nodes, eyes full, acute, running in groove, foliage medium and light coloured, germination good, stool medium, flesh brown.

Gingila.—Brown to black-coloured cane, heavily waxed, with dark claret stripe, stout nature, erect habit, joints 3 to 4 in., slightly barrel and staggered, eyes large, full, and acute, foliage medium, germination and stool fair. This variety is supposed to have originated from the grafting of Mauritius Gingham and Badila.

Petite Senneville.—Brown-coloured cane with longitudinal skin cracks, medium stoutness, erect habit, joints 4 to 5 in., slightly staggered, eyes medium, full, and acute, foliage medium, germination and stool good.

New Guinea 16.—Dark-blue to black-coloured cane, heavily waxed with white wax, stout nature, erect habit, joints 2 to 4 in., barrel-shaped and slightly staggered, foliage broad and heavy, germination and stool good.

NEW EXPERIMENTS.

The following new experiments have been initiated :—

(1) TESTS TO DETERMINE THE EFFECT OF FERTILISER ON PLANT CROPS AND ITS ACTION 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 will be treated as follows :—

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

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

The preparation of the land was as follows :—Shortly after harvesting, the stools from the preceding crop were ploughed out and carted off the field. Lime was then applied broadcast at the rate of 1 ton per acre, the land ploughed as deeply as possible with the disc plough, and a crop of small red Mauritius bean seed sown at the rate of 1 bushel per acre. Towards the middle of February

the bean crop was ploughed in and, after rotting sufficiently, the plot was deeply ploughed and subsoiled. Owing to rain, it was impossible to plant at once, so the land was left under bare fallow until early in August, when, after a further deep ploughing, the plot was planted up with New Guinea 24B.

(2) TESTS TO DETERMINE THE VALUE OF SUBSOILING RATOON CROPS.

The method of ratooning cane in vogue at 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 hardpan. In this connection the following results will be of interest :—

From second ratoons of New Guinea 24B (half an acre in extent) originally subsoiled for the plant crop a yield at the rate of 33·6 tons of cane was obtained. The ratooning consisted of a double stroke of the spring tooth cultivator, and beyond the application of fertilisers and ordinary scarifyings nothing further was done. These results are satisfactory.

In the preparation of land for planting the writer has frequently noticed that where land has previously been subsoiled, the subsoil, even after a lapse of as long as 4 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

EXPERIMENTS WITH ARSENICAL SPRAYS FOR DESTRUCTION OF WEEDS.

These experiments (of which account is given in last year's Report) were repeated this year upon younger cane, and the results then obtained were confirmed, viz., that the most troublesome weeds to eradicate did not succumb to the sprays, and the method is too costly for certain seasons of the year in North Queensland.

DISTRIBUTION OF CANE VARIETIES AT MACKAY.

Due to dry conditions prevailing at the commencement of the year the general distribution of cane plants to growers did not take place till August. This season 26 crates of cane were sent out to farmers' associations, mills, and for planting up the variety plots in different parts of the State. Thirty-four packages of cane were also sent out, and, in addition, 120 local growers were supplied with new varieties. An increasing demand for new kinds is manifest amongst growers generally who are usually on the look-out for promising canes.

SUBSIDIARY CROPS.

The growth of sorghums, yuban, and cow cane is still continued, both for the purpose of forage for station stock, and distribution of seed to growers.

FRUIT TREES.

A small demand still exists for mango, pawpaw, and tamarind seeds and plants. Unfortunately, owing to the dry weather, the pawpaws have been practically all lost. An attempt is, however, being made to again establish the varieties. All the above trees are from time to time available for distribution.

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

Mr. James Pringle is the Chemist in Charge of the Southern Sugar Experiment Station, and his duties have been carried out in an entirely satisfactory manner. The present appearance of the Station reflects great credit on his energy and care.

A description of this Station, which is situated in the Woongarra sub-district of Bundaberg, appears in the last Annual Report. The severe drought experienced last season had a pronounced effect on this season's crop, and good rains did not fall until February. The cane, which up till then had presented a dry wilted appearance and had made scarcely any growth, then commenced to pick up. In a few weeks it was gloriously green, but, as the best of the growing season was over, the progress made was relatively small. Through the winter the cane grew slowly and developed a fine green top. Due to the industrial upset the Bundaberg Mills did not start crushing at the usual

time, and many growers decided to stand over a good deal of their cane till the 1917 season. It was felt that justice would not be done to a number of the experiments if they were harvested this year in the face of the foregoing disadvantages, and it was therefore decided to stand these over till next season also. Those field trials, which will be cut next year, comprise the first ratoons of—

(1) Liming experiments with and without subsoiling.

(2) Liming experiments with and without mixed manures.

(3) Experiments with and without subsoiling.

(4) Experiments with and without manures.

(5) Badila cane in plots containing different widths of rows.

(6) Experiments in planting tops, middles, and bottoms of Badila.

Experiments with Different Methods of Ratooning. (Second Ratoons.)

The cane upon which these trials were made was originally planted before the Station was purchased at the end of 1913. The crop occupied a large area, so that uniform results ought to be assured. The treatment was as follows :—

Plot 1.—No manure used, ordinary cultivation.

Plot 2.—Mixed manure applied, ordinary cultivation.

Plot 3.—Ploughed with four furrows between the rows.

Plot 4.—Cane allowed to volunteer through trash.

Plot 5.—Ordinary cultivation only.

Referring to the volunteer part of the experiment, it may be said that due to the drought this plot took the lead and rapidly passed all the others, both in height of cane and green appearance, up till the time the rains fell. The other plots then commenced to catch up, particularly the manured one, but, even for some time after, the volunteer plot could be picked out from plots 1, 3, and 5, and in the final results it came second. While not recommending this method as suitable to all years, yet taking the present high cost of labour into consideration, it is well worth trying in droughty seasons.

The following table gives the analytical data in connection with these experiments :—

Analytical Results of Different Methods of Ratooning—Second Ratoon Crop—Variety D 1135.

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.	P.O.C.S.
1	D 1135	No manure	12 months	25-9-16	18·3	16·69	1·00	91·20	14·85	13·27
2	D 1135	Mixed manure	do.	25-9-16	17·8	16·19	1·06	90·95	14·40	12·85
2	D 1135	Ploughed with four furrows between the rows	do.	26-9-16	17·9	16·36	·89	91·45	14·56	13·02
4	D 1135	Cane allowed to volunteer through trash	do.	26-9-16	18·4	17·22	·53	93·58	15·33	13·90
5	D 1135	Ordinary cultivation—viz., three furrows ploughed between rows	do.	26-9-16	18·1	16·86	·92	93·14	15·01	13·47

The crop results are set out in the table appearing hereunder :—

Yield of Cane and Sugar per Acre with Different Methods of Ratooning—Second Ratoon Crop—D 1135.

