

1914.

QUEENSLAND.

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 fourteenth Annual Report of the General Superintendent of Sugar Experiment Stations.

ERNEST G. E. SCRIVEN,
Director.

Brisbane, 29th October, 1914.

The Annual Report of the Bureau of Sugar Experiment Stations this year will include:—

1. Introduction.
2. Progress of the Industry and Approximate Estimate of the 1914 Crop.
3. Work of the General Superintendent and the Field Assistants.
4. New Varieties of Cane.
5. Work of the Central Sugar Experiment Station at Mackay.
6. Laboratory Work.
7. Work of the Southern Sugar Experiment Station at Bundaberg.
8. Results of the Sugar Experiment Plots in different parts of the State.
9. Division of Entomology.
10. Seedling Experiments at Kamerunga.
11. Mill Work and Economics.

1.—INTRODUCTION.

At the time of the publication of the last Annual Report it was hoped that after a long period of unrest the Sugar Industry would settle down in view of the recent State legislation governing it to a large extent. Unfortunately, this has not proved to be the case. The awards made under the Industrial Peace Act have had the effect of again materially increasing the cost of labour to the producer, while nothing in the shape of increased protection has been given him by the Federal Government. The average price paid for cane has not been increased, and farmers have been faced not only with the much higher cost of production but with the increase that has been going on in the cost of living and the purchase of farming materials and implements. This has developed into a serious position for many small growers, and this season has led in three instances to what might be termed "farmers' strikes" at sugar mills—a state of things that has probably never previously happened in Queensland. These were all for an increased rate in the price to be paid for cane. The differences were settled for the time being, but they are an indication of a feeling on the part of growers that they should, under the new conditions, be receiving better treatment.

These difficulties, which are only lightly touched on here, are also having another effect in some Northern sugar districts. They are leading to a determination on the part of certain Queensland cane growers to get out of the industry, and the opportunity to do this is being given them by the keen desire of Italians and other foreigners to become possessors of sugar farms. In given localities in the North, principally the Johnstone and Herbert Rivers, the proportion of foreign labour is from 75 to 90 per cent., the Italian nation being the most largely represented. It is principally from this latter class that the offers to buy cane farms are coming. Their methods are for several of them to put their earnings together and pay a deposit on a farm, and then to place one

of their number in to run it. The remainder go on working in the cane fields until they have saved enough to pay a fresh deposit, when another Italian goes in. It is perfectly safe to say that 99 per cent. of the sales of cane farms upon the Herbert River recently have been made to Italians, whose standard of living is very much lower than that of our own race. Thirty per cent. of the total farmers on this river are stated to be of Italian nationality. At Mourilyan 26 out of 80 farms are in their possession to date, and they are also acquiring farms on the South Johnstone.

A much smaller percentage of Austrians, Russians, Spaniards, and Greeks are also purchasing farms. The properties are usually sold at a good price, but only a small deposit is paid. It is regrettable that the Australian cane labourer shows no desire to go into cane farming. As a cane cutter he is nomadic, and as soon as his cheque is made he usually goes South, and frequently engages in other labour, returning to the cane fields for the next season.

There appears no reason why the Australian labourer could not also purchase farms on similar lines, but up to the present time no inclination to do so has been exhibited.

The national importance of the Sugar Industry was strongly dwelt upon in the last Annual Report and the above facts may possibly have some bearing on the matter. If the continental people now engaging in the industry settle down will they make defenders of their adopted country should the occasion arise?

The increased measure of protection for the industry, so earnestly advocated by the Royal Commission on the Sugar Industry nearly two years ago, has not yet been granted. This item, with other tariff matters, is now in the hands of another body—the Interstate Commission. The latter only recently decided to postpone the consideration of the protection to be accorded to the Sugar Industry upon the grounds that the present war in Europe was sufficient protection in itself, and stated “that the sugar producers of Australia would have the market of Australia entirely to themselves for the next two years.” This may be true enough, but it is poor consolation for the Australian sugar grower at a time when sugar values in all parts of the world but this are increasing by leaps and bounds. As a matter of fact the Australian price of sugar is £1 per ton less at the time of writing than it was this time last year and, under recent war legislation, that price has been fixed for the time being. Up to the present time, therefore, no benefit has come to the Australian sugar producer either from the effects of the war on the European crops, or from the fact that he has the Australian market to himself. In America, where it was feared that recent tariff amendments were going to ruin the industry, a great revival of confidence has taken place and a feeling of elation is felt—the difference in the price to be realised for sugar amounting to nearly £18 per ton extra (*vide* “Louisiana Planter.”) While it is not desired that the Australian industry should benefit in like manner, still sugar growers feel that their claims for a better price are just.*

2.—PROGRESS OF THE INDUSTRY.

Last year was a record one in Queensland sugar production, and the actual figures will be dealt with under the heading of “Economics.” Good as last year was, it will be eclipsed this year in the districts north of Proserpine. Although the weather remained dry during the last few months of 1913, this was followed in the North by an early and abundant wet season, which had a marked effect upon the growth of the cane. Happily the too frequent cyclones and floods were not in evidence this year, so that the cane had every opportunity to make a splendid crop.

In the Mackay and Southern Districts, particularly the latter, taken as a whole, the crop will not be nearly so good as that of last year. About Bundaberg and Childers the cane made little headway until March of this year, when the growing season was practically done. Three of the best months of the year were thus lost, and the rainfall being below the average the two factors had a depressing effect upon the yield. This will pull down the total tonnage for the State below that of last year, though the high yield in the North will make the crop a satisfactory one.

The following are the estimates recently supplied by the mills. They are, of course, only approximate, but should prove somewhere near the actual crop:—

Tons of Cane.		Tons of Cane.	
Mossman	62,000	Waterloo, Bundaberg	10,000
Hambledon, Cairns	95,000	Miara, Bundaberg	10,000
Mulgrave, Cairns	80,000	Ferrymead, Bundaberg	66,000
Goondi, Johnstone River	120,000	Bingera, Bundaberg	55,000
Mourilyan, Johnstone River	53,000	Pemberton, Bundaberg	18,000
Macnado, Herbert River	100,000	Invieta, Bundaberg	30,000
Victoria, Herbert River	100,000	Quinala, Bundaberg	40,000
Inkerman, Lower Burdekin	82,000	Millaquin, Bundaberg	44,000
Pioneer, Lower Burdekin	108,000	Goodwood, Bundaberg	13,000
Kabamia, Lower Burdekin	80,000	Gin Gin	40,000
Proserpine	44,000	North Isis, Childers	33,000
Eley-tova, Mackay	45,000	Deebley, Childers	33,000
North Eton, Mackay	33,000	Childers	70,000
Rainpoorua, Mackay	50,000	Maryborough, Maryborough	29,000
Plano Creek, Mackay	44,000	Mt. Sample, Maryborough	42,000
Marian, Mackay	55,000	Monston, Nambour	31,000
Palms, Mackay	30,000	Marburg	4,000
Hambush, Mackay	43,000	Legon and Albert District	21,000
Cattle Creek, Mackay	44,000	Nerang	10,000
Ferleigh, Mackay	45,000		
Buffe Creek, Bundaberg	6,600	Total	1,800,000

Last year, the record season, produced 2,035,588 tons of cane.

Speaking generally, the sugar contents of the cane this year in most of the sugar districts has been below the average. Whether this can be attributed to the excessive flowering or arrowing of the cane this season, or to heavy wet following a very dry time, is an open question. This latter

* *Note.*—Since the above was written the price of sugar has advanced twenty-five shillings per ton, but this, so far, is only in Queensland.

factor, however, would have no influence in the Bundaberg District, where complaints have also been made of "low density." Frost did a certain amount of damage to the standing cane in this latter locality during July. In Innisfail 128 in. of rain had fallen from 1st January to 23rd September, 1914.

The prospects for next season are at the present time good; plantings upon an increased scale have taken place in all the Northern sugar districts as well as in some of the Southern, and the weather has been almost ideal for the purpose.

The labour offering for the industry continues to be of a better class than formerly. Intemperance is on the decrease, and complaints of men not turning up to work on Monday mornings at the mills are rare. In the slack season, due to the high wage awarded field labourers, only the very best men are retained, and as few of them as possible. Farmers generally are exercising their ingenuity and endeavouring to do as much horse work as practicable.

A considerable increase in liming and green manuring has taken place, while fertilising with artificial and organic manures, such as meatworks, is rapidly spreading, especially in the North, where quick and positive returns from manuring cane can with almost certainty be predicted.

A desire for richer varieties of cane is also finding expression, especially by those farmers who are now being paid on analysis schemes or sugar in cane values. This has kept the Mackay Experiment Station almost continually engaged from February to October. Further reference will be made to this branch of the work at a later stage.

Cultivation generally is also on the up grade. Improved types of implements are now being used; many of these are manufactured in Australia and are giving great satisfaction. Machines are also being used for spreading lime and distributing fertilisers to a greater extent. A number of new cane planters have been devised during the year, some of them being in practical use, while others are yet in the experimental stage. Harrows for harrowing plant cane in the drills are also used in some of the Northern districts as labour savers. There is nothing further to report concerning motor implements, although the self-contained motor plough is engaging the attention of several manufacturers. Cane-cutting machines have not progressed in Queensland, but it is stated that a cutter is now upon the market in Louisiana.

During the present season the new Inkerman Mill, in the Lower Burdekin, has been opened. This fine plant, the last word in sugar mills in Australia, until Babinda is erected, is a monument to the energy and spirited enterprise of the Drysdale Brothers, the only private people who have had the courage to build a new sugar mill in Queensland. When in full swing it is expected to deal with from 16,000 to 18,000 tons of sugar.

The new Government Central Mill at Babinda, near Cairns, is now in course of erection, and will be a remarkably fine building, fitted with the latest appliances for the manufacture of sugar. A similar mill is to be erected on the South Johnstone in 1916. This has given a great impetus to cane-growing on these tropical scrubs, and farms are being rapidly taken up and cleared for cane crops.

3.—WORK OF THE GENERAL SUPERINTENDENT AND FIELD ASSISTANTS.

The General Superintendent, when free from administrative duties and attendance to correspondence, which is constantly on the increase, moves around the different districts as often as possible, getting into touch with the cane farmer, and, where practicable, giving advice on the ground. Meetings of growers are also held, at which methods of cane cultivation are discussed. The majority of the growers show a most commendable interest in the improvement of their lands and are keenly eager to do their best in improving their methods with the view to securing larger crops to meet the heavy outlay for labour. Twenty-two meetings of this kind took place during the year. During the past year every sugar district in Queensland has been visited either by the Field Assistants or the writer. The former, in addition to carrying out the instructions of the General Superintendent having reference to the cane experiment plots established in different localities in the State, reporting upon the cultivation by the farmers in charge, and general condition and appearance, have also received instructions to make observations upon each farm visited by them, which are tabulated and sent in to the Sugar Bureau every month. These comprise notes on soils, and their testing for alkalinity and acidity, crops, use of lime, green manures and fertilisers, drainage, irrigation, weather, ploughing, planting, cultivation, harvesting, ratooning, labour, pests, varieties of cane, arrowing of cane, disposal of trash, &c.

This information is necessary in order that a complete survey of the cane farms of Queensland may be made. When completed and indexed it will prove of the highest value, as each cane farm will then be on record with its history. This will facilitate the giving of advice to growers in a marked degree. The acidity or alkalinity of soils has a most important bearing on the question of the application of lime.

In pursuance of these instructions the Field Officers have sent in reports upon 522 farms. Upon these 61 farmers have used lime, 150 have practised green manuring, and 202 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. This section of the work has been delayed during the past three months owing to the services of the Field Officers being required in distributing new varieties from the various experimental plots and the harvesting and ratooning of the competitive plots planted with the standard varieties of the different districts. This work is now practically over and the collection of farm data will be resumed. In addition to the above duties the Field Assistants collect soil samples from farmers desirous of having their fields mechanically and chemically tested and advised upon. These services are rendered free to all cane growers who desire them. Before leaving this subject the writer would like to state that Messrs. Burn and Harvey, the Northern and

Southern Field Assistants respectively, have carried out instructions in regard to their duties in a satisfactory manner and farmers generally speak in appreciative terms of their assistance.

In last year's report it was stated that upwards of 800 letters were dealt with during the year. Since its publication this number has increased to over 1,200. A large number of these were in answer to applications for advice from farmers and recommendations based upon analysis of soils.

A paper on "The Sugar Industry of Queensland" was prepared for the International Institute of Tropical Agriculture, and another, entitled "How Mills could help Growers," was read at the last Brisbane Conference of the Australian Sugar Producers' Association. A bulletin dealing with cane varieties is also nearly ready for the press and will be published this year.

Letters are frequently received from farmers acknowledging the work done by the Station and expressing their appreciation of the help rendered them. Even from so far away as Mauritius comes the following letter:—

The General Superintendent, Sugar Bureau, Bundaberg.

Dear Sir,—I have received, as usual, the report of Sugar Experiment Stations of Queensland, and I thank you for your kindness to send it to me. It is always with great pleasure I read the experiments made on the cane cultivation and many of your recommendations have been applied by me on my estate with great success.

I remain, Yours faithfully,
G. ABBIN, Planter.

S-1-14., Mauritius.

The supervision and direction of experiments upon the Mackay and Bundaberg Sugar Experiment Stations also takes up a great deal of time.

BRIEF NOTES ON DISTRICTS VISITED.

Mossman.—One mill. This district is now on the up grade again and recovering from the effects of the disastrous cyclone of 1911, which proved a severe blow to the farmers. The courage and determination which is characteristic of the Northern sugar growers was, however, manifested, and the lost ground is being rapidly retrieved. Not only have methods of cultivation greatly improved during the last twelve months, but large sums of money are being successfully and profitably spent on fertilisers and green manures. The crop for this season will be about 62,000 tons of cane, while the prospects for next season are highly promising, and if the anticipations are realised there should be 80,000 tons of cane for next year's crushing. One hundred and sixty acres of new scrub land has been placed under cane, and, in addition, a large area of old fallow land has been replanted. The principal new cane-growing areas are on what is known as the Cassowary extension, where the land is superior to the general average of the Mossman. This area commenced with a tonnage of 2,200 in 1911, and next year (1915) will produce at least 15,000 tons. Somewhat under half the labour is foreign in the Mossman district and a few farms have latterly been acquired by Italians, Russian labour predominates amongst cane cutters of foreign extraction, but there are also Greeks, Italians, and Austrians. The weather has been more or less showery since the wet season and ideal for planting. The varieties of cane mostly grown are Badila, H.Q. 126, D 1135, and New Guinea 24, 24a, and 24n. The last variety is spoken highly of and is largely grown. The great necessity of the Mossman district for successful cane growing is lime, and this matter the mill authorities are taking in hand. Rats are not so troublesome as last year, but wild pigs are doing considerable damage in places. The following are the varieties of cane grown:—

N.G. 24 (Goro), 24a, and 24n	24 per cent.
D. 1135	20 per cent.
B. 147	12 per cent.
Badila	11 per cent.
Rappee	6 per cent.
Innis	5 per cent.
B. 208	4 per cent.
Malabar	4 per cent.
N.G. 40	4 per cent.
Striped Singapore	4 per cent.
H.Q. Seedlings	1 per cent.
Other varieties	4 per cent.
	100 per cent.

Cairns.—Two mills. Heavy cane crops are estimated in this district and the two existing mills are now working full time in the endeavour to get the large crop harvested. Invasions of grubs have been severe on many farms, and upon the Highleigh Estate and some of the river plantations, as well as along the Cairns-Babinda line, they are largely in evidence. At the end of last year the dry weather had prejudicially affected the cane on the higher lands, and it has never wholly recovered from this check, but the river lands, which late last year gave promise of good crops, have fulfilled this expectation.

The cane going to the Mulgrave and Lambledon Mills this year includes a good deal of the Babinda cane. The Babinda Mill site is cleared and the building, partly erected. It will be in the shadow of the towering ranges of Baulle Freer and Bellenden Ker, surrounded by rich tropical foliage, and it is impossible to have anything but admiration for the men who are here engaged in carrying for themselves burdens out of the giant scrub. The contract for this mill is in the hands of Messrs. Geo. Fletcher and Company, of Derby.

The principal varieties grown in the Cairns District are Badila, New Guinea 24, 24a, 24n, H.Q. 126, and a few other newer canes introduced by the Sugar Bureau. These were doing very well.

The strike of young plant cane in the Cairns District was reported to be not quite so good as usual, but in spite of this it is considered that a good crop will be harvested next season.

Innisfail District.—Two mills. This year will be a record one at Innisfail, the Goondi Mill dealing with 120,000 tons of cane, or 52,000 tons more cane than was crushed by the same mill last season. Owing to the severe floods in the early part of last year a good deal of cane was allowed to stand over, and a large proportion of this has fallen down. The rainfall for the present year has also been heavy, amounting, up to the middle of September, to 128 in. The average quality of the cane this year was somewhat adversely affected in consequence and Innisfail farmers were found to be concerned at the price they were receiving.

In order to cope with the high price of manual labour in the field farmers were using horse tillage to a much larger extent. At several farms the cultivation of the whole of the plant crop, including the drills in which the cane had been planted, is being done with implements. In some cases this is done with disc harrows between the rows, followed by a curved harrow in the drill itself, and it is stated that young plant cane can be thus treated without any damage until it is at least 12 in. high. In this way it is found that at this time of the year the whole of the weeding can be done with horse implements, and it certainly appeared in this district—which is perhaps the weediest, as it is certainly the wettest of the cane districts—that the effect of the recent award under the "Industrial Peace Act" was to have caused growers to exercise their ingenuity and cut down manual labour practically one-third. The amount of foreign labour in the Innisfail District engaged in cane-cutting is stated to be 75 per cent., mostly Italians and Spaniards. Where Italians have purchased farms in the South Johnstone area their fellow countrymen are clearing the scrub.

Considerable damage has been done in the Innisfail District by the weevil borer, and the Colonial Sugar Refining Company some time ago employed Professor Mlingworth, of the Harvard University, to obtain parasitic flies. These were sent to Fiji, and from there were brought to Goondi by one of the Company's officers in May last. Already 1,000 of these flies have been liberated in the cane fields of Duradji. These deposit maggots close to the borer holes in the cane. The maggots then enter, forming pupa cases inside the larva of the borer, which leads to the death of the latter. This work is of a highly interesting and scientific character and the results will be awaited with anxiety. The Company are certainly to be congratulated upon the steps they have taken to assist the Innisfail farmers in this direction. Similar work has proved most successful in Hawaii.

At Mourilyan the estimated harvest will reach 53,000 tons of cane this year. About 90 per cent. of the labour is foreign, a large proportion being Italians, who are also buying farms, 26 out of 80 being in their possession. Cultivation is improving and better varieties of cane are being grown.

At South Johnstone scrub clearing is being rapidly pushed on with and farms are being taken up in readiness for the opening of the new mill in 1916.

Varieties grown at Innisfail are Badila (90 per cent.), H.Q. 426, and a few other canes.

At Mourilyan, Badila, Rappoe, Striped Singapore, H.Q. 426, N.G. 24, 24A and 24B are the main varieties.

Herbert River.—Two mills. Foreign labour on this river is fully 90 per cent. of the whole and a large number of Italians are acquiring farms. The two mills will deal with 200,000 tons of cane. The density is better than at Innisfail. The Colonial Sugar Refining Company have recently introduced a number of New Guinea varieties which have been planted out for future trials. The B. 208 variety, which has been giving fine results on the river, is now deteriorating and contracting disease, and for this reason it is going rapidly out of cultivation and H.Q. 426 and N.G. 24B are taking its place. Badila cane is also doing well and large quantities continue to be grown.

Lower Burdekin District.—Three mills. This district is making great headway and the prospects for this year are excellent. At Lakerman the big new mill has commenced operations and a large settlement is springing up on the south side of the Burdekin River.

A very large portion of the crop is of the Badila variety, originally supplied by the Experiment Station at Mackay. This is not only doing well on the river banks, but also around Kalamia and Pioneer. The young plant cane is making good growth and a good strike is apparent, so that the prospects for next year are most encouraging.

The following are the varieties of canes principally grown in the Lower Burdekin District:—Badila, N.G. 24, 24A, 24B, Oraya, Malagache, Striped Meerah, Blue Meerah, Mahona, D. 1135, H.Q. 10, H.Q. 426.

The Imperial (Mauritius Gingham), previously largely grown, is now being discarded owing to leaf stripe disease.

Proserpine District.—One mill. The yield of cane at Proserpine will not be up to last year's crop. Prospects for next season are stated to be good. A large number of different kinds of cane are grown in this district, but the following are now being more largely cultivated:—Badila, N.G. 24, 24A, 24B, H.Q. 426, Malagache, B. 147, D. 1135, H.Q. 5, and 1900 Seedling.

The cane areas are very scattered and lie in many instances at a considerable distance from the mill. Grubs were doing a little damage early in the year.

Mackay District.—Nine mills. Since the publication of the last Report the Racecourse Central Mill Company have purchased the Meadowlands Mill, which has in consequence been closed, the former company dealing with all the cane previously supplied to the latter. The season at Mackay has not been so good as last; though, owing to a favourable planting season followed by a good deal of showery weather, the prospects for next year are good. Farmers still continue to grow a large amount of the "red" canes, and interesting experiments have been commenced and are continuing at the Mackay Experiment Station with a view to determining the respective values of these canes. Details of the analyses of these will be found on a later page.

Bundaberg District, including Gin Gin, Goodwood, Miara, Waterloo, Invicta, and Baffle Creek.—Eleven mills. The crop in the Bundaberg District is also far short of last year's production. The early part of the season was not propitious and a good deal of disease was present in the young cane on the Woongarra last December and January. A run of severe frosts in July also cut down the tonnage on the Woongarra besides injuring and retarding the growth of cane planted in March for next year. Except at Gin Gin, where a certain amount of damage was done, especially on the river flats, the injury to the cane in the outlying districts was very slight. Grubs have been troublesome in the Gin Gin District but have not done any appreciable damage elsewhere.

During this month (October) splendid rains have fallen about Bundaberg, as much as $7\frac{1}{2}$ in. being recorded at the Experiment Station. This will give the young cane in the district a fine start and should be the forerunner of a good season for next year. The density of the cane about Bundaberg this season, in common with many other cane districts, has been low. This cannot be attributed to an excessive rainfall in this case. The principal cane variety grown continues to be D. 1135, followed by 1900 Seedling. Badila, N.G. 24, 24A, and 24B are grown to a small extent but are rather slow. Malagache, B. 147, B. 208, Rappoe, Striped Singapore, Mahona, and a few other varieties are also grown, while a fair quantity of H.Q. 426 has been planted out.

Childers District.—Three mills. The crops in the Isis District will also be short of last year. Grubs did a great amount of damage in the early part of the season. On one of the large plantations the pest was very severe and most of the cane will have to be ploughed out and replanted. The pest appeared to be more severe in the North Isis, Lynwood, and Hapsburg areas, and is nearly always found where stand over cane has been allowed to remain. Large sums of money were being made both by children and adults in collecting the grubs, for which a stated price is paid per quart. Beetles also were paid for but were not collected in such numbers as the grubs.

An experiment with explosives was carried out by the Sugar Bureau in the early part of the year in order to test their effect on the grubs. It was found that if a sufficient quantity of material was used the destruction of the whole of the grubs followed, but the cost per acre was too high to render the method of any practical value.

The principal varieties of cane grown in the district are:—D. 1135, 1900 Seedling, B. 208, H.Q. 426, Rappoe, Striped Singapore, Badila, and a small portion of other canes.

Maryborough, including Pialba, Yerra, and Degilbo.—One mill. This is a scattered cane district and most of the crop comes by rail from long distances. Part of the Pialba cane also goes to the Isis and Mount Bauple. Rappoe, Striped Singapore, D. 1135, Mavoe, 1900, and a cane known as Green Seedling are the varieties most grown.

Mount Bauple.—One mill. At Mount Bauple considerable improvements have been effected during the past twelve months and there were evidences of great prosperity in the district. The growth of cane has been magnificent, better than anything south of the Lower Burdekin. The utmost facilities were given to farmers for loading their cane and the new tramlines relieved the farmers' horses to a very large extent and rendered them available for better and more extended cultivation. Hence it was found that the supply of cane from the district immediately around Mount Bauple had increased by over 25 per cent. This meant a cutting down of expenses in the haulage of outside cane, which would otherwise take place. It is thought that in the course of a year or two at the most the growers in the near vicinity will be able to supply all the cane required for the mill. This year the season will be even better than last, it being anticipated that 42,000 tons will be crushed, as against 36,000 tons last season. Two hundred and seventy acres of new land were going into cane this year. The farmers in the district are satisfied with the present conditions under the management of the Bureau of Central Sugar Mills. Varieties grown:—Mahona, D. 1135, Rappoe, Striped Singapore, Mavoe, H.Q. 426, and 1900 Seedling.

Nambour.—One mill. This district is also in a prosperous condition and the crop will probably be a little better than last year. The Moreton District is fortunate in being absolutely free from grubs. Cane growing is developing on the Maroochy River and about Yandina, which are mostly alluvial flats. Farms are also found on creek banks and the slopes of the Blackall Ranges. The number of farmers growing cane is large, but they are somewhat scattered in relation to the mill site. The main varieties are:—N.G. 22 (Mahona), Violet, D. 1135, Rappoe, Striped Singapore, Malagache, Q. 116, 1900 Seedling, M. 33, N.G. 24A, and H.Q. 285. The last-mentioned cane is spoken highly of and was sent down by the Mackay Sugar Station some time ago.

Albert, Logan, and Nerang Districts.—Eight mills. With the exception of Nerang, the seven mills in the Logan District are all of small capacity, dealing with 1,500 to 6,000 tons of cane. The crop this year will be rather better than last season. A number of varieties introduced by the Sugar Bureau are doing remarkably well. Mr. A. Rose, of Beenleigh, says—"The canes are an undoubted success, which is acknowledged by all who see them, and we consider the varieties sent to be a much better class of cane to grow. The old canes in the district only grow to 5 ft. long, while these reach the height of 9 ft."

Marburg District.—One mill. This is a small sugar district, south-west of Brisbane, in which cane farming is carried on as an adjunct to other crops and dairying. About 4,000 tons of cane are expected this season. Varieties grown:—D. 1135, Mavoe (erroneously called Batoc), Mahona, Rappoe, Striped Singapore. New varieties have been introduced from the Mackay Sugar Station.

4.—NEW VARIETIES OF CANE.

The canes brought over by Mr. T. H. Wells from Papua are now well established and experiment work with a number of them will commence this year. Analyses of many of these canes will be found under the work of the Mackay Station. The cane known as Clark's Seedling, or H.Q. 426, is being widely planted in many parts of Queensland. It is a quick and vigorous striker, resists drought well, and at the Bundaberg Station stood the severe frosts better than the local canes. A comparison of its

sugar contents with Badila in June at Cairns, gave the following:—H.Q. 426, 15 per cent. P.O.C.S.; Badila, 15.9 per cent. P.O.C.S. Although being largely planted, it is stated to yield a considerably lower tonnage of cane in the North when compared with Badila.

It has been claimed that two new canes have been produced by grafting in the Lower Burdekin district, in the same way as Gingila was raised on the Herbert by Mr. Hollins. The two former canes were produced by Mr. C. R. Crofton. The crosses were made between Mauritius Gingham and Oraya (an old New Guinea cane) and Mauritius Gingham and Goru (N.G. 24), and the resulting crosses are highly characteristic of the parent canes. They have been named "Gingraya" and "Gingor" respectively. The analytical results are exceedingly promising, being as under:—

Name of Cane.	Age.	Brix.	Sucrose.	Purity.	P.O.C.S.
Gingraya	11½ months	22.04	20.65	93.69	16.72
Gingor	11½ months	20.04	19.08	93.98	15.97

These analyses were made by Mr. Linsley Smith, chemist to the Pioneer Mill. He states that the fibre is comparatively low.

If new varieties can be produced by grafting or splitting different canes and tying them together and planting them, an illimitable prospect is opened to us. A great deal of scepticism exists as to these canes and also as to Gingila, but we have here three distinctly new canes. Where do they come from? There is not the slightest reason for doubting the word of the growers who were successful in obtaining them. Mr. Crofton stated that he tried 50 experiments, and succeeded in getting 2 to grow.

It is noteworthy that all three crosses were made with Mauritius Gingham or Striped Singapore.

Mr. Smith also supplied the following analyses of Gingila:—

Brix	20.55
Sucrose	18.85
Purity	91.7
P.O.C.S.	15.04

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

A number of new experiments initiated at the Mackay Station have been harvested this year and the results will be found of the utmost interest. The principal work that will engage the attention of this station during the immediate future will be the testing under commercial conditions of the number of new varieties now awaiting trial. The extent of available land suitable for cane growing at Mackay is limited, and further experiments in cultivation and manuring will be carried out for the most part at Bundaberg, where the Bureau possesses a great deal more land. The Mackay Station is well situated for the growth and distribution of varieties, being midway between the Northern and Southern sugar districts, and the work will be continued on a larger scale even than hitherto.

The work done at this station commands keen and increasing interest not only on the part of local farmers but of visiting farmers also, of whom there are many from all parts of the State.

The General Superintendent is assisted at Mackay by the Chemist in Charge of the Station, Mr. L. C. McCready, whose work must be spoken of in high terms of praise. The appearance of the station is creditable and the experimental work determined upon is most carefully and thoroughly carried out. Mr. McCready is also in charge of the Laboratory, and is aided by Messrs. James Pringle and E. Barke, whose work and attention to their chemical duties, he states, is uniformly good and painstaking.

The data appearing in the following portion of the report have been compiled by Mr. McCready, to which comments have been added. A particularly large amount of chemical work has been carried out this year, more so than on any previous occasion, and it has been found necessary to connect the crushing plant to machine power in order that the numerous samples might be expeditiously dealt with.

EXPERIMENTS AT PRESENT IN HAND.

The experiments now in hand, details of which will be found further on in report, are as follows:—

Ratoning Experiment.—A comparison of four different methods of ratoning cane crops, viz.—Volunteering, burying trash, relieving, and burning trash with thorough cultivation (station method).

Arrowed and Non-Arrowed Plants Experiment.—A comparison of planting a crop from arrowed cane sets and from non-arrowed cane sets, with relation to germination and crop.

Manurial Experiment.—A comparison of the different forms of nitrogenous manurial compounds now on the market, respecting their effects on cane, both in growth and quality.

Cultivation Experiments.—A comparison of different methods of after-tillage as to its effect on the succeeding crops.

