1915.

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

ERNEST G. E. SCRIVEN,
Director.

Brisbane, 30th November, 1915.

The Annual Report of the Bureau of Sugar Experiment Stations this year includes—



### 1.—INTRODUCTION.

The Sugar Industry in Queensland during the time that has elapsed since the publication of the last Annual Report has passed through a critical period. This was indeed predicted last year when it was found that the Queensland production of sugar, instead of being stimulated and encouraged, was being retarded by the unduly low price fixed by the Southern Control of Prices Boards in those centres of population where the bulk of the staple is consumed. This led, in many cases, to mills making an absolute loss on the season's operations, and forbad the farmer obtaining that increase in payment for his cane to which he was justly entitled in order to meet the higher cost of production and the increases in the cost of living. This happened at a time when the price of sugar had been materially enhanced in other sugar-producing countries, particularly in those employing cheap coloured labour. It was a position directly antagonistic to the white-labour ideals of this country and the National view of settling the northern littoral by means of the sugar industry for defence purposes.

Fortunately for the sugar-grower, however, these matters have now been taken control of by the Queensland State Government and the Commonwealth, and an arrangement has been come to whereby the price of raw sugar has been fixed at a more equitable rate. Although the price of the refined article is not to be so high as it is in many other sugar countries, it is perhaps as much as the Queensland sugar-grower hoped for, as he had no desire to benefit at the expense of his fellow-citizens at a time like the present.

This arrangement has been followed by legislation for the purpose of constituting Boards for the Regulation of Sugar Cane Prices. These Boards are at the present time in course of creation, and when

established it is confidently anticipated that there will be a brighter and more satisfactory era for the cane-grower, and one which he has long been waiting for. Should this prove the case, there is certain to be a large expansion in the Sugar Industry in this State. At the present time there is plenty of margin for such expansion as far as suitable cane land is concerned. This question will be touched on under the heading of "No. 2—Progress of the Industry."

On top of the low prices for sugar ruling last season, the climatic conditions since the beginning of the present year have been of a most adverse character, and have seriously affected this year's crop and output of sugar. The shortage in this season's crop in Queensland compared with the consumption is expected to reach approximately 114,000 tons of raw sugar of 94 net titre.

Unfortunately, up to the time of writing the drought is still continuing in most of the sugar districts, and, if sufficient rain does not speedily fall, next year's crop will also be seriously prejudiced.

## 2.—PROGRESS OF THE INDUSTRY.

As anticipated in the last issue of this Report, the 1914 season was a record for those sugar districts north of Proserpine; and the yield for the whole of the State amounted to 225,847 tons of sugar, being 16,990 tons below the record year of 1913, when the output was 242,837 tons.

This year the serious drought through which we are passing has materially affected the yield of cane and sugar per acre. The rainfall in a number of the sugar districts has been abnormally low. In given localities, only 4 to 5 inches have fallen since the commencement of the year. In other districts such as parts of Cairns, the rainfall, instead of the average of about 80 inches, has only been 12 inches.

The following are the estimates of mill crushings supplied by the various mills during October of this year. They are, of course, only approximate at this stage, but should give a good idea of the actual crop to be realised this year:—