Plot Number.	Treatment.	Yield of Cane per Acre, English Tons.	Yield of Total Sugar per Acre, English Tons.	Yield of P.O.C.S. per Acre, English Tons.
1	No manure	22·17	3·70	2·94
2	Mixed manure	29·75	4·82	3·82
3	Ploughed with four furrows between rows	23·33	3·82	3·04
4	Cane allowed to volunteer through trash	25·47	4·38	3·54
5	Ordinary cultivation—viz., three furrows ploughed between rows .	24·31	4·10	3·27

The experiment with potash manure only, in the form of 2 cwt. of sulphate of potash, *versus* no manure on a cane crop was continued again this year, the cane being second ratoons. The plant

crop was originally planted before the purchase of the Station. Analyses show the percentage of potash on the Station soils to be particularly low. The analytical figures are supplied in the table below :—

ANALYTICAL RESULTS OF MANURIAL EXPERIMENTS—SECOND RATOON CROP—VARIETY D 1135.

Plot No.	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.	P.O.C.S.
1	D 1135	Potash only	12 months	27-9-16	18·3	17·09	·80	93·38	15·21	13·77
2	D 1135	No Potash	do.	27-9-16	16·8	15·18	1·56	90·35	13·51	12·00

The crop results are set out hereunder, and it will be seen that an additional increase of 5·25 tons of cane per acre has been secured from the use of the potash.

YIELD OF CANE AND SUGAR PER ACRE FROM SECOND RATOONS, TREATED WITH AND WITHOUT POTASH—VARIETY D 1135.

Plot No.	Treatment.	Yield of Cane per Acre, English Tons.	Yield of Total Sugar per Acre, English Tons.	Yield of P.O.C.S. per Acre, English Tons.
1	2 cwt. Sulphate of Potash per acre	16·14	2·76	2·22
2	No Potash	10·89	1·65	1·31

For the purpose of testing the suitability of the early maturing cane known as H.Q. 426 a plot of this variety was planted last August. The dry weather experienced militated severely against the growth of the cane. The variety came away strongly, the germination being almost perfect. It made good headway for the first three months and then made little progress until February of this year, when it commenced to go ahead again, but not so vigorously as the D. 1135 variety. Chemical tests made in August show the following details :—

ANALYTICAL RESULTS OF H.Q. 426—PLANT CROP—AUGUST PLANTING, 1915.

Variety of Cane.	Age of Cane.	Date of Analysis.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	P.O.C.S. in Cane.
H.Q. 426	12 months	26-9-16	19·2	17·86	·73	93·02	15·89	14·36

The weight of cane and sugar per acre resulting are, considering the drawbacks to the crop pointed out above, satisfactory. They are given below :—

YIELD OF CANE AND SUGAR PER ACRE FROM H.Q. 426—PLANT CROP—AUGUST PLANTING, 1915.

Variety of Cane.	Yield of Cane per Acre in English Tons.	Yield of Total Sugar per Acre in English Tons.	Yield of P.O.C.S. per Acre in English Tons.
Hambledon Queensland 426	16·53	2·95	2·34

EXPERIMENTS WITH NEW PAPUAN AND OTHER VARIETIES.

In last Report mention was made of the planting out of the following canes :—N.G. 67, 69, 70, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 24A, 93, 94, 95, 96, 97, 98, 99, 100, 102, 103, 104, M. 1900, N.G. 92, 108, 110, H.Q. 285, N.G. 112, M. 189, N.G. 114, 115, 116, 117, 118, 119, 122, 123, 124, 125, 126, N.G. 24B, 128, 129, 130, 131, 133, 134, 135, 136, 137, 138, 139, M. 87, N.G. 141, 142, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 157, 158, 159, 161, H.Q. 14, N.G. 164, 165, 167, 168, 171, 174, 175, 176, 177, 178, 15, 181, 182, 41, Sport, 184, 185, D.1135, M. 89, M. 55, Q. 115, 135, 137, 307, 365, 554, 558, 684, 694, 695, 698, 719, 721, Malagache, Q. 748, 750, 763, 767, 779, 795, 812A, 813, 822, 855, 900, 903, 970, 999, 1004, 1025, 1092, 1098, 1133, B. 244, 306, 3412, 3747, 3922, T. 211, D. 115, 1483, Badila Seedling, Hybrid 1, H.Q. 426, H.Q. 458, Cingila, Cassilis, N.G. 16.

Due to the effect of the drought the germination of these varieties was most irregular. The weather immediately after planting was cold and dry, and this was followed by raging northerly winds, which quickly deprived the soil of its moisture and had a most prejudicial effect on the canes generally. Careful note was taken during growth, and the following table shows the percentage of the cane plants on each plot which died right out :—