Analytical Tests.—A comparison of the sugar values of the varieties known as Cheribon, Malabar, and Otamite in competition with the varieties known as Badila, Goru, and Clark's Seedling or Jambledou Queensland 426.

TESTS WITH DIFFERENT VARIETIES OF CANE.

As in former years, a great deal of work has been done in testing canes with a view to obtaining a knowledge of the commercial values of different varieties. Taking into consideration the widely diverse conditions of soil and climate met with along the Queensland seaboard, this is a matter to which too much attention cannot be given, and it is gratifying to note that, in most of the sugar districts of Queensland, canes introduced and tested at this station are rapidly coming into prominence.

The different experiments under the above heading may be enumerated as follows:—

Experiments with Miscellaneous Canes.

Experiments with Mauritius Seedling Canes.

Both the above experiments are second ratoons and will be found completed in this report.

Experiments with Canes from Louisiana

Experiments with Canes from Queensland Acclimatisation Society.

These two experiments are first ratoons and will be continued until details are to hand of the second ratoon crop next season.

Further Experiments with Canes from the Queensland Acclimatisation Society, Secondary Selection.

This experiment is in the initial stage and will be continued further before completion.

Propagation of New Varieties, with a view to further testing.

At the present time a number of new varieties of cane introduced from Papua by Mr. T. Wells, of Childers, are being pushed along with a view to testing. During the year the more advanced of the canes were planted out in experiment, details of which will be found further on in this report.

In addition to the Papuan canes mentioned above, the varieties known as H.Q. 459, Gingila, and New Guinea 16 will be tested as soon as sufficient cane is available to plant out.

The latter cane is largely grown in New South Wales, but when tested at the station some years ago was not considered successful.

RATOONING EXPERIMENT.

This experiment was planted out in August, 1912, with a view to arriving at the best system of treating ratoons. The land selected for the experiment was the same as that on which a ratooning experiment had been attempted previously, the cane on which, owing to the prevailing dry weather of 1911, had failed to ratoon.

The treatment of the land was as follows:—The stools from the preceding crop were ploughed out and carted off. The land was then ploughed and cross ploughed three times. Early in August of last year it was again deeply ploughed with a swing plough to a depth of 14 in., followed by the subsoiler to a further depth of 6 in., thus securing a seedbed of from 18 to 20 in. in depth of loose soil. The land was then divided into 4 plots of 5 drills each and planted with the cane known as New Guinea 40. In order to secure accuracy in detail all plants were carefully cut to three eyes each and 100 plants dropped in each drill. A departure has also been made from the usual system of planting in 5 ft. drills, the rows in this case having been drawn at 6 ft. This is with the object of allowing more room for the implements in the carrying out of the different systems detailed hereafter.

The resulting plant crop did exceedingly well, as will be seen from last year's report.

Immediately after harvesting the different plots were treated as follows:—

Plot 1.—Trash was left on the ground and cane allowed to volunteer.

Plot 2.—Trash was buried between the rows.

Plot 3.—Trash was shifted and put in every other space between the rows, the cleared spaces being cultivated with the plough and subsoiler, followed at intervals by the Planet Junior. This method is generally known as relieving.

Plot 4.—Trash was burned, and the middles opened with a swing plough followed by the subsoiler to a depth of from 16 in. to 18 in. The drills were then cut away and the subsoiler again followed, the crowns being finally worked down with the Planet Junior, with which implement all subsequent cultivation has been performed. This is the method of ratooning practised at the Experiment Station with excellent results.

Owing to the dry weather experienced during the latter part of the year the ratoons on Plot 4 did not come away as fast as the cane on Plots 1, 2, and 3, the trash on these plots acting as a mulch and thereby retaining what moisture there was at the time in the soil. As soon as rain fell, however, the canes came away with astonishing rapidity and soon established Plot 4 in the lead, closely followed by Plot 3. With reference to Plot 2, however, it may be stated that the results cannot on this crop be taken as conclusive. For the successful burying of trash it is necessary to have a certain amount of moisture in the soil, a factor which last year was not present. Owing to the dry hard state the plot was in, the furrow when turned to cover the trash in promptly broke up into large clods, thus allowing air to gain access to the trash and prevent decomposition. This latter fact was plainly seen in January last, when the cane was finally opened up between the drills to allow the next year's trash to be buried.

For the purpose of ascertaining whether the differing treatment of the four plots made any difference to the quality of the juice, monthly analyses, from June to August, were carried out. These were followed by the final analyses in September, when the canes on 40 running feet formed the sample. The results are given in the following tables:—

FIRST PRELIMINARY EXAMINATION OF CANES IN THE RATOON EXPERIMENT, FIRST RATOON CROP, JUNE, 1914.

No. of Plot.	Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
1	New Guinea	New Guinea 40	17-6-14	9 mo's	14.7	11.40	2.08	77.55
2	Do.	do.	17-6-14	do.	16.3	13.45	1.35	82.51
3	Do.	do.	18-6-14	do.	16.4	13.64	1.14	83.17
4	Do.	do.	18-6-14	do.	16.4	13.66	1.12	83.29

SECOND PROGRESSIVE EXAMINATION OF CANES IN THE RATOON EXPERIMENT, FIRST RATOON CROP, JULY, 1914.

No. of Plot.	Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
1	New Guinea.	New Guinea 40	15-7-14	10 mo's	16.5	14.31	.99	86.72
2	Do.	do.	15-7-14	do.	16.9	16.05	.46	89.68
3	Do.	do.	15-7-14	do.	17.7	15.48	.75	87.46
4	Do.	do.	15-7-14	do.	17.5	16.51	.80	88.62

THIRD PROGRESSIVE EXAMINATION OF CANES IN THE RATOON EXPERIMENT—FIRST RATOON CROP, AUGUST, 1914.

No. of Plot.	Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
1	New Guinea	New Guinea 40	12-8-14	11 mo's	16.8	15.00	.54	89.28
2	Do.	do.	12-8-14	do.	17.9	16.83	.43	94.02
3	Do.	do.	12-8-14	do.	18.0	16.73	.64	92.94
4	Do.	do.	12-8-14	do.	18.1	16.71	.42	92.32

FINAL EXAMINATION OF CANES IN THE RATOON EXPERIMENT—FIRST RATOON CROP, SEPTEMBER, 1914.

No. of Plot.	Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice	% Fibre in Cane.	% Sucrose in Cane.	Date of Harvesting.
1	New Guinea	New Guinea 40	11-9-14	12 mo's	18.4	16.80	.53	91.30	10.48	15.04	
2	Do.	do.	11-9-14	do.	18.1	16.01	.30	93.42	11.40	14.98	
3	Do.	do.	11-9-14	do.	18.3	17.23	.27	94.09	9.92	15.51	
4	Do.	do.	11-9-14	do.	18.5	17.39	.28	94.00	10.28	15.60	Canes did not arrive.

It will be noticed from the above that the purity of the juice from the Volunteer plot in all the analyses was much lower than in the other three plots. It will be interesting to note whether this is confirmed in the second ratoons.

Immediately following the final analyses in September, the crop was cut and carted to the mill. From the mill weights the following table of crop results has been compiled:—

CROP RESULTS OF RATOON EXPERIMENT—FIRST RATOON CROP, SEPTEMBER, 1914.

No. of Exp.	Variety of Cane.	Treatment of Trash in Experiment.	Age of Cane.	No. of Canees per Acre.	Average Weight of Stalks in Pounds.	Weight of Canees per Acre in English Tons.	Yield of Sugar per Acre in Pounds.	Yield of Sugar per Acre in English Tons.
1	New Guinea 40	Trash left, and volunteered ..	11 months	22,324	2.1	21.5	7,255	3.2
2	Do. ..	Trash ploughed under ..	do.	19,057	2.0	17.7	5,948	2.6
3	Do. ..	Trash relieved	do.	22,566	2.3	23.3	8,107	3.6
4	Do. ..	Trash burnt off	do.	26,426	2.2	25.0	9,076	4.0

With respect to this experiment it is too early to speak definitely until the results have been confirmed by the yields of the second ratoon crop. So far the Station method has given the highest yield and the plot with trash ploughed under the lowest. Excluding this plot, for the reason given by Mr. McCready, the Volunteer plot is, as we should expect to find it, the lowest. In an abnormally dry season, however, it is believed by many farmers that this method would come out on top. Judging, however, by many experiments in different countries the method of conserving moisture by frequent shallow stirrings of the soil would count in the long run.

EXPERIMENTS WITH MISCELLANEOUS CANES.

SECOND RATOON CROP, 1913-1914.

During the year 1909 the following varieties of cane were introduced:—Hambleton Seedlings 426 and 452, Mauritius 1900 Seedling, Couve, Mauritius 189, and Barbadoes 208, the last mentioned being reintroduced. These canes, with the exception of Hambleton 452 (which died out), were carefully propagated, and by March of 1911 had furnished sufficient seed to enable them to enter into further experiment. Two sport canes—viz., New Guinea 40 and 64—have also been added.

As a check a plot was planted with Demerara 1135. These canes received identical treatment with regard to cultivation and manuring, so that their relative commercial values might be arrived at.

Immediately following the harvesting of the first ratoon crop (details of which appeared in last year's report), the trash was burned and the canes ratooned in the usual manner in vogue at the Station.

The first application of manures was made early in October—i.e., at time of ratooning. The cane received a further top dressing of nitrogenous manures about the middle of December.

Following the ratooning the canes made very little headway, but after December the crop made great strides and has progressed favourably to the time of cutting.

A description of these canes appeared in last report, to which the reader is referred.

The usual preliminary analyses, the sample for which consists of one average stool, were carried out in the months of June, July, and August. The final and fibre analyses, the samples for which are taken from all cane growing on 40 running feet, were made in September. The analytical results appear in the following tables:—

FIRST PRELIMINARY EXAMINATION OF MISCELLANEOUS CANES—SECOND RATOON CROP, JUNE, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Per cent of Juice (Dry.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Hambleton, Queensland	H.Q. 426	5-6-14	8 months ..	14.0	10.75	2.31	72.14
Demerara	D. 1135	5-6-14	do. ..	13.0	10.24	2.08	73.66
Mauritius	1900 Seedling	5-6-14	do. ..	10.0	11.08	2.77	69.25
Barbadoes	B. 208	5-6-14	do. ..	10.2	13.36	1.52	82.46
Mauritius	M. 180	8-6-14	do. ..	17.4	14.22	1.83	81.72
Mauritius	Couve	8-6-14	do. ..	10.6	4.83	3.60	46.56
Queensland	N.G. 64 Sport	8-6-14	do. ..	14.6	11.12	2.08	76.16
Queensland	N.G. 40 Sport	8-6-14	do. ..	13.9	9.90	2.35	71.22

SECOND PROGRESSIVE EXAMINATION OF MISCELLANEOUS CANES—SECOND RATOON CROP, JULY, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Hambledon, Queensland	H.Q. 426	2-7-14	9 months	18.8	10.53	.71	87.97
Demerara	D 1135	2-7-14	do. ..	15.3	12.50	1.36	81.69
Mauritius	1900 Seedling	2-7-14	do. ..	18.2	15.71	1.18	86.31
Barbadoes	B. 208	2-7-14	do. ..	17.8	15.92	.86	89.43
Mauritius	M. 189	2-7-14	do. ..	17.1	13.21	2.36	77.25
Mauritius	Couvé	2-7-14	do. ..	16.6	13.02	2.00	78.43
Queensland	N.G. 64 Sport	2-7-14	do. ..	16.9	14.20	1.34	84.02
Queensland	N.G. 40 Sport	2-7-14	do. ..	17.4	14.99	1.13	86.14

THIRD PROGRESSIVE EXAMINATION OF MISCELLANEOUS CANES—SECOND RATOON CROP, AUGUST, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Hambledon, Queensland	H.Q. 426	3-8-14	10 months	19.8	18.63	2.4	94.69
Demerara	D. 1135	3-8-14	do.	16.6	14.06	1.25	84.69
Mauritius	1900 Seedling	3-8-14	do.	18.6	16.20	1.44	87.58
Barbadoes	B. 208	3-8-14	do.	19.0	17.72	.56	98.26
Mauritius	M. 189	3-8-14	do.	20.2	17.80	1.10	88.11
Mauritius	Couvé	3-8-14	do.	17.1	14.30	1.75	83.62
Queensland	N.G. 64 Sport	3-8-14	do.	18.0	15.92	1.02	88.44
Queensland	N.G. 40 Sport	3-8-14	do.	18.2	16.40	.72	90.60

FINAL EXAMINATION OF MISCELLANEOUS CANES—SECOND RATOON CROP, SEPTEMBER, 1914.

Country.	Variety of Cane.	Date of analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Fibre in Cane.	% Sucrose in Cane.
Hambledon, Queensland	H.Q. 426	8-9-14	11 months	21.1	19.74	.28	93.55	9.02	17.96
Demerara	D. 1135	8-9-14	do.	17.9	15.98	.78	89.27	11.16	14.20
Mauritius	1900 Seedling	8-9-14	do.	19.3	17.74	.90	91.91	7.84	16.35
Barbadoes	B. 208	9-9-14	do.	18.2	16.89	.61	92.80	12.28	14.82
Mauritius	M. 189	9-9-14	do.	18.8	16.82	.95	89.46	10.84	15.00
Mauritius	Couvé	9-9-14	do.	14.6	11.28	2.47	77.26	9.26	10.23
Queensland	N.G. 64 Sport	9-9-14	do.	18.9	16.66	1.08	88.14	9.18	15.13
Queensland	N.G. 40 Sport	9-9-14	do.	16.7	14.87	.97	89.04	10.78	13.27

ANALYTICAL RESULTS TO DATE OF THE MISCELLANEOUS CANES—PLANT, FIRST, AND SECOND RATOON CROPS, 1912, 1913, 1914.

Name or Number of Cane.	PLANT CROP, 1912.				FIRST RATOON CROP, 1913.				SECOND RATOON CROP, 1914.				AVERAGE FOR THE THREE YEARS.	
	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Sucrose.	Purity.
Hambledon Queensland 426	21.3	19.73	.31	92.02	20.6	19.25	.31	93.44	21.1	19.74	.28	93.55	19.57	93.23
Demerara 1135	17.3	14.54	1.08	84.04	18.0	16.17	.57	86.83	17.9	15.98	.78	89.27	15.56	87.90
Mauritius 1900 Seedling	19.3	17.56	.85	90.98	19.8	18.30	.40	92.72	19.3	17.74	.90	91.91	17.88	92.16
Barbadoes 208	19.2	17.72	.72	92.29	18.0	17.51	.56	92.04	18.2	16.89	.61	92.80	17.37	92.83
Mauritius 189	19.6	17.08	.78	90.66	19.3	17.37	.83	90.00	18.8	16.82	.95	89.46	17.23	90.05
Mauritius Couvé	16.6	13.00	1.71	78.85	16.4	13.56	1.60	82.68	14.6	11.28	2.47	77.26	12.27	79.16
Queensland N.G. 64 Sport	17.0	13.85	1.50	81.47	18.5	16.24	1.13	87.78	18.9	16.66	1.08	88.14	15.58	89.07
Queensland N.G. 40 Sport	17.7	15.61	.90	88.10	17.4	15.24	.60	87.58	16.7	14.87	.97	89.04	15.24	88.00

The two tables below comprise the crop results of the second ratoons and the total crop results of the plant first, and second ratoons. From the latter it will be seen that H.Q. 426, though rich in sugar, is not a particularly heavy cane; indeed, in the experiment it does not compare in weight per acre with D. 1135, although the tonnage of sugar is the same.

CROP RESULTS OF THE MISCELLANEOUS CANES—2ND RATOON CROP, SEPTEMBER, 1914.

No. of Plot.	Country.	Variety of Cane.	Age of Cane.	Number of Canes per Acre.	Average Weight of the Stalks in Pounds.	Weight of Cane per Acre in English Tons.	Yield of Sugar per Acre in Pounds.	Yield of Sugar per Acre in English Tons.
1	Queensland	Hambledon Q. 426	11 months	26,571	2.0	31.3	12,595	5.6
2	Demerara	Demerara Seedling 1135	do.	35,154	2.4	39.4	12,550	5.6
3	Mauritius	Seedling 1900	do.	20,255	4.5	41.2	15,098	6.7
4	Barbadoes	Seedling 208	do.	25,047	2.0	22.8	7,585	3.3
5	Mauritius	Seedling 189	do.	40,075	2.4	43.5	14,636	6.5
6	Mauritius	Couvé	do.	24,829	3.4	38.3	9,778	3.9
7	New Guinea	Sport from No. 64	do.	23,740	2.8	30.6	10,330	4.6
8	New Guinea	Sport from No. 40	do.	30,274	2.2	30.1	8,959	3.9

TOTAL CROP RESULTS TO DATE OF THE MISCELLANEOUS CANES—PLANT CROP, FIRST RATOON, AND SECOND RATOON CROPS, 1912, 1913, 1914.

No. of Plot.	Country.	Variety of Cane.	PLANT CROP, 1912.		FIRST RATOON CROP, 1913.		SECOND RATOON CROP, 1914.		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	Queensland	Hambledon Q. 426	23.1	4.1	37.0	6.4	31.3	5.6	91.4	16.1
2	Demerara	Demerara Seedling 1135	33.3	4.3	52.4	7.4	39.4	5.6	125.1	17.3
3	Mauritius	Mauritius Seedling 1900	27.4	4.3	43.8	7.2	41.2	6.7	112.4	18.2
4	Barbadoes	Barbadoes Seedling 208	29.9	4.7	41.8	6.4	22.8	3.3	94.5	14.4
5	Mauritius	Mauritius Seedling 189	27.0	4.4	46.3	7.1	43.5	6.5	117.7	18.0
6	Mauritius	Couvé	35.9	3.9	42.9	5.2	38.3	3.9	117.1	13.0
7	New Guinea	Sport from No. 64	40.8	5.1	47.4	6.8	30.6	4.6	118.8	16.5
8	New Guinea	Sport from No. 40	36.4	5.1	38.6	5.2	30.1	3.9	105.1	14.2

These canes will not be further ratooned. The varieties H.Q. 426, M. 1900 Seedling, D. 1135, M. 189, and N.G. 64 Sport will be reserved for distribution purposes, while B. 208, M. Couvé, and N.G. 40 Sport will be discarded.

EXPERIMENTS WITH MAURITIUS SEEDLING CANES.

SECOND RATOON CROP, 1913-1914

In 1910 the following canes were received from the Director of the Agricultural Experiment Station in Mauritius:—

M. 55, 87, 89, 779, 993, 1002, 1201, 1237 and 1474.

Due to the time occupied in transit, Nos. 1201 and 1237 died. The others, however, made good growth and were entered in competition in August, 1911. Results of plant and first ratoon crops have already appeared, as well as a short description of the canes.

As second ratoons the canes have all done well and have in given cases produced heavier yields of cane than did the first ratoon crops, which were backward owing to dry weather affecting the plant crop.

The usual preliminary and final analyses appear hereunder:—

FIRST PRELIMINARY EXAMINATION OF MAURITIUS SEEDLINGS—SECOND RATOON CROP, JUNE, 1914.

No. of Plot.	Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
1	Mauritius	M. 55	12-6-14	9 months	15.2	10.67	2.71	70.19
2	Do.	M. 87	12-6-14	do.	16.2	12.66	2.47	78.14
3	Do.	M. 89	12-6-14	do.	15.1	10.78	3.12	71.39
4	Do.	M. 779	12-6-14	do.	14.2	9.55	2.47	67.25
5	Do.	M. 998	12-6-14	do.	15.7	12.21	2.31	77.77
6	Do.	M. 1002	12-6-14	do.	16.1	12.61	1.86	78.32
7	Do.	M. 1474	12-6-14	do.	14.1	9.47	3.28	67.16

SECOND PROGRESSIVE EXAMINATION OF MAURITIUS SEEDLINGS—SECOND RATOON CROP, JULY, 1914.

No. of Plot.	Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
1	Mauritius	M. 55	9-7-14	10 months	16.7	12.72	2.70	76.16
2	Do.	M. 87	9-7-14	do.	18.6	15.15	2.03	81.45
3	Do.	M. 89	9-7-14	do.	17.7	14.68	2.09	82.93
4	Do.	M. 779	9-7-14	do.	15.8	11.38	2.70	72.62
5	Do.	M. 998	9-7-14	do.	16.6	12.97	2.16	78.13
6	Do.	M. 1002	9-7-14	do.	17.2	14.03	1.66	81.56
7	Do.	M. 1474	9-7-14	do.	16.4	13.43	1.73	81.89

THIRD PROGRESSIVE EXAMINATION OF MAURITIUS SEEDLINGS—SECOND RATOON CROP, AUGUST, 1914.

No. of Plot.	Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
1	Mauritius	M. 55	7-8-14	11 months	16.2	12.13	2.54	74.87
2	Do.	M. 87	7-8-14	do.	18.8	16.34	1.47	86.91
3	Do.	M. 89	7-8-14	do.	17.2	13.10	2.65	76.16
4	Do.	M. 779	7-8-14	do.	16.8	13.23	2.13	87.75
5	Do.	M. 998	7-8-14	do.	17.3	14.73	1.52	85.14
6	Do.	M. 1002	7-8-14	do.	19.1	16.82	.96	88.06
7	Do.	M. 1474	7-8-14	do.	17.4	15.02	1.38	86.32

FINAL EXAMINATION OF MAURITIUS SEEDLINGS—SECOND RATOON CROP, SEPTEMBER, 1914.

No. of Plot.	Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Pith in Cane.	% Sucrose in Cane.	Date of Harvesting.
1	Mauritius ..	M. 55	11-9-14	12 months	19.9	17.75	1.20	89.19	9.46	16.07	June 1
2	Do.	M. 87	11-9-14	do.	18.6	16.21	1.20	87.15	8.40	14.85	June 1
3	Do.	M. 89	11-9-14	do.	17.4	14.41	1.06	82.81	9.40	13.95	June 1
4	Do.	M. 779	11-9-14	do.	18.5	16.03	1.20	89.04	10.50	14.35	..
5	Do.	M. 998	11-9-14	do.	19.5	17.63	.78	90.41	10.38	15.80	June 10
6	Do.	M. 1002	11-9-14	do.	21.2	19.79	.46	93.34	10.94	17.62	June 1
7	Do.	M. 1474	11-9-14	do.	18.9	17.32	.64	91.64	9.76	15.63	..

As stated in last year's report these varieties require a longer period than twelve months to enable them to attain their full sugar content. They would possibly make good canes for the latter end of the season and may do better in districts north of Mackay.

The following table gives the analytical results for the three years:—

ANALYTICAL RESULTS TO DATE OF MAURITIUS SEEDLING CANES—PLANT, FIRST, AND SECOND RATOON CROPS, 1912, 1913, 1914.

Name or Number of Cane	PLANT CROP, 1912.				FIRST RATOON CROP, 1913.				SECOND RATOON CROP, 1914.				AVERAGE OF THE THREE YEARS.	
	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Sucrose in Juice.	Purity of Juice.
Mauritius 55	18.4	15.81	1.85	85.02	19.2	17.10	.90	89.53	19.0	17.75	1.20	89.10	18.91	89.53
Mauritius 87	17.6	14.97	1.23	85.05	18.8	18.23	.70	92.07	18.6	18.21	1.20	87.15	18.47	88.07
Mauritius 89	17.2	13.23	2.16	77.28	18.3	15.68	1.30	85.13	17.4	14.41	1.08	82.81	14.42	81.79
Mauritius 779	17.5	12.89	1.87	78.05	18.1	15.53	1.28	85.90	18.6	16.03	1.20	86.64	14.81	82.27
Mauritius 998	16.4	13.53	1.35	82.50	19.0	17.42	.48	91.78	19.5	17.63	.78	90.41	19.10	83.47
Mauritius 1002	18.5	17.98	.68	92.20	21.4	19.08	.40	91.98	21.2	19.70	.48	93.34	19.15	92.31
Mauritius 1474	17.0	15.26	1.20	86.70	19.5	18.13	.42	92.66	18.0	17.32	.64	91.64	18.90	90.37

In September these varieties were harvested and sent to the mill. The crop results are given below, together with the total results to date:—

CROP RESULTS OF MAURITIUS SEEDLINGS—SECOND RATOON CROP, SEPTEMBER, 1914.

No. of Pts.	Name or Number of Variety.	Age of Cane.	Number of Canes per Acre.	Average Weight of the Sticks in Pounds.	Weight of Canes per Acre in English Tons.	Yield of Sugar per Acre in Pounds.	Yield of Sugar per Acre in English Tons.
1	Mauritius Seedling, 55	12 months	30,709	3.2	44.9	16,170	7.2
2	Do. 87	do.	26,789	2.6	31.3	10,414	4.6
3	Do. 89	do.	23,086	3.8	39.8	11,653	5.2
4	Do. 779	do.	33,541	2.5	37.4	12,032	5.3
5	Do. 998	do.	27,678	2.2	27.9	9,876	4.4
6	Do. 1002	do.	28,531	1.7	22.4	8,864	3.9
7	Do. 1474	do.	36,590	2.2	37.4	13,106	5.8

CROP RESULTS TO DATE OF MAURITIUS SEEDLINGS—PLANT, FIRST, AND SECOND RATOON CROPS, 1912, 1913, 1914.

No. of Pts.	Country.	Name or Number of Variety.	PLANT CROP, 1912.		FIRST RATOON CROP, 1913.		SECOND RATOON CROP, 1914.		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	Mauritius ..	M. Seedling, 55	43.0	6.3	50.1	7.0	44.9	7.2	138.0	21.4
2	Do. ..	do. 87	54.1	7.3	36.4	5.9	31.3	4.6	121.8	17.8
3	Do. ..	do. 89	39.8	4.8	31.6	4.4	39.8	5.2	111.2	14.4
4	Do. ..	do. 779	32.2	3.7	33.0	4.5	37.4	5.3	102.6	13.5
5	Do. ..	do. 998	33.7	4.0	28.8	4.4	27.9	4.4	90.4	12.8
6	Do. ..	do. 1002	27.2	4.3	25.6	4.4	22.4	3.9	75.2	12.6
7	Do. ..	do. 1474	28.3	3.9	27.4	4.4	37.4	5.8	93.1	13.1

The following canes have been reserved for trial in other districts:—

M. 55, 87, 89, 779, and 1474.

The following will be discarded:—

M. 998 and 1002.

EXPERIMENTS WITH SEEDLING CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY, BRISBANE.

FIRST RATOON CROP, 1913-1914.

In last year's report all preliminary details of the canes abovementioned appeared. It was shown therein that of the original 144 varieties received, owing to drought and disease, only thirty varieties had made sufficient progress to be planted out in competition, the names or numbers being as follows:—

Country.	Name or Number.	Country.	Name or Number.
Queensland	58	Queensland	59
Queensland	135	Queensland	137
Queensland	286	Queensland	303
Queensland	307	Queensland	365
Queensland	437	Queensland	694
Queensland	695	Queensland	795
Queensland	813	Queensland	855
Queensland	970	Queensland	1001
Queensland	1092	Queensland	1098
Queensland	1110	Queensland	1133
Barbadoes	3412	Barbadoes	3922
Barbadoes	3747	Barbadoes	306
Queensland	1112	Queensland	Badilla Seedling
Queensland	Hybrid No. 1	Queensland	903
Queensland	1049	Queensland	1121

Of the above thirty canes the following were planted out in one field:—

Country.	Name or Number.	Country.	Name or Number.
Queensland	58	Queensland	813
Queensland	59	Queensland	855
Queensland	135	Queensland	970
Queensland	137	Queensland	1001
Queensland	286	Queensland	1092
Queensland	303	Queensland	1098
Queensland	307	Queensland	1110
Queensland	365	Barbadoes	306
Queensland	437	Barbadoes	3412
Queensland	694	Barbadoes	3922
Queensland	695	Barbadoes	3747
Queensland	795	Queensland	1133

These twenty-four varieties were planted on uniform land and descriptions of the canes appear in previous reports, together with the results of the plant crop.

The canes were ratooned in October last and mixed manures were applied at the time of the working of the ratoons. Following the usual practice a light surface dressing of sulphate of ammonia and nitrate of soda was later on applied.

The canes on the whole have made good growth, more especially Q. 813, Q. 970, Q. 135, Q. 1092, Q. 1098, and Q. 695.

Q. 365 and B. 3412, mentioned as promising in last year's report, have developed striped leaf disease in the ratoons, whilst B. 3922, which gave such promise in the plant crop, has proved disappointing in the ratoons.

The comparative tests of the above canes, from an analytical standpoint, are given hereunder, and include monthly analyses from June to August and the final and fibre determination in September.