| Mill and District. | Estimated Tonnage of Cane for Crushing. | Mill and District. | Estimated Tonnage of Cane for Crushing. |
|---|---|---|---|
| Mossman, Mossman .. .. | 48,000 | Bingera, Bundaberg .. .. .. | 42,000 |
| Hambledon, Cairns .. .. .. | 50,000 | Invicta, Bundaberg .. .. .. | 18,757 |
| Mulgrave, Cairns .. .. .. | 50,000 | Qunaba, Bundaberg .. .. .. | 27,000 |
| Babinda, Cairns .. .. .. | 45,000 | Millaquin, Bundaberg .. .. | 31,000 |
| Goondi, Johnstone River .. .. | 100,000 | Goodwood, Bundaberg .. .. | 5,000 |
| Mourilyan, Johnstone River .. .. | 45,000 | Gin Gin, Bundaberg .. .. .. | 13,581 |
| Macnade, Herbert River .. .. | 65,000 | North Isis, Childers .. .. .. | 21,000 |
| Victoria, Herbert River .. .. | 63,000 | Doolbi, Childers .. .. .. | 14,500 |
| Pioneer, Lower Burdekin .. .. | 46,000 | Childers, Childers .. .. .. | 35,000 |
| Kalamia, Lower Burdekin .. .. | 16,992 | Maryborough, Maryborough .. .. | 7,000 |
| Proserpine, Proserpine .. .. | 45,000 | Mt. Bauple, Maryborough .. .. | 16,500 |
| Pleystowe, Mackay .. .. .. | 35,000 | Moreton, Nambour .. .. .. | 22,000 |
| North Eton, Mackay .. .. .. | 11,961 | Marburg, Marburg .. .. .. | 2,095 |
| Racecourse, Mackay .. .. .. | 30,000 | Rocky Point, Logan and Albert .. | 4,000 |
| Plane Creek, Mackay .. .. .. | 42,000 | Eagleby, Logan and Albert .. .. | 1,000 |
| Marian, Mackay .. .. .. | 30,000 | Steiglitz, Logan and Albert .. .. | 2,500 |
| Palms, Mackay .. .. .. | 20,000 | Junction, Logan and Albert .. .. | 2,300 |
| Homebush, Mackay .. .. .. | 25,000 | Gramzow, Logan and Albert .. | 1,000 |
| Cattle Creek, Mackay .. .. | 16,000 | Logan and Albert, Logan and Albert | 1,000 |
| Farleigh, Mackay .. .. .. | 38,000 | Nerang, Nerang River .. .. | 7,000 |
| Baffle Creek, Bundaberg .. .. | 4,700 | | |
| Waterloo, Bundaberg .. .. | 4,200 | Total .. .. .. | 1,157,881 |
| Miara, Bundaberg .. .. .. | 2,695 | | |
| Fairymead, Bundaberg .. .. | 50,000 | Yield last year, 1,922,633 tons. | |

This would be equivalent to about 136,000 tons of sugar on the basis of 8.5 tons of cane to 1 ton of 94 net titre sugar. As the sugar content in the cane this season, however, has been unusually good, the output may reach a higher figure. Some of the mills have also realised slightly higher tonnages since this estimate was framed.

In addition to the above tonnage crushed by the mills, a considerable quantity of cane has this year been sold for fodder purposes. Thus it is estimated that no less than 4,000 tons of cane was sold for this purpose in the Logan district alone. Of the estimates made as late as July, many have suffered reduction. At one mill in Bundaberg, it was stated that the crops lost 4 tons per acre during the last few weeks of the crushing due to the continued dry weather.

Due to the dry nature of the season, what is commonly referred to as the "density" of the cane has been particularly good in nearly all sugar districts this year—that is, the sugar content in the cane has been high. This has led to better prices being realised in some of the Northern districts where cane is purchased on an analytical basis.

The plantings for next season have, on the whole, been large; but the lack of rainfall has already had an arresting effect on the young cane in the districts more severely affected by drought.

Labour, probably due to the war, was not quite so plentiful as last season; but no difficulty has been experienced in getting crops off in the bulk of the sugar areas.

The present season has been a discouraging one as far as the use of lime and fertilisers has been concerned. Due to the absence of sufficient moisture, little and in most cases no benefit has accrued from the use of these agents. Green manures have also proved not so efficacious as usual, due to the small crops generally secured for ploughing under. The season however, has lent itself to good cultivation; and a considerable improvement was noted in nearly every sugar district. Improved types of implements for the cultivation of sugar-cane have been introduced and are being largely used.

No fresh developments have taken place with respect to cane-cutting machines in Queensland. Reporting to the Department of Agriculture in Mauritius, Mr. J. F. Clarenc says:—"There are now in the State of Louisiana two kinds of cane harvesters. The Luce machine appears to me to be simpler and lighter . . . and to give in general greater satisfaction. Both of these machines will undoubtedly give good results in Louisiana, which is a flat country almost devoid of stone but I do not believe that satisfactory results could be obtained under the soil conditions in Mauritius, especially as our canes very often lie flat and continue to grow in that position after a cyclone, whereas in Louisiana two straight varieties only are grown—D. 74 and D. 95." The General Superintendent has been in correspondence with the Luce Company, who are endeavouring to ascertain Queensland conditions in the canefields with the view of finding out what could be done here.