Variety.	Percentage which died.	Variety.	Percentage which died.
N.G. 67	11·5	N.G. 157	..
N.G. 69	..	N.G. 158	2·1
N.G. 70	3·7	N.G. 159	..
N.G. 72	3·5	N.G. 161	..
N.G. 73	4·7	H.Q. 114	..
N.G. 74	..	N.G. 164	..
N.G. 75	1·2	N.G. 165	..
N.G. 76	..	N.G. 167	..
N.G. 77	3·4	N.G. 168	..
N.G. 78	3·3	N.G. 171	9·1
N.G. 79	40·6	N.G. 174	..
N.G. 80	57·1	N.G. 178	..
N.G. 81	1·0	N.G. 176	2·3
N.G. 82	..	N.G. 177	..
N.G. 83	1·1	N.G. 178	..
N.G. 84	11·5	N.G. 15	..
N.G. 85	2·5	N.G. 181	..
N.G. 86	3·0	N.G. 182	6·2
N.G. 87	2·7	N.G. 41 Sport	5·8
N.G. 88	1·8	N.G. 184	3·2
N.G. 89	..	N.G. 185	..
N.G. 90	3·6	D. 1135	1·4
N.G. 91	..	M. 89	..
N.G. 24A	2·1	M. 55	..
N.G. 93	5·5	Q. 115	9·0
N.G. 94	28·3	Q. 135	5·2
N.G. 95	3·5	Q. 137	..
N.G. 96	7·0	Q. 307	..
N.G. 97	9·6	Q. 365	3·8
N.G. 98	7·3	Q. 554	1·5
N.G. 99	..	Q. 558	3·0
N.G. 100	..	Q. 684	..
N.G. 102	..	Q. 694	..
N.G. 103	1·4	Q. 695	10·0
N.G. 104	..	Q. 698	3·3
M. 1900	..	Q. 719	10·4
N.G. 92	10·4	Q. 721	50·0
N.G. 108	2·0	M. Malagache	1·2
N.G. 110	..	Q. 748	1·8
H.Q. 285	3·7	Q. 750	..
N.G. 112	4·5	Q. 763	..
M. 189	..	Q. 767	..
N.G. 114	3·4	N.G. 24	..
N.G. 115	1·3	Q. 779	8·4
N.G. 116	1·7	Q. 795	5·2
N.G. 117	2·2	Q. 812	1·4
N.G. 118	6·4	Q. 813	·9
N.G. 119	3·4	Q. 822	..
N.G. 122	12·2	Q. 855	..
N.G. 123	..	Q. 900	..
N.G. 124	36·3	Q. 903	..
N.G. 125	..	Q. 970	..
N.G. 126	..	Q. 999	11·1
N.G. 24B	4·1	Q. 1004	..
N.G. 128	..	Q. 1025	..
N.G. 129	..	Q. 1092	..
N.G. 130	..	Q. 1098	1·8
N.G. 131	8·7	Q. 1133	4·2
N.G. 133	15·7	B. 244	..
N.G. 134	3·6	B. 306	..
N.G. 135	..	B. 3412	..
N.G. 136	3·1	B. 3747	..
N.G. 137	13·5	B. 3922	..
N.G. 138	7·7	T. 211	7·7
N.G. 139	3·2	D. 115	13·9
M. 87	5·4	D. 1483	..
N.G. 141	4·0	Badila S.	..
N.G. 142	2·4	Hybrid No. 1	4·0
N.G. 146	..	Unknown	1·5
N.G. 147	..	H.Q. 458	..
N.G. 148	2·0	Gingila	2·0
N.G. 149	10·0	Cassilis	2·2
N.G. 150	16·0	N.G. 16	..
N.G. 151	3·3	H.Q. 426	..
N.G. 152	..	D. 1135 Sport	16·6
N.G. 153	1·6	D. 1135 Sport	..
N.G. 154	1·5		
N.G. 155	38.2		

This experiment was intended as a comparative one in connection with the new Papuan canes, but the conditions experienced were so abnormal that it was felt that it would be unfair to carry it on as a field trial.

As a guide to their sugar contents, however, a preliminary examination was made in September and the data are included below. The results obtained at this Station should be compared with those appearing in the Mackay portion of the Report.

PRELIMINARY EXAMINATION PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—SEPTEMBER, 1916.

Country.	Variety of Cane.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	P.O.C.S.
New Guinea	N.G. 69	13 mos.	12-9-16	14·2	10·71	5·25	75·43	9·53	7·41
Ditto	N.G. 70	do.	12-9-16	17·0	14·33	4·16	84·29	12·77	10·83
Ditto	N.G. 74	do.	12-9-16	18·4	16·91	1·60	91·90	15·05	13·50
Ditto	N.G. 76	do.	12-9-16	17·2	15·70	1·16	91·27	13·97	12·48
Ditto	N.G. 79	do.	12-9-16	17·7	15·33	3·12	86·61	13·64	11·81
Ditto	N.G. 80	do.	13-9-16	17·7	16·33	1·19	92·26	14·54	13·07
Ditto	N.G. 81	do.	13-9-16	16·5	14·55	2·66	88·42	12·95	11·33
Ditto	N.G. 82	do.	13-9-16	17·5	15·94	1·00	91·08	14·18	12·66
Ditto	N.G. 83	do.	13-9-16	16·6	14·52	2·77	87·35	12·92	11·11
Ditto	N.G. 84	do.	13-9-16	17·5	15·59	1·78	89·08	13·87	12·22
Ditto	N.G. 86	do.	13-9-16	17·2	15·67	1·47	91·10	13·95	12·45
Ditto	N.G. 90	do.	13-9-16	16·1	13·63	2·90	84·65	12·13	10·33
Ditto	N.G. 91	do.	14-9-16	17·6	15·84	1·47	90·00	14·10	12·03
Ditto	N.G. 94	do.	14-9-16	18·0	15·04	3·67	83·55	13·38	11·30
Ditto	N.G. 97	do.	14-9-16	15·0	12·72	2·27	84·80	11·32	9·66
Ditto	N.G. 99	do.	14-9-16	17·8	16·38	1·95	92·02	14·58	13·09
Ditto	N.G. 102	do.	14-9-16	16·4	14·17	3·04	86·46	12·61	10·08
Ditto	N.G. 103	do.	14-9-16	17·1	15·13	2·50	88·45	13·46	11·81
Ditto	N.G. 104	do.	14-9-16	16·1	13·93	2·60	86·52	12·39	10·68
Ditto	N.G. 108	do.	14-9-16	19·0	17·64	1·47	92·84	15·70	14·17
Ditto	N.G. 110	do.	14-9-16	17·8	16·26	1·47	91·91	14·56	13·06
Ditto	N.G. 112	do.	14-9-16	18·4	17·12	1·19	93·04	15·24	13·77
Ditto	N.G. 114	do.	14-9-16	16·0	13·01	5·68	81·31	11·58	9·71
Ditto	N.G. 115	do.	14-9-16	16·9	14·63	3·28	86·56	13·03	11·21
Ditto	N.G. 116	do.	18-9-16	16·9	14·79	2·31	87·51	13·16	11·47
Ditto	N.G. 117	do.	18-9-16	16·0	13·26	3·90	82·87	11·80	9·96
Ditto	N.G. 122	do.	18-9-16	15·6	12·64	3·38	81·02	11·31	9·31
Ditto	N.G. 123	do.	18-9-16	15·9	12·88	4·16	81·00	11·46	9·49
Ditto	N.G. 125	do.	18-9-16	17·0	15·24	1·78	89·64	13·56	11·93
Ditto	N.G. 126	do.	18-9-16	16·5	14·01	4·16	84·90	12·47	10·63
Ditto	N.G. 128	do.	18-9-16	17·8	16·41	1·09	92·19	14·60	13·13
Ditto	N.G. 129	do.	18-9-16	15·3	11·61	5·00	76·88	10·33	8·11
Ditto	N.G. 130	do.	18-9-16	16·3	13·74	3·67	84·42	12·23	10·34
Ditto	N.G. 131	do.	18-9-16	17·8	16·06	2·31	90·22	14·29	12·68
Ditto	N.G. 133	do.	18-9-16	18·5	17·28	1·25	93·40	15·38	13·93
Ditto	N.G. 136	do.	19-9-16	18·2	16·68	1·56	91·20	14·84	13·29
Ditto	N.G. 137	do.	19-9-16	17·7	16·14	1·31	91·18	14·36	12·83
Ditto	N.G. 138	do.	19-9-16	13·5	9·25	7·35	68·51	8·23	5·98
Ditto	N.G. 139	do.	19-9-16	17·3	15·72	5·00	90·86	13·99	12·47
Ditto	N.G. 141	do.	19-9-16	18·0	16·76	1·38	93·11	14·92	13·48
Ditto	N.G. 142	do.	19-9-16	20·0	18·97	·46	94·85	16·83	15·46
Ditto	N.G. 146	do.	19-9-16	18·0	16·22	2·08	90·11	14·43	12·78
Ditto	N.G. 147	do.	19-9-16	18·2	17·16	1·25	94·28	15·27	13·91
Ditto	N.G. 148	do.	19-9-16	18·1	16·52	·83	90·71	14·70	13·14
Ditto	N.G. 149	do.	19-9-16	16·9	15·35	1·38	90·82	13·66	12·17
Ditto	N.G. 155	do.	20-9-16	17·8	16·36	1·66	91·91	14·56	13·07
Ditto	N.G. 158	do.	20-9-16	18·7	16·94	2·50	90·59	15·07	13·41
Ditto	N.G. 159	do.	20-9-16	16·4	14·39	2·65	87·74	12·81	11·18
Ditto	N.G. 165	do.	20-9-16	17·1	15·59	1·92	90·63	13·87	12·39
Ditto	N.G. 167	do.	20-9-16	17·8	16·41	1·00	92·19	14·60	13·13
Ditto	N.G. 168	do.	20-9-16	16·5	14·74	1·66	88·12	13·12	11·51
Ditto	N.G. 171	do.	20-9-16	16·8	14·30	3·67	85·11	12·73	10·88
Ditto	N.G. 174	do.	20-9-16	17·7	16·22	1·50	91·63	14·43	12·93
Ditto	N.G. 175	do.	21-9-16	15·8	14·34	1·25	91·01	12·76	11·46
Ditto	N.G. 176	do.	21-9-16	17·9	16·63	·86	92·90	14·80	13·36
Ditto	N.G. 182	do.	21-9-16	17·1	15·16	2·40	88·65	13·49	11·89
Ditto	N.G. 185	do.	21-9-16	17·1	13·56	7·35	79·29	12·07	9·86