FIRST PRELIMINARY EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—FIRST RATOON CROP, JUNE, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Queensland	Q. 58	9-6-14	8½ months	10.7	4.74	3.90	44.20
Do.	Q. 59	10-6-14	do.	15.5	14.26	1.05	92.00
Do.	Q. 135	10-6-14	do.	13.6	9.41	2.15	69.19
Do.	Q. 137	10-6-14	do.	15.1	11.48	1.54	76.02
Do.	Q. 286	10-6-14	do.	13.6	10.38	1.81	73.32
Do.	Q. 303	10-6-14	do.	10.4	4.69	3.04	43.09
Do.	Q. 307	10-6-14	do.	13.8	9.89	2.35	71.66
Do.	Q. 365	10-6-14	do.	14.8	10.27	2.77	69.39
Do.	Q. 437	10-6-14	do.	9.9	3.71	3.28	37.47
Do.	Q. 694	10-6-14	do.	14.4	9.85	2.84	68.40
Do.	Q. 695	10-6-14	do.	14.4	9.58	2.90	66.52
Do.	Q. 795	11-6-14	do.	13.8	9.33	1.92	67.60
Do.	Q. 813	11-6-14	do.	17.4	14.84	1.15	89.28
Do.	Q. 855	11-6-14	do.	17.6	14.68	1.16	83.40
Do.	Q. 970	11-6-14	do.	15.9	11.67	2.15	73.39
Do.	Q. 1001	11-6-14	do.	15.5	12.23	1.49	78.90
Do.	Q. 1092	11-6-14	do.	15.5	13.07	2.90	84.32
Do.	Q. 1098	11-6-14	do.	17.8	14.05	2.19	82.30
Do.	Q. 1110	11-6-14	do.	16.3	12.91	2.31	78.24
Do.	Q. 1133	11-6-14	do.	14.2	10.17	3.20	71.62
Barbadoes	B. 306	11-6-14	do.	7.2	1.86	3.78	25.83
Do.	B. 3412	11-6-14	do.	10.9	9.31	2.90	85.41
Do.	B. 3747	11-6-14	do.	14.2	10.08	3.19	75.21
Do.	B. 3922	11-6-14	do.	14.2	11.64	1.60	81.97

SECOND PROGRESSIVE EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—FIRST RATOON
CROP, JULY, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Queensland	Q. 58	6-7-14	9½ months	13.0	7.81	3.25	60.07
Do.	Q. 59	6-7-14	do.	17.2	15.27	.80	88.77
Do.	Q. 135	6-7-14	do.	16.9	13.90	1.64	82.24
Do.	Q. 137	6-7-14	do.	17.6	15.64	.86	88.86
Do.	Q. 286	6-7-14	do.	13.9	10.47	2.16	75.32
Do.	Q. 303	6-7-14	do.	11.2	6.24	2.16	55.71
Do.	Q. 307	6-7-14	do.	14.9	11.59	1.73	77.78
Do.	Q. 363	7-7-14	do.	15.1	11.64	2.32	77.08
Do.	Q. 437	7-7-14	do.	14.9	10.29	3.42	69.06
Do.	Q. 694	7-7-14	do.	15.8	11.27	2.70	71.32
Do.	Q. 695	7-7-14	do.	15.5	11.20	2.82	72.83
Do.	Q. 795	7-7-14	do.	19.6	17.52	.58	89.38
Do.	Q. 813	7-7-14	do.	20.9	19.48	.34	93.20
Do.	Q. 855	7-7-14	do.	20.7	18.70	.45	90.33
Do.	Q. 970	7-7-14	do.	19.4	17.07	1.16	87.98
Do.	Q. 1001	7-7-14	do.	17.2	14.28	1.03	83.02
Do.	Q. 1092	7-7-14	do.	17.3	12.92	2.50	74.68
Do.	Q. 1998	8-7-14	do.	17.8	15.29	1.30	85.89
Do.	Q. 1110	8-7-14	do.	15.7	11.53	2.32	73.43
Do.	Q. 1133	8-7-14	do.	16.7	13.77	1.73	82.45
Barbadoes	B. 306	8-7-14	do.	9.2	4.17	3.61	45.32
Do.	B. 3412	8-7-14	do.	14.1	10.25	2.32	72.69
Do.	B. 3747	8-7-14	do.	16.0	11.84	1.51	72.12
Do.	B. 3922	8-7-14	do.	18.0	16.28	.50	90.44

THIRD PROGRESSIVE EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—FIRST RATOON
CROP, AUGUST, 1914.

Country	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Queensland	Q. 58	5-8-14	10½ months	13.7	8.59	3.17	62.70
Do.	Q. 59	5-8-14	do.	17.6	10.01	.00	90.06
Do.	Q. 135	5-8-14	do.	17.3	14.22	1.58	82.10
Do.	Q. 137	5-8-14	do.	16.7	13.51	1.51	80.89
Do.	Q. 286	5-8-14	do.	13.2	9.94	2.00	75.30
Do.	Q. 303	5-8-14	do.	18.4	16.24	.74	88.26
Do.	Q. 307	5-8-14	do.	17.3	14.25	1.35	82.30
Do.	Q. 366	5-8-14	do.	15.9	12.02	2.32	75.50
Do.	Q. 437	5-8-14	do.	16.3	12.05	2.70	73.82
Do.	Q. 694	5-8-14	do.	18.5	15.66	1.26	84.64
Do.	Q. 695	5-8-14	do.	16.1	12.56	2.13	78.01
Do.	Q. 795	5-8-14	do.	19.4	17.34	.08	89.38
Do.	Q. 813	5-8-14	do.	21.7	20.43	.16	94.14
Do.	Q. 855	5-8-14	do.	20.6	18.09	.58	92.18
Do.	Q. 970	5-8-14	do.	20.3	17.72	.86	87.29
Do.	Q. 1001	6-8-14	do.	18.4	16.48	.64	89.56
Do.	Q. 1092	6-8-14	do.	19.1	16.51	1.47	86.43
Do.	Q. 1098	6-8-14	do.	18.7	16.45	1.58	87.96
Do.	Q. 1110	6-8-14	do.	18.4	15.63	1.91	84.94
Do.	Q. 1133	6-8-14	do.	16.8	13.37	2.41	79.53
Barbadoes	B. 306	6-8-14	do.	13.3	9.52	2.95	71.57
Do.	B. 3412	6-8-14	do.	10.3	6.91	2.88	58.34
Do.	B. 3747	6-8-14	do.	19.1	17.78	.25	93.08
Do.	B. 3922	6-8-14	do.	16.4	14.47	1.18	88.23

FINAL EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—FIRST RATOON CROP, SEPTEMBER, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice. (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Fibre in Cane.	% Sucrose in Cane.	Date of Attainable
Queensland ..	Q. 58 ..	10-9-14	11½ months	10.5	17.82	.51	91.38	16.10	16.02	June 30
Do. ..	Q. 59 ..	10-0-14	do.	10.9	18.44	.38	92.66	13.04	16.03	..
Do. ..	Q. 135 ..	10-9-14	do.	10.0	18.23	.50	91.60	10.34	16.34	June 1
Do. ..	Q. 137 ..	10-9-14	do.	21.6	19.96	.31	92.40	12.18	17.53	21 May
Do. ..	Q. 286 ..	10-9-14	do.	10.3	17.52	.53	90.77	10.68	15.65	August
Do. ..	Q. 303 ..	10-9-14	do.	20.4	18.85	.45	92.40	11.14	16.75	21 May
Do. ..	Q. 307 ..	10-9-14	do.	19.2	17.45	.40	90.88	10.80	15.53	21 May
Do. ..	Q. 305 ..	10-0-14	do.	16.2	18.04	2.33	80.49	9.42	11.81	1 July
Do. ..	Q. 437 ..	10-9-14	do.	15.3	11.50	2.42	75.16	10.00	10.35	..
Do. ..	Q. 604 ..	10-9-14	do.	20.5	17.75	1.63	86.58	11.30	15.74	..
Do. ..	Q. 605 ..	10-9-14	do.	18.6	16.80	1.43	90.32	10.66	16.01	..
Do. ..	Q. 793 ..	10-9-14	do.	20.7	18.99	.51	91.73	8.56	17.31	18 May
Do. ..	Q. 813 ..	9-9-14	do.	22.5	21.12	.19	93.86	10.44	18.91	18 June
Do. ..	Q. 855 ..	9-9-14	do.	20.7	10.18	.60	92.65	12.84	16.72	18 June
Do. ..	Q. 970 ..	9-9-14	do.	22.3	20.79	.29	93.23	9.96	18.72	30 June
Do. ..	Q. 1001 ..	9-9-14	do.	20.1	19.03	.18	94.67	13.66	16.43	30 June
Do. ..	Q. 1092 ..	9-9-14	do.	19.0	16.34	1.85	80.00	8.46	14.96	18 May
Do. ..	Q. 1098 ..	9-9-14	do.	21.0	19.61	.66	93.38	11.34	17.39	18 June
Do. ..	Q. 1110 ..	9-9-14	do.	20.6	18.59	1.04	90.24	9.16	16.89	18 May
Do. ..	Q. 1133 ..	9-9-14	do.	18.9	16.76	1.20	88.67	9.56	15.16	18 May
Barbadoes ..	B. 306 ..	9-9-14	do.	18.4	16.48	1.20	89.56	7.40	15.26	18 May
Do. ..	B. 3412 ..	9-9-14	do.	10.0	13.74	1.17	85.87	11.16	12.21	..
Do. ..	B. 3747 ..	9-9-14	do.	18.7	17.28	.72	92.40	9.40	15.65	..
Do. ..	B. 3922 ..	9-9-14	do.	19.4	18.38	.21	94.74	10.52	16.45	30 June

In the following table the analytical results for the plant and first ratoon crop are given together, for purposes of easy reference. The average sucrose in juice and purity are good in the majority of instances.

ANALYTICAL RESULTS TO DATE OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—PLANT AND FIRST RATOON CROPS, 1913-1914.

Name or Number of Cane.	PLANT CROP, 1913.				FIRST RATOON CROP, 1914.				AVERAGE OF THE TWO YEARS.	
	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Sucrose.	Purity.
Queensland 58 ..	17.4	15.51	.78	89.13	10.5	17.82	.51	91.38	16.65	90.54
Do. 59 ..	18.0	17.58	.98	94.51	10.9	18.44	.38	92.66	18.01	93.80
Do. 135 ..	18.2	16.25	.83	89.28	19.9	18.23	.50	91.60	17.24	90.73
Do. 137 ..	20.0	19.21	.12	96.05	21.6	19.96	.31	92.40	19.58	94.13
Do. 286 ..	19.4	18.66	.17	96.18	10.3	17.52	.53	90.77	18.09	93.21
Do. 303 ..	20.3	19.30	.14	95.07	20.4	18.85	.45	92.40	19.07	93.94
Do. 307 ..	18.8	17.24	.38	91.70	19.2	17.45	.40	90.88	17.34	91.26
Do. 305 ..	18.8	17.27	.64	91.84	16.2	13.04	2.33	80.49	15.15	86.57
Do. 437 ..	17.0	13.69	2.45	80.52	15.3	11.50	2.42	75.16	12.59	78.10
Do. 604 ..	20.3	18.65	.50	91.87	20.5	17.75	1.63	86.58	18.20	89.21
Do. 605 ..	18.1	15.98	1.22	88.28	18.6	16.80	1.43	90.32	16.39	89.50
Do. 793 ..	21.0	20.03	.25	95.38	20.7	18.99	.51	91.73	19.51	93.79
Do. 813 ..	21.4	20.41	.19	95.37	22.5	21.12	.19	93.86	20.78	94.79
Do. 855 ..	19.8	18.69	.34	95.35	20.7	19.18	.60	92.65	18.93	94.17
Do. 970 ..	21.1	19.93	.35	94.45	22.3	20.79	.29	93.23	20.36	93.82
Do. 1001 ..	19.4	18.27	.30	94.17	20.1	19.03	.18	94.67	18.65	94.43
Do. 1092 ..	18.5	15.65	1.40	84.05	19.0	16.34	1.85	80.00	15.94	85.24
Do. 1098 ..	20.1	18.89	.51	93.98	21.0	19.61	.66	93.38	19.25	93.92
Do. 1110 ..	20.2	18.74	.57	92.31	20.6	18.59	1.04	90.24	18.66	91.47
Do. 1133 ..	17.8	15.81	1.28	87.40	18.9	16.76	1.20	88.67	16.18	88.23
Barbadoes 306 ..	18.3	16.80	1.08	90.71	18.4	16.48	1.20	89.56	16.54	90.38
Do. 3412 ..	16.0	14.38	1.30	85.08	10.0	13.74	1.17	85.87	14.06	85.47
Do. 3747 ..	18.4	16.99	.50	92.33	18.7	17.28	.72	92.40	17.13	92.37
Do. 3922 ..	18.1	17.32	.23	95.69	19.4	18.38	.21	94.74	17.85	95.20

The value of varieties to farmers, however, is more largely governed by their cropping capacities, and the following tables give:—

- (a) The results of the first ratoon crop for the present season.
(b) The total results to date of the plant and first ratoon crops.

CROP RESULTS OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—FIRST RATOON CROP,
SEPTEMBER, 1914.

Country.	Variety of Cane	Age of Cane.	Number of Canes per Acre.	Average height of the sticks in Fathoms.	Weight of Cane per Acre in English Tons.	Yield of Sugar per Acre in Pounds.	Yield of Sugar per Acre in English Tons.
Queensland ..	Queensland Seedling 58	11½ months	24,611	3.5	38.6	13,851	6.1
Do. ..	do. 59	do.	40,510	2.2	40.8	14,663	6.5
Do. ..	do. 135	do.	30,709	3.1	43.1	15,801	7.0
Do. ..	do. 137	do.	35,065	2.5	39.7	15,615	6.9
Do. ..	do. 286	do.	24,829	3.6	40.1	14,077	6.2
Do. ..	do. 303	do.	16,552	2.3	17.6	6,639	2.9
Do. ..	do. 307	do.	35,937	3.1	50.1	17,436	7.8
Do. ..	do. 365	do.	32,016	3.1	44.6	11,806	5.2
Do. ..	do. 437	do.	28,531	1.3	16.8	3,899	1.7
Do. ..	do. 604	do.	56,845	2.4	61.6	21,734	9.7
Do. ..	do. 695	do.	27,225	3.6	44.9	15,103	6.7
Do. ..	do. 795	do.	18,513	2.8	23.1	8,972	4.0
Do. ..	do. 813	do.	27,878	3.0	38.3	16,227	7.2
Do. ..	do. 855	do.	27,878	3.0	37.4	14,020	6.2
Do. ..	do. 970	do.	24,611	3.7	40.8	17,124	7.6
Do. ..	do. 1001	do.	22,851	2.0	21.0	7,765	3.4
Do. ..	do. 1092	do.	26,336	3.5	41.7	13,978	6.2
Do. ..	do. 1098	do.	32,016	2.9	42.2	16,475	7.3
Do. ..	do. 1110	do.	29,403	2.4	32.2	12,212	5.4
Barbadoes ..	Barbadoes Seedling 306	do.	24,829	3.0	34.1	11,665	5.2
Do. ..	do. 3412	do.	28,314	2.1	20.7	7,313	3.2
Do. ..	do. 3922	do.	20,353	3.1	36.9	13,614	6.0
Do. ..	do. 3747	do.	27,878	3.0	38.4	13,463	6.0
Queensland ..	Queensland Seedling 1133	do.	22,869	3.8	39.1	13,306	5.9

CROP RESULTS TO DATE OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—PLANT AND FIRST RATOON CROPS, 1913, 1914.

Country.	Variety of Cane.	PLANT CROP, 1913.		FIRST RATOON CROP, 1914.		TOTAL YIELD, TWO 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.
Queensland ..	Queensland Seedling 58	38.6	5.2	38.0	6.1	77.2	11.3
Do. ..	do. 59	35.6	5.4	40.8	6.5	76.4	11.9
Do. ..	do. 135	52.0	7.7	43.1	7.0	95.7	14.7
Do. ..	do. 137	40.8	6.9	39.7	6.9	80.5	13.8
Do. ..	do. 286	48.0	7.9	40.1	6.2	88.1	14.1
Do. ..	do. 303	25.8	4.3	17.6	2.9	43.4	7.2
Do. ..	do. 307	51.9	8.0	50.1	7.8	102.0	15.8
Do. ..	do. 365	42.9	6.5	44.6	5.2	87.5	11.7
Do. ..	do. 437	23.9	2.0	16.8	1.7	40.7	4.6
Do. ..	do. 604	48.8	7.9	61.0	9.7	110.4	17.6
Do. ..	do. 695	45.4	6.6	44.9	6.7	90.3	13.3
Do. ..	do. 795	31.9	5.7	23.1	4.0	55.0	9.7
Do. ..	do. 813	43.8	7.9	38.3	7.2	82.1	15.1
Do. ..	do. 855	31.3	5.1	37.4	6.2	68.7	11.3
Do. ..	do. 970	47.2	8.4	40.8	7.6	88.0	16.0
Do. ..	do. 1001	33.7	5.4	21.0	3.4	54.7	8.8
Do. ..	do. 1092	46.4	6.5	41.7	6.2	88.1	12.7
Do. ..	do. 1098	53.5	9.2	42.2	7.3	95.7	16.5
Do. ..	do. 1110	39.2	6.5	32.2	5.4	71.4	11.9
Barbadoes ..	Barbadoes Seedling 306	45.3	6.9	34.1	5.2	79.4	12.1
Do. ..	do. 3412	49.5	6.4	26.7	3.2	76.2	9.6
Do. ..	do. 3922	49.8	7.9	36.9	6.0	86.7	13.9
Do. ..	do. 3747	52.7	8.2	38.4	6.0	91.1	14.2
Queensland ..	Queensland Seedling 1133	55.4	7.9	39.1	5.9	94.5	13.8

Several of these new varieties are therefore found to be highly promising and will be reserved for future distribution to farmers. Q. 694 is a large stooler, but the sticks are very thin. Queensland 813 is a cane that should come to the front.

CONTINUATION OF EXPERIMENTS WITH CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY.

FIRST RATOONS, 1913-1914.

The remaining six canes mentioned as having made sufficient progress to be planted out in experiment were, owing to lack of ground adjacent to the first experiments, carried over to another portion of land. The preparation of the soil, subsequent cultivation, and treatment, were identical with the 24 just dealt with.

A description of these canes will be found in the last Annual Report. They were:—Q. 1112, Badila Seedling, Hybrid No. 1, Q. 903, Q. 1049, and Q. 1121. The plant crop was cut last year in September.

The same remarks as to analytical and crop results apply here. These are set out hereunder:—

FIRST PRELIMINARY EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—FIRST RATOON CROP, JUNE, 1914.

Country.	Variety of Cane	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Queensland	Q. 903	12-6-14	8½ months	12.8	8.08	3.37	63.12
Do.	Q. 1049	12-6-14	do.	15.0	13.18	1.54	82.80
Do.	Q. 1112	12-6-14	do.	15.2	11.32	2.45	74.47
Do.	Q. 1121	12-6-14	do.	14.6	11.34	2.03	77.67
Do.	Badila Seedling	12-6-14	do.	16.5	13.13	2.15	79.57
Do.	Hybrid No. 1	12-6-14	do.	13.7	10.27	2.15	74.06

SECOND PROGRESSIVE EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—FIRST RATOON CROP, JULY, 1914.

Queensland	Q. 903	9-7-14	9½ months	17.9	15.34	1.44	85.68
Do.	Q. 1049	9-7-14	do.	16.3	13.56	1.37	83.19
Do.	Q. 1112	8-7-14	do.	14.0	9.20	3.09	65.71
Do.	Q. 1121	9-7-14	do.	16.9	14.44	1.21	85.44
Do.	Badila Seedling	8-7-14	do.	19.5	17.55	.95	90.00
Do.	Hybrid No. 1	9-7-14	do.	18.1	16.46	.57	90.93

THIRD PROGRESSIVE EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—FIRST RATOON CROP, AUGUST, 1914.

Queensland	Q. 903	7-8-14	10½ months	10.2	17.86	.48	93.02
Do.	Q. 1049	7-8-14	do.	18.7	17.68	.51	94.54
Do.	Q. 1112	7-8-14	do.	15.6	11.88	2.65	76.13
Do.	Q. 1121	7-8-14	do.	17.4	15.67	.60	90.05
Do.	Badila Seedling	7-8-14	do.	19.7	18.27	2.25	92.74
Do.	Hybrid No. 1	7-8-14	do.	17.2	15.89	.64	92.38

FINAL EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—FIRST RATOON CROP, SEPTEMBER, 1914.

Country.	Variety of Cane	Date of Analysis	Age of Cane.	Density of Juice (Brix)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice	% Fibre in Cane.	% Sucrose in Cane.	Date of Harvesting.
Queensland	Q. 903	11-9-14	11½ months	19.5	18.19	.34	93.28	10.00	16.37	10 Aug.
Do.	Q. 1049	11-9-14	do.	21.3	20.07	.30	94.22	9.34	18.19	30 June
Do.	Q. 1112	11-9-14	do.	19.6	17.21	.74	87.80	9.58	15.56	10 Aug.
Do.	Q. 1121	11-9-14	do.	21.0	19.26	.15	91.71	11.74	17.00	17 Aug.
Do.	Badila Seedling	11-9-14	do.	22.0	20.82	.19	94.63	9.06	18.93	..
Do.	Hybrid No. 1	11-9-14	do.	19.3	18.35	.32	95.07	8.14	16.86	..

ANALYTICAL RESULTS TO DATE OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—PLANT AND FIRST RATOON CROPS, 1913-1914.

Variety.	PLANT CROP, 1913.				FIRST RATOON CROP.				AVERAGE OF TWO YEARS.	
	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Sucrose.	Purity.
Queensland 903	19.8	18.70	.30	94.74	19.5	18.19	.34	93.28	18.47	94.02
Do. 1049	22.0	21.16	.23	90.18	21.3	20.07	.30	94.22	20.61	95.21
Do. 1112	15.6	16.64	.90	89.46	19.6	17.21	.74	87.80	16.92	89.07
Do. 1121	20.3	19.30	.29	95.07	21.0	19.26	.15	91.71	19.28	93.36
Q. Badila Seedling	21.2	20.10	.30	95.23	22.0	20.82	.19	94.63	20.50	94.93
Q. Hybrid No. 1	20.3	19.41	.17	95.61	19.3	18.35	.32	95.07	18.88	95.35

CROP RESULTS OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—FIRST RATOON CROP, SEPTEMBER, 1914.

Country.	Variety of Cane.	Age of Cane.	Number of Cane per Acre.	Average weight of the stalks in pounds.	Weight of Cane per Acre in English tons.	Yield of Sugar per Acre in Pounds.	Yield of Sugar per Acre in English Tons.
Queensland	Queensland Seedling 903	11½ months	20,908	3.2	30.3	11,123	4.0
Do.	do. 1040	do.	12,850	2.6	15.4	6,290	2.3
Do.	do. 1112	do.	20,908	2.1	20.0	6,981	3.1
Do.	do. 1121	do.	28,314	3.5	45.1	17,180	7.6
Do.	Badila Seedling	do.	26,571	3.9	46.2	19,625	8.7
Do.	Hybrid No. 1	do.	27,442	2.8	34.4	12,990	5.8

CROP RESULTS TO DATE OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—PLANT AND FIRST RATOON CROPS, 1913-1914.

Country.	Variety of Cane.	PLANT CROP, 1913.		FIRST RATOON CROP, 1914.		TOTAL YIELD: TWO 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.
Queensland	Queensland Seedling 903	35.4	5.7	30.3	4.0	65.7	10.6
Do.	do. 1040	23.3	4.5	15.4	2.8	38.7	7.3
Do.	do. 1112	42.5	6.1	20.0	3.1	62.5	9.2
Do.	do. 1121	40.2	6.0	45.1	7.0	85.3	14.5
Do.	Badila Seedling	47.1	8.0	46.2	8.7	93.3	17.3
Do.	Hybrid No. 1	43.7	7.6	34.4	6.6	78.1	13.4

Badila Seedling, Q. 1121, and Hybrid No. 1 made the best growth. Q. 1112, which gave good results in the plant crop, did not do so well as first ratoons.

EXPERIMENTS WITH CANES FROM LOUISIANA AND CANE KNOWN AS CASSILIS.

FIRST RATOON CROP, 1913-1914.

In last year's Report the following details in connection with the origin of the above canes appear:—"In March of 1910 two plants each of the following varieties were received from Audubon Park, Louisiana, viz., D. 117, D. 604, La Striped, T. 211, and La Purple. Owing to the long voyage and the time occupied, the plants had all perished with the exception of the Louisiana Striped and Trinidad 211, and of these only one and two eyes respectively were available. These two canes were carefully propagated, and in April, 1911, were cut and planted out in order to provide seed for further experiment. The canes, more especially the Trinidad 211, came along well, and by August of 1912 had provided seed for planting out in competition."

These two canes, to which has been added the Cassilis, a cane spoken of favourably by Mr. Scougall, of Tiara, were described in last year's Report when dealing with the plant crop. They received the same treatment as the Queensland seedlings above mentioned, and below are given the analytical and crop results:—

FIRST PRELIMINARY EXAMINATION OF CANES FROM LOUISIANA AND CANE KNOWN AS CASSILIS—FIRST RATOON CROP, JUNE, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Louisiana	T. 211	9.6.14	8½ months	13.2	6.68	2.77	50.60
Do.	La Striped	9.6.14	do.	14.9	11.80	1.65	79.70
Unknown	Cassilis	9.6.14	do.	13.6	9.63	2.50	70.73

SECOND PROGRESSIVE EXAMINATION OF CANES FROM LOUISIANA AND CANE KNOWN AS CASSILIS—FIRST RATOON CROP, JULY, 1914.

Louisiana	T. 211	6.7.14	9½ months	14.0	8.39	3.82	59.92
Do.	La Striped	6.7.14	do.	12.6	8.23	2.20	68.58
Unknown	Cassilis	6.7.14	do.	14.7	11.45	1.01	77.88

THIRD PROGRESSIVE EXAMINATION OF CANES FROM LOUISIANA AND CANE KNOWN AS CASSILIS—FIRST RATOON CROP, AUGUST, 1914.

Louisiana	T. 211	5.8.14	10½ months	15.8	11.12	3.25	70.44
Do.	La Striped	5.8.14	do.	16.6	14.26	1.31	85.64
Unknown	Cassilis	5.8.14	do.	17.9	16.19	.58	90.44

FINAL EXAMINATION OF CANES FROM LOUISIANA AND CANE KNOWN AS CASSILIS—FIRST RATOON CROP,
SEPTEMBER, 1914

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Fibre in Cane.	% Sucrose in Cane.	Date of Arriving.
Louisiana ..	T. 211 ..	10-0-14	11½ months	10.1	16.56	1.43	86.70	11.42	14.67	1 June
Do. ..	La Striped ..	10-0-14	do.	18.4	16.37	.95	88.06	9.74	14.77	10 June
Unknown ..	Cassilis ..	10-0-14	do.	19.8	18.81	.35	95.00	11.52	16.64	18 May

ANALYTICAL RESULTS TO DATE OF CANES FROM LOUISIANA AND CANE KNOWN AS CASSILIS—PLANT AND RATOON CROPS, 1913-1914.

Name or Number of Cane.	PLANT CROP, 1913.				FIRST RATOON CROP, 1914.				AVERAGE OF THE TWO YEARS.	
	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Sucrose.	Purity.
Louisiana T. 211 ..	18.4	15.15	1.85	82.33	19.1	16.56	1.43	86.70	15.85	84.75
Louisiana La Striped	20.1	10.40	.20	95.53	18.4	16.37	.95	88.06	17.03	92.42
Cassilis ..	20.5	19.52	.14	95.21	19.5	18.81	.35	95.00	19.18	95.11

CROP RESULTS OF CANES FROM LOUISIANA AND A CANE KNOWN AS CASSILIS—FIRST RATOON CROP, 1914.

Country.	Variety of Cane.	Age of Cane.	Number of Canes per Acre.	Average Weight of the Stalks in Pounds.	Weight of Cane per Acre in English Tons.	Yield of Sugar per Acre in Pounds.	Yield of Sugar per Acre in English Tons.
Louisiana ..	Trinidad Seedling 211 ..	11½ months	24,829	3.5	39.7	13,068	5.8
Do. ..	La Striped ..	do.	19,602	3.3	29.4	9,747	4.3
Unknown ..	Cassilis ..	do.	18,048	3.7	31.5	11,778	5.2

CROP RESULTS TO DATE OF CANES FROM LOUISIANA AND A CANE KNOWN AS CASSILIS—PLANT AND FIRST RATOON CROPS, 1913-1914.

Country.	Variety of Cane.	PLANT CROP, 1913.		FIRST RATOON CROP, 1914.		TOTAL YIELD: TWO 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.
Louisiana ..	Trinidad Seedling 211 ..	39.7	5.3	39.7	5.8	79.4	11.1
Do. ..	La Striped ..	18.6	3.2	29.4	4.3	48.0	7.5
Unknown ..	Cassilis ..	40.4	6.9	31.5	5.2	71.9	12.1

Trinidad 211 has given the highest yield of cane in the two seasons, but is beaten by Cassilis in sugar contents. Louisiana striped is liable to disease and very much resembles our Striped Singapore, or Mauritius Gingham.

FURTHER EXPERIMENTS WITH CANES FROM THE ACCLIMATISATION SOCIETY.

On referring to the last Report from this Station, it will be seen that a second selection of the canes received from the Acclimatisation Society was made. The varieties in this secondary selection in many cases appeared promising, but, owing to various causes, chief of which were drought and stunted and debilitated plants, they failed to furnish sufficient seed for planting out in experiment, and in consequence had to be replanted in order that sufficient cane might be obtained for experimental work. They were therefore planted out in September, 1912, on a new piece of land, which had for some years been growing cassava. The season being favourable these canes made good growth, and by the latter end of July of last year a further selection of the most promising were made and the canes planted out in competition.

The piece of land selected for the trial had previously been under a cane crop for three years, and received the following treatment:—Immediately following the harvest the trash was burnt and the stools ploughed out and carted off the land. The ground was then ploughed as deeply as possible and laid in bare fallow for some months. In November, 1912, the land received a dressing of lime at the rate of 1 ton per acre. This was applied broadcast and then ploughed in. Early in December, suitable rains having fallen, a crop of cowpea was sown at the rate of 1 bushel per acre. Owing to the heavy and continuous rains in the early part of the year this crop could not be ploughed under until April. Early in June a deep swing ploughing was given, followed early in July by a further ploughing and

subsoiling. The land was then divided off into plots consisting of two rows 5 ft. apart, the interspaces allowed between each variety being 6 ft., and planted with the following canes:—

Queensland Seedlings No. 112, Q. 115, Q. 554, Q. 558, Q. 684, Q. 698, Q. 719, Q. 721, Q. 745, Q. 748, Q. 750, Q. 763, Q. 767, Q. 768, Q. 779, Q. 812, Q. 812a, Q. 822, Q. 840, Q. 887, Q. 900, Q. 999, Demerara 115, Demerara 1483, Barbadoes 244, New Guinea 41 Sport, Q. 1004, Q. 1009, Q. 1013, and Q. 1025.

The dry weather towards the end of last year interfered considerably with the striking of the cane in many instances, while in other cases poor stands were secured. As soon as the rains occurred, however, many of the varieties made capital growth.

As in other experiments, the preliminary and progress monthly analyses of samples consisting of one stool have been carefully carried out and details will be found in the following tables.