Due to the severity of the season, the new Inkerman Mill was unable to crush this year, and there appears to be some doubt as to whether there will be sufficient cane to crush next season. The drought at Inkerman has been much more severe than in any other sugar district, and as the farmers are only newly settled they were not so well able to meet an adverse season as they would have been if they had been established for some years.

At Babinda the fine large plant erected by the Government is now operating. This district, with Innisfail, has practically had no drought, and the crushing for next year is anticipated to be a remarkably heavy one owing to a number of new areas having been planted.

The sister mill at the South Johnstone is now in course of erection. Both of these mills have opened up large areas of rich tropical scrubs, and have been the means of settling large numbers of hardy cane-growers upon the lands.

Altogether it may be said that, in spite of the present depression due to the drought, the future should be good. Dry seasons in the Northern sugar districts, at any rate, do not frequently occur; and it is hoped that we are now in for a few good seasons such as followed the drought of 1902.

Although there is considered to be ample room for expansion of the Sugar Industry during the next few years, the ultimate limit will be reached when the consumption is overtaken. As the consumption is steadily increasing, this limit is still a long way ahead. When it is reached, two solutions have been mentioned, both of which are somewhat visionary:—

(*a*) Imperial Federation, which would protect sugar grown within the Empire by levying duties against outside countries; and

(*b*) Payment of an Export Bonus by the Commonwealth or raised by a tax upon the Australian consumers of sugar.

The present consumption of sugar in Australia is estimated to be about 250,000 tons, and is yearly increasing.

| | |
|---|---|
| The yearly consumption from 1901 to 1910 has been given as ... ... ... ... | 211,311 tons |
| And the average yearly output during the same period in Queensland was ... ... | 144,347 tons |
| Average deficiency of Queensland sugar per annum ... ... ... ... ... | 66,964 tons |

Taking the yield of cane and sugar per acre and the tons of cane required to make 1 ton of sugar over the past sixteen years as shown in the following table, it is pleasing to note that during the last eight years there has been an average increase in the production of cane and sugar and a decrease in the amount of cane required to make a ton of sugar. This last figure is even better than it appears, as it is only during recent years that the yield of sugar has been calculated to the basis of 94 net titre:—

TABLE SHOWING YIELD OF CANE AND SUGAR PER ACRE AND TONS OF CANE REQUIRED TO MAKE ONE TON OF SUGAR DURING SIXTEEN YEARS.

| Year. | Tons Cane per Acre. | Tons Sugar per Acre. | Tons Cane to 1 Ton Sugar. |
|---|---|---|---|
| 1899 .. .. .. .. .. .. .. .. | 14·81 | 1·55 | 9·54 |
| 1900 .. .. .. .. .. .. .. .. | 11·68 | 1·28 | 9·44 |
| 1901 .. .. .. .. .. .. .. .. | 15·10 | 1·55 | 9·76 |
| 1902 .. .. .. .. .. .. .. .. | 10·86 | 1·30 | 8·38 |
| 1903 .. .. .. .. .. .. .. .. | 13·65 | 1·52 | 8·97 |
| 1904 .. .. .. .. .. .. .. .. | 16·04 | 1·78 | 8·99 |
| 1905 .. .. .. .. .. .. .. .. | 14·73 | 1·59 | 9·27 |
| 1906 .. .. .. .. .. .. .. .. | 17·61 | 1·88 | 9·38 |
| 1907 .. .. .. .. .. .. .. .. | 17·64 | 2·00 | 8·84 |
| 1908 .. .. .. .. .. .. .. .. | 15·54 | 1·64 | 9·49 |
| 1909 .. .. .. .. .. .. .. .. | 14·53 | 1·68 | 8·65 |
| 1910 .. .. .. .. .. .. .. .. | 19·45 | 2·23 | 8·73 |
| 1911 .. .. .. .. .. .. .. .. | 16·02 | 1·81 | 8·85 |
| 1912 .. .. .. .. .. .. .. .. | 12·72 | 1·45 | 8·79 |
| 1913 .. .. .. .. .. .. .. .. | 20·29 | 2·36 | 8·59 |
| 1914 .. .. .. .. .. .. .. .. | 17·80 | 2·09 | 8·51 |