This season being a great deal more favourable, as many of the Papuan varieties were replanted as possible in August this year, and on recent inspection were found to have made, in nearly every case an excellent strike, and presented a fine healthy appearance; it is trusted that the crop results from these will be available next year.

NEW VARIETY FROM INDIA.

It was mentioned last year that a new variety known as Shahjahanpur 10 from India had been introduced. This was recommended as a particularly fine cane for severe winters. The sets sent out on being planted struck well and grew rapidly. Before planting the resulting cane out

in the field this season, an analysis was made in August, the following being the chemical figures obtained :—

ANALYSIS OF CANE FROM INDIA.

Shahjahanpur No. 10.

Total Solids (Brix).	Sucrose.	Glucose.	Purity.	P.O.C.S.
17·8	15·71	·43	88·2	12·24

NEW EXPERIMENTS.

New experiments on a large field scale have been laid down 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 have also been planted for the purpose of ratoon experiments—No. 1 will be volunteered and in No. 2 the trash will be relieved. An ordinary cultivation plot has also been provided for. These tests were planted in March and the standard variety of the District, viz., D. 1135 was used. The cane struck well and has so far made good progress.

The land for the above experiment was limed at the rate of one ton per acre and planted with Mauritius Bean. This was subsequently ploughed under prior to cane planting.

FREE DISTRIBUTION OF CANE AT BUNDABERG.

The annual distribution of cane varieties to growers took place this year in August. The following varieties were available :—H.Q. 285, 114, 426, Q. 813, 1092, M. 189, 1900 Seedling, B. 147, 156, 306, N.G. 64 Sport, 24, 24A, 24B, 22 (Mahona), Badila, and Petite Senneville. Several farmers from all parts of the district received plants, and, in addition, 24 crates and packages were forwarded to growers North and South of Bundaberg.

Java, India, Louisiana, Mauritius, Buenos Aires, Tahiti, and Japan were also supplied with cane plants from this Station.

MISCELLANEOUS.

During the drought a stand pipe was erected at the well on the Experiment Station to enable local farmers to obtain water free of charge. This was largely availed of, and numbers of growers removed many thousands of gallons weekly for domestic and stock purposes while the dry weather continued. The water was of excellent quality and, despite the severe demands made, the amount in the well varied very little. This service to the farmers was greatly appreciated.

A portion of the land at the Station is devoted to the raising of forage for stock. Fine crops of corn and lucerne have been grown, and plenty of feed is on hand for the draught horses.

RAINFALL AT THE SOUTHERN SUGAR EXPERIMENT STATION.

In the following table is given the rainfall during during the period from August, 1915, to October, 1916, inclusive :—

RAINFALL AT SOUTHERN SUGAR EXPERIMENT STATION, BUNDABERG, FROM AUGUST, 1915, TO OCTOBER, 1916.

Month.	Rainfall.	Month.	Rainfall.
August 1915	1·460	May, 1916	2·830
September, 1915	·530	June, 1916	3·580
October, 1915	·510	July, 1916	2·071
November, 1915	·992	August, 1916	2·720
December, 1915	2·560	September, 1916	4·230
January, 1916	1·413	October, 1916	5·667
February, 1916	5·728		
March, 1916	3·303	Total	41·879
April, 1916	4·285		

The rainfall for the same period last year was 35·220 inches, while for the whole year 1915 it only amounted to 26·657 inches.

7.—LABORATORY WORK.