FIRST PRELIMINARY EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY, SECOND SELECTION—PLANT CROP, JUNE, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Queensland	Q. 112	15-6-14	10 months	9.3	3.03	3.57	42.25
Do.	Q. 115	15-6-14	do.	13.2	8.69	3.37	65.83
Do.	Q. 554	15-6-14	do.	14.6	9.96	2.90	68.21
Do.	Q. 558	15-6-14	do.	11.6	5.71	4.03	49.22
Do.	Q. 684	15-6-14	do.	11.7	4.37	5.43	37.35
Do.	Q. 698	15-6-14	do.	13.1	6.37	4.80	48.62
Do.	Q. 719	15-6-14	do.	15.9	11.24	2.90	70.68
Do.	Q. 721	15-6-14	do.	16.4	12.08	2.97	73.65
Do.	Q. 745	15-6-14	do.	16.3	12.50	2.15	77.23
Do.	Q. 748	15-6-14	do.	13.5	8.70	3.37	64.44
Do.	Q. 750	15-6-14	do.	12.7	7.31	4.03	57.65
Do.	Q. 763	15-6-14	do.	14.0	10.58	2.15	75.57
Do.	Q. 767	16-6-14	do.	14.3	11.07	1.71	77.41
Do.	Q. 768	16-6-14	do.	16.2	12.53	1.86	77.34
Do.	Q. 779	16-6-14	do.	16.8	13.90	1.54	82.73
Do.	Q. 812	16-6-14	do.	13.9	9.79	2.55	70.43
Do.	Q. 812a	16-6-14	do.	17.3	14.41	1.45	82.39
Do.	Q. 822	16-6-14	do.	16.8	14.03	1.95	83.51
Do.	Q. 840	16-6-14	do.	12.8	8.15	3.12	63.67
Do.	Q. 887	16-6-14	do.	13.9	8.78	3.37	63.23
Do.	Q. 900	16-6-14	do.	15.6	12.91	1.43	82.75
Do.	Q. 999	16-6-14	do.	12.4	7.24	4.03	58.38
Do.	Q. 1004	17-6-14	do.	16.4	12.75	2.60	77.74
Do.	Q. 1009	17-6-14	do.	14.1	10.55	2.27	74.29
Do.	Q. 1013	17-6-14	do.	14.8	10.34	2.71	69.86
Do.	Q. 1025	17-6-14	do.	15.7	11.34	2.50	72.22
Do.	N.G. 41 Sport	17-6-14	do.	14.2	10.55	2.55	74.29
Demerara	D. 115	16-6-14	do.	14.1	9.87	2.84	70.00
Do.	D. 1483	16-6-14	do.	15.3	12.10	2.31	78.06
Barbadoes	B. 244	17-6-14	do.	14.7	10.58	2.77	71.97

SECOND PROGRESSIVE EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY, SECOND SELECTION—PLANT CROP, JULY, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Queensland	Q. 112	10-7-14	11 months	15.0	10.91	2.28	72.73
Do.	Q. 115	10-7-14	do.	15.4	11.56	2.32	73.06
Do.	Q. 554	10-7-14	do.	15.8	12.29	2.32	77.78
Do.	Q. 558	10-7-14	do.	13.6	8.18	3.61	60.14
Do.	Q. 684	10-7-14	do.	12.0	3.16	5.20	26.33
Do.	Q. 698	10-7-14	do.	11.6	5.12	5.20	44.13
Do.	Q. 719	10-7-14	do.	13.6	7.89	3.25	58.01
Do.	Q. 721	10-7-14	do.	16.5	12.16	2.60	73.69
Do.	Q. 745	10-7-14	do.	19.0	17.06	.73	89.78
Do.	Q. 748	10-7-14	do.	16.3	12.48	2.32	76.56
Do.	Q. 750	13-7-14	do.	14.3	9.31	3.25	65.10
Do.	Q. 763	13-7-14	do.	15.7	13.99	.81	89.10
Do.	Q. 767	13-7-14	do.	15.2	12.32	2.09	81.05
Do.	Q. 768	13-7-14	do.	16.9	13.69	1.68	81.00
Do.	Q. 779	13-7-14	do.	17.6	15.10	1.30	85.79
Do.	Q. 812	13-7-14	do.	15.8	12.99	1.52	82.21
Do.	Q. 812a	13-7-14	do.	18.8	16.56	.91	88.08
Do.	Q. 822	13-7-14	do.	19.0	16.98	1.04	89.36
Do.	Q. 840	13-7-14	do.	14.6	11.01	2.40	75.41
Do.	Q. 887	13-7-14	do.	15.4	11.08	2.16	71.94
Do.	Q. 900	14-7-14	do.	17.1	15.78	.49	92.28
Do.	Q. 999	14-7-14	do.	14.9	11.08	2.40	74.36
Do.	Q. 1004	14-7-14	do.	18.5	16.00	1.16	86.48
Do.	Q. 1009	14-7-14	do.	15.8	12.88	1.41	81.51
Do.	Q. 1013	14-7-14	do.	16.6	12.43	2.40	75.33
Do.	Q. 1025	14-7-14	do.	17.6	14.30	1.73	81.25
Do.	N.G. 41 Sport	14-7-14	do.	17.1	14.36	1.45	83.97
Demerara	D. 115	14-7-14	do.	14.1	10.00	1.85	77.30
Do.	D. 1483	14-7-14	do.	17.4	15.05	1.30	86.49
Barbadoes	B. 244	14-7-14	do.	17.9	14.84	1.32	82.90

THIRD PROGRESSIVE EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY, SECOND SELECTION—PLANT CROP, AUGUST, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Juice (Brix.) Density of	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Queensland	Q. 112	7-8-14	12 months	17-6	15-34	1-36	87-15
Do.	Q. 115	7-8-14	do.	16-7	14-01	1-68	83-89
Do.	Q. 554	7-8-14	do.	17-4	14-38	2-16	82-64
Do.	Q. 558	10-8-14	do.	16-6	13-61	2-13	81-98
Do.	Q. 684	10-8-14	do.	14-8	9-46	3-82	63-91
Do.	Q. 698	10-8-14	do.	16-0	11-48	2-76	71-78
Do.	Q. 719	10-8-14	do.	17-4	14-73	1-62	84-66
Do.	Q. 721	10-8-14	do.	18-8	16-39	1-32	87-18
Do.	Q. 745	10-8-14	do.	19-5	18-40	-55	94-35
Do.	Q. 748	10-8-14	do.	13-3	8-72	3-09	65-56
Do.	Q. 750	10-8-14	do.	14-7	10-26	3-43	69-79
Do.	Q. 763	10-8-14	do.	18-3	17-36	-26	94-86
Do.	Q. 767	10-8-14	do.	16-6	15-00	-49	90-36
Do.	Q. 768	10-8-14	do.	18-3	16-88	-83	92-24
Do.	Q. 779	10-8-14	do.	19-5	18-61	-23	95-44
Do.	Q. 812	10-8-14	do.	15-2	12-10	1-84	79-60
Do.	Q. 812A	11-8-14	do.	18-6	16-24	-45	87-31
Do.	Q. 822	11-8-14	do.	19-6	18-53	-74	95-02
Do.	Q. 840	11-8-14	do.	14-2	10-55	2-32	74-29
Do.	Q. 887	11-8-14	do.	17-5	14-87	1-30	84-97
Do.	Q. 900	11-8-14	do.	16-2	14-39	-80	88-82
Do.	Q. 999	11-8-14	do.	15-1	11-99	1-66	79-40
Do.	Q. 1004	11-8-14	do.	17-8	15-71	1-25	88-25
Do.	Q. 1009	11-8-14	do.	14-3	12-90	1-58	88-96
Do.	Q. 1013	11-8-14	do.	18-9	16-11	-89	89-44
Do.	Q. 1025	11-8-14	do.	18-3	16-56	-76	90-49
Do.	N.G. 41 Sport	11-8-14	do.	18-7	17-06	-62	91-22
Demerara	D. 115	11-8-14	do.	15-8	12-72	1-83	80-50
Do.	D. 1483	11-8-14	do.	19-0	17-83	-56	93-84
Barbadoes	B. 244	11-8-14	do.	17-6	14-81	1-39	84-14

Early in September the final analyses of all canes growing on 90 running feet was carried out, the details being as follows:—

FINAL EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY, SECOND SELECTION—PLANT CROP, SEPTEMBER, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Fibre in cane.	% Juice in cane.	Date of Harvesting.
Queensland	Q. 112	15-9-14	13 months	17-7	14-89	1-43	84-12	10-36	13-35	..
Do.	Q. 115	15-9-14	do.	17-8	14-62	1-43	82-13	11-78	12-90	..
Do.	Q. 554	15-9-14	do.	17-7	14-94	1-28	84-40	9-36	13-54	30 April
Do.	Q. 558	15-9-14	do.	16-9	14-17	1-40	85-84	8-20	13-01	5 May
Do.	Q. 684	15-9-14	do.	14-6	9-02	4-20	61-78	7-76	8-32	5 May
Do.	Q. 698	14-9-14	do.	18-4	15-91	1-85	81-57	12-22	13-17	5 May
Do.	Q. 719	14-9-14	do.	17-8	15-39	1-75	86-46	9-78	13-88	5 May
Do.	Q. 721	14-9-14	do.	20-6	18-83	-67	91-40	10-78	16-80	..
Do.	Q. 745	14-9-14	do.	21-0	19-87	-34	94-63	7-76	18-33	..
Do.	Q. 748	14-9-14	do.	14-8	11-53	2-21	77-99	7-49	10-68	1 June
Do.	Q. 750	14-9-14	do.	15-6	12-64	2-09	77-17	8-23	11-05	13 May
Do.	Q. 763	14-9-14	do.	18-0	16-55	-44	81-92	8-54	15-14	..
Do.	Q. 767	14-9-14	do.	17-6	15-42	-90	87-61	9-35	13-98	1 June
Do.	Q. 768	14-9-14	do.	20-4	18-46	-56	90-49	8-89	16-82	1 June
Do.	Q. 779	14-9-14	do.	20-0	18-50	-42	92-50	9-63	16-72	..
Do.	Q. 812	14-9-14	do.	17-6	15-75	-98	89-48	7-69	14-55	..
Do.	Q. 812A	14-9-14	do.	21-5	20-27	-21	94-27	11-10	18-62	30 June
Do.	Q. 822	14-9-14	do.	20-4	18-83	-80	92-30	10-14	16-92	1 June
Do.	Q. 840	14-9-14	do.	17-9	14-28	1-43	84-00	8-40	13-08	..
Do.	Q. 887	14-9-14	do.	18-8	16-98	1-17	90-31	12-62	14-94	..
Do.	Q. 900	14-9-14	do.	20-5	19-55	-18	95-36	11-16	17-37	..
Do.	Q. 999	14-9-14	do.	17-4	14-65	-67	80-86	6-74	12-79	..
Do.	Q. 1004	14-9-14	do.	20-1	18-50	-64	92-63	11-34	16-50	..
Do.	Q. 1009	14-9-14	do.	17-3	15-59	-84	90-11	7-26	14-35	..
Do.	Q. 1013	14-9-14	do.	19-2	17-37	-70	90-40	10-74	15-50	..
Do.	Q. 1025	14-9-14	do.	19-2	17-35	-70	90-36	10-19	15-60	..
Do.	N.G. 41 Sport	14-9-14	do.	18-8	16-84	-88	89-57	9-74	15-29	19 July
Demerara	D. 115	14-9-14	do.	18-8	17-37	-55	92-30	10-12	15-61	10 July
Do.	D. 1483	14-9-14	do.	18-5	16-89	-94	90-81	8-08	15-44	..
Barbadoes	B. 244	14-9-14	do.	18-5	16-00	1-14	86-48	8-36	14-66	..

Immediately following the final analyses the whole of the crop was cut and carted to the mill. From the mill weights and the details above, the following table of crop results has been calculated:—

CROP RESULTS OF THE SECONDARY SELECTION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—
PLANT CROP, SEPTEMBER, 1914.

Country.	Variety of Cane.	Age of Cane.	Number of Cane per Acre.	Average Weight of the Stalks in Pounds.	Weight of Cane per Acre in English Tons.	Yield of Sugar per Acre in Pounds.	Yield of Sugar per Acre in English Tons.
Queensland ..	Queensland Seedling 112 ..	13 months	33,976	3.2	49.0	14,054	6.5
Do. ..	do. 115 ..	do.	33,641	3.8	57.9	16,745	7.4
Do. ..	do. 594 ..	do.	18,730	2.8	24.1	7,313	3.2
Do. ..	do. 568 ..	do.	45,738	3.5	72.1	21,025	9.3
Do. ..	do. 684 ..	do.	14,810	5.0	33.6	5,263	2.7
Do. ..	do. 698 ..	do.	32,670	3.5	52.3	15,432	6.8
Do. ..	do. 719 ..	do.	23,958	3.8	41.4	12,878	5.7
Do. ..	do. 721 ..	do.	14,810	3.4	22.5	8,488	3.7
Do. ..	do. 745 ..	do.	27,007	3.2	39.4	16,208	7.2
Do. ..	do. 748 ..	do.	28,314	3.1	40.2	9,030	4.2
Do. ..	do. 750 ..	do.	27,442	3.1	38.5	9,530	4.2
Do. ..	do. 763 ..	do.	23,086	5.1	53.0	18,004	8.0
Do. ..	do. 767 ..	do.	16,117	5.3	38.1	11,935	5.3
Do. ..	do. 768 ..	do.	15,681	5.1	35.0	13,554	6.0
Do. ..	do. 779 ..	do.	24,393	3.8	42.2	15,804	7.0
Do. ..	do. 812 ..	do.	27,878	3.3	42.2	13,763	6.1
Do. ..	do. 812A ..	do.	24,393	3.3	35.0	14,521	6.4
Do. ..	do. 822 ..	do.	27,878	4.3	53.8	20,415	9.1
Do. ..	do. 840 ..	do.	17,424	3.5	27.2	7,070	3.5
Do. ..	do. 887 ..	do.	27,007	2.8	34.2	11,463	5.1
Do. ..	do. 900 ..	do.	26,571	3.8	45.8	17,850	7.9
Do. ..	do. 999 ..	do.	3,920	2.6	4.6	1,327	.5
Demerara ..	Demerara Seedling 115 ..	do.	22,651	4.0	47.0	10,465	7.3
Do. ..	do. 1483 ..	do.	20,037	5.3	48.0	16,812	7.4
Do. ..	do. 244 ..	do.	30,056	4.0	54.6	17,944	8.0
New Guinea ..	Sport from N. Guinea 41 ..	do.	27,442	5.1	62.0	21,310	9.6
Queensland ..	Queensland Seedling 1004 ..	do.	20,620	3.6	47.6	17,502	7.8
Do. ..	do. 1009 ..	do.	13,503	5.1	30.9	9,938	4.4
Do. ..	do. 1013 ..	do.	27,442	2.2	27.2	9,452	4.2
Do. ..	do. 1025 ..	do.	26,136	3.4	40.0	13,998	6.2

Some of the yields of cane in this series have been particularly good. N.G. 41 Sport was a splendid crop and aroused considerable admiration. Q. 553, while a heavy cropper, developed a certain amount of dry rot at maturity. Until further trials are made, nothing definite can be said, but it is hoped that a few canes will prove satisfactory for distribution purposes.

EXPERIMENTS HAVING FOR THEIR OBJECT DIFFERENT METHODS OF CULTIVATION BETWEEN THE CANE ROWS.

As a good deal of difference of opinion exists in Queensland as to the proper methods of subsequent cultivation of cane—*i.e.*, cultivation after the cane is planted and up—a series of experiments have been conducted for the purpose of testing different implements between the rows. The method recommended by cane experts in other countries is what is known as "shallow surface cultivation" with an implement fitted with broad cutting hoes, which leaves a 3 in. mulch upon the surface and so breaks the capillary tubes which are leading water to the air, and conserves moisture. To carry out this method, good tilage before planting is absolutely essential.

Many farmers in Queensland, however, believe in ploughing away from and back to the cane, although this method is often condemned, as it is stated to bury plant foods and ferments, and damages the roots of the young cane by cutting them. It is often adopted, however, as a labour saving device, so as to avoid excessive hand labour.

The following methods have been used on these plots:—

Plot No. 1.—All subsequent cultivation was performed with the ordinary Planet Junior cultivator fitted with the broad duckfoot hoes.

Plot No. 2.—All subsequent cultivation was performed with the same implement fitted with the digging hoes.

Plot No. 3.—All subsequent cultivation was performed with a combination of the pony plough and the Planet Junior cultivator fitted with the digging hoes. This is the common method of cutting away and working back.

Plot No. 4.—All subsequent cultivation was performed with the riding spring-toothed cultivator.

Plot No. 5.—All subsequent cultivation was performed with a light drill harrow fitted with straight sharp tynes.

The land selected for this experiment was formerly under a first season crop of varieties for distribution, and the preparation of the land was as follows:—

Immediately following the harvesting of the abovementioned crop, the trash was burnt and the stools left cut and carted off. Lime was then sown broadcast at the rate of 1 ton per acre and ploughed

under with the disc plough. Early in December of 1912 small red Mauritius bean was planted at the rate of 1 bushel per acre. This crop was allowed to grow until June before ploughing in. By this time a magnificent crop was showing, and, owing probably to the effect of the lime and the fact that the crop was sufficiently heavy to keep the ground from being beaten down hard by the heavy rains early in the year, the soil was in a very loose condition. This fact, added to the heavy nature of the crop, rendered the ploughing in a somewhat difficult matter. Just previous to planting the plot was again cross ploughed with the disc and then deeply ploughed with the swing plough, followed by the subsoiler to a total depth of 20 in., and by the time of planting was in a condition of almost perfect tilth.

Portion of the block was now laid off into plots as follow:—Five plots were laid out containing five rows 5 ft. apart, the plants being placed 6 in. apart in the drills, an 8 ft. interspace being allowed between each plot. The variety of cane used was that known as New Guinea 24n.

The good tilth and the large amount of humus supplied by the bean crop sufficed to establish an almost perfect germination, and to retain ample soil moisture to carry the crop along in vigorous growth until the weather broke. The whole of the cane in this block was not affected in any way by the drought and ript from the start of germination has grown vigorously without check, and has excited much interest from visiting farmers and others.

In the following tables will be found details of the usual preliminary and final analyses:—

FIRST PRELIMINARY EXAMINATION OF CANES IN THE CULTIVATION EXPERIMENTS—PLANT CROP, JUNE, 1914.

No. of Plot.	Variety of Cane.	Treatment in Subsequent Cultivation.	Date of Analysis.	Age of Cane.	Density of Juice (lbrix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
1	N.G. 24n	Shallow cultivation with duck-foot hoes on Planet Junior cultivator. Depth 2 in.	18-6-14	9½ months	15.9	12.27	2.22	77.17
2	Do.	Deeper cultivation with digging hoes fitted on Planet Junior cultivator. Depth 4 in.	18-6-14	do.	16.0	10.17	3.20	63.56
3	Do.	Combination of pony plough and Planet Junior cultivator fitted with digging hoes. Depth 6 in.	18-6-14	do.	10.3	12.66	2.23	77.66
4	Do.	Spring tooth harrowed to depth of 6 in.	18-6-14	do.	15.7	12.37	2.10	78.78
5	Do.	Cultivated with light drill harrow, fitted with straight sharp tynes. Depth 3 in.	18-6-14	do.	16.2	12.03	2.11	79.81

SECOND PROGRESSIVE EXAMINATION OF CANES IN THE CULTIVATION EXPERIMENTS—PLANT CROP, JULY, 1914.

1	N.G. 24n	Shallow cultivation with duck-foot hoes on Planet Junior cultivator. Depth 2 in.	15-7-14	10½ months	15.1	11.08	2.50	73.37
2	Do.	Deeper cultivation with digging hoes fitted on Planet Junior cultivator. Depth, 4 in.	15-7-14	do.	16.0	12.46	2.36	77.87
3	Do.	Combination of pony plough and Planet Junior cultivator fitted with digging hoes. Depth 6 in.	15-7-14	do.	16.6	14.01	1.73	84.39
4	Do.	Spring tooth harrowed to depth of 6 in.	15-7-14	do.	16.1	13.01	1.85	80.80
5	Do.	Cultivated with light drill harrow, fitted with straight sharp tynes. Depth 3 in.	15-7-14	do.	15.0	11.05	2.60	73.66

THIRD PROGRESSIVE EXAMINATION OF CANES IN THE CULTIVATION EXPERIMENTS—PLANT CROP, AUGUST, 1914.

1	N.G. 24n	Shallow cultivation with duck-foot hoes on Planet Junior cultivator. Depth 2 in.	12-8-14	11½ months	17.9	15.29	1.49	85.41
2	Do.	Deeper cultivation with digging hoes fitted on Planet Junior cultivator. Depth 4 in.	12-8-14	do.	17.8	14.73	1.52	82.75
3	Do.	Combination of pony plough and Planet Junior cultivator fitted with digging hoes. Depth 6 in.	12-8-14	do.	17.0	13.63	2.13	80.17
4	Do.	Spring tooth harrowed to depth of 6 in.	12-8-14	do.	19.4	17.45	.87	89.94
5	Do.	Cultivated with light drill harrow, fitted with straight sharp tynes. Depth 3 in.	12-8-14	do.	10.3	17.07	1.08	88.96

FINAL EXAMINATION OF CANES IN THE CULTIVATION EXPERIMENTS—PLANT CROP, SEPTEMBER, 1914.

No. of Plot.	Variety of Cane.	Treatment in Subsequent Cultivation.	Date of Analysis.	Age of Cane.	Density of Juice (Brix)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Fibre in Cane.	% Sucrose in Cane.	Date of Arrowing.
1	N.G. 24n	Shallow cultivation with duck-foot hoes on Planet Junior cultivator. Depth 2 in.	13-9-14	12½ mths.	19.6	17.06	.90	90.10	9.70	16.05	1 Aug. (slightly)
2	Do.	Deeper cultivation with digging hoes, fitted on Planet Junior cultivator. Depth 4 in.	15-9-14	do.	19.4	17.47	.86	90.05	9.28	15.85	..
3	Do.	Combination of pony plough and Planet Junior cultivator, fitted with digging hoes. Depth 6 in.	15-9-14	do.	19.9	18.05	.84	90.70	8.96	16.43	..
4	Do.	Spring tooth harrowed to depth of 6 in.	15-9-14	do.	19.5	17.90	.72	91.79	10.16	16.08	..
5	Do.	Cultivated with light drill harrow, fitted with straight sharp tynes. Depth 3 in.	15-9-14	do.	18.8	16.71	.95	88.88	10.58	14.94	..

Following the final analyses in September the whole of the crop was cut and sent to Racecourse Mill. The table given below gives the crop results:—

CROP RESULTS OF CANE IN THE CULTIVATION EXPERIMENTS—PLANT CROP, SEPTEMBER, 1914.

No. of Plot.	Variety of Cane.	Method of Subsequent Cultivation.	Age of Cane.	Number of Cane per Acre.	W. per Cane of the Shuck in Pounds.	W. per Cane in English Tons.	Yield of Sugar per Acre in Pounds.	Yield of Sugar per Acre in English Tons
1	New Guinea 24n	Shallow cultivation with duck foot hoes on Planet Junior cultivator. Depth 2 in.	12½ mths.	25,482	4.7	54.4	19,463	8.6
2	Do.	Deeper cultivation with digging hoes fitted on Planet Junior cultivator. Depth 4 in.	do.	24,175	4.2	45.0	16,207	7.2
3	Do.	Combination of pony plough and Planet Junior cultivator, fitted with digging hoes. Depth 6 in.	do.	22,651	4.8	49.5	18,230	8.1
4	Do.	Spring toothed harrow to depth of 6 in.	do.	24,175	4.7	51.0	18,003	8.3
5	Do.	Cultivated with light drill harrow, fitted with straight sharp tynes. Depth 3 in.	do.	23,958	4.9	53.4	17,874	7.9

Until the experiment has been checked by subsequent ratoon crops, it would be unwise to say much. The shallow method of cultivation with broad hoes has so far given the best results, followed by the light drill harrower.

EXPERIMENTS TO DETERMINE IF CANE SETS CUT FROM ARROWED CANES HAVE A PREJUDICIAL EFFECT ON THE GERMINATION AND SUBSEQUENT YIELD.

It has been frequently stated that cane planted from arrowed sets resulted in a poorer strike and a lower tonnage of cane per acre. No definite information upon this point exists in Queensland, and it is usual to advise the planting of non-arrowed sets where possible. In order that reliable data upon the question might be secured an experiment has been laid down at this Station in a most careful and accurate manner. An absolutely uniform piece of land was chosen and carefully prepared.

The plants were selected from a field of cane of the variety known as Q. 116. This was all of the same age, but some had arrowed while other portions had not. Care was taken to choose canes for plants under both these conditions that were as like each other as possible in all details except arrowing. The same number of three eye plants were placed in every drill.

Great care was taken in the planting, each one being carefully inspected before placing in the drill so that every precaution might be taken that none of the eyes were in any way damaged. The germination was most carefully noted every week during the early period of growth, every shoot showing in both plots being counted.

Early in December, whilst the process of stooling out was in progress, a further count of every shoot above ground was made.

The cane in both plots has grown exceedingly well and has made a fine stand. About the middle of July last the plots were trashed in order to facilitate the final count of canes in August. From the counts at the times abovementioned the following table of results has been compiled:—

DETAILS OF GERMINATION IN THE ARROWED AND NON-ARROWED PLANT EXPERIMENT—PLANT CROP, 1914.

No. of Plot.	Variety of Cane.	Date of Planting.	Total Number of Eyes Planted.	Plants Cut from.	Date of First Germination.	Shoots showing on 4th September.	Shoots showing on 11th September.	Shoots showing on 18th September.	Shoots showing on 25th September.	Shoots showing on 2nd October.
1	Queensland 116 ..	5 Aug., 1913	528	Arrowed cane ..	28 Aug., 1913	87	148	190	214	232
2	Do. 116 ..	do.	528	Non-arrowed cane	25 Aug., 1913	122	178	238	287	300

DETAILS OF GROWTH IN THE ARROWED AND NON-ARROWED PLANT EXPERIMENT—PLANT CROP, 1914.

No. of Plot.	Variety of Cane.	Date of Planting.	Total Number of Eyes Planted.	Plants Cut From.	Number of Shoots showing on 19th October, 1913.	Number of shoots showing on 1st December, 1913.	Actual Count of Canes made on 1st August, 1914.
1	Queensland 116	5 Aug., 1913	528	Arrowed cane	260	748	770
2	Do. 116	5 Aug., 1913	528	Non-arrowed cane	335	888	777

From the above table it will be seen that the non-arrowed cane sets assumed the lead, which was maintained right up to August of this year, but it is noteworthy that the big lead in the beginning was reduced to almost equal numbers by that date.

As in other experiments, the canes have been subjected to the usual preliminary and final analyses, details of which appear in the following tables:—

FIRST PRELIMINARY EXAMINATION OF CANES IN THE ARROWED AND NON-ARROWED PLANT EXPERIMENT—PLANT CROP, JUNE, 1914.

No. of Plot.	Variety of Cane.	Plants Cut from.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
1	Q. 116 ..	Arrowed cane	18-6-14	10 months	14-6	10-07	2-96	68-96
2	Q. 116 ..	Non-arrowed cane	18-6-14	do.	15-1	10-90	2-97	72-78

SECOND PROGRESSIVE EXAMINATION OF CANES IN THE ARROWED AND NON-ARROWED PLANT EXPERIMENT—PLANT CROP, JULY, 1914.

1	Q. 116 ..	Arrowed cane	15-7-14	11 months	17-6	14-99	1-27	85-17
2	Q. 116 ..	Non-arrowed cane	15-7-14	11 months	16-9	13-77	1-85	81-47

THIRD PROGRESSIVE EXAMINATION OF CANES IN THE ARROWED AND NON-ARROWED PLANT EXPERIMENT—PLANT CROP, AUGUST, 1914.

1	Q. 116 ..	Arrowed cane	12-8-14	12 months	16-4	13-66	1-89	82-68
2	Q. 116 ..	Non-arrowed cane	12-8-14	do.	17-9	16-98	1-28	89-27

FINAL EXAMINATION OF CANES IN THE ARROWED AND NON-ARROWED PLANT EXPERIMENT—PLANT CROP, SEPTEMBER, 1914.

No. of Plot.	Variety of Cane.	Plants Cut from.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Fibre in Cane.	% Sucrose in Cane.	Date of Harvesting
1	Q. 116 ..	Arrowed cane	15-9-14	13 months	19-0	10-84	-97	88-63	12-00	14-82	20 May
2	Q. 116 ..	Non-arrowed cane	15-9-14	do.	19-2	17-29	-90	90-05	10-88	15-41	..

The non-arrowed canes appear from the final table to have some advantage in sucrose and purity, while the per cent. of fibre is also lower. It will also be noted that the plants from the non arrowed cane sets did not arrow, while those from the arrowed sets flowered as early as May.

Immediately following the final analyses in September the plots were harvested and the cane sent to the mill. From the mill weights the following table of crop results has been compiled:—

CROP RESULTS OF CANE IN THE ARROWED AND NON-ARROWED PLANT EXPERIMENT—PLANT CROP, 1914.

No. of Plot	Variety of Cane.	Plant Cut from.	Age of Cane.	Number of Canes per Acre.	Average Weight of the Sticks in pounds.	Weight of Cane per Acre in English Tons.	Yield of Sugar per Acre in Pounds.	Yield of Sugar per Acre in English Tons.
1	Queensland 116 ..	Arrowed cane ..	13 months	25,264	4.0	55.5	18,426	8.2
2	Do. 116 ..	Non-arrowed cane ..	do.	26,136	4.4	51.9	17,934	8.0

The plants from arrowed sets have given the highest yield in the plant crop.

ANALYTICAL TESTS OF MALABAR (GREEN TANNA), OTAMITE, AND CHERIBON IN COMPETITION WITH NEW GUINEA 15 (BADILA), NEW GUINEA 21 (GORU), AND HAMBLEDON QUEENSLAND 426 (CLARK'S SEEDLING).

A great amount of controversy exists in some sugar districts (more particularly Mackay) as to the commercial value of Malabar or Green Tanna, Otamite, and Cheribon. These three canes were introduced into Queensland many years before the establishment of the Sugar Experiment Station, and no exact data is on record concerning them. Analyses of these particular varieties are of course available at the mills, but these have shown such extremes that it is claimed by many farmers that these canes are capable of giving good results at a certain age. Samples have been taken from a field and tested, but no further analysis has been made at a later date, so that early and late tests of the same field of canes are not often procurable.

In order that this matter may be definitely settled, Malabar, Otamite, and Cheribon, in competition with Badila, Goru, and H.Q. 426 were planted up in April, 1913, while the same varieties were again planted in August of the same year so that what is known as a "long" and a "short" crop might be secured. Analyses of all the varieties was commenced in June last, which will be carried on for several months with a view to determining whether the three first named canes are to be compared with the well-known rich varieties, such as Badila, Goru, and H.Q. 426.

These canes germinated well and made exceptionally fine growth. This test being simply analytical the weights of the cane were not secured owing to the necessity of keeping part of the crop standing for further monthly analyses. That part of the cane utilised in the tests up to date will be ratooned so that the results from the ratoons of the above varieties may be ascertained.

The following are the particulars of the analyses to date:—

FIRST PRELIMINARY EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENT—PLANT CROP, JUNE, 1914.

Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Hambledon, Queensland 426	8.6.14	10 months	19.5	17.03	.64	90.41
Badila	8.6.14	do.	18.4	16.03	1.35	87.11
Goru	8.6.14	do.	16.5	13.10	2.01	79.75
Cheribon	8.6.14	do.	13.9	9.20	2.07	80.18
Malabar	8.6.14	do.	14.7	10.83	2.50	73.67
Otamite	8.6.14	do.	12.9	8.11	3.57	62.86
Hambledon, Queensland 426	8.6.14	15 months	19.8	18.28	.56	92.32
Badila	8.6.14	do.	15.5	11.83	2.50	76.64
Goru	9.6.14	do.	16.4	13.66	1.58	83.20
Cheribon	9.6.14	do.	14.1	10.55	2.71	74.32
Malabar	9.6.14	do.	14.5	10.69	2.50	73.72
Otamite	9.6.14	do.	13.6	8.99	2.84	66.10

SECOND PROGRESSIVE EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENT—PLANT CROP, JULY, 1914.

Hambledon, Queensland 426	2.7.14	11 months	20.9	10.32	.23	92.44
Badila	2.7.14	do.	20.1	18.44	.76	91.74
Goru	3.7.14	do.	17.9	15.34	1.38	85.60
Cheribon	3.7.14	do.	15.9	12.74	2.00	80.12
Malabar	3.7.14	do.	16.8	13.75	1.73	81.84
Otamite	3.7.14	do.	17.0	14.36	1.64	84.47
Hambledon, Queensland 426	3.7.14	10 months	19.8	18.42	.40	93.03
Badila	3.7.14	do.	18.6	16.45	1.18	88.44
Goru	3.7.14	do.	18.1	15.29	1.62	84.47
Cheribon	3.7.14	do.	15.9	12.19	2.70	76.66
Malabar	3.7.14	do.	15.9	12.46	1.73	78.36
Otamite	3.7.14	do.	14.8	9.83	2.60	66.41

THIRD PROGRESSIVE EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENT—PLANT CROP,
AUGUST, 1914.

Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
Hambledon, Queensland 426	4-8-14	12 months	21.1	20.27	.11	95.61
Badila	4-8-14	do.	21.2	19.95	.33	94.10
Goru	4-8-14	do.	18.5	16.42	.99	88.75
Cheribon	4-8-14	do.	18.3	15.63	1.88	85.45
Malabar	4-8-14	do.	17.2	14.28	1.85	83.02
Otamite	4-8-14	do.	16.7	12.72	2.54	76.16
Hambledon, Queensland 426	4-8-14	17 months	20.4	19.46	.16	95.39
Badila	4-8-14	do.	19.3	17.98	.76	93.16
Goru	4-8-14	do.	18.7	16.34	1.22	87.37
Cheribon	4-8-14	do.	18.4	15.67	1.39	86.70
Malabar	4-8-14	do.	16.8	14.17	1.49	84.34
Otamite	4-8-14	do.	16.9	13.64	2.36	80.71

FOURTH PROGRESSIVE EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENT—PLANT CROP,
SEPTEMBER, 1914.

Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Fibre in Cane.	% Sucrose in Cane.	P.O.C.S. in Cane.	Date of Stripping.
Hambledon, Q. 426	10-9-14	13 months	22.25	21.25	-10	94.44	10.00	19.00	17.31	..
Badila	10-9-14	do.	23.0	21.96	-20	95.47	9.62	19.85	18.20	..
Goru	10-9-14	do.	21.5	20.35	-15	94.65	10.58	18.20	16.61	21 Aug., slightly
Cheribon	10-9-14	do.	20.2	17.81	1.40	88.16	11.02	15.85	13.86	..
Malabar	10-9-14	do.	19.4	17.26	-59	88.86	13.42	14.94	13.15	21 July
Otamite	10-9-14	do.	18.6	16.19	1.18	87.04	10.18	14.54	12.62	..
Hambledon, Q. 426	10-9-14	18 months	22.9	22.15	-09	96.72	8.56	21.25	18.71	..
Badila	10-9-14	do.	21.0	19.74	-41	94.00	7.30	18.30	16.63	..
Goru	10-9-14	do.	20.0	17.89	-60	89.45	9.80	16.14	14.24	2 Aug., slightly
Cheribon	10-9-14	do.	20.1	18.61	-85	92.56	10.20	16.71	15.06	..
Malabar	10-9-14	do.	18.8	16.74	-70	89.04	12.80	14.60	12.85	21 July
Otamite	10-9-14	do.	19.0	16.71	1.34	87.04	8.84	15.23	13.31	..

FIFTH PROGRESSIVE EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENT—PLANT CROP,
OCTOBER, 1914.

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. in Cane.
Hambledon, Queensland 426	7-10-14	14 months	22.1	21.05	-08	95.24	17.23
Badila	7-10-14	do.	23.9	22.93	-06	95.94	19.05
Goru	7-10-14	do.	20.7	18.88	-34	91.21	15.08
Cheribon	7-10-14	do.	18.7	16.96	-62	90.85	13.43
Malabar	7-10-14	do.	18.5	16.42	-54	88.75	12.40
Otamite	7-10-14	do.	19.3	17.37	-68	90.00	13.82
Hambledon, Queensland 426	7-10-14	19 months	21.8	20.82	-12	95.50	17.46
Badila	7-10-14	do.	21.8	20.45	-14	93.80	17.23
Goru	7-10-14	do.	19.8	18.08	-65	91.26	14.58
Cheribon	7-10-14	do.	18.9	17.24	-62	91.21	13.83
Malabar	7-10-14	do.	19.2	17.19	-50	89.33	13.24
Otamite	7-10-14	do.	18.6	16.69	1.00	89.73	13.45

It will be noticed that analyses made in June show the H.Q. 426, Badila, and Goru to be greatly superior in sugar contents and purity to Cheribon, Malabar, and Oramite. This is also so in July and August. In September the last three canes show considerable improvement, though, except in the case of Goru, at 18 months the other canes are still in advance. In the month of October the former three canes are still in the lead and the very high P.O.C.S. of Badila (19 months) may be drawn attention to.

EXPERIMENTS WITH DIFFERENT FORMS OF NITROGENOUS MANURES, INCLUDING NEW COMPOUNDS, ON A PLANT CROP.

Experiments were instituted for testing various forms of nitrogenous fertilisers on a plant crop. It was originally intended to run a series of untreated check plots alongside, but the only available piece of land not being uniform with that on which the manured plots were situated the check plot had to be limited to one only. The best apparent results are due to the application of dried blood fertiliser, Nitrolin being next. As the particular land is fairly rich in lime it is probable the Nitrolin did not have nearly the effect it would have had on land poorer in lime. The six plots received absolutely uniform treatment except that:—

- Plot No. 1 received 100 lb. per acre nitrogen as nitrate of soda.
 Plot No. 2 received 100 lb. per acre nitrogen as sulphate of ammonia
 Plot No. 3 received 100 lb. per acre nitrogen as Nitrolin.
 Plot No. 4 received 100 lb. per acre nitrogen as dried blood.
 Plot No. 5 received 100 lb. per acre nitrogen as nitrate of ammonia.
 Plot No. 6 received no manure.

The canes all germinated fairly well, but received a severe check during the succeeding dry period. This had the effect of not only stopping growth but acted detrimentally towards the stooling power of the cane, and the resulting crop in consequence was somewhat lighter than expected.

During the early part of growth the manured plots were backwards, but on the appearance of the wet season the manures began to assert themselves, and the cane, growing unchecked throughout the winter, soon established and maintained a lead over the unmanured plot.

The following tables are the analytical and crop results:—

FIRST PRELIMINARY EXAMINATION OF CANES IN THE NITROGENOUS MANURIAL EXPERIMENTS—PLANT CROP, JUNE, 1914.

No. of Plot.	Variety of Cane.	Manure Applied.	Quantity of Manure per Acre.	Date of Analysis.	Age of Cane.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
1	New Guinea 24A ..	Nitrate of soda	100 lb. N	4-6-14	14 mo's	15.4	11.86	2.12	77.01
2	Do.	Sulphate of ammonia	do.	4-6-14	do.	15.5	11.45	2.27	73.87
3	Do.	Nitrolin	do.	4-6-14	do.	10.4	12.72	1.80	77.56
4	Do.	Dried blood	do.	4-6-14	do.	16.5	12.72	2.19	77.00
5	Do.	Nitrate of ammonia	do.	5-6-14	do.	15.5	11.42	2.23	73.67
6	Do.	No manure .. ..	..	5-6-14	do.	10.1	13.34	1.73	82.85

SECOND PROGRESSIVE EXAMINATION OF CANES IN THE NITROGENOUS MANURIAL EXPERIMENTS—PLANT CROP, JULY, 1914.

1	New Guinea 24A ..	Nitrate of soda	100 lb. N	1-7-14	15 mo's	17.7	14.89	1.36	84.12
2	Do.	Sulphate of ammonia	do.	1-7-14	do.	16.9	13.56	1.51	80.23
3	Do.	Nitrolin	do.	1-7-14	do.	18.3	16.42	1.15	89.72
4	Do.	Dried blood	do.	1-7-14	do.	17.7	15.12	1.27	85.42
5	Do.	Nitrate of ammonia	do.	1-7-14	do.	16.9	13.75	1.62	81.30
6	Do.	No manure .. ..	..	1-7-14	do.	17.4	14.30	1.52	82.18

THIRD PROGRESSIVE EXAMINATION OF CANES IN THE NITROGENOUS MANURIAL EXPERIMENTS—PLANT CROP, AUGUST, 1914.

1	New Guinea 24A ..	Nitrate of soda	100 lb. N	3-8-14	16 mo's	18.8	16.08	.60	90.81
2	Do.	Sulphate of ammonia	do.	3-8-14	do.	18.2	16.55	.65	90.93
3	Do.	Nitrolin	do.	3-8-14	do.	19.1	17.07	.51	92.51
4	Do.	Dried blood	do.	3-8-14	do.	18.8	16.79	.84	89.30
5	Do.	Nitrate of ammonia	do.	3-8-14	do.	18.7	17.06	.78	91.22
6	Do.	No manure .. ..	..	3-8-14	do.	18.6	17.01	.94	91.45

FINAL EXAMINATION OF CANES IN THE NITROGENOUS MANURIAL EXPERIMENTS—PLANT CROP, SEPTEMBER, 1914.

No. of Plot.	Variety of Cane.	Manure Applied.	Quantity of Manure per Acre.	Date of Analysis.	Age of Cane.	Density of Juice (Brix.)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Fibre in Cane.	% Sucrose in Cane.	Date of Stooling.
1	New Guinea 24A ..	Nitrate of soda	100 lb. N	8-9-14	17 mo's	19.5	17.98	.57	92.20	10.14	16.16	Aug. 16, slightly
2	Do.	Sulphate of ammonia	do.	8-9-14	do.	19.3	17.79	.61	92.17	10.90	15.85	do.
3	Do.	Nitrolin	do.	8-9-14	do.	19.0	17.19	.65	90.47	10.78	15.34	do.
4	Do.	Dried blood	do.	8-9-14	do.	19.3	17.42	.62	90.25	10.38	15.01	do.
5	Do.	Nitrate of ammonia	do.	8-9-14	do.	19.7	18.43	.60	93.55	9.60	16.06	do.
6	Do.	No manure .. ..	..	8-9-14	do.	20.4	19.25	.29	94.30	9.62	17.40	do.

CROP RESULTS OF CANE IN THE NITROGENOUS MANURIAL EXPERIMENTS—PLANT CROP, 1914.

No. of Plot.	Variety of Cane.	Manure Applied.	Quantity of Manure per Acre.	Age of Cane.	Number of Cane per Acre.	Average Weight of the Stalks in Pounds.	Weight of Cane per Acre in English Tons.	Yield of Cane per Acre in Pounds.	Yield of Sugar per Acre in English Tons.
1	New Guinea 24A	Nitrate of soda ..	100 lb. nitrogen (2 applications)	17 mo's	27,007	3.7	45.3	16,420	7.3
2	Do.	Sulphate of ammonia	do.	do.	25,264	4.4	50.3	17,882	7.9
3	Do.	Nitrolim ..	do.	do.	24,611	4.6	51.4	17,687	7.8
4	Do.	Dried blood ..	do.	do.	23,740	5.1	54.5	19,086	8.5
5	Do.	Nitrate of ammonia	do.	do.	23,522	4.2	44.4	16,597	7.4
6	Do.	No manure ..	..	do.	24,393	3.9	43.2	16,837	7.5

EXPERIMENTS WITH PAPUAN CANES.

WELLS'S COLLECTION.

In last year's Report reference was made to the introduction of new varieties of cane from Papua. These comprised a total of 125 new species. The canes were all planted out and propagated to provide seed for experiment, and up to date 116 varieties remain, the other nine having either failed to germinate, or have germinated and then died out.

The different canes have all been re-numbered, starting from No. 66, which was the number of the last cane in the collection brought over from the same country in 1895 by Mr. Tryon.

In order that the varieties may again be traced to their original district, the following table of numbers and districts is recorded:—

NUMBERS OF PAPUAN CANES.

Serial No.	Wells's No.	District.	Serial No.	Wells's No.	District.
67	1	Bini	121	73	Bola (failed)
68	2	"	122	75	"
69	3	"	123	76	"
70	4	"	124	77	"
71	5	"	125	78	"
72	6	"	126	79	"
73	7	"	127	81	"
74	8	Sogeri	128	82	"
75	9	"	129	84	"
76	10	"	130	85	"
77	11	"	131	86	"
78	12	"	132	88	"
79	13	"	133	89	"
80	14	Babaki	134	90	"
81	15	"	135	92	"
82	16	"	136	93	"
83	17	"	137	94	"
84	18	Itiki	138	95	"
85	19	"	139	96	Barula
86	20	"	140	100	"
87	21	"	141	103	"
88	22	"	142	108	"
89	23	"	143	110	"
90	24	"	144	111	"
91	25	"	145	112	" (failed)
92	27	Wainai	146	113	"
93	32	"	147	116	"
94	33	Manari	148	117	"
95	34	"	149	118	"
96	35	"	150	120	"
97	37	"	151	122	Aison
98	38	"	152	123	"
99	39	Efogi	153	124	"
100	40	"	154	125	"
101	41	"	155	126	"
102	42	"	156	127	"
103	43	"	157	129	"
104	44	"	158	131	"
105	45	"	159	137	Havari
106	46	"	160	138	"
107	47	"	161	139	"
108	48	"	162	140	Maiara 1
109	54	Kagi	163	141	"
110	55	"	164	143	"
111	57	"	165	144	"
112	58	"	166	145	"
113	59	"	167	146	"
114	61	"	168	148	"
115	62	"	169	149	Maiara 2
116	63	"	170	151	"
117	65	Bola	171	152	"
118	66	"	172	153	"
119	67	"	173	155	"
120	72	"	174	156	"

In addition to the above canes there are eleven varieties of which the labels were either lost or too indistinct when received to be deciphered. These have been numbered from 175 to 185.

Naturally great interest is being taken in these new canes from Papua and it has to be said that many of them appear promising. It will be some time, however, before they will have been tested sufficiently to determine which varieties will be suitable for distribution. In the meantime, where sufficient cane was to spare from the amount required for planting out, preliminary analyses have been made.

Owing to a lack of space, and other conditions, it was originally necessary to plant out the canes in four different lots. As these were planted at different times and under different conditions, the results are here shown in four separate tables.

PRELIMINARY EXAMINATION OF PAPUAN CANES (WELLS'S COLLECTION)—PLANT CROP, OCTOBER, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
New Guinea	N.G. 98	1-10-14	11 months	17.6	14.71	1.73	83.57
Do.	N.G. 99	1-10-14	do.	18.0	15.50	1.15	86.11
Do.	N.G. 101	1-10-14	do.	16.0	13.15	1.31	82.18
Do.	N.G. 102	1-10-14	do.	17.6	14.79	1.17	84.03
Do.	N.G. 105	2-10-14	do.	13.3	9.30	2.27	69.02
Do.	N.G. 109	2-10-14	do.	16.8	11.65	1.92	73.73
Do.	N.G. 112	2-10-14	do.	18.4	16.75	.78	91.03
Do.	N.G. 113	2-10-14	do.	17.8	14.04	1.19	83.93
Do.	N.G. 114	2-10-14	do.	16.7	13.66	1.79	81.70
Do.	N.G. 118	1-10-14	do.	15.4	12.53	1.22	81.36
Do.	N.G. 120	30-9-14	do.	16.6	13.32	1.38	80.24
Do.	N.G. 122	1-10-14	do.	16.3	10.47	2.01	64.23
Do.	N.G. 123	1-10-14	do.	15.2	11.70	2.08	76.97
Do.	N.G. 124	1-10-14	do.	19.8	16.62	.96	84.24
Do.	N.G. 126	1-10-14	do.	18.2	15.60	1.15	86.04
Do.	N.G. 128	1-10-14	do.	18.0	14.86	1.38	82.55
Do.	N.G. 129	1-10-14	do.	16.6	13.24	1.83	79.75
Do.	N.G. 130	1-10-14	do.	19.0	16.74	1.00	88.10
Do.	N.G. 131	1-10-14	do.	19.4	17.42	.81	89.79
Do.	N.G. 143	1-10-14	do.	14.0	9.20	2.50	65.71
Do.	N.G. 144	1-10-14	do.	17.2	13.83	2.15	80.40
Do.	N.G. 150	1-10-14	do.	16.6	13.26	1.58	79.87
Do.	N.G. 151	1-10-14	do.	15.5	11.88	1.81	76.65
Do.	N.G. 162	2-10-14	do.	20.1	16.59	1.35	82.53
Do.	N.G. 163	2-10-14	do.	19.2	15.80	1.56	82.70
Do.	N.G. 164	2-10-14	do.	17.1	15.40	.89	90.05
Do.	N.G. 166	2-10-14	do.	18.1	15.66	.94	86.24
Do.	N.G. 170	2-10-14	do.	19.6	17.34	.80	88.46
Do.	N.G. 171	2-10-14	do.	19.5	17.40	.90	86.23
Do.	N.G. 172	2-10-14	do.	19.1	16.95	.92	88.74
Do.	N.G. 186	30-9-14	do.	15.3	12.85	1.04	83.08

PRELIMINARY EXAMINATION OF PAPUAN CANES (WELLS'S COLLECTION)—PLANT CROP, OCTOBER, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (Brix)	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.
New Guinea	N.G. 115	30-9-14	13 months	19.4	17.29	1.27	89.12
Do.	N.G. 117	30-9-14	do.	19.4	18.19	.43	93.76
Do.	N.G. 119	30-9-14	do.	15.8	13.15	1.13	83.22
Do.	N.G. 125	29-9-14	do.	16.5	14.33	.81	86.84
Do.	N.G. 133	30-9-14	do.	18.6	16.40	.96	88.17
Do.	N.G. 138	29-9-14	do.	12.9	7.52	3.47	58.29
Do.	N.G. 139	29-9-14	do.	18.0	14.11	.82	78.33
Do.	N.G. 140	30-9-14	do.	16.8	13.13	1.27	78.16
Do.	N.G. 146	30-9-14	do.	17.3	14.60	1.25	84.30
Do.	N.G. 158	29-9-14	do.	19.2	17.70	.63	92.18
Do.	N.G. 159	29-9-14	do.	18.5	16.37	.60	88.48
Do.	N.G. 161	30-9-14	do.	20.0	18.23	.60	91.15
Do.	N.G. 168	29-9-14	do.	19.3	17.26	.46	89.58
Do.	N.G. 173	30-9-14	do.	17.6	15.69	.98	88.57
Do.	N.G. 174	29-9-14	do.	18.7	17.20	.59	91.97
Do.	N.G. 181	29-9-14	do.	18.4	16.48	.69	89.56
Do.	N.G. 182	30-9-14	do.	17.5	15.45	.92	88.28
Do.	N.G. 183	30-9-14	do.	18.5	16.08	1.30	86.91
Do.	N.G. 184	30-9-14	do.	19.2	17.19	.96	89.53
Do.	N.G. 185	30-9-14	do.	19.2	17.24	1.15	86.79

PRELIMINARY EXAMINATION OF PAPUAN CANES (WELLS'S COLLECTION) PLANT CROP—OCTOBER, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (trka).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice
New Guinea	N.G. 76	6-10-14	13 months	19.2	17.32	.68	90.20
Do.	N.G. 92	6-10-14	do.	17.8	16.11	.48	90.50
Do.	N.G. 93	2-10-14	do.	19.9	18.18	.35	91.35
Do.	N.G. 94	6-10-14	do.	18.4	14.91	2.27	81.03
Do.	N.G. 95	6-10-14	do.	18.0	15.64	.83	86.88
Do.	N.G. 96	6-10-14	do.	19.7	18.08	.83	91.77
Do.	N.G. 97	6-10-14	do.	18.8	17.32	.51	91.12
Do.	N.G. 100	2-10-14	do.	14.6	10.66	2.27	73.01
Do.	N.G. 103	6-10-14	do.	16.6	13.71	1.25	82.59
Do.	N.G. 104	6-10-14	do.	14.0	9.60	1.76	68.57
Do.	N.G. 106	6-10-14	do.	18.8	16.92	.77	90.00
Do.	N.G. 107	6-10-14	do.	17.1	14.97	.69	87.54
Do.	N.G. 108	6-10-14	do.	21.5	19.96	.34	93.02
Do.	N.G. 110	6-10-14	do.	22.4	21.04	.28	93.92
Do.	N.G. 116	6-10-14	do.	19.6	17.77	.51	90.66
Do.	N.G. 133	2-10-14	do.	22.0	20.58	.16	93.54
Do.	N.G. 134	6-10-14	do.	19.6	17.18	1.04	87.60
Do.	N.G. 136	6-10-14	do.	19.3	16.87	1.20	87.40
Do.	N.G. 137	6-10-14	do.	18.0	14.70	1.64	81.66
Do.	N.G. 141	6-10-14	do.	20.7	18.88	.55	91.20
Do.	N.G. 147	6-10-14	do.	20.1	18.63	.26	92.68
Do.	N.G. 148	2-10-14	do.	21.0	19.67	.20	93.66
Do.	N.G. 152	6-10-14	do.	20.4	18.19	.38	89.16
Do.	N.G. 153	2-10-14	do.	19.5	17.40	1.00	89.23
Do.	N.G. 154	6-10-14	do.	20.2	17.91	.60	88.66
Do.	N.G. 155	2-10-14	do.	18.9	16.76	.96	88.14
Do.	N.G. 159	6-10-14	do.	17.4	15.26	.89	87.70
Do.	N.G. 157	2-10-14	do.	21.2	20.00	.20	94.33
Do.	N.G. 160	6-10-14	do.	19.0	16.82	.80	88.52
Do.	N.G. 165	6-10-14	do.	20.3	18.14	1.07	89.35
Do.	N.G. 167	2-10-14	do.	18.0	17.45	.41	92.32
Do.	N.G. 175	2-10-14	do.	17.1	14.65	1.00	85.67
Do.	N.G. 176	2-10-14	do.	17.2	13.43	2.40	78.37
Do.	N.G. 177	2-10-14	do.	19.6	18.05	.29	92.09
Do.	N.G. 178	2-10-14	do.	18.0	14.40	1.80	80.50
Do.	N.G. 179	6-10-14	do.	18.7	16.42	.91	87.80

PRELIMINARY EXAMINATION OF PAPUAN CANES (WELLS'S COLLECTION) PLANT CROP—OCTOBER, 1914.

Country.	Variety of Cane.	Date of Analysis.	Age of Cane.	Density of Juice (trka).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice
New Guinea	N.G. 67	29-9-14	14 months	18.4	16.09	.73	92.33
Do.	N.G. 68	29-9-14	do.	19.9	18.61	.54	91.51
Do.	N.G. 69	29-9-14	do.	18.5	16.69	.96	90.21
Do.	N.G. 70	29-9-14	do.	15.9	12.08	1.56	75.97
Do.	N.G. 72	28-9-14	do.	16.9	14.03	1.32	83.01
Do.	N.G. 73	28-9-14	do.	17.3	14.79	1.38	85.49
Do.	N.G. 74	28-9-14	do.	21.3	20.05	.25	94.13
Do.	N.G. 75	28-9-14	do.	19.8	18.47	.36	93.28
Do.	N.G. 77	28-9-14	do.	20.8	19.77	.16	95.04
Do.	N.G. 78	28-9-14	do.	19.5	18.16	.25	93.12
Do.	N.G. 79	28-9-14	do.	21.2	19.95	.22	94.10
Do.	N.G. 80	29-9-14	do.	18.5	15.53	1.42	83.94
Do.	N.G. 81	29-9-14	do.	18.8	17.43	.61	92.71
Do.	N.G. 82	29-9-14	do.	19.0	16.71	.74	87.80
Do.	N.G. 83	29-9-14	do.	18.0	15.58	.99	86.55
Do.	N.G. 84	28-9-14	do.	18.0	15.29	1.15	84.91
Do.	N.G. 85	28-9-14	do.	18.7	16.64	.90	88.98
Do.	N.G. 86	28-9-14	do.	20.4	19.28	.28	94.50
Do.	N.G. 87	28-9-14	do.	19.0	16.76	.96	88.21
Do.	N.G. 88	28-9-14	do.	16.7	13.96	1.38	83.59
Do.	N.G. 89	28-9-11	do.	18.3	16.11	1.13	88.03
Do.	N.G. 90	28-9-14	do.	17.9	14.81	1.64	82.73
L.J.	N.G. 91	28-9-14	do.	18.2	16.33	1.00	89.72

PAPUAN CANES PLANTED OUT IN EXPERIMENT.

Attention has already been drawn, both in last year's Report and in preceding pages, to the introduction of canes from the above country. A selection of these canes has been made and the following varieties, preliminary analyses of which are included above, have been planted out in experiment with a view to establishing their commercial values:—

N.G. 67, 68, 69, 70, 72, 73, 74, 75, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 114, 123, 158, and 161.

The balance of the new Papuan varieties will be planted out later.

The preparation of the land in which the above experiment was planted was as follows:—The plot of ground chosen was the one on which the manurial experiment with single element fertilisers had been previously carried out. In order to secure uniformity of results, however, the rows in this case have been planted in the opposite direction. Immediately on harvesting the above-mentioned experiment the trash was burnt and the stoles ploughed out and carted off. The land was then treated with a dressing of lime at the rate of 1 ton per acre, and ploughed as deeply as possible. This was harrowed down, and in January of this year, following on good rains, a crop of small red Mauritius bean was sown at the rate of 1 bushel per acre, broadcast. This latter crop came along well and by July had established a fine stand. This was ploughed under and allowed to rot for about six weeks, when the land was deeply cross-ploughed with a swing plough to a depth of 12 in., followed by the subsoiler to a further depth of 6 in., thus securing a deep fine tilth to a minimum depth of 18 in. Owing to a light shower forming a crust on the surface, a final ploughing was given with the disc plough about the third week in August.

TOTAL SUGAR AND OBTAINABLE SUGAR.

In all the results of the Mackay experiment work the total sugar per acre is calculated out. What is known as "available" or "obtainable" sugar depends entirely (as has often been previously explained) on the skill of the manufacturer and the condition of his plant. No satisfactory formula for reducing total to obtainable sugar has been evolved for Queensland conditions, as the work of the mills differs so greatly.

DISTRIBUTION OF VARIETIES OF CANE FROM MACKAY.

The demand for new canes in the different districts still continues, and the work of distribution is one of the most important duties of the Mackay Station. All cane has to be most carefully selected, examined, and packed, so that the varieties may reach their destination in the very best of order. Notwithstanding many farmers in the different districts have availed themselves of the opportunity of securing new varieties from the different experiment plots established in their districts, there has been no falling off in the number of applications dealt with by the Station. Up to last year crates of cane sent to Southern sugar districts were sent via Brisbane, which often meant the transfer of crates to other steamers and considerable delay. Last year, however, a firm of shipping agents at Gladstone were appointed to deal with crates of varieties, and these are now railed direct from Gladstone to Southern centres on arrival. This method is most satisfactory and often saves a fortnight's delay.

During the distributing season this year, March and August, 58 crates of cane have been sent to farmers' associations, mill owners, and for planting up the variety plots in the different farmers' experiment plots in the South and North. These crates are carefully and strongly built and carry the cane quite safely and in good condition to its destination. Smaller parcels of cane, packed in hessian, have been sent to a total of 30 persons. In addition to this 190 local farmers called and received an assortment of varieties this year.

Crates of canes for exhibition have been sent to the Mackay, Gin Gin, Childers, and Bundaberg Shows, and also to the Brisbane Exhibition, where, owing to their fine growth and appearance, they attracted considerable attention.

Seventy-seven applications were also received for a quantity of H.Q. 426 that the Station had for disposal. The successful applicants were decided by ballot.

SUBSIDIARY CROPS.

SORGHUMS.

Sufficient sorghum varieties have been grown during the year to provide feed for station horses and seed for distribution purposes. The kinds grown chiefly are:—Early Orange, Mixed American, and Giant Honduras. Of these the Mixed American and the Early Orange give the best results, furnishing generally two crops while the Giant Honduras is making one. Seed is collected when applied for, owing to the difficulty experienced in keeping this seed in stock.

FRUIT TREES.

A small demand still exists for mango, paw paw, and lamarind seeds and plants. These are from time to time available for distribution.

GRAPE VINES AND PINEAPPLES.

Distributions of vine cuttings and pineapple suckers have been made at the usual time to cane farmers. Owing to the ground on which the pineapples were grown having given out this crop was last year replanted in fresh ground, and the suckers have come along well. During the year the vines have also received attention, and a fresh lot of cuttings planted out, with which it is eventually intended to replace all the old vines.

The temperature readings are also of importance from the manner in which they are shown. Hilgard ("Soils," page 289) points out that it is the extremes of temperature that are most important, and that the annual mean temperature is not a good criterion, since one and the same figures may result equally from the averaging of two widely divergent data and from such as are close together. Thus an average of 60 deg. Fahr. might result equally from the averaging of 65 and 55 deg., or from taking the mean of 15 and 105 deg., yet the respective cultural adaptations would be widely different.

6.—LABORATORY WORK.

During the past year the Mackay Laboratory has been kept fully employed. The new gas plant installed last year has continued to give every satisfaction and has worked without any hitch.

In addition to the volume of chemical work recorded in the above tables, many soil, fertiliser, and other analyses have been performed, including the testing of a number of canes for farmers.