The improvement shown in the last column can no doubt be attributed to some extent to greater efficiency in mill work; but it is also largely due to the improved varieties of sugar-cane grown by farmers during recent years. Many of these varieties have been distributed from this Bureau, or, prior to its establishment, by the Department of Agriculture.

The table presented hereunder shows that there has been a steady improvement in the Sugar industry since the abolition of black labour as well as considerable expansion :—

TABLE SHOWING TOTAL ACRES CRUSHED AND TOTAL YIELDS OF CANE AND SUGAR PER ACRE FOR A PERIOD OF SIXTEEN YEARS.

| Year. | Acres Crushed. | Yield. | |
|---|---|---|---|
| | | Tons Cane. | Tons Sugar. |
| 1899 .. .. .. .. .. .. .. .. | 79,435 | 1,176,466 | 123,289 |
| 1900 .. .. .. .. .. .. .. .. | 72,651 | 848,328 | 92,554 |
| 1901 .. .. .. .. .. .. .. .. | 78,160 | 1,180,091 | 120,858 |
| 1902 .. .. .. .. .. .. .. .. | 59,102 | 641,927 | 76,626 |
| 1903 .. .. .. .. .. .. .. .. | 60,375 | 823,875 | 91,828 |
| 1904 .. .. .. .. .. .. .. .. | 82,741 | 1,326,989 | 147,688 |
| 1905 .. .. .. .. .. .. .. .. | 96,093 | 1,415,745 | 152,722 |
| 1906 .. .. .. .. .. .. .. .. | 98,194 | 1,728,780 | 184,377 |
| 1907 .. .. .. .. .. .. .. .. | 94,384 | 1,665,028 | 188,307 |
| 1908 .. .. .. .. .. .. .. .. | 92,219 | 1,433,315 | 151,098 |
| 1909 .. .. .. .. .. .. .. .. | 80,095 | 1,163,569 | 134,584 |
| 1910 .. .. .. .. .. .. .. .. | 94,641 | 1,840,447 | 210,756 |
| 1911 .. .. .. .. .. .. .. .. | 95,766 | 1,534,451 | 173,296 |
| 1912 .. .. .. .. .. .. .. .. | 78,142 | 994,212 | 113,060 |
| 1913 .. .. .. .. .. .. .. .. | 102,803 | 2,085,588 | 242,837 |
| 1914 .. .. .. .. .. .. .. .. | 108,013 | 1,922,633 | 225,847 |

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

During the year the Sugar Bureau suffered a loss in the death of Mr. H. T. Harvey, who occupied the position of Field Assistant in the Southern sugar districts. Mr. Harvey was a conscientious and painstaking officer, and his death at the early age of 29 was generally regretted. On the retirement of Mr. H. G. Burn (the Northern Field Assistant), Mr. A. P. Gibson, who has had considerable technical and field experience, was appointed to fill both positions, which he is creditably and satisfactorily doing. The broad policy of the Sugar Bureau is to keep constantly moving around amongst cane-growers and to give them every assistance both in the supplying of varieties of cane and the testing of their soils. In addition, advice is given upon methods of cultivation, fallowing, rotation, and application of fertilisers, usually upon the farm itself, as well as by means of addresses to cane farmers by the General Superintendent. A large proportion of the correspondence of the Bureau also consists of applications for advice as to treatment of lands.

In order that a complete survey of the cane farms of Queensland may be on record, the Field Assistants were instructed 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 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 654 farms. Upon these 69 farmers have used lime, 168 have practised green manuring, and 235 have used fertilisers. The percentage of growers using lime, green manures, and fertilisers is much higher on Northern sugar farms than it is in the South. In the cane soils submitted to the Agricultural Chemist for analysis, it is found that acidity is predominant.