The work of the laboratories in connection with the Sugar Experiment Stations is of the utmost importance, and the chemical tables published in this report show the intimate connection between the results obtained in the laboratories and those of the field. In addition to this, a great deal of useful work is performed for growers in the free analysis of soils, waters, fertilisers, sugar-canes, &c., and of sugars for millers. At Mackay the laboratory has been kept fully employed through the year, and it will be noticed from the details of the analyses given below that an increase has again taken place in the number of sugar-cane tests made for farmers. This table is only brought up to the end of June of the present year, and since that date a further 48 samples have come in. This desire of knowing the sugar contents of the cane may be attributed largely to the Central Cane Prices Board fixing a price for cane on an analysis basis. Tests of canes were also carried out for the Mackay District Show as usual.

DETAILED REPORT OF ANALYTICAL WORK PERFORMED IN THE LABORATORY OF THE SUGAR EXPERIMENT STATION, MACKAY, FROM 1ST JULY, 1915, TO 30TH JUNE, 1916.

Materials.	Number of Samples Analysed.	Number of Analyses.
Soils—		
Agricultural method	9	18
Nitrogen determinations	9	18
Humus determinations	9	18
Mechanical analysis	9	9
Citric method	9	18
Fertilisers	9	18
Water	2	4
Mineral deposit	1	2
Hyacinth deposit	1	2
Kaolin	1	2
Coral lime	1	2
Sugar cane and juices (farmers)	134	268
Sugar cane and juices (Station)	589	1,178
Sugar cane fibres	112	112
Total	895	1,669

The Bundaberg Laboratory is opened during the crushing season and is only equipped for sugar-cane testing. Owing to the mills not having commenced crushing, the number of analyses this year is not so great as last season. Details are given below :—

CANE ANALYSES CARRIED OUT AT THE SUGAR EXPERIMENT STATION LABORATORY, BUNDABERG, SEASON 1916.

Materials.	Number of Samples Analysed.	Number of Analyses.
Canes and juices for farmers	85	170
Canes and juices for Agricultural Show, Bundaberg	53	106
Canes and juices for Agricultural Show, Childers	23	46
Canes and juices for Experiment Station	82	164
Total	241	486

Part of the staff of the Bureau is located in the Agricultural Laboratory at Brisbane ; and the work carried out at that institution is supervised by Mr. J. C. Brünnich, the Agricultural Chemist. Since the issue of the last report, the following analyses have been made for the Bureau at this Laboratory :—

Materials.	Number of Samples Analysed.	Number of Analyses.
Soils	33	66
Sugar canes	13	26
Syrups and molasses	8	16
Waters	13	26
Megasse ash	1	2
Manure, lime, &c.	7	14
Sugars	5	10
Green manures	6	12
Totals	86	172

Certain green manures grown at the Bundaberg Sugar Experiment Station were the subject of analyses in the Brisbane Laboratory. The results appear hereunder :—

ANALYSES.

Laboratory No.	Variety.	Moisture.	Organic Matter.	Ash.	Nitrogen.	Phosphoric Acid.	Lime.	Potash.
		ANALYSES OF DRY MATERIAL.						
		%	%	%	%	%	%	%
148	No. 1 Mauritius Bean	11·11	75·43	13·46	2·248	·52	4·14	1·84
149	No. 2 Mauritius Bean	9·76	78·87	11·37	1·492	·62	3·21	2·46
150	Jerusalem Pea	10·98	78·21	10·81	1·730	·42	2·77	1·73
		ANALYSES OF GREEN MATERIAL.						
148	No. 1 Mauritius Bean	77·8	18·84	3·36	·562	·130	1·035	·460
149	No. 2 Mauritius Bean	78·3	18·96	2·74	·360	·149	·774	·592
150	Jerusalem Pea	80·0	17·58	2·42	·388	·094	·622	·388

YIELD PER ACRE.

Laboratory No.	Variety.	TONS PER ACRE.		LB. PER ACRE.			
		Total Crop.	Organic Matter.	Nitrogen.	Phosphoric Acid.	Lime.	Potash.
148	No. 1 Mauritius Bean	13·69	2·58	173	40	317	141
149	No. 2 Mauritius Bean	14·22	2·70	115	47	246	189
150	Jerusalem Pea	12·90	2·67	112	27	180	112

From these analyses it will be seen that the Mauritius bean is superior as a fertiliser to the Jerusalem pea.

Thanks are due to Mr. Brünnich for his supervision of this work and the promptness with which results are sent out.

8.—VARIETY PLOTS IN DIFFERENT DISTRICTS.

The series of experiment plots in the Northern and Southern Sugar Districts of Queensland established by my predecessor, Dr. A. J. Gibson (now General Manager of Central Sugar Mills), having passed through three crops are now finished. The exception to this statement was the experiment plot on Mr. Jas. Mackersie's farm at Ayr which, owing to the 1915 drought, was allowed to stand over. The results from this, however, due to the fact that the Lower Burdekin Sugar Mills have only recommenced crushing, have not come to hand in time for this report.

Variety plots for the free distribution of new cane plants to farmers in different districts are being established. Some of these are upon the same farms as were the experiment plots. So far, six have been established in the following localities :—

Mossman.—Mossman Central Mill.

Herbert River.—E. Waller, Macknade, and H. E. Hollins, Ingham.

Lower Burdekin.—Jas. Mackersie, Ayr.

Proserpine.—H. Ruge and Sons.

Yerra.—N. Jacobsen.

It is intended to establish others as opportunity offers. Distributions were made this season from the plots on the Herbert River, Lower Burdekin, Proserpine, and Yerra. Varieties were also distributed at Childers and Cordalba from the old experiment plots on Messrs. Broadhurst and Adie's farms.

9.—WORK OF THE DIVISION OF ENTOMOLOGY.

This important part of the Bureau's energies is still in the capable hands of Mr. Edmund Jarvis, who has continued to carry on his duties in a highly satisfactory manner. The results of many of the Entomologist's investigations have appeared in monthly reports made to this Bureau.

In the following report a brief survey of the year's operations is made. Mr. Allan Dodd, the Entomological Assistant, enlisted with the Australian Imperial Forces in the early part of the year, and he has been granted leave of absence while away on military duty :—

Gordonvale, Cairns, 10th October, 1916.

"Sir,—I have the honour to submit the following report embodying a short account of research work instituted at Gordonvale Laboratory during the past twelve months.

In addition to the continuance of experiments started last year in connection with several leading forms of repression, preliminary investigations were undertaken to determine as far as possible the relation of topographical conditions to influences arising from the operation of various methods of agricultural and natural control.

Some time was occupied in the preparation of two bulletins (Nos. 3 and 4, Div of Ent.), and a special report dealing with a new kind of light-trap designed expressly for capturing our "grey-back" cockchafer.