The following table shows the total number of analyses carried out at the Mackay Station Laboratory from 1st July, 1913, to the 30th June, 1914:—

DETAILED REPORT OF ANALYTICAL WORK PERFORMED IN THE LABORATORY OF THE SUGAR EXPERIMENT STATION, MACKAY, FROM 1ST JULY, 1913, TO 30TH JUNE, 1914.

Materials.	Number of Samples Analyzed.	Number of Analyses.
Soils—		
Agricultural Method	12	24
Nitrogen Determinations	12	24
Murex Determinations	12	24
Mechanical Analyses	12	12
Citric Method	12	12
Fertilisers	6	12
Lime	1	2
Sugar Canes and Juices (Farmers)	32	64
Sugar Canes and Juices (Station)	314	628
Sugar	2	4
Sugar Cane Fibres	62	124
Water Analyses	2	4
Brix Spindles (Standardising)	6	6
Total	485	840

Part of the staff of the Bureau of Sugar Experiment Stations is located in the Agricultural Laboratory, and the work carried out there is under the supervision of Mr. J. C. Brünnich, the Agricultural Chemist. During the year the following analyses have been made at the Brisbane Laboratory, from 1st July, 1913, to the 30th June, 1914:—

Materials.	Number of Samples Analyzed.	Number of Analyses.
Soils	91	182
Sugar Canes	67	134
Sugar and Molasses	5	10
Lime-stones	3	6
Total	166	332

In addition to the above, 53 determinations of ash in different varieties of sugar cane, including the tops, have been made. These have been carried out with the standard varieties of the different districts at various times during the crushing season. The results, which are highly interesting and instructive, appear in the table hereunder, which will be useful for purposes of reference. This work will be continued, but separate determinations are to be made in the tops and sticks. Further information respecting the weight of elements removed from the soil will be sought for.

% IN DRY MATTER OF CAKE (INCLUDING TOB). *

Variety of Cane.	Locality.	Type of Soil.	Mineral Constituents of the Ash.											
			Nitrogen.	Crude Ash.	Silica (SiO ₂).	Ferrous Oxide (FeO).	Manganese (MnO).	Alumina (Al ₂ O ₃).	Magnesia (MgO).	Potash (K ₂ O).	Soda (Na ₂ O).	Sulphuric Anhydride (SO ₃).	Chlorine (Cl).	Phosphoric Acid (P ₂ O ₅).
Dornara 1135...			%	%	%	%	%	%	%	%	%	%	%	%
Do.	Pialla	Grey scrub soil	7.07	4.27	.69	.05	trace	.08	.15	1.83	.05	.48	.38	.14
Do.	Cordalba	Red volcanic soil	.472	3.01	.54	.04	.01	.19	.09	1.29	.20	.63	.10	.13
Do.	Childers	do.	.354	1.95	.61	.08	.01	.14	.18	.42	.08	.30	.14	.11
Do.	Goodwood	do.	.509	2.93	.64	.06	.01	.15	.16	.68	.08	.26	.15	.17
Do.	East Bundaberg	Alluvial soil	.398	4.46	1.23	.05	.01	.13	.17	1.57	.12	.34	.22	.25
Do.	Bonnie, near Bundaberg	do.	.435	3.45	.92	.05	trace	.12	.13	1.37	.05	.23	.22	.32
Do.	Woongarra, near Bundaberg	Red volcanic soil	.371	3.26	1.03	.07	do.	.14	.12	.99	.10	.35	.35	.21
Do.	Bingera	do.	.594	3.54	1.06	.04	do.	.16	.16	1.17	.07	.34	.21	.19
Do.	Bingera	Alluvial soil	.470	4.57	.67	.04	.01	.16	.12	1.84	.08	.10	.43	.19
Do.	Oakwood, near Bundaberg	Red volcanic soil	.649	4.46	1.24	.09	trace	.15	.13	1.37	.16	.45	.38	.30
Do.	Mossman	Alluvial	.340	1.91	.64	.03	.01	.10	.20	.47	.07	.14	.07	.13
Badilla, New Guinea 15			%	%	%	%	%	%	%	%	%	%	%	%
Do.	Woongarra, near Bundaberg	Red volcanic soil	.405	3.30	1.32	.09	trace	.18	.11	.80	.09	.19	.14	.21
Do.	Bonnie, near Bundaberg	Alluvial soil	.447	4.23	2.03	.04	.01	.13	.15	1.05	.14	.21	.22	.40
Do.	Proserpine	do.	.370	3.12	1.79	.08	trace	.19	.16	.58	.09	.09	.11	.16
Do.	Burdakin	do.	.598	3.91	1.65	.03	do.	.19	.16	1.09	.12	.16	.21	.24
Do.	Ingham	do.	.535	3.11	1.45	.04	.01	.12	.11	.95	.14	.07	.13	.20
Do.	Innisfail	Red volcanic	.416	1.69	.53	.04	.01	.16	.12	.39	.10	.12	.09	.10
Do.	Nelson, near Cairns	do.	.389	2.60	.82	.06	.01	.12	.10	.81	.11	.06	.10	.30
Do.	Mossman	Alluvial	.481	3.31	1.13	.03	trace	.15	.17	1.01	.08	.17	.16	.30
Rappee...			%	%	%	%	%	%	%	%	%	%	%	%
Do.	Childers	Red volcanic soil	.320	2.54	.80	.04	trace	.21	.11	.69	.09	.21	.12	.12
Do.	East Bundaberg	Alluvial soil	.644	4.12	1.39	.07	.01	.13	.13	1.36	.11	.33	.18	.17
Do.	Oakwood, near Bundaberg	Red volcanic soil	.514	3.27	1.26	.08	trace	.26	.16	.67	.08	.17	.19	.27
Do.	Bingera	Alluvial soil	.325	3.78	1.12	.03	do.	.15	.10	1.26	.11	.15	.15	.21
Do.	Bingera	Red volcanic soil	.663	3.84	1.19	.04	do.	.23	.18	1.60	.09	.31	.23	.18
Do.	Bonnie, near Bundaberg	Alluvial soil	.326	2.94	1.06	.01	do.	.15	.11	.73	.10	.11	.12	.22
New Guinea 24a			%	%	%	%	%	%	%	%	%	%	%	%
Do.	Bonnie, near Bundaberg	Alluvial soil	.415	4.31	2.04	.07	trace	.11	.12	1.17	.12	.22	.26	.33
Do.	Proserpine	do.	.243	2.82	1.07	.04	.01	.09	.07	1.02	.09	.07	.12	.16
Do.	Burdakin	do.	.321	4.79	1.65	.04	.02	.17	.16	1.46	.12	.21	.19	.23
Do.	Ingham	do.	.319	2.91	1.00	.05	.01	.00	.09	.80	.08	.07	.11	.13
Do.	Nelson, near Cairns	Red volcanic	.412	2.11	.53	.04	.02	.07	.13	.67	.03	.06	.15	.11

% IN DRY MATTER OF CANE, INCLUDING TOPS.

Variety of Cane.	Locality.	Type of soil.	Nitrogen	Grade Ash.	Silica	Potash	Magnesia	Lime	Mineral Constituents of the Ash.										
									Phosphoric Oxide	Sulphuric Oxide	Iron Oxide	Alumina	Hydrous Oxide	Calcium	Magnesium	Sodium	Potassium	Chlorine	Phosphoric Acid
New Guinea 21A	Do.	Alloval	.279	2.36	1.12	.65	trace	.20	.15	.51	.13	.11	.10	.20	.22	.22	.15	.15	.33
Do.	Do.	do.	.343	3.61	1.28	.65	.02	.18	.13	1.07	.08	.09	.13	.24	.24	.22	.10	.10	.15
Do.	Do.	do.	.232	3.17	1.20	.66	.01	.19	.10	.98	.10	.10	.10	.19	.15	.15	.10	.10	.15
Do.	Do.	Red volcanic	.315	2.87	.93	.65	.03	.26	.19	.61	.13	.31	.15	.15	.15	.15	.15	.15	.15
Mauritius Mahagache	Do.	Alloval	.364	5.43	2.52	.10	.01	.15	.25	1.28	.11	.20	.28	.30	.30	.28	.28	.28	.30
Do.	Do.	do.	.337	4.01	1.31	.05	trace	.16	.12	1.34	.12	.18	.18	.24	.24	.24	.18	.18	.24
Do.	Do.	do.	.200	2.33	.88	.05	do.	.08	.09	.71	.09	.05	.06	.17	.17	.17	.06	.06	.17
Do.	Do.	Red volcanic	.466	2.27	.77	.68	.03	.15	.12	.56	.06	.21	.15	.09	.09	.09	.15	.15	.09
Mauritius 1969 Seedling	Do.	Red volcanic soil	.386	2.44	.44	.05	.01	.14	.14	.63	.08	.24	.10	.14	.14	.14	.10	.10	.14
Do.	Do.	do.	.472	2.30	.74	.03	.01	.15	.12	.69	.02	.28	.09	.11	.11	.11	.09	.09	.11
Do.	Do.	do.	.294	2.75	1.07	.66	.01	.14	.14	.66	.12	.23	.13	.12	.12	.12	.13	.13	.12
Do.	Do.	do.	.379	4.33	.98	.66	trace	.24	.15	1.57	.06	.40	.39	.23	.23	.23	.40	.39	.23
Striped Singapore	Do.	Grey scrub soil	.877	4.26	.73	.66	.01	.11	.17	1.83	.05	.33	.35	.19	.19	.19	.35	.35	.19
Do.	Do.	Alloval soil	.419	3.38	1.33	.01	trace	.13	.15	.81	.13	.12	.16	.26	.26	.26	.12	.12	.26
Do.	Do.	do.	.451	4.55	1.03	.03	do.	.15	.08	1.61	.08	.19	.19	.24	.24	.24	.08	.08	.24
New Guinea 40	Do.	Red volcanic soil	.318	4.05	1.18	.65	.01	.17	.18	1.26	.09	.23	.22	.17	.17	.17	.23	.22	.17
Do.	Do.	do.	.436	3.02	.79	.63	.03	.21	.09	.83	.11	.23	.22	.09	.09	.09	.11	.11	.09
Gora. New Guinea 24	Do.	Red volcanic	.431	2.95	.73	.10	.01	.10	.16	.64	.25	.13	.20	.17	.17	.17	.13	.13	.17
Do.	Do.	Alloval	.473	3.10	.54	.05	.01	.10	.15	1.08	.10	.14	.15	.22	.22	.22	.10	.10	.22
Green Seedling, Barbados 156	Do.	Grey scrub soil	.750	3.78	.61	.65	.01	.14	.17	1.57	.17	.33	.37	.16	.16	.16	.33	.37	.16
Do.	Do.	Red volcanic soil	.612	3.94	1.36	.66	trace	.20	.22	1.09	.08	.35	.22	.12	.12	.12	.08	.08	.12
Maveo or Euteo	Do.	Grey scrub soil	.740	4.24	.75	.65	.01	.10	.15	1.78	.04	.43	.26	.15	.15	.15	.04	.04	.26
Black Inits	Do.	Red volcanic soil	.390	4.51	1.38	.67	trace	.23	.13	1.57	.07	.36	.41	.24	.24	.24	.07	.07	.41

The thanks of the Bureau are due to Mr. Bünnich for the prompt despatch of results.

7.—WORK OF THE SOUTHERN OR BUNDABERG SUGAR EXPERIMENT STATION.

At the end of last year (1913) the Department of Agriculture acquired 45 acres of land in the Woongarra District, near Bundaberg, for the purpose of an Experiment Station. As soon as the previous owner had harvested his crop (December, 1913) the land was taken over.

The property is improved, so that little or no outlay for new buildings will be required.

Secondly.—The property is compact and easily laid out into sections for different kinds of work.

Thirdly.—The soil is uniform in character—one of the most rigidly important matters in experimental work. It is impossible to compare the experiments where the soil is varying from plot to plot.

Fourthly.—The soil is deep red volcanic in nature, and typical not only of a great portion of the Bundaberg and Childers Districts, but of many other cane-growing localities.

The choice was also endorsed by the representatives of the Queensland Farmers' Union, who consulted with the Minister for Agriculture on the subject.

The red soil on this station, according to chemical analysis, is not better than the average soils of the district, and a portion of it is considerably poorer, as will be pointed out later.

The advantages of selecting the area for use as an Experiment Station may be summed up as under:—

The Mackay Sugar Station possesses an alluvial soil. By taking a site having red volcanic soils, experiments can now be conducted on the two great types of sugar soils in this State.

Further, no experimental work on any large scale has yet been conducted on any of these red soils, and there are a number of problems in connection with these which are urgently in need of investigation.

Owing to the fact that practically the whole of the 45 acres of the new Experiment Station is under cultivation, it will be possible to carry out experiment work on a much larger scale than at Mackay, where the land that can be made use of for cultivation purposes is limited to some 10 or 12 acres.

After taking over the Station, the existing cane on it was ratooned and the fallow pieces ploughed up and prepared for the commencement of experiments.

It was proposed in last year's Report to commence experiments in different methods of ratooning, such as relieving, volunteering, and grubbing, ploughing and scarifying between the rows, with the ratoons then on the property.

Owing to the reasons following these experiments were so affected that reliable figures at the time of harvest could not be obtained.

It was noticed shortly after acquiring the Experiment Station that the cane upon a portion of the land where these experiments had been initiated was turning rapidly yellow. This appearance was also noted in many other parts of the Woongarra and was causing considerable concern amongst growers. It was therefore determined to investigate the matter and to endeavour to ascertain whether different fertilisers or lime would have any effect, and at the same time a sample of the soil upon which the diseased cane was growing was forwarded to the Agricultural Chemist for analysis.

Accordingly a measured distance in every alternate three rows was selected for the experiment, at the spot where the "yellowing" was most pronounced. These were treated as follows:—

First three rows	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	Nitrate of soda
Second three rows	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	Sulphate of ammonia.
Third three rows	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	Sulphate of potash.
Fourth three rows	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	Meatworks.
Fifth three rows	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	Lime.
Sixth three rows	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	No manure.

The fertilisers were applied at the rate of 4 cwt per acre, and the lime at the rate of 1 ton per acre.

It was very soon noticed that where the sulphate of potash had been applied the cane began to improve and to assume a better colour, and later on, in March, these three rows stood out from the remainder to a very marked degree, the cane having almost entirely recovered and looking green and healthy. In that month the analysis of this soil was received from Mr. Brunnich, and this showed that the available potash was exceedingly low, the findings of the Laboratory thus confirming the field trials in a most satisfactory manner.

Of course it is not known definitely whether the yellowing in all parts of the district is due to this lack of potash in the soil, but other farmers informed the writer that on using a mixed fertiliser with a large proportion of potash the yellowing had disappeared.

Regarding the cause of the disease, investigations under the microscope revealed the presence of female gall worms within the roots. In a bulletin of the Huwaimi Experiment Station (No. 6, page 54) it is stated that in order to extract full grown female worms from the galls the latter should be cut up or teased under water. This was the method adopted, and numbers of female worms were seen, resembling exactly the figures given in the bulletin above referred to.

The probability is that, the soil having been impoverished in one or more of the vital elements, the plants become debilitated and cannot resist the attacks of the gall worms, which are known to be present in large numbers in many of our canefields.

In the table below the analysis of the soil is set out:—

Readily Available Plant Foods.	Remarks.	Pounds per Acre.
Phosphoric acid	Very low	127
Lime	Fair	461
Potash	Very low	13

The reaction was strongly acid. The nitrogen and humus good.

The following table sets out the crop results with the different forms of fertiliser and lime:—

No. of Experiment.	Manure Applied per acre.	Yield of Cane per Acre in Tons.	Cost of Manure and Application per Acre.
1	4 cwt. nitrate of soda	4.5	£ s. d. 3 4 6
2	4 cwt. sulphate of ammonia	6.3	3 14 6
3	4 cwt. sulphate of potash	20.1	3 8 6
4	4 cwt. meatworks	9.3	1 15 0
5	1 ton of lime	7.9	2 5 0
6	No manure	3.1	Nil

From the above it will be seen that all the fertilisers, as well as the lime, made some improvement in the crop, the nitrate of soda having the least effect and the potash and phosphoric acid the most. This was to be expected when viewed in relation to the analysis of the soil. The application of potash, however, made the greatest difference, and this experiment attracted considerable attention from visiting farmers, particularly those whose cane was similarly affected. All round the potash experiment the cane was miserably poor, while the cane fertilised with potash had not only made a complete recovery but had progressed so rapidly as to yield 17 tons per acre more than the cane not manured.

The cost of working this cane per acre can be given as under, careful note being taken of the expenditure:—

Operations.	Sulphate of Potash	No Manure.
Ratooning	£ s. d. 0 10 0	£ s. d. 0 10 0
Manure and application	3 8 6	Nil
Subsequent cultivation (4)	0 9 0	0 9 0
3 hand hoeings	1 4 0	1 4 0
Cutting	5 0 6	1 11 0
Carting	1 0 1	0 3 1
	£11 12 1	£3 17 1
	£ s. d.	£ s. d.
20.1 tons of cane at 22s. 8d.	22 15 7	
Cost of production and harvesting	11 12 1	
Profit per acre	£11 3 6	
		£ s. d.
3.1 tons of cane at 22s. 8d.		3 10 3
Cost of production and harvesting		3 17 1
Loss per acre		£0 6 10

The difference in the profit per acre from the use of the sulphate of potash would therefore amount to £11 10s. 4d. This excludes rent of land and taxes, which would increase the loss on the unmanured plot still further, but would still leave a good profit on the manured plot.

It is perhaps fortunate that there is a large patch of several acres of this poor exhausted soil, which, however rich it may have been at one time, has now lost most of its available plant food. This is clearly borne out not only by the very poor growth of the ratoons on the south-western portion of the Station, but also by the analyses of these soils set out above. There is therefore a fine field for experiment without looking for poor land elsewhere, and the ground will be taken in hand with a view to its permanent improvement.

The plant cane on this poor soil is stated to have only yielded 12 tons per acre last year.

In view of the above circumstances it is depressing to know that the prospects of obtaining sulphate of potash for some time to come are rather remote.

EXPERIMENTS WITH DIFFERENT FORMS OF FERTILISERS ON CROP OF FIRST RATOONS.

Experiments with different forms of fertilisers were also carried out on a large scale. These were applied to ratoons existing on the station at the time of purchase. The piece of land on which these were growing was of much better quality than that above mentioned. Due, however, to the fact that the sowing was not taken over until December, the fertiliser could not be applied till late in that month. This was followed by a comparatively dry period and, as stated above, it was not until March that any real growing weather set in. This had an adverse effect on the manures, which in consequence

did not give nearly such a good yield as was hoped for, although the result of the mixed manures was on the whole satisfactory and in line with experience elsewhere. The following are the crop results:—

MANURIAL EXPERIMENTS WITH FIRST RATOONS. YIELD OF CANE AND SUGAR PER ACRE. VARIETY, D. 1135. AGE OF CANE, 13 MONTHS.

Plot No.	Manure Applied.	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Pure Obtainable Cane Sugar per Acre.
1	Nitrate of soda, 4 cwt.	23.17	3.14	2.84
2	Sulphate of ammonia, 4 cwt.	24.56	3.45	3.16
3	Sulphate of potash, 4 cwt.	20.03		
4	Meatworks, 6 cwt.	20.95	2.96	2.68
5	Mixed manure, 6 cwt. (nitrogen, potash, and phosphoric acid)	26.17	3.71	3.43
6	No manure	10.13	2.78	2.57

The analytical data are set out hereunder:—

ANALYTICAL RESULTS OF MANURIAL EXPERIMENTS WITH FIRST RATOONS OF D. 1135. AGE OF CANE, 13 MONTHS.

Plot No.	Manures Applied.	Produce of Juice (Tons).	Sucrose in Juice.	Quantity of Juice.	Sucrose in Cane.	P.O.C.S.
1	Nitrate of soda	17.94	15.78	87.08	13.57	12.26
2	Sulphate of ammonia	18.4	16.41	89.13	14.08	12.67
3	Sulphate of potash					
4	Meatworks	18.50	16.46	88.07	14.16	12.82
5	Mixed manure	18.12	16.51	91.11	14.19	13.11
6	No manure	18.00	16.93	91.02	14.56	13.48

Supplied by courtesy of the Millaquin Sugar Company.

No. 3 (sulphate of potash) plot was not analysed, due to an oversight.

Experiments such as the above with single elements and mixed fertiliser are of the greatest use in ascertaining whether soil is deficient in one or more elements. The value of such an experiment was clearly demonstrated in the case of the poor yellow cane. On average land, however, it has been found that mixed manures give the most payable results.

In the table hereunder the increase due to fertilisers and the profit or loss per acre is shown. It may be here pointed out that manuring does not appear to be nearly so profitable in the Southern districts as it is in the more humid districts of the North.

FIRST RATOON CROP D. 1135. INCREASE FROM USE OF MANURES OVER UNMANURED PLOT AND PROFIT OR LOSS PER ACRE.

No. of Plot	Manure Applied.	Increase in Tonnage per Acre.	Cost of Manures and Applications per Acre.	Net Value of Increased Yield per Acre.	PER ACRE.	
					Profit.	Loss.
1	Nitrate of soda	4.04	£ s. d. 2 4 0	£ s. d. 3 7 3	£ s. d. 0 2 0	£ s. d. ..
2	Sulphate of ammonia	5.43	3 14 6	4 10 6	0 16 0	..
3	Sulphate of potash	0.90	3 8 0	0 15 0	..	2 13 6
4	Meatworks fertiliser	1.82	1 15 0	1 10 3	..	0 4 3
5	Mixed fertiliser	7.04	4 0 0	5 17 4	1 17 4	..

The cost of working the ratoons in these experiments may be given:—

	Unmanured per Acre.	Mixed Manure per Acre.
	£ s. d.	£ s. d.
Ratooning	0 10 0	0 10 0
Subsequent cultivation (4)	0 9 0	0 9 0
Hand hoeings (3)	1 4 0	1 4 0
Manure and application .. .. .	..	4 0 0
Cutting and carting	5 14 9	7 17 0
Rent, etc.	2 15 0	2 15 0
	£10 12 9	£16 15 0
	£ s. d.	£ s. d.
18.13 tons unmanured, at 22s. 8d.	21 13 7	
Cost of production	10 12 9	
Profit per acre	£11 0 10	
26.17 tons manured cane, at 22s. 8d.	29 13 2	
Cost of production	16 15 0	
Profit per acre	£12 18 2	
Additional profit per acre from use of manure		£1 17 4

As soon as the previous owner had given up possession the fallow portion of the land and another piece, where second ratoons had been ploughed out, were taken in hand for future experiments and the establishment of a nursery for new varieties.

The latter was in fine order, and in March and August the following varieties were planted out to provide seed for future experiments:—

- New Guinea 15 (Badila), 16, 24 (Gou), 24A, 24b, 26, 40, 40 Sport, 41 Sport, 64 Sport.
 Mauritius Madagache, 55, 57, 59, 779, 998, 1474, 189, 1900 Seedling.
 Queensland Seedlings, 58, 112, 115, 116, 135, 137, 307, 305, 354, 358, 684, 694, 695
 698, 719, 721, 745, 748, 750, 763, 767, 768, 779, 795, 812, 812A, 813, 822, 840, 855, 887,
 900, 903, 970, 999, 1004, 1009, 1013, 1019, 1023, 1092, 1098, 1110, 1112, 1121, 1153.
 Demerara 115, 145, 1483.
 Barbadoes 147, 156, 244, 306, 625, 3412, 3922, 3717.
 Trinidad 241.
 Humbleden Queensland Seedlings 5, 10, 114, 235, 426, 458.
 New Guinea (Wells's Collection) 57, 68, 69, 70, 71, 73, 74, 75, 76, 77, 78, 79, 80,
 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103,
 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 122,
 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140,
 141, 142, 143, 144, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158,
 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 170, 171, 172, 173, 174, 175, 176, 177,
 178, 179, 180, 181, 182, 183, 184, 185.
 Miscellaneous—Badila Seedling, Hybrid No. J, Cassilis, Gingila, Gingoi, Gingraya,
 Unknown, Petit Senneville, Yuban.

A number of these will be planted out under experimental conditions next year.

EXPERIMENTS ALREADY INITIATED.

These comprise experiments having for their object the testing of subsoiling, liming, and fertilisers, and have been laid out as under:—

- Plot 1.—Limed and sub-soiled.
 Plot 2.—Limed, not sub-soiled.
 Plot 3.—Limed, not sub-soiled, mixed fertilisers.
 Plot 4.—Limed, not sub-soiled, no fertilisers.
 Plot 5.—Sub-soiled only.
 Plot 6.—Not sub-soiled.
 Plot 7.—Not sub-soiled, mixed manures.
 Plot 8.—Not sub-soiled, no manures.

The variety used was D. 1135, the standard cane of the district. The plants used were rather old, but were the only ones that could be secured at that time of the year. The subsoiling was done to a depth of from 18 to 20 inches.

A number of trials with N.G. 15 or Badila have also been commenced. These include (a) different distances between rows, and (b) using different parts of the cane for plants.

- In (a)—Plot 1.—Rows 5 ft. apart.
 Plot 2.—Rows 6 ft. apart.
 Plot 3.—Rows 7 ft. apart.
 In (b)—Plot 1.—Bottom plants only used, 5 ft. rows, plants 12 in. apart.
 Plot 2.—Top plants only used, 5 ft. rows, plants 12 in. apart.
 Plot 3.—Bottom plants only used, 5 ft. rows, plants 6 in. apart.
 Plot 4.—Top plants only used, 5 ft. rows, plants 6 in. apart.
 Plot 5.—Middle plants only used, 5 ft. rows, plants 12 in. apart.

Counts of the germination on the above plots (b) have been most carefully carried out and will be given next year. The top plants produced more than double the number that the bottom ones did.

All the above experiments were planted in March, and by the end of June had made good growth and were looking healthy and well. In July ten severe frosts were experienced night after night, and these cut the whorls of the young plant cane to the ground, including all the varieties planted in the nursery. At the time of preparation of this report the cane has all grown again and is now making headway, but fully two and a-half months of growth were lost.

The land from which the stools of the second ratoons were ploughed out has been ploughed and worked up and divided into three parts. Section 1 was limed and sections 2 and 3 unlimed. Golden vetches were then sown on 1 and 2 in April last. A rather dry time ensued, and although the vetches made a creditable showing above ground their root system was not much developed. They were ploughed under in July, and the ground on which the vetches were, contrary to the usual experience with green crops, turned up very lumpy. The ground was divided into six plots in August, a part subsoiled, and cane planted as under:—

- Plot 1.—Lime, vetches, subsoiled, mixed manures.
 Plot 2.—Lime, vetches, not subsoiled, mixed manures.
 Plot 3.—Vetches, subsoiled, mixed manures.
 Plot 4.—Vetches, mixed manures.
 Plot 5.—Subsoiling only, no manures.
 Plot 6.—No subsoiling, no manures.

Due to the extreme hardness of this ground, the subsoiling was not carried out nearly so satisfactorily as in the previous experiments, the depth varying from 15 in. to 17 in. only.

The cane used for plants was D. 1135, and the plants were much better than those obtained in March.

Dry conditions followed and very little cane had come through up to the 1st October. Heavy rain, however, fell in October, and the plants are now fast coming through.

Experiments with second ratoons have also been started. These will embrace mixed manures versus no manure, and mixed manures containing superphosphate versus mixed manures containing meatworks. A subsoiling test will also be made with first ratoons. Land for the commercial trials of varieties will be prepared with lime and green manures, and it is expected that the canes will be planted out in March next.

MISCELLANEOUS.

During the ten months the Station has been open the visitors have numbered 140. The members of the Interstate Agricultural Conference paid a visit to the Station in May and were favourably impressed with its appearance and the work being carried out. As soon as the experimental work is fairly well established it is proposed to request Farmers' Associations to send monthly delegates to watch the progress of the work, and arrangements will also be made for an annual field day. A laboratory will be established during the coming year.

RAINFALL AT EXPERIMENT STATION FROM 1st JANUARY TO 15th OCTOBER, 1914.

January	.. .. .	2-003	July	.. .. .	0-670
February	.. .. .	5-485	August	.. .. .	0-100
March	.. .. .	3-525	September	.. .. .	1-015
April	.. .. .	2-710	October	.. .. .	7-575
May	.. .. .	2-115			
June	.. .. .	4-175	Total	.. .. .	29-373

8—RESULTS OF EXPERIMENT PLOTS IN THE NORTHERN AND SOUTHERN SUGAR DISTRICTS OF QUEENSLAND.

In the report of 1911, my predecessor, Dr. Gibson, mentioned that a number of farmers' experiment plots were to be established in leading centres, north and south of Mackay.

A series of such plots were therefore planted:—

- (a) To test green manuring, subsoiling, use of lime and fertilisers upon varying soils.
- (b) To test approved varieties of sugar cane in different localities.
- (c) To provide for the distribution of the approved varieties in such districts.

Unfortunately in laying out these experimental plots the Huron struck a bad year. Not only was the weather of the driest and most unfavourable nature to cane crops that had been experienced for many years past, but the labour difficulties became acute, and this feature caused the abandonment of some of the plots originally provided for.

Another drawback is the fact that many farmers are not equipped with sufficient horses and implements to carry out the subsoiling as deeply as is desired, and the hard soil has prevented the depth accomplished being as great as it should have been.

The existing plots were chosen by the chemist in charge of the Mackay Station, Mr. McCready, who has supplied the following particulars and remarks:—

"The fact that sugar is grown practically all along the Queensland seaboard, between the 16th and 28th parallels of latitude, renders the conditions of soil and climate in this State unique and not approached by those of any other sugar-growing country in the world. When the fact is taken into consideration that sugar-cane is grown in, say, the Bundaberg district, with a red volcanic soil and an average rainfall of 40 in. and is also grown in the Mossman district, on an alluvial soil with an average rainfall of 170 in., it becomes obvious that no hard and fast principles of working can be laid down. For these reasons the findings of the different plots should prove of some value. It is intended to experiment with different mixtures of fertiliser in order to try and arrive at the best mixture for each locality. This mixture may then be used as a basis, subject, of course, to modifications to suit the seasons.

"In addition to the above the plots will be made use of as a means of introduction and distribution of new varieties. Cane varieties will first be grown and tested at the Station at Mackay, and all canes proved of commercial value and free from disease will then be sent to the different plots, and from there distributed to the surrounding farmers.

"The plots have, except where otherwise mentioned, been laid out into eight divisions.

"Plots 1 and 2 have been reserved for the introduction of new varieties, one plot being planted and the other held in reserve to supply cane when the first has run out. By this means there will always be one plot under cane and one in reserve."