The time of the General Superintendent has been taken up to some extent by the Commission which sat in the early part of the year on certain Central Sugar Mills at Mackay, and by a visit to Victoria at the request of the Government of that State. The remainder of his time has been fully occupied in attending to correspondence (which still continues to increase), the visiting of the various sugar districts in Queensland, and the general direction of the Mackay and Bundaberg Sugar Experiment Stations. Bulletin No. 2 of the general series, entitled "Varieties of Sugar Cane in Queensland," was published during the year. Fourteen addresses to cane farmers in various parts of Queensland were also delivered.

### NOTES ON DISTRICTS VISITED.

*Mossman.*—One mill. This district expected a large crop for the 1915 season, but, in common with many other sugar districts, suffered from the general dryness of the season. The original estimate made at the close of last year was in the vicinity of 80,000 tons of cane. The October estimate of the crushing was cut down to 48,000 tons. The extreme droughty conditions led to a large part of the country being burnt, including a good deal of standing cane. The strike of the young cane was good, and prospects for next year were most favourable if climatic conditions were not hostile. A large amount of the cane known as D 1135 was being grown at Mossman, and was well liked because it was stated to be not much affected by rats, which usually cause a good deal of damage to recumbent canes.

*Cairns District.*—Three mills. The Cairns district, with the exception of Babinda, is suffering severely from the drought. In some parts of the Hambledon and Mulgrave districts only 12 inches of rain have fallen for the year. On the high lands about Mulgrave many crops of Badila eighteen months old were either dying or dead, and several of these areas had been affected by grubs. On the lower lands towards the river conditions were much better. At Babinda the rainfall had been much higher, and this district is more like the Johnstone River, to which it is close. The new mill has started grinding

cane, and everything about the factory, with the exception of the crushing plant, is electrically driven. The present crop is estimated at 45,000 tons; but for next year, if weather conditions are favourable, it is expected that there will be from 120,000 to 140,000 tons for the mill to deal with. This is gratifying, because it shows that the farmers who promised to put in full areas have done so, and thus carried out obligations which they entered into on the faith of the mill being erected.

*Johnstone River.*—Two mills. On the Johnstone River the cane has had 50 inches of rain this year, and, while this is considered to be a drought by the inhabitants, it has really done a vast amount of good in enabling farmers to clean up their farms and plant larger areas for next year. It has also been entirely favourable to those new growers who have taken up scrub lands, inasmuch as it has enabled them to burn off without a great deal of difficulty. The cane here is remarkably sweet this season, and better prices are in consequence being paid. The Goondi Mill is treating the largest crop in Queensland this year—namely, 100,000 tons. The young cane is looking well, but not quite so green or well forward as on the Herbert River, where they had 20 inches less rain. The Johnstone River soils, however, are accustomed to large supplies of moisture, and are unable to go without for very long. Some rain has latterly fallen, which was needed to freshen up the young cane and to fill tanks, the water supply being low.

At what is known as the "South Johnstone," the new mill is well under way and much more forward than was Babinda at the same time last year. The building is practically completed, and the cement beds for engines and mills nearly finished. Twelve months ago one solitary hut adorned the site; now there are boarding-houses, tearooms, laundries, cottages, and a picture show, the whole making a thriving township. Very solid tramways are being built for the purpose of bringing in cane from outside areas. The cane being grown around the mill looks remarkably well, and a vast amount of work has been done by the pioneer farmers in this locality. Some cases of damage by grubs have been reported, and a Grub Destruction Fund should be established in this area without delay.

On the Mourilyan side of the river conditions were somewhat drier, but the cane looked well, and good plantings had taken place for next year. Considerable delay took place in the starting of the mill; but things were running smoothly at the time the district was visited.

At Daraji a wonderful change has been brought about during the last few years. The immense scrubs have been laid low, and miles of beautiful canefields are now visible.