Control of the Cane-Beetle.

Research work at Gordonvale Laboratory is confined almost entirely at present to the study of different modes of combating the egg, larval, and imago stages of *Lepidiota albohirta*, Waterh. the most destructive of our root-eating scarabaeid beetles affecting sugar-cane.

The following notes constitute a brief summary of experimentation in this connection.

The Egg Stage.

Field investigations on the whole proved unsatisfactory, resulting in the discovery of a single batch of eggs after close examination of about 150 cubic feet of soil.

Breeding experiments at the laboratory, undertaken for the purpose of determining the number of eggs laid at one time, and whether the beetle deposited more than one batch, yielded evidence of an indefinite nature, the numbers laid by different specimens varying from 10 to 26. In short, the evidence obtained was not sufficiently conclusive to warrant the publication of remedial measures other than those already advocated.

As an outcome of numerous dissections of the ovary I am inclined to believe that the majority of eggs mature simultaneously, and are deposited in one large batch of about 24, after which, under normal conditions, a few additional eggs may be laid loosely in the soil either singly or in small lots of three or more.

The Grub Stage.

Larvicides.—Research work in this connection was initiated in February, 1915, when a number of insecticidal solutions were applied to cages containing larvæ of *albohirta* with varying results.

Although of secondary importance, there are times when limited areas of grossly infested soil may be profitably treated in this way. The following chemicals were found to exhibit apparent larvicidal effects worthy of mention :—(1) Creolin (1 pint to 50 gallons water) proved fatal to 100 per cent. of larvæ twenty-four hours after treatment ; five quarts of this solution were applied to the roots of a stool of cane at the laboratory without injuriously affecting the foliage. (2) Cyanide of potassium (1 lb. to 200 gallons water) destroyed 100 percent. of larvæ in cages of soil and also in the field ; a cane plant, two feet high, watered with eight quarts of this solution, showed slight signs of wilting after twenty-four hours, but regained its normal appearance a week or so later. (3) Borax (1 lb. to 3 gallons water) proved efficient, but is too expensive for general purposes. (4) Creosote (8 ozs. to 5 gallons water) emulsified with "Sunlight" soap gave fair results. Solutions of the following chemicals applied to soil in cages had no perceptible effect on larvæ of *albohirta*. Saltpetre (1 lb. to 3 gallons water), barium chloride (1 lb. to 3 gallons water), hellebore (1 lb. to 12 gallons water). For further details see "Australian Sugar Journal," vol. viii.., p. 62.

Poison Bait.—The great importance of control by means of stomach poisons was recognised from the start and kept in view throughout the course of preliminary research work initiated last season.

The results obtained by recent experimentation are embodied in Bulletin No. 4 of this Bureau (Division of Entomology), entitled "On the Value of Poison Bait for Controlling Cane Grubs," which deals comprehensively with the preparation, application, and economic value of two kinds of bait composed of cowpea foliage treated with cheap arsenical poisons.

Details need not be given here, it being sufficient to summarise results of laboratory tests as follows :—

(1) Grubs will readily devour cowpea leaves dusted with aceto-arsenite of copper (Paris Green) or with arsenious acid.

(2) Such foliage when treated with the former arsenical and buried 6 inches deep remains palatable and deadly in the ground for about a month.

(3) Two cage experiments with copper arsenite bait gave a mortality of from 90 to 100 per cent. of grubs in 16 days : while the poison diluted with three times its weight of stale flour yielded a mortality of 100 per cent. in 25 days.

(4) Similar cage experiments with arsenious acid bait yielded 100 per cent. of dead grubs in 14 days, the bait retaining its efficiency underground for at least one month.

It was proposed to apply the bait by sowing cowpeas in a single line 1 foot from stools about three weeks after the first general emergence of the beetle, and as soon as the peas produced a row of stocky plants, 6 inches high, dust same with the arsenical and plough them under in such manner as to bury the poisoned leaves against the main roots of the cane, where grubs when moving through the soil would be most likely to meet with them.

The total cost per acre for labour and material was estimated at about 12s. 6d., or possibly 10s., in the event of farmers deciding to grow their own cowpeas.

This plan of procedure relates solely to treatment of the late crop, planted in August or September, the intention being to combat the grub as far as possible during its second stage, at a time when young plant and ratoon cane would not be high enough to interfere with the necessary field work.

Parasitic and *Predaceous Insects.*—A few interesting parasites have been bred lately from larvæ and pupæ of minor lepidopterous insects injurious to cane, amongst which may be mentioned a large tachinid fly infesting pupæ of the new moth pest (*Mocis frugalis*, Fab.), the caterpillars of which occasioned noticeable damage to cane leaves at Gordonvale and Meringa last March.

Another species of *Tachinidæ*, resembling a very small house fly, was bred freely from larvæ of our commonest leaf-eating hesperid butterfly (*Paruara mathias*, Fab.), infested caterpillars of which contained from two to four of the parasitic grubs of this fly, that after devouring the fluid contents of their host crawled from its body and invariably pupated openly on the leaf-blade close to the empty skin.

Larval specimens of the common elaterid beetle (*Agrypnus mastersi*) continue to be ploughed up from time to time in fair numbers on red volcanic land.

In general appearance this predator is not unlike a large flattened wireworm with polished yellowish-brown body. Its voracity has already been commented upon in my monthly report for May, 1915 ("Australian Sugar Journal," vol. VII., p. 301), but it will be of interest to mention further that a specimen collected in the field on October 27th, 1914 (about two years ago), and placed in a breeding cage is still in the larval form, as active as ever, and up to date (October 1st) has killed and devoured no less than 256 large cane grubs.

As previously pointed out, it is no easy matter to augment the sphere of usefulness of an indigenous parasite by artificial methods, seeing that its normal rate of increase has long been determined by conditions of environment and various repressive influences exercised by its hyperparasitic and other foes.

Knowledge of this fact, however, need not necessarily induce us to wholly neglect such methods of control as being altogether beyond our influence. It is not unreasonable to assume that in a vast territory like Queensland, supporting a great variety of useful insects inhabiting widely separated tracts of country, we should be able in some cases to derive assistance from the introduction of useful native species of local occurrence, provided they were transferred from considerable distances and without their hyperparasites and other natural enemies. A chalcid parasite of our sheep maggot fly, for instance, discovered by the writer in Central Queensland, is at present extensively bred at Brewarrina Laboratory, New South Wales, where it is considered to be a very important factor in reducing the numbers of these noxious blowflies.