Referring to the working of these plots, Mr. H. G. Burn, the Northern Field Assistant, who is in charge of the work on the Northern plots under instructions from the General Superintendent, remarks:—

"In reference to the working of the plots it may be necessary to state, and the same remark has been expressed to me by the farmers who have undertaken the work, that the preparation of land for experiments could be done in less time on a much larger area—*i.e.*, the constant turning of horses on limited areas, the method of work being somewhat new, and (being short of horses) the changing of same team from the disc plough to the subsoiling plough, causes considerable delay, and adds largely to the cost."

In the statements which follow, the Field Assistants—Mr. H. G. Burn (Northern) and Mr. H. T. Harvey (Southern)—have supplied the dates of the work done on the various plots.

The results of the plant crop of all the experiment plots (except Messrs. Draper, Adie, and Popp) appeared in last year's report.

Mr. Geo. Muntz's Plot, Mossman.

August 11, 1913.—Plots 3, 4, 5, 6, 7, and 8: Plant crop harvested from competitive plots.

Mr. Muntz was unable to ratoon the cane of plots 3 to 8 until October, the ground being too hard, evidently, to plough. Rain, however, fell in October. Plots 3, 4, 5, 6, and 7 were ploughed and each furrow skeleton ploughed. Plot 8 was not subsoiled. Centres scuffed down.

November.—Plots 7 and 8: Manure at the rate of 4 cwt. per acre was applied to these two plots. This was a mixed fertiliser consisting of 172 lb. sulphate of ammonia, 69 lb. sulphate of potash, and 207 lb. superphosphate, the cost of the manure per acre being £2 4s.

November.—Plots 2 to 8 were scarified and chipped.

December.—Plots 4 and 6: 1 cwt. sulphate of ammonia applied on the surface to cane stools. Cost of manure per acre, 16s.

January, 1914.—All plots scarified.

July 9 and 10, 1914—First ratoons cane varieties plot 2 distributed to farmers.

The canes N.G. 24A, N.G. 24b, H.Q. 426, D. 1135, B. 147 were the chief favourites. Mauritius Malagache and M. 189 were also sought after. The first five canes suit the district and are giving good returns. With the exception of H.Q. 426, N.G. 26, N.G. 40, B. 147, all the rest of the canes in plot 2 arrowed more or less in May.

August—Replace plot was planted with new varieties for distribution purposes. First ratoons on competitive plots harvested, with the following results:—

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENT PLOT UPON MR. GEO. MUNTZ'S FARM AT MOSSMAN. FIRST RATOONS. VARIETY, N.G. 24 (GURU). AREA OF PLOT, 3 ACRES.

Division.	Treatment.	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Pure Obtainable Cane Sugar per Acre.
3	Subsoiled (plant crop had lime and green manure)	17.27	..	..
4	Subsoiled and mixed manures (plant crop had lime and green manure)	30.45	5.07	4.55
5	Subsoiled (plant crop had lime)	12.47	2.17	1.95
6	Subsoiled and mixed manures (plant crop had lime)	25.34	..	..
7	Subsoiled	10.98	..	..
8	Ordinary cultivation	10.14	..	..

Due to an oversight by the mill, Divisions 4 and 5 were the only ones analysed. Divisions 1 and 2, varieties. Cane ratooned October, 1913. Harvested August, 1914.

The analytical results appear hereunder:—

ANALYTICAL RESULTS FROM EXPERIMENT PLOTS UPON MR. GEO. MUNTZ'S FARM, MOSSMAN. FIRST RATOONS. VARIETY, NEW GUINEA 24 (GURU).

Division.	Treatment.	Density of Juice (Brix).	% Sucrose in Juice.	Quotient of Purity.	% Sucrose in Cane.	P.O.S.
4	Manured	20.47	18.75	91.69	16.08	14.95
5	Not manured	21.23	19.61	92.36	17.45	15.71

Supplied by courtesy of the Mossman Central Mill Company.

The whole plot had to contend with dry conditions from June to December in the year 1913. Best growth was made from January to May of this year. It is necessary to say that the competitive plots had to stand until rain fell—two months after cutting the plant cane—before the ratooning was done.

Till was in fair condition, but the subsoiling seemed to be poor, and no possible comparison can be made between subsoiling and not subsoiling.

In spite of these drawbacks, however, the yield of cane on the manured plots was remarkably good, representing an increase of 20.31 and 15.20 tons more cane per acre for an expenditure of £3 per acre for manures.

Mr. James Souter's Plot, Saltwater, Mossman.

September 3 to 9, 1913.—The plant crop was harvested from plots 1, 2, 3, 4, 5, and 6.

October 25 and 27, 1913.—Plots 1, 2, 3, 4, 5, and 6, ploughing and subsoiling centres.

November.—Plot 1 received at the rate of 1 cwt. sulphate of potash and 2 cwt. of meatworks per acre. Cost of manure per acre, £1 9s. 6d.

Plot 2 received at the rate of 2 cwt. dried blood, 1 cwt. sulphate of potash, and 1 cwt. of meatworks per acre. Cost of manure per acre, £2 4s.

Plot 3 received at the rate of 1 cwt. dried blood, 1 cwt. sulphate of potash, and 1 cwt. superphosphate per acre. Cost of manure per acre, £1 12s. 6d.

November.—Plots 1 to 6 scarified.

December.—Plots 1 and 3 received a surface dressing of sulphate of ammonia at the rate of 1 cwt. per acre. Cost per acre, 16s.

December.—Plots 1 to 6 scarified.

January 13, 1914.—Plots 1 to 6 scarified. Apparently no hand chipping was done.

September.—Ratoons harvested. Results given below.

YIELD OF CANE AND SUGAR PER ACRE FROM THE EXPERIMENT PLOTS UPON MR. J. SOUTER'S FARM, AT SALTWATER, MOSSMAN. FIRST RATOONS. VARIETY, B. 147. AREA OF PLOT, 2 ACRES.

Division.	Treatment	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Pure Obtainable Cane Sugar per Acre.
1	Subsoiling mixed manure as meatworks, sulphate of ammonia and sulphate of potash, 4 cwt. per acre. Plant crop limed and green manured	18.57	3.00	2.68
2	Subsoiling mixed manure as dried blood, sulphate of potash and meatworks, 4 cwt. per acre. Plant crop limed and green manured	16.24	2.91	2.68
3	Subsoiling mixed manure as dried blood, sulphate of potash, sulphate of ammonia and superphosphate, 4 cwt. per acre. Plant crop limed and green manured	23.81	4.27	3.94
4	Subsoiling mixed manure as 172 lb. sulphate of ammonia, 69 lb. sulphate of potash, and 207 lb. superphosphate per acre. Plant crop limed and green manured	20.59	3.63	3.33
6	Subsoiling mixed manure as 256 lb. sulphate of ammonia, 77 lb. sulphate of potash, and 115 lb. superphosphate per acre. Plant crop limed and green manured	20.48	3.70	3.39
6	Subsoiling only. Plant crop limed and green manured	6.81	1.09	0.99

Cane ratooned, October, 1913. Cane harvested, September, 1914.

ANALYTICAL RESULTS FROM EXPERIMENT PLOTS UPON J. SOUTER'S FARM, AT SALTWATER, MOSSMAN. FIRST RATOONS. VARIETY, B. 147.

Division.	Treatment.	Percent of Juice (Dry).	Sucrose in Juice.	Quotient of Purity.	Sucrose in Cane.	T.O.C.S.
1	Subsoiling and mixed manures as above	10.30	17.98	93.16	10.02	14.47
2	Subsoiling and mixed manures as above	20.87	20.14	96.50	17.92	16.35
3	Subsoiling and mixed manures as above	20.85	20.10	96.83	17.98	16.58
4	Subsoiling and mixed manures as above	20.60	19.81	95.74	17.63	16.20
5	Subsoiling and mixed manures as above	21.36	20.33	95.17	18.09	16.60
6	Subsoiling only	20.06	18.87	94.06	16.70	15.28

Supplied by the courtesy of the Mossman Central Mill Company.

Very dry conditions prevailed from June to December, inclusive, of 1913, and growth of crop generally was very slow till January, 1914, when the rain helped.

The condition of tilth was fair, centres of bays were subsoiled only, and not that part next to the cane rows.

Although the cultivation of this plot was not as good as it should have been, due largely to dry conditions, still the results from the manure plots are highly satisfactory, considering the poor nature of the soil where the experiments are planted and the difficulty usually experienced in getting crops to give a fair yield. It will be noted that the plot with dried blood and mixed artificial fertilisers has given the best result, being 17.30 tons per acre in advance of the unmanured plot. Plots 4 and 5 have also given good yields. Compared with the small expenditure for manures, the results are to be commended to other growers in the Saltwater District.

Mr. A. J. Draper's Plot, Gordonvale, Cairns (Plant Crop, 1913).

November 23, 1911.—The land for plots 1, 2, 3, 4, 5, 6, 7, and 8 was broken up and cross harrowed.

December 7.—Black Mauritius beans were sown broadcast, on plots 1 to 8, and disc harrowed.

April 5, 1912.—Green manure (fair crop) cross ploughed under.

May 28.—Lime was applied to plot 7 only, broadcast, at the rate of 1 ton per acre.

May 31.—Plots 1 to 7 were cross ploughed 10 in. deep and subsoiled below the ploughing to a further depth of 6 in.

Plot 8 was ploughed to a similar depth, but was not subsoiled. All plots were cross harrowed.

July 10.—Plots 1 to 8 were cross ploughed to a depth of 10 in., then harrowed.

July 18 to 22.—Plot 2 was planted with cane varieties from Mackay and competitive plots 3 to 8 planted with the standard cane of the district—N.G. 24. Drills were made 6 ft. apart in the variety plot and 5 ft. apart in the competitive plots. Depth of drills, 6 in. to 7 in. Plants with three eyes placed 6 in. apart and covered with 3 in. of soil with scarifiers. Plants were in good condition.

July 22, 1912.—Meatworks and potash placed in drills when planting plot 3. 2½ cwt. per acre. Cost, 27s.

51 lb. meatworks and 13 lb. potash placed in drills when planting plot 4; 2½ cwt. per acre. Cost, 27s.

1 cwt. meatworks applied to plot 5 in the drills when planting. Cost, £1 16s.

September 11.—Plot 2 was scarified with Planet Junior.

September 25.—Plots 3 to 8 were scarified with Planet Junior.

October 16 and 17.—Plots 2 to 8 were weeded.

October 23.—Cane misses were supplied to competitive plots.

November 11.—Plots 2 to 8 were scarified.

December 2.—4 cwt. mixed fertiliser per acre applied to plot 6, containing 172 lb. sulphate of ammonia, 69 lb. sulphate of potash, and 207 lb. of superphosphate. Cost per acre, £2 4s.

December 3.—Plots 2 to 8 were scarified.

December 17.—Plots 2 to 8 were scarified.

December 27.—Plots 3 to 8 were hand hoed.

January, 1913.—Plot 3 received 1½ cwt. nitrate of soda per acre. Cost, 24s. Surface dressing.

Plot 4 received 1½ cwt. sulphate of ammonia per acre. Cost, 27s. Surface dressing.

January 8.—Plots 2 to 8 were scarified.

January 13.—All headlands were ploughed.

January 18.—Plots 2 to 8 were scarified.

The soil conditions before planting were good, with the exception of moisture: cane made slow growth from the time of planting, the rainfall being very poor during the later months of 1912. From January to April, 1913, all cane made splendid growth, being helped by good rains.

The necessity of having to plant up cane misses in plots 3 to 8, caused by wire worms, should be taken into consideration when comparing competitive plots.

July 15, 16, and 17.—Distribution of cane varieties.

July 25.—Harrowing variety plot.

October.—Plant crop cut. Results are set out hereunder:—

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENT PLOTS UPON MR. A. J. DRAPER'S FARM, AT NELSON. PLANT CANE VARIETY, N.G. 24 (GORD). AREA OF PLOT, 3 ACRES.

Division.	Treatment.	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Cane Obtainable Cane Sugar per Acre (P.O.S.S.).
3	Green manure, mixed manure as nitrate of soda, meatworks and sulphate of potash, and subsoiling, 4 cwt. per acre	31.95	5.24	1.29
4	Green manure, mixed manure as sulphate of ammonia, meatworks and sulphate of potash, 4 cwt. per acre, and subsoiling	32.28	6.11	1.48
5	Green manure, meatworks manure, 4 cwt. per acre, and subsoiling	33.06	5.76	1.06
6	Green manure, mixed manure as sulphate of ammonia, sulphate of potash, and superphosphate and subsoiling	28.57	5.48	1.04
7	Lime, green manure, and subsoiling	26.65	4.96	1.13
8	Green manure and ordinary cultivation	19.54	5.36	1.09

Divisions 1 and 2, varieties. Cane planted, July, 1912. Cane harvested, 23rd October, 1913.

ANALYTICAL RESULTS FROM EXPERIMENTAL PLOTS ON Mr. A. J. DRAVER'S FARM, NELSON. PLANT CANE.
No. 24 (GORD).

Division.	Treatment.	Density of Juice (Brix)	Sucrose in Juice.	Quotient of Purity.	Sucrose in Cane.	P.O.C.S.
3	Green manure, mixed manure, and subsoiling ..	22.65	18.81	83.05	16.74	14.07
4	Green manure, mixed manure, and subsoiling ..	23.20	21.29	91.77	18.94	16.98
5	Green manure, meatworks manure, and subsoiling ..	22.10	19.61	88.75	17.45	15.32
6	Green manure, mixed manure, and subsoiling ..	23.10	21.37	92.51	19.01	17.13
7	Lime, green manure, and subsoiling ..	22.80	21.01	92.17	18.69	16.79
8	Green manure and ordinary cultivation only ..	23.00	22.10	93.64	19.66	17.84

Supplied by courtesy of the Mulgrave Central Mill Company.

In these plots the meatworks fertiliser has given the highest results.

1st Ratoon Crop.

With reference to the ratoons, Field Assistant Burn remarks:—

"Very dry conditions prevailed with the plot when ratooning, and rain did not fall until January, 1914. The crop made the bulk of growth from January to May of this year.

"On inspecting the plot at different times it was evident that the work required to be done in time to obtain the best results had to stand aside, as other work had to be attended to and extra labour and horses were not available. No doubt, under these circumstances, any good that might otherwise have been gained was lost, and had it not been for the help of the maiming very little result would have been obtained."

August 15, 31, 1913.—Scarifying variety plot.

September 16, 27.—Scarifying variety plot.

October 24.—Scarifying variety plot.

October 21.—Plots 3, 4, 5, 6, 7, and 8: Harvesting cane crop (plant cane).

October 31.—Plots 3, 4, 5, 6, 7, and 8: Burning off trash.

November 3 to 8.—Ploughing and subsoiling plots 1 to 7.

Plot 8, not subsoiled.

Plot 3, mixed manure, meatworks, and sulphate of potash applied, 2½ cwt. per acre.

Plot 4, meatworks and sulphate of potash applied, 2½ cwt. per acre. Cost in each case, 27s. per acre.

Plot 5, meatworks fertiliser applied. 4 cwt. to acre. Cost, £1 16s.

Plot 6, mixed fertiliser containing 172 lb. sulphate of ammonia, 60 lb. sulphate of potash, and 207 lb. of superphosphate. Cost, £2 4s. per acre.

November 8, 25, and 26.—Scarifying variety plot.

November 24 and 25.—Plot 1, replace plot, skeleton ploughing.

November 26.—Plot 1, replace plot, harrowing and rolling.

December 10, 15.—Plots 3, 4, 5, 6, 7, 8, scarifying.

January 8 to 10, 1914.—Plots 2, 3, 4, 5, 6, 7, and 8, chipping.

January 12 to 14.—Plots 2, 3, 4, 5, 6, 7, 8, chipping.

January 14.—Plots 2, 3, 4, 5, 6, 7, 8, disc cultivator used.

January 16 and 17.—Plots 2, 3, 4, 5, 6, 7, 8, centres skeleton ploughed.

Nitrate of soda, 1½ cwt. per acre, as surface dressing to plot 3. Cost, £1 4s.

Sulphate of ammonia, 1½ cwt. per acre, as surface dressing to plot 4. Cost, £1 7s.

January 17.—Scarifying.

February 23, 24.—Replace plot 1, ploughing.

March 3.—Plots 2 to 8, scarifying.

March 11.—Plot 1, harrowing.

March 21 and 30.—Plots 3, 4, 5, 6, 7, 8, scarifying.

March 31 and April 1.—Plot 1 (replace), ploughing and subsoiling depth 14 in. to 16 in.; also picking grubs behind plough.

April 24, 25.—Plot 1 (replace), ploughing replace plot 1, depth 9 in.

April 26.—Plot 1 (replace), harrowing replace plot.

April 27.—Drilling and planting new varieties in plot 1 as follows:—

Mauritius 998—Rows 1 and 2.
Mauritius 779—Rows 3, 4, and 5.
Mauritius 1474—Rows 6, 7, and 8.
Mauritius 998—Row 9 and 10.

Mauritius 89—Rows 11, 12, and 13.
Mauritius 55—Rows 14, 15, and 16.
Mauritius 87—Rows 17, 18, and 19.
Mauritius mixed canes—Row 20.

*Taken from Plot 2.

New Guinea 24a—Rows 21 and 22.
Malagache—Row 23.
H.Q. 426 and M. 139—Row 24.
H.Q. 5—Row 25.

B. 147—Row 26.
N.C. 24a—Row 27.
Mixed canes—Row 28.

The 1st ratoon variety canes were all more or less affected by grubs, and while H.Q. 426, N.G. 10, and N.G. 26 did not arrow, N.G. 21A, N.G. 24B, and B. 147 arrowed a little, Malagaehc. M. 180, H.Q. 114, and H.Q. 5 still more. The varieties flowered in May.

August 6 and 7.—Distributing 1st ratoon cane varieties (1st ratoons).

August 31.—Harvesting cane crop. Plots 3, 4, 5, 6, 7, 8. The results appear below.

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENT PLOT UPON MR. A. J. DRAPER'S FARM, AT NELSON. FIRST RATOONS. VARIETY, N.G. 24 (GORD). AREA OF PLOT, 3 ACRES.

Division	Treatment	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Pure Obtainable Cane Sugar per Acre. (P.O.C.S.)
3	Mixed manure as nitrate of soda, meatworks and sulphate of potash, 4 cwt. per acre, subsoiled	16.26	2.76	2.48
4	Mixed manure as sulphate of ammonia, meatworks, and sulphate of potash, 4 cwt. per acre, subsoiled	18.48	3.30	3.01
5	Meatworks manure, 4 cwt. per acre, subsoiled	15.18	2.46	2.00
6	Mixed manure as sulphate of ammonia, sulphate of potash and superphosphate, subsoiled	11.05	1.90	1.81
7	Subsoiling only	10.18	1.77	1.64
8	Ordinary cultivation only	9.36	1.63	1.49

Divisions 1 and 2, varieties Ratooned, November, 1913. Harvested, September, 1914. Experiment vitiated by grubs.

ANALYTICAL RESULT FROM EXPERIMENT PLOT UPON MR. A. J. DRAPER'S FARM, AT NELSON. FIRST RATOONS. VARIETY, N.G. 24 (GORD).

Division	Treatment	Density of Juice (Brix)	Sucrose in Juice.	Quantity of Purity.	Percent. Sucrose in Cane.	P.O.C.S.
3	Subsoiling, mixed manure as above	20.92	19.11	91.35	17.00	15.29
4	Subsoiling, mixed manure as above	21.62	20.13	93.11	17.91	16.29
5	Subsoiling, meatworks manure	19.02	17.50	80.11	15.57	13.80
6	Subsoiling, mixed manure	21.22	20.03	94.39	17.82	16.33
7	Subsoiling only	21.12	19.87	94.08	17.68	16.18
8	Ordinary cultivation only	21.02	19.09	93.07	17.52	15.99

Supplied by courtesy of the Mulgrave Mill Company.

Although the manures have apparently had some good effect, yet the prevalence of grubs on Mr. Draper's farm must be considered to have disturbed the results, and account for a lower yield of cane than was anticipated.

Experiment Plots upon Mr James McKersie's Farm at Ayr, Lower Burdekin.

This plot, the area of which is 2 acres, is situated upon a typical piece of the Lower Burdekin forest lands and is representative of the soils of that locality. An error was made in the method of sowing the green crop before the plant crop, and the manurial treatment is different to most of the other experiment plots.

October 9, 1913.—Plant crop harvested.

November 5.—Cane ratooned on plots 3, 4, 5, 6, and 7, by ploughing and subsoiling. Plot 8 ploughed only.

November 6 and 7.—Manures applied as under:—

Plot 3, meatworks, at rate of 4 cwt. per acre. Cost 29s.

January 3, 1914.—All plots scarified.

January 9.—Replace plot 1 ploughed with disc.

February 9 and 10.—All plots hand hoed and scarified.

February 26.—All plots scarified.

April 17 to May 19.—Replace plot prepared for planting.

June 1.—Planted replace plot with the following varieties:—

M. 55	.. .. .	3 rows.	1900 Seedling	.. .. .	2 rows.
M. 1474	.. .. .	3 rows.	M. 779	.. .. .	3 rows.
M. 87	.. .. .	2 rows.	M. 89	.. .. .	3½ rows
M. 998	.. .. .	3 rows.	H.Q. 426	.. .. .	2½ rows

August 11 and 12.—1st ratoon varieties were distributed.

September 26 to October 5.—1st ratoon crop harvested. Results are given below.

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENT PLOTS UPON MR. JAMES MCKERSIE'S FARM, AT AVR. FIRST RATOONS. VARIETY, NEW GUINEA 21A.

Division.	Treatment.	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Pure Obtainable Cane Sugar per Acre (P.O.C.S.).
3	Subsoiled and meatworks fertiliser (plant crop limed and green manured)	19.2	3.00	3.25
4	Subsoiled and mixed fertiliser (plant crop limed and green manured)	26.17	4.93	4.39
5	Subsoiled and mixed fertiliser (plant crop limed and green manured)	28.65	5.34	4.84
6	Subsoiled (plant crop limed and green manured)	29.59	5.86	5.42
7	Subsoiled (plant crop green manured)	18.21	3.21	2.92
8	Ordinary cultivation only	23.45	4.54	4.15

Divisions 1 and 2, varieties. Ratooned, November, 1913. Harvested, October, 1914.

ANALYTICAL RESULTS FROM THE EXPERIMENT PLOTS ON MR. JAMES MCKERSIE'S FARM, AT AVR. FIRST RATOONS. VARIETY, NEW GUINEA 24A.

Division.	Treatment.	Density of Plants (B/W)	Sucrose in Juice.	Quotient of Purity.	Sucrose in Cane.	P.O.C.S.
3	Subsoiled, meatworks fertiliser (as above)	22.71	21.17	93.21	17.78	17.04
4	Subsoiled, mixed fertiliser (as above)	23.33	21.18	90.78	17.79	16.80
5	Subsoiled, mixed fertiliser (as above)	22.91	21.42	93.50	17.99	17.27
6	Subsoiled, no manures (as above)	24.13	22.66	93.91	19.63	18.32
7	Subsoiled, no manures (as above)	21.21	19.87	93.68	16.69	16.95
8	Ordinary cultivation	23.03	21.80	94.66	18.31	17.71

Supplied by courtesy of the Pioneer Mill, Lower Burdekin.

From the crop results it will be seen that the manures have made no difference. It was pointed out last year that this was the only experiment in the series that has been irrigated. Mr. Burn has the following remarks to offer:—

"When the plot was visited in August the crop looked healthy and promised well. Since June rain has not fallen, and dry weather conditions setting in no watering was given, which was absolutely necessary. This was due to some troubles with the irrigation plant, and when the cane was harvested the crop was starting to die back, and plots 3, 4, and 7 suffered the most. The plots have not been irrigated since the 28th October, 1913."

Plots 5, 6, and 8 were not so dry, and the tops appeared much greener.

Messrs. H. Ruge and Sons' Experiment Plot, Proserpine.

This plot, the area of which is 2 acres, is situated within half a mile of the town of Proserpine and is representative of the ordinary forest lands in that locality.

September, 1913.—Plant crop harvested.

October 1.—Ratooning plots 3 to 7 by ploughing and subsoiling. Plot 8 ploughed only.

October 3.—All plots scarified.

October 13.—Plots 4 and 6, mixed manure, consisting of 172 lb. sulphate of ammonia, 63 lb. sulphate of potash, and 207 lb. superphosphate, applied per acre. Cost of same £2 4s.

November 3.—Plots 2 to 8 scarified.

November 10.—Plot 2 hand hoed.

November 13.—Plots 2 to 8 scarified.

December 29.—Plots 4 and 6, surface dressing 1 cent. sulphate of ammonia per acre. Cost, 16s.

December 31.—Plots 2 to 8 scarified.

January 22, 1914.—Plots 4 and 6 hand hoed.

February 14.—Plots 2 to 8 scarified.

February 21.—Plots 2 to 8 hand hoed.

March 3.—Ploughing replace plot.

March 19.—Harrowing and planting replace plot

May 21.—Planting new varieties as follows:—M. 55, M. 87, M. 1474, M. 998, M. 1900 Seedling, M. 89, M. 779.

August.—Distribution of cane varieties (1st ratoons).

September.—1st ratoons (competitive plots) harvested. Results appear hereunder:—

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENT PLOTS ON MESSRS. H. RUGE AND SONS' FARM, AT PROSERPINE. FIRST RATOONS. VARIETY, MALAGACHE. AREA OF PLOT, 2 ACRES.

Division.	Treatment.	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Pure Obtainable Cane Sugar per Acre (P.O.C.S.).
3	Subsoiling (plant crop limed and green manured)	19.05	3.29	3.00
4	Subsoiling and mixed manures (plant crop limed and green manured)	25.77	4.15	3.62
5	Subsoiling (plant crop limed)	12.61	2.04	1.85
6	Subsoiling and mixed manures (plant crop limed)	24.95	4.26	3.85
7	Subsoiling only	13.70	2.35	2.20
8	Ordinary cultivation only	12.70	2.01	1.80

Plots 1 and 2, varieties. Ratooned, October, 1914. Cane harvested, September, 1914.

ANALYTICAL RESULTS FROM EXPERIMENT PLOTS UPON MESSRS. H. RUGE AND SONS' FARM, AT PROSERPINE. FIRST RATOONS. VARIETY, MALAGACHE.

Division.	Treatment.	Density of Juice. (H.W.).	Sucrose (H.W.).	Equivalent Purity.	% Sucrose in Cane.	P.O.C.S.
3	Subsoiling (as above)	20.60	19.45	94.41	17.31	15.79
4	Subsoiling, mixed manures (as above)	19.47	17.70	90.91	15.75	14.05
5	Subsoiling (as above)	19.53	18.25	93.45	16.24	14.71
6	Subsoiling, mixed manures (as above)	20.57	19.20	93.34	17.08	16.46
7	Subsoiling only	20.84	19.80	95.01	17.62	16.11
8	Ordinary cultivation	19.44	17.80	91.56	15.84	14.18

Supplied by courtesy of the Proserpine Central Mill Company.

In these plots the manures have given increased yields, as was anticipated. Plots 5, 7, and 8 are poor, while plots 4 and 6 are good. This experiment suffered severely from the dry weather at the end of 1913, and rats also did a great amount of damage to all plots. All the cane arrowed early.

The experiment plots upon Messrs. Ogston and Andrewes' farms have been abandoned. In the former case Mr. Ogston found that owing to ill-health he was unable to carry them on, and in the latter Mr. Andrewes sold the farm during the year.

Mr. J. Clark's Plot, Kalkie, Bundaberg.

The plot established at Kalkie, near Bundaberg, on Mr. J. Clark's farm, consists of red volcanic soil of a very porous nature. It is typical of the greater part of the red soil of the Woongarra District. The soil is deep, porous, and always has a loose dry surface. Its looseness and porosity are caused by the fact that this soil does not contain much colloidal earth. This land has been growing cane for a very long time, and the owner states that during late years it has become somewhat "patchy" in fertility. This "patchiness" seems to be caused, partly at any rate, by the presence of a destructive fungus in some of the soil, which attacks the roots of the cane. The land was under an old ratoon crop of cane when taken over by the Bureau.

October, 1913.—Plant crop harvested.

Plots 3 to 7 ratooned by ploughing and subsoiling. Plot 8 was not subsoiled.

Plots 4 to 6 received an application of mixed fertiliser containing 172 lb. sulphate of ammonia, 69 lb. sulphate of potash, and 207 lb. of superphosphate. Cost per acre, £2 4s.

Plots 3 to 8 hand hoed.

November.—All plots scarified and hand hoed.

December.—All plots scarified.

January, 1914.—All plots scarified and hand hoed.

Plots 4 and 6, 1 cwt. sulphate of ammonia as a surface dressing applied per acre. Cost, 16s.

February and March.—All plots scarified.

August.—1st ratoons of the varieties distributed to farmers H.Q. 5, N.G. 40, 24A, 24b, and Q. 116 were most in demand. The variety known as Malagache was all spoilt by frost.

October.—Competitive plots harvested. Results appear in the tables below.

YIELD OF CANE SUGAR PER ACRE FROM EXPERIMENTAL PLOTS ON MR. J. CLARK'S FARM, AT WOONGARRA, BUNDABERG. FIRST RATOONS. VARIETY, D. 1135. AREA OF PLOT, 3 ACRES.

Division.	Treatment.	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Pure Obtainable Cane Sugar per Acre. (P.O.C.S.)
3	Subsoiled (plant crop limed and green manured)	20.24	3.15	2.95
4	Subsoiled, mixed manure (plant crop limed and green manured)	22.53	3.49	3.28
5	Subsoiled (plant crop limed)	24.82	3.63	3.36
6	Subsoiled, mixed manure (plant crop limed)	24.70	3.92	3.69
7	Subsoiled	18.01	..	..
8	Ordinary Cultivation	19.85	3.19	2.94

Plots 1 and 2, varieties. Ratooned, October, 1913. Cane harvested, September, 27th to October 3rd, 1914.

ANALYTICAL RESULTS FROM EXPERIMENT PLOTS ON MR. J. CLARK'S FARM, AT WOONGARRA, BUNDABERG. FIRST RATOONS. VARIETY, D. 1135.