The Johnstone River is undoubtedly the finest sugar-growing district in Queensland, and has a great future before it. This is being generally recognised; and quite recently a farm of 180 acres changed hands at the sum of £12,000, and this was without this year's crop of cane.

*Herbert River District.*—Two mills. While the season has not been too good for the cane now being crushed, it has considerably increased the density of the crop, and prices were good in consequence. The dry weather has enabled a good deal of land to be properly cleaned up and planted; and the resulting strike of cane was excellent—considerably better than in any other part of Queensland. Not alone was the colour good, but the plants were well forward. This applied more particularly to Macnade, Halifax, parts of the Stone River, the Long Pocket, and Alma Grove. The upper part of the Stone River has suffered severely in this drought, and the older lands about Victoria Mill were showing the effects of dry weather. While this year there has not been nearly the same interchange of farms between the old settlers and the Italians, the latter were found to a considerable extent selling farms to one another, often at a trifling profit. Thus it was hard to ascertain who was really in possession of a given farm, as it would be owned by one Italian this week and a fortnight hence a different man would be found upon it. Due to the droughty conditions, large numbers of the birds known as native companions were seen in different parts of the canefields. At first it was feared that these were damaging the cane, but upon investigation it was found that they were actively engaged in uprooting nut grass and eating the nuts. The prospects with a favourable season ensuing are excellent for next year.

*Lower Burdekin District.*—Three mills. This district is situated between Bowen and Townsville; and the drought has been far more severe than on any other strip of coast from Nerang to Mossman. As a consequence these districts which lie in this belt have been considerably more adversely affected than any other sugar localities in Queensland.

The Inkerman District is a new one, and has only been recently settled. The erection of a large up-to-date mill was only completed last year, when the first crushing of about 60,000 tons of cane took place. This year, in July, the bulk of the cane was already dead or quickly dying, except on the farms of a few growers who were possessed of irrigation plants, and even here in some instances the application of water was left too late to ensure a maximum crop. The rainfall for the twelve months to July had been most deficient, the largest amount received being only 10 inches, while in various part of the district not more than 3 inches have fallen in the same period. This naturally has had a most disastrous effect on the cane, and it may be safely said that four-fifths of the crop perished. On going over the cane farms, many growers were found to be ploughing the crop out, while others had turned their stock to eat down what little cane remained. The settlers have put in a tremendous amount of hard work in clearing and planting their land, and were looking to this crop to set them on their feet. The district is admirably adapted for the growth of cane with irrigation, and a scheme which would enable every farmer to secure water is one that should pay, and is strongly to be recommended.

Under the circumstances detailed above it was impossible for the new Inkerman Sugar Mill to crush this year, and on present appearances it is very doubtful if it will be enabled to do so next season. This will mean a large loss to the district, the Railway Department, and the proprietors of the mill, who some time ago were being heartily commended for their courage in being the only private mill-owners who had embarked capital in a new enterprise.

The majority of the settlers, however, are in good heart and looking forward to better times. They are mostly engaged in getting more land cleared and ready for cane; and it is surprising to note

how much work they have done on their holdings in so short a time. Their properties are mostly well improved, and they are well supplied with stock and implements. As a body they are undoubtedly deserving of the utmost encouragement and sympathy.

On the Ayr side of the river, the farmers have been established for a much longer period, and the majority have irrigation plants. Unfortunately, however, in anticipation of the usual wet season, many growers did not commence irrigation till rather late. This year the wet season failed to put in an appearance, and the crops of those growers who did not irrigate early were suffering in growth. The cane—strangely enough— looked fine and green; but there has been no length of stick secured. This has also taken place in a few crops where irrigation was applied early, and seems to bear out the opinion of many of the Ayr farmers that the season, apart from its lack of rainfall, had not been a good growing one. Where good crops have been secured, the cost has been very great owing to the large amount of water supplied. Where crops were grown without irrigation, the cane is in the same state as at Inkerman —namely, dying or dead. In order to plant for next season, most of the growers were, in July, irrigating their ground preparatory to planting; and it was stated that some 1,500 acres of land were being so planted for the Pioneer Mill for next year. The strike on those portions already planted was good, but the expense, of course, was great. The amount of