The subject of parasitism is receiving considerable attention just now from economic entomologists the world over, and one is not surprised at the popularity of so fascinating a form of control, since it offers not only the possibility of a speedy solution to such troubles as those now confronting our canegrowers, but, in the event of its proving successful, relieves the man on the land of any necessity for personal effort, all the work being performed as if by enchantment through the agency of some tiny insect quite able and willing to look after its own interests.

Although a firm believer in such remedial measures in a general way, I am of opinion that our chances of being able to introduce a parasite fitted to cope successfully with the cane grub are not sufficiently promising at present to warrant the neglect of less attractive forms of repression.

I may say that several parasites, comprising four hymenopterous and six dipterous insects, are known to attack scarabaeid cane grubs in other sugar-growing countries, and one or more of these might meet our requirements; but before introducing either of them into Queensland it would be necessary to take steps to ascertain whether our soils and other important conditions resulting from environment and climatic influences resemble those obtaining in localities where the parasite under consideration occurs naturally or has been successfully established.

Such investigation would have to be carried out by a capable entomologist, who should visit the home of the parasite, study its economy, and, in the event of finding normal conditions practically identical with those of our own in essential particulars, collect a large quantity of suitable material which during transit would be under his constant supervision.

Control of the Beetle.

Light-Traps.—As an outcome of investigations conducted in 1914, an original form of light-trap was invented for capturing our cane-beetle, *Lepidiota albohirta*, Waterh.

It was designed with the purpose of taking advantage, firstly, of the mode of approach and behaviour of this beetle whilst reacting to acetylene light, and, secondly, of its inability under certain restrictive conditions to fly from off the ground in a vertical direction.

A special illustrated report dealing with this subject was published last April ("Queensland Agricultural Journal," vol. v., p. 226), so it suffices to state that during the trial of this trap on 1st of January, 66 grey-back beetles were captured in two hours (7·45 to 9·45 p.m.), the temperature throughout being 81° F. A light south-easterly breeze was blowing at the time and the moon rose at 9·15 p.m., shortly after which beetles ceased flying and the experiment was discontinued.

In order to avoid destroying useful insects, many of which are attracted to artificial light, it was thought best to forego the use of insecticidal solutions, and allow captured beetles to remain alive until daybreak, at which time they become torpid, and can be easily tranferred to bags in the usual way and sold.

Since writing the above report it has transpired that a small arboreal earwig that flies in great numbers to acetylene lights is predaceous on our common sugar-cane plant-louse (*Aphis sacchari*), and probably mainly responsible for the efficient control of this pest.

Trial of Attractive Odours.—Researches in this connection were initiated in November, 1914, when thirteen different preparations were experimented with without appreciable reaction of any kind being noticed.

During December last, eighteen additional aromas were tested in the field, including oils obtained from plants closely related to those upon which this cane-beetle (*albohirta*) is known to subsist, but no definite reaction resulted. The wide and varied range of dietary of this insect no doubt tends to curtail the chance of our being able to induce reaction towards aromas resembling those associated with its chief food-plants. On the other hand, it is not improbable that flight prior to oviposition may be affected in some degree by the occurrence of certain native shrubs having roots more palatable to the future larvae than those of sugar-cane. Laboratory experiments this year demonstrated the susceptibility of *albohirta* to various odours, the beetle reacting very noticeably and at once to the smell of cajeput oil, acetic acid, carbolic, and nitrobenzine, and being strongly repelled by oil of almonds. They were not in the least influenced by such substances as oil of cloves, fish oil, or even the pungent fumes of formalin 40 per cent. strength. Knowledge of the above facts justifies us in assuming that reaction of a positive nature is at any rate well within the bounds of possibility, and should encourage further research in this direction. (*See* "Australian Sugar Journal," vol. vii., p. 797)

The Effect of Meteorological and Topographical Conditions on the Numerical Increase and Infestation of Cane Beetles.

A detailed account of investigations undertaken in this connection will appear later in a special bulletin now in course of preparation, which it is proposed to illustrate by several maps showing the extent and degree of infestation around Gordonvale, and the various topographical and other conditions assumed to be responsible for the occurrence of excessive numbers of cane-grubs in certain localities.

This interesting phase of control applicable to the adult stage was briefly mentioned in a previous report. ("Australian Sugar Journal," vol. vii., pp. 692 and 735.)

Miscellaneous Cane Pests.

Additions to our official collection have been few in number, owing chiefly to the absence since February of my assistant, Mr. A. P. Dodd, whose time was occupied largely in the collection and preservation of economic insects associated with sugar-cane.

The appearance of a new moth pest of minor importance (*Mocis frugalis*, Fab.) in canefields formed subject for report last March, when numbers of the slender greenish-brown caterpillars of this pest were observed damaging cane leaves at Gordonvale, the mode of injury resembling that occasioned by our common "Army Worm" (*Leucania unipuncta*, Haw.).

A number of these larvae were collected by Mr. J. A. Hadley and, in due time, pupated at the laboratory, but contrary to expectation, very few were parasitised, fully 90 per cent. yielding moths, and the remainder specimens of a tachinid fly, but no hymenopterous parasites.

The occurrence in canefields of the well-known widely distributed leaf-butterfly (*Melanitis leda*, Linn.) was also recorded for the first time in Queensland last June ("Queensland Agricultural Journal," vol. vi., p. 102).

Larvae of this butterfly defoliate cane leaves in the same manner as those of *Mocis frugalis*. No parasites were bred from them, but several pupae succumbed to a bacterial disease (not yet identified) that caused them to blacken and decompose a few days after pupation. Fortunately, this insect is of very minor importance.

Beneficial Insects.

Details respecting the economy of a useful species of earwig were published in a recent monthly report ("Australian Sugar Journal," vol. vi., p. 202). This insect, which was discovered last July to be eminently predaceous on all stages of our sugar-cane plant-louse (*Aphis sacchari*), is probably a species of genus *Labia*.

Technical Work and Office Routine.

An appreciable amount of time was bestowed on the drawing of five plates to illustrate bulletins, two isometrical sketches of a light-trap for cane beetles, and various maps and architectural plans. Correspondence and other official routine claimed their usual share of attention.

ASSISTANTS.

Owing to the absence of the Assistant Entomologist, Mr. A. P. Dodd, who went into camp last February, we have been unable to give much time to insect breeding or working out the metamorphosis of our minor scarabaeid cane beetles.