Division.	Treatment.	Density of Jutes (Brix.)	Sucrose in Juice.	Quotient of Purity.	Sucrose in Cane.	P.O.C.S.
3	Subsoiled (as above)	20.22	18.56	90.29	15.59	14.02
4	Subsoiled (mixed manures as above)	20.45	18.41	90.05	15.46	14.53
5	Subsoiled (as above)	19.80	17.43	87.97	14.64	13.35
6	Subsoiled, mixed manures (as above)	20.87	18.87	90.40	15.85	14.92
7	Subsoiled .. ..	..	..	..	..	..
8	Ordinary Cultivation	20.85	19.20	92.08	16.12	14.85

Supplied by courtesy of the Millaquin Sugar Company, Limited. Owing to an oversight at the Mill the cane from Plot 7 was not analysed.

It cannot be said that the application of manures has been of any benefit to this crop, the lime and green manure applied to the plant crop apparently holding to some extent to the ratoons. It has to be said, however, that the irregular results may be to a great extent due to the patchiness of the soil. As the new Bundaberg Experiment Station is immediately opposite Mr. Clark's farm, this experiment will now be discontinued.

Experiment Plots upon Messrs. W. Hocking and Co's Farm, at Wallaville, Gin Gin.

The experimental plot established on this farm in the Gin Gin District is situated on the rich soil of the Burnett River alluvial flats in that district. The one great drawback to this land from the sugar-growers' point of view is that it is greatly subject to frost.

September, 1913.—Plant crop harvested.

October.—Competitive plots 3 to 7 ratooned by ploughing and subsoiling. Plot 7 was ploughed only.

Mixed fertilisers, containing 172 lb. sulphate of ammonia, 69 lb. sulphate of potash, and 207 lb. of superphosphate, were applied to plots 4 and 6, equivalent to 4 cwt. per acre. Cost per acre, £2 4s.

Variety plot hand hoed.

November.—All plots scarified.

December.—All plots scarified and hand hoed.

January 7, 1914.—Sulphate of ammonia at the rate of 1 cwt. per acre was applied to plots 4 and 6. Cost per acre, 16s.

January 8.—All plots scarified and chipped.

February.—All plots scarified. Replace plot No. 1 ploughed.

May.—Replace plot No. 1 ploughed.

July.—Replace plot No. 1 ploughed and subsoiled.

Heavy frost destroyed all the canes on variety plot.

August.—Competitive plots harvested. Results are given in the following table:—

YIELD OF CANE AND SUGAR FROM EXPERIMENT PLOTS UPON MESSRS. HOCKING AND CO'S FARM, AT WALLAVILLE. FIRST RATOONS. VARIETY, D. 1135. AREA OF PLOT, 2 ACRES.

Division.	Treatment.	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Pure Obtainable Cane Sugar per Acre. (P.O.C.S.)
3	Subsoiled (plant crop limed and green manured)	30.14	3.02	2.98
4	Subsoiled, mixed manures (plant crop limed and green manured)	35.60	3.64	2.87
5	Subsoiled (plant crop limed)	31.57	3.17	2.51
6	Subsoiled mixed manures (plant crop limed)	33.73	3.49	2.76
7	Ordinary cultivation	31.97	3.71	3.45
8	Subsoiled	35.43	3.07	2.94

Plots 1 and 2, varieties. Ratooned, September, 1913. Harvested, August, 1914.

ANALYTICAL RESULTS FROM EXPERIMENT PLOTS UPON THE FARM OF MESSRS. HOERING AND COMPANY,
WALLAVILLE. FIRST RATOONS. VARIETY, D. 1135.

Division.	Treatment.	Density of Juice (Brix).	Sucrose in Juice.	Quotient of Purity.	Sucrose in Cane.	P.O.C.S.
3	Subsoiled (as above)	14.86	11.30	76.04	10.06	7.02
4	Subsoiled and mixed manures (as above)	15.19	11.55	76.03	10.28	8.09
5	Sub-soiled (as above)	14.78	11.30	76.45	10.06	7.96
6	Sub-soiled and mixed manures (as above)	15.25	11.65	76.39	10.37	8.20
7	Ordinary cultivation	16.21	13.05	80.50	11.61	9.56
8	Subsoiled	14.98	11.68	77.77	10.37	8.31

Supplied by courtesy of the Gin Gin Central Mill.

In the case of these plots the manures were of some small benefit, but the ground upon which they are growing is so well stocked with plant food that manures at the present time cannot be considered to be of much advantage.

Frost did considerable damage at a time when the cane was growing very rapidly, which seriously checked the formation of sugar in the plant, and for this reason the analytical results are markedly low. On these rich river flats proper cultivation and careful selection of plants should be sufficient to produce a good crop.

Experiment Plots on Mr. C. A. F. Stollznow's Farm, Currajong, Gin Gin.

The experiment plot established on Mr. C. Stollznow's farm, Currajong, Gin Gin District, is situated on a high-lying red volcanic soil. It is not very good land, as it contains a lot of gravelly basaltic fragments and is in such a situation that there must necessarily be a considerable amount of leaching of soluble plant-foods from the soil. It also dries out very quickly in dry weather. A considerable amount of the high-lying land of the district is somewhat similar to it in these respects.

September, 1913.—Plant crop harvested.

Plots 3, 4, 5, 6, and 8 were ratooned by ploughing and subsoiling between the rows. Plot 7 ploughed only.

Mixed fertiliser, containing 172 lb. sulphate of ammonia, 59 lb. sulphate of potash, and 207 lb. of superphosphate, was applied to plots 4 and 6, equivalent to 4 cwt. per acre. Cost, £2 4s.

October.—Varieties distributed from plot No. 1.

December 4.—Variety plot ratooned, it being impossible to raton before owing to the dry weather and hardness of the ground.

December 11.—All plots scarified.

December 19.—All plots hand hoed.

January 17, 1914.—Sulphate of ammonia at the rate of 1 cwt. per acre applied to plots 4 and 6. Cost per acre, 16s.

All plots scarified and hand hoed.

February 19.—All plots scarified.

March.—Plots 2 to 8 scarified and hand hoed.

Replace plot ploughed twice.

April.—Replace plot No. 1 drilled and planted with the following varieties:—H.Q. 426, M. 998, 55, 1474, 87, 779, 89 H.Q. 114, 285, B. 147, Q. 116, N.G. 40, Malagache, N.G. 24a, 24a.

May 25.—Plots 2 to 8 scarified and hand hoed.

June.—Plot No. 1 scarified and hand hoed.

August.—1st raton plots harvested, the results of which are given hereunder:—

YIELD OF CANE AND SUGAR FROM EXPERIMENT PLOTS UPON MR. C. A. F. STOLLZNOW'S FARM, AT CURRAJONG, GIN GIN. FIRST RATOONS. VARIETY USED, D. 1135. AREA OF PLOT, 2 ACRES.

Division.	Treatment.	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Pure Obtainable Cane Sugar per Acre (P.O.C.S.)
3	Subsoiled (plant crop limed and green manured)	13.77	2.29	2.04
4	Subsoiled, mixed manures (plant crop limed and green manured)	17.32	2.78	2.43
5	Subsoiled (plant crop limed)	15.60	2.61	2.34
6	Subsoiled, mixed manures (plant crop limed)	16.89	2.62	2.30
7	Ordinary cultivation	14.29	2.32	2.04
8	Subsoiled	14.21	2.02	1.75

Plots 1 and 2, varieties. Ratooned, September, 1913.

Harvested, September, 1914.

ANALYTICAL RESULTS FROM EXPERIMENT PLOTS UPON MR. C. A. F. STOLLZNOW'S FARM, AT CURRAJONG,
CIN CIN. FIRST RATOONS. VARIETY, D. 1135.

Division.	Treatment.	Density of Juice (Brix.)	Sucrose in Juice.	Quotient of Purity.	Sucrose in Cane.	F.O.C.S.
3	Subsoiled (as above)	20.50	18.70	91.22	16.64	14.86
4	Subsoiled, mixed manures (as above)	20.46	18.05	88.22	16.06	14.06
5	Subsoiled (as above)	20.54	18.80	91.52	16.73	14.96
6	Subsoiled, mixed manures (as above)	19.78	17.50	88.56	16.57	13.67
7	Ordinary cultivation	20.54	18.25	88.85	16.24	14.28
8	Subsoiled	18.37	16.00	87.09	14.24	12.36

Supplied by courtesy of the Cin Gin Central Mill.

It will be seen from the above crop results that while the yield is fairly good from such a poor class of land, the manures, while somewhat increasing the yield, have not paid for themselves.

Mr. J. Broadhurst's Plot, South Isis, Childers District.

The experimental plot at South Isis, on the farm of Mr. J. Broadhurst, is situated on red volcanic soil. This soil is not very fertile—it dries out somewhat fast, and according to chemical analyses is of poor quality. The land was lying fallow when it was acquired for experimental purposes, and has been in cultivation for over twenty years.

October, 1913.—Competitive plots 3 to 8 harvested.

The ratooning of these plots, except plot 7, was carried out by ploughing and subsoiling between the rows; plot 7 being ploughed only.

Plots 4 and 6 received an application of mixed manure, at the rate of 4 cwt. per acre, containing 172 lb. of sulphate of ammonia, 69 lb. of sulphate of potash, and 207 lb. of superphosphate. Cost per acre, £2 4s.

November, 1913, to March, 1914.—All plots were scarified four times and received two hand hoeings. A surface dressing of 1 cwt. sulphate of ammonia, costing 16s. per acre, was applied to plots 4 and 6 in December.

February.—Replace plot No. 1 twice ploughed and once subsoiled.

April.—Replace plot No. 1 planted with the following varieties:—N.G. 24A, 21B, 40, H.Q. 5, 285, 426, 114, Q. 116, M. 779, 89, 1471, 998, 87, and 55.

May.—All plots scarified.

June.—All plots scarified.

August.—Varieties distributed to farmers from plot 2.

September 15 to 18.—Competitive plots 3 to 8 harvested. Results appear in tables hereunder:—

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENTAL PLOTS ON MR. J. BROADHURST'S FARM, AT CHILDERS. FIRST RATOONS. VARIETY, D. 1135. AREA OF PLOT, 2 ACRES.

Division.	Treatment.	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Pure Obtainable Cane Sugar per Acre (F.O.C.S.)
3	Subsoiling (plant crop limed and green manured)	20.80	3.27	3.11
4	Subsoiling and mixed manures (plant crop limed and green manured)	23.78	3.61	3.41
5	Subsoiled (plant crop limed)	22.46	3.62	3.32
6	Subsoiled, mixed manures (plant crop limed)	25.35	3.90	3.66
7	Ordinary cultivation only	17.39	2.67	2.51
8	Subsoiling only	19.51	3.10	2.92

Divisions 1 and 2, varieties. Ratooned, October, 1913. Harvested, September 15th to 18th, 1914.

ANALYTICAL RESULTS FROM EXPERIMENT PLOTS ON MR. J. BROADHURST'S FARM, AT CHILDERS. FIRST RATOONS. VARIETY, D. 1135.

Division.	Treatment.	Density of Juice (Brix.)	Sucrose in Juice.	Quotient of Purity.	Sucrose in Cane.	F.O.C.S.
3	Subsoiling (plant crop as above)	20.7	19.2	91	15.9	15.11
4	Subsoiling and mixed manure (plant crop as above)	19.8	18.3	90	15.2	14.37
5	Subsoiling (plant crop as above)	20.5	19.0	90	15.7	14.82
6	Subsoiling (plant crop as above)	20.5	18.6	89	15.4	14.45
7	Ordinary cultivation only	20.4	18.6	89	15.4	14.49
8	Subsoiling only	20.7	19.1	90	15.9	14.98

Supplied by courtesy of the Colonial Sugar Refining Company, Childers.

In these plots both the manuring and the subsoiling have had a good effect and the yield of sugar per acre is highly satisfactory.

Experiment Plot upon the farm of Mr. A. Adie, Cordalba, Isis.

The plot in the Cordalba District, on Mr. A. Adie's farm, is situated on red volcanic soil. It is a piece of land that was originally close to the border of the scrub. The ground was under a crop of ratoon cane when taken over by the Bureau. This was taken off and ploughed out in March, 1912. Lime was then applied to portion of the land at the rate of 1 ton per acre. In April the land was cross-ploughed, after which vetches were sown on a portion. These failed to produce a crop owing to lack of rain.

Early in September, 1912, the variety plot was ploughed up and subsoiled and the canes from Mackay were planted. These came away fairly well.

The remainder of the plot was reploughed shallow.

It was decided to make another attempt to grow a crop of green manure on the competitive plots before planting them, but owing to the dry spring it was found impossible to get the seed sown till the 1st November. Red Mauritius bean seed was then sown. They produced a good crop on plot 3, but on plot 5 they were very poor.

The heavy rain in January, 1913, washed out a considerable amount of soil from the variety plot.

In February, 1913, the competitive plots were ploughed, turning in the bean vines on plots 3 and 5.

In March the land was again ploughed and subsoiled.

Early in April the plots were drilled and planted with D 1135 cane. A rather poor strike resulted.

The cane used was plant 19 months old. Four rows on the plot were planted with young cane from another farm, and these germinated very well, so that it would seem that young cane will continue to strike well later in the season than older cane.

In August the varieties grown on the plot were distributed among those farmers who applied for them.

This plot of cane is now being cultivated for a ratoon crop.

On September 29, plants were supplied in the misses on the competitive plots. It was not possible to do this earlier in the spring, owing to lack of rain.

The following particulars relate to work done on the plots:—

May, 1913. — Plots 3 to 8 scarified and hand hoed.

July. — Plots 3 to 8 scarified only.

August 22.—Variety plot 2 ratooned.

August 27.—Plots 3 to 8 scarified and hand hoed.

November 29. —Plots 2 to 8 hand hoed.

December 13.—4 cwt. of mixed fertiliser, containing 172 lb. sulphate of ammonia, 69 lb. of sulphate of potash, and 207 lb. of superphosphate, applied to plots 4 and 6. Cost, £2 4s. per acre.

January 23, 1914.—Plots 3 to 8 scarified and hand hoed.

March 5.—Replace plot ploughed.

March 18.—Replace plot harrowed.

March 28.—Plots 3 to 8 hand hoed.

April 8.—Plot No. 1 cross-ploughed and 1 ton of lime per acre applied and worked in with grubber.

August.—Plot 2, varieties distributed to farmers.

September.—Plots 3 to 8 harvested.

The results are given below.

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENTAL PLOTS UPON THE FARM OF MR. A. ADIE, AT CORDALBA, ISIS. PLANT CANE. VARIETY, D. 1135. AREA OF PLOT, 2 ACRES.

Division.	Treatment.	Tons of Cane per Acre.	Tons of Total Sugar per Acre.	Tons of Pure Obtainable Cane Sugar per Acre (P.O.C.S.)
3	Lime, green manures, mixed manures, and subsoiling ..	24.67	3.87	3.70
4	Lime, mixed manures, and subsoiling	23.97	3.57	3.36
5	Lime, green manure, and subsoiling	22.83	3.22	3.01
6	Lime and subsoiling	25.48	4.07	3.90
7	Ordinary cultivation	19.31	2.80	2.72
8	Subsoiling	19.75	2.77	2.57

Cane planted, 4th April, 1914. Harvested, September, 1914. Plots 1 and 2, varieties.

ANALYTICAL RESULTS FROM EXPERIMENT PLOTS UPON THE FARM OF MR. A. ADIE, CORDALBA, LISIS.
PLANT CANE VARIETY, D. 1135.

DIVISION.	Treatment.	Density of Juice (Brix.).	Sucrose in Juice.	Quotient of Purity.	Sucrose in Cane.	P.O.U.S.
3	Lime, green manure, mixed manure, and subsoiling	20.16	18.71	92.81	15.71	15.02
4	Lime, mixed manure, and subsoiling	19.66	17.70	90.34	14.91	14.04
5	Lime, green manure, and subsoiling	18.86	16.83	89.24	14.13	13.20
6	Lime and subsoiling	20.56	19.07	92.75	16.01	15.31
7	Ordinary cultivation	19.86	17.88	90.03	15.01	14.10
8	Subsoiling	18.86	16.71	88.60	14.03	13.05

Supplied by courtesy of the Isis Central Sugar Mill Company, Limited.

It will be noted that, as pointed out last year in connection with the other plant crops, the manures have given practically no increase.

Experiment Plot upon the Farm of Mr. C. A. Popp, Piaba.

Owing to the October rains Mr. C. A. Popp was unable to get his crop on the experiment plots harvested in time for the report, and the figures consequently will not be published until next year.

The canes from the variety plot were distributed in September, and there was a good demand by local and visiting farmers for almost the whole of the different kinds.

SUMMARY.

It was pointed out last year that the yield from the Northern plots was better than the Southern ones. This year, however, the reverse has taken place, and the average yield from the 1st ratoon crops in the Southern plots amount to 4.72 tons of cane more per acre than the average yield from the Northern plots.

The Northern plots, however, have given the highest return for the use of manures—*i.e.*, the manured plots will generally be found to be a long way ahead of the unmanured plots even where these were limed and green manured for the plant crop. The difference in some cases amounts to 20 tons of cane more per acre. On the other hand, the yields from the various plots on the Southern experiments are far more regular, and no such startling differences occur between manured and unmanured. In these districts the manures cannot be said to have shown any profit worth mentioning, and the lime and green manures applied to the plant crops appear to be also affecting the ratoon crops beneficially. This is a noteworthy feature, and it will be interesting to see if this condition of affairs is maintained in the second ratoon crops, which will be cut next year. One gratifying point, as mentioned last year, is that the average yield of sugar is uniformly good and the analyses of most of the canes are excellent.

In order to obtain definite results from experiments of this nature they require to be carried out with the most rigid care, and this is impossible except upon an experiment station. No matter how willing farmers are to help, there are always times when their own work is imperative and takes the precedence.

The thanks of the Bureau are due to the various farmers who have been good enough to take charge of these different plots. They have one and all given every possible assistance cheerfully and willingly and carried out instructions to the very best of their ability. They have displayed considerable enthusiasm and have met the Bureau in every possible way.

The plots themselves have latterly aroused considerable interest and have been in most instances visited by a large number of farmers, the issue of descriptive cards having had a good effect. Nicely painted pegs have also been prepared by the Mackay Station.

The distribution of the different varieties was made absolutely free to the farmers in the district in which the experiment plot was situated, and this was highly appreciated.

9.—DIVISION OF ENTOMOLOGY.

The first Entomologist to the Sugar Bureau having decided to return to America on the termination of his engagement, in August of this year, steps are now being taken to secure a successor. In the meantime Mr. Edmund Jarvis, latterly Assistant Entomologist to the Department of Agriculture in Brisbane, has taken over the duties.

During his term of office at Nelson (now Gordonvale), Mr. Girault has accomplished a good deal of useful and valuable work, which will have a most important bearing on future investigations.

Full details of the findings of Mr. Girault and his assistant, Mr. Dodd, will shortly be published as a bulletin by the Sugar Bureau; while a simpler non-technical publication will also be issued for general use. In the meantime the following information, which has been supplied by Mr. Girault, will be of use:—

CONDENSED INFORMATION RELATIVE TO THE GRUB PEST.

1. The egg hatches after a period of about 16-17 days, varying with temperature.
2. The grub stage lasts from December to the following November on the average, but a certain proportion of grubs do not pupate the first year, thus living in this stage 20 months or more. Thus grubs may be found in any month. Pupation takes place in November. This statement may have to be modified when our data can be analysed (as regards the grubs).

3. The pupal stage lasts from three to four weeks. Pupae have been found at a depth of 3 ft. in canefields and down only as far as 6 in.

In confinement pupae were found at a depth of $4\frac{1}{2}$ ft., when this depth was available: in our usual cage, nearly always near the bottom (depth of about 1 ft.).

4. The beetles emerge from December to January, inclusive (or later), flying for about a month (more or less) depending very much when infertion occurs. Mating continues (mating and infertion) for individuals certainly not longer than a few days. The eggs are deposited in a mass in a crude cell in compact soil. The period of infertion, however, covers several months—December to February. The eggs are within 8 in. of the soil surface.

5. The large grubs now found are certainly a year old, since we have kept them over the period of pupation. They are the same species as are the young now (or rather in early February) occurring. No beetles have ever been found later than the first week in March. (However, a pupa of one of the cane beetles, not a common one, was found on 10th March, together with an adult.)

6. The grubs go down or retreat during dry weather, coming up again when the moisture allows.

7. There are at least 10 species. The number occurring here may reach 15. The majority of these, I think, can be connected with their adults, which are now being identified by means of the form of vertiture on the venter of the last segment of the body, and principally by this means alone. Thus there are three species of the commonest large yellow-headed biting grub in canefields. These occur as far south as Mackay and up as far as Cooktown."

Mr. Girault's resignation, which was due to his desire to return to America for the purpose of following other lines of research work, was accepted with regret.

Mr. Jarvis, who has taken over the work at Gordonvale, has forwarded the following interesting report, and work will now proceed along the lines he has laid down:—

INTRODUCTORY.

Upon reviewing the cane-grub situation in the light of past investigation at Gordonvale, it becomes apparent that the time has arrived for instituting several definite lines of action against this pest. Up to the present research at the laboratory has been mainly devoted to a very necessary study of the life-cycle or metamorphosis of our most injurious cane-beetle (*Lepidiota albobirtum*) and several closely related destructive species. This branch of work will be continued, but supplemented by more extended field investigations regarding the adult stage of *albobirtum* and of other cockchafer known to be of economic importance. The value of such field work cannot be overestimated, affording as it does the possible discovery of some peculiar habit constituting perhaps a weak point that can be taken advantage of for the purpose of attracting, trapping, or otherwise destroying vast quantities of the beetles. We must not lose sight of the fact that in economic problems such as that now facing us leading entomologists have always considered that ideal control methods are those in which we succeed best in capturing the females before they have had time to deposit eggs. Various methods of procedure in connection with this leading branch of control are being planned at the laboratory, and experimentation will be commenced upon the first appearance of the adult insects. I am of opinion that the oviposition of *albobirtum* should be closely studied, as this and the first larval stage are passed comparatively near the surface, and more easily reached than later larval instars or the pupal form. It is proposed, therefore, to organise a series of experiments with various chemicals to thoroughly test their insecticidal effect on subterranean insects, but more especially in the hope of discovering attractive poison-baits for both the grubs and beetles.

The question of parasitic control will not be neglected, although popular opinion inclines somewhat strongly towards disbelief in its practical utility. Such doubts are justifiable in view of the fact that the parasites in question, although operating as a continuous controlling factor up to a certain point, have not appreciably increased of late years. Our cane-beetles being native species, it naturally follows that existing relations between them and their various enemies have been carefully adjusted by nature, in such manner as to enable each insect concerned to multiply in proportions suited to its peculiar requirements. This knowledge need not, however, deter us from attempting to readjust the balance in our own favour.

The cultivation of large tracts of forest land has apparently enabled this pest to breed in abnormal numbers, but at the same time these artificial conditions, whilst seemingly congenial also to the increase of such parasites as "digger-wasps," have probably proved still more favourable to the hyperparasite of these useful insects, a species of "bee-fly" (*Bombylido*). Data collected at the laboratory gives the average infestation of cane-grubs by *Dielis formosus* in the Mulgrave district during the last two years as about 1 per cent.; whilst, in 1902, Mr. Tryon recorded local infestations of 25 per cent. in a farm on the Mulgrave River, and 10 per cent. at South Isis.

With reference to the question of parasitic fungi, it is encouraging to note the satisfactory results of preliminary experiments with the *Metarrhizium* fungus conducted at the laboratory towards the end of this month. I succeeded in communicating the disease to grubs of the so-called "Christmas-beetle" (*Anoplognathus boisduvali*) in about a week. When examined ten days after infection they were quite dead, and covered with a luxuriant growth of the fungus. The method of infection was somewhat novel, but simple, and moreover is suitable for practical field application. Further and more comprehensive experiments in this direction are now in hand at the laboratory.

It may be mentioned that in a recent letter Mr. Girault states—"The Samoan fungus has killed all-chirrup grubs after two months exposure to it. A rather large amount of the culture has been liberated in the fields around Gordonvale."

With regard to matters of office routine in the future, I would suggest the advisability of forming a collection of our insect pests of sugar-cane, comprising the following classes:—

- (1.) Insects attacking the stem and leaves externally.
- (2.) Insects attacking the stem and leaves internally.
- (3.) Insects injuring the roots.
- (4.) Insects closely related to our more destructive cane-pests.
- (5.) Useful insects, parasitic and predaceous.
- (6.) Insects incidentally associated with sugar-cane.

A collection of this kind could be gradually acquired and would be exceedingly useful for comparison and reference.

Comparatively few of our cane-pests have been figured or described, and it would, I think, be a good plan to work out the life-histories of the principal species as opportunity occurs and publish results in illustrated leaflet or pamphlet form suitable for distribution amongst growers.

WORK FOR THE MONTH.

Time has been largely occupied in getting into touch with work at the laboratory and organising a plan of attack for the approaching campaign.

In addition to the usual beetle and moth borers (*Rhabdoenemis obscurus*, and *Diatroea saccharalis*) at least two New Guinea pests of cane hitherto unrecorded for Queensland were discovered in cane at Maenade and destroyed, both being beetle borers attacking the stalk.

One of these, a species of *Cryptorhynchus*, is especially interesting from the fact that although weevils belonging to this genus are of economic importance in various countries, no species, I believe, has hitherto been noticed as injurious to cane.

The second borer is a new species of *Rhabdoenemis* (*Sphenophorus*) with habits similar to those of our common *R. obscurus*, but a smaller insect possessing decided structural and other specific differences. Notes on the economy of this weevil and of the *Cryptorhynchus*, together with descriptions of the two beetles, are in course of preparation, and will be furnished later.

10.—SEEDLING EXPERIMENTS AT KAMERUNGA, AND OLD VARIETIES AT ATHERTON.

As after repeated trials it was never found possible to raise seed from canes grown at Mackay, it has been determined to take to Kamerunga, near Cairns, the best of the varieties growing at Mackay, with the view of determining whether seedling canes can be raised from such. Accordingly, in April, 1913, a number of canes were forwarded to the manager of the Kamerunga Nursery (Mr. C. E. Wood). These were planted out, and in May this year commenced to arrow. It was somewhat unfortunate that the arrowing was irregular, and that when one variety had finished flowering another had only commenced, while a few did not arrow at all. This interfered with the best results being obtained.

However, a good many canes matured at the same time, and these were carefully sown in specially prepared boxes of soil, and germination took place in a number of cases. These will be carefully tended and watched by Mr. Wood, to whom we are indebted for the care and attention already bestowed on the work.

The canes sent to Atherton under the care of the manager of the State Farm at Kairi (Mr. D. Macpherson), as mentioned in last year's report, continue to do well, and will be allowed to remain at that elevation for some considerable time.

11.—MILL WORK AND ECONOMICS.

During the year Mr. J. C. Brünnich, Chemist to the Department of Agriculture, and who was formerly associated with the Colonial Sugar Refining Company, made a tour through the various sugar districts for the purpose of assisting those mills requiring advice on manufacture and chemical control. Mr. Brünnich is repeating his visit at the present time, and Mr. J. Pringle, Assistant Chemist to the Bureau, is visiting the Logan District with the object of extending assistance in a chemical direction to the mills in that locality.

The 1913 season was a record for this State, the yield (*vide* Government Statistician) reaching 2,085,588 tons of cane. In 1910, the previous record year, 1,840,447 tons of cane were harvested, which was 245,171 tons of cane behind last season. The sugar manufactured was 242,837 tons, an excess of 32,681 tons above the 210,756 tons produced in 1910.

During 1913 there were 147,743 acres under cane, of which 102,803 were crushed. The average yield of cane per acre reached a higher figure than it has done for many years—viz., 20.29. The production of sugar per acre was also satisfactory, being 2.36 tons. This was entirely due to the favourable nature of the season experienced. The area crushed was 24,661 acres in excess of the previous year. The lowest yield of cane per acre is stated to have been in the Ingham-Monrilyan District—viz., 17.04 tons, while the highest was upon the Lower Burdekin, where the fine average tonnage of 26.66 was cut, the tonnage of sugar being 3.36, an exceptionally good figure. This district usually succeeds in obtaining

better yields of cane and sugar than any of the others, due to the fact that the soil is good and the weather comparatively dry, so that irrigation can be applied just when it is needed. The tons of cane required for a ton of sugar varied from 7.24 in the Ingham and Mourilyan District to 11.47 in the Logan District. In the Government Statistician's report the figure given for Nerang—viz., 7.57—is too low; the correct figure is given as 9.14. The average tons of cane to a ton of sugar for all districts is 8.59. On account of the error in Nerang figures this would be slightly increased.

The number of sugar-mills operating last year was 47, as against 46 the previous year. The apparent consumption of sugar per head of population reached the high figure of 157.48 lb. last year. The average annual requirements of sugar for the whole period since Federation is stated at 223,913 tons, equal to 127.69 lb. per head of the mean population.

Two sugar-mills (Meadowlands and Bonna) have closed down since last year, while a new one (Inkerman) has commenced operations. Eleven years ago there were 60 sugar-mills operating in Queensland. To-day there are only 48, and of the latter Badlie Creek, Cattle Creek, and Inkerman are the only mills in new localities. The tendency, however, for a number of years has been to increase the size of the mills, which means that many small plants have had to quit business.

There is no doubt that the majority of our mills are not doing the work that they should do. In 1913 the recovery varied at many mills between 73 and 82 per 100 sugar in cane. Better methods of milling must be introduced and farmers must grow a better and richer class of cane. If this is not done it is certain that many of the smaller mills will be unable to carry on under the new conditions. It is pleasing to note, however, that some of the mills have put in new machinery and others are contemplating improvements and additions either to the crushing or boiling plant.

GENERAL.

Before closing his report, the writer would like to thank the various officers of farmers' associations and the management of the several mills in Queensland for their courtesy in assisting in the work of the Sugar Bureau. Information in connection with the work has been readily supplied and means of transit in the various districts provided. At most of the mills a keen interest in and a desire to further the objects of the Experiment Station are strongly in evidence.

Thanks are also due to the management of the "Australian Sugar Journal" for their uniform willingness to publish the various reports and investigations of the Sugar Bureau. By its circulation amongst sugar-growers, information can be much more speedily diffused than by any other means. The Brisbane and country Press also assist the Bureau in no small degree in the circulation of reports, &c.

The Sugar Bureau is also indebted to the mills in the different districts where the experiment plots are situated for their readiness to weigh each plot separately and furnish weights and analyses of the canes. Also to the Millaquin Sugar Company for carrying out similar work for the Bundaberg Experiment Station this year.

HARRY T. EASTERBY,
General Superintendent

Brisbane, 29th October, 1914.

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