Considerable life-history data, accumulated by us during 1915, were, at the time, duly recorded and tabulated by Mr. Dodd, who has also formulated two useful keys—supplementary to those given in Bulletin No. 2 of this office—that will facilitate the identification of larval and pupal forms of our scarabaeidae of sugar-cane. This, and additional data relating to laboratory experiments undertaken in connection with remedial methods during the past two years, will be published in due course. Mr. J. A. Hadley, who continues to give satisfaction as an obliging conscientious worker, has been employed on several occasions of late in the work of collecting insects from canefields, and reporting the occurrence of species that may be causing noticeable damage to the foliage.

It need scarcely be said that owing to lack of assistants I have been unable to devote much time to the study of several important lines of research, either of which might justly claim the undivided attention of a specialist.

PUBLICATIONS.

"Notes on Insects Damaging Sugar-cane in Queensland."—Edmund Jarvis (Qld. Bur. Sug. Exp. Stat., Div. Ent., Bull. No. 3, 1916).

"On the Value of Poison Bait for Controlling Cane Grubs."—Edmund Jarvis (Qld. Bur. Sug. Exp. Stat., Div. Ent., Bull. No. 4, 1916).

"A New Light-Trap for Cane Beetles."—Edmund Jarvis ("Queensland Agricultural Journal," vol. v., p. 226, 1916).

"Monthly Progress Reports," September, 1915, to July, 1916.—Edmund Jarvis ("Australian Sugar Journal," vols. vii., 1915—viii., 1916).

I have, &c.,

EDMUND JARVIS,

Acting Entomologist.

The General Superintendent,
Bureau of Sugar Experiment Stations."

A Bill is now before Parliament giving the Minister for Agriculture power to proclaim any area "grub infested," and to levy a sum of not less than one penny per ton of cane, which is to be applied in such manner as may be thought proper in the destruction of cane grubs and beetles, the payment of entomologists, the erection and equipment of buildings and laboratories, and the conducting of inquiries, researches, and investigations in connection with the grub pest.

It is proposed to erect such buildings on Crown land at Meringa, a station on the Cairns-Babinda Railway about 2 miles from Gordonvale on the Cairns side. A suitable location has been chosen and sufficient land has been reserved to enable field experiments to be carried out.

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 ½d. 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.

Regarding fertilisers, there is little to be said in addition to what was mentioned last year. Potash is practically unobtainable, and other fertilisers have all advanced more or less in price. A great deal of meatworks fertiliser is now being used, and, in the absence of potash, this fertiliser, with nitrate of soda, seems the best for general use.

11.—ECONOMICS.

From the Report of the Government Statistician for 1916, it appears that the area under cane in 1915 was 152,027 acres, of which only 94,459 supplied cane for crushing. This was the largest area cultivated during the past five years, except 1914, but was the smallest area from which cane was cut for the mill for the same period save 1912. The amount of cane harvested from this area was 1,152,516 tons, a decrease from the previous year of 770,117 tons. 140,496 tons of sugar were manufactured, or 85,351 tons less than 1914. Due to the abnormal drought conditions, 1915 was the worst year since 1902 in the yield of cane per acre, the average for the State being only 12·2. The yield of sugar per acre was 1·49, a slightly better figure than 1912. The highest average yield was 18·10 tons cane and 1·98 tons sugar in those districts south of Gympie where the drought was not so severe. The lowest yield of cane per acre was at Ayr, being 10·45 tons. This district usually is in a high position in cane tonnage. Mackay yields were also very low, as was Bundaberg and Childers. The density or sugar content of the cane last year, however, was particularly good, and a ton of sugar was manufactured from 8·2 tons of cane on the average, a lower figure than at any period heretofore.

In the present condition of affairs it is impossible to say what mills will work continuously through the present season. It seems definite that some at any rate will not open, while others will not work through the whole of the crushing season.

Provided that conditions will go favourably with the industry in future, it is a great drawback to the production of sugar that the existing mills are not kept more fully supplied. As pointed out in the Report of the Board to Inquire into the Position of the Sugar Industry, there is now sufficient milling power in Australia to manufacture 355,000 tons of sugar in a good year. Apart from climatic conditions, however, it is found that the Southern sugar mills are at present not supplied more than 52 per cent. of their full capacity, and more cane could also be grown for many of the Northern mills.

The present consumption of sugar in Australia is now estimated to be 260,000 tons, with a yearly increase of 5,000 tons so long as the population maintains its present state of progression. It is seldom, however, that anything like the tonnage of sugar required in Australia is made within its boundaries.

The estimated value of the raw sugar crop in Queensland for the 1915 season at £18 per ton was £2,528,928.

The value of the by-product, molasses, is not accurately known. Steps are being taken, it is understood, to make better use of this material, much of which has hitherto run to waste.

It is noteworthy that a factory for the manufacture from maize of glucose, a sugar substitute used in making confectionery, has been erected and is in operation in Melbourne.

12. INCREASE OF SOUTHERN EUROPEANS IN THE INDUSTRY.

The influx of Southern Europeans into the industry, north of Townsville, still continues, and farming on the communal system is a marked feature of these races. In evidence given before the Board of Inquiry previously referred to, the number of British and non-British farmers (chiefly Italians) supplying cane on the Herbert and Johnstone Rivers was stated to be—

	British.		Non-British.	
Herbert River—				
Victoria Mill	118		Italians, 32; others, 4	36
Macnade Mill	68		Italians, 38; others, 6	44
Johnstone River—				
Goondi Mill	100		French, 1; Italians, 4; Danes, 1; Chinese, 1; Germans, 7; Austrians, 4; Turks, 1	19
Mourilyan Mill	30		Italians, 33; Germans, 4; Austrians, 3; others, 6	46
	316			145

while the numbers of British and non-British canecutters in the same districts were—

	British.		Non-British.	
Herbert River—				
Victoria	60		Italians, 111; others, 24	135
Macknade	25		Southern Europeans	180
Johnstone River—				
Goondi—	57		Italians, 49; Spanish, 40; Hindoos, 23; Greeks, 14; Maltese (British), 8; Austrians and Hungarians, 16	150
Mourilyan	27		Italians, 75; others, 81	156
	169			621

At Babinda, three years ago, there were only two foreigners in occupation of cane farms. To-day there is stated to be 40 per cent.

CONCLUSION.

The writer desires to return thanks to the various farmers' associations and the management of the several sugar mills for many acts of courtesy and attention, and for their willingness to assist the Sugar Bureau in every direction.

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.

Brisbane, 24th November, 1916.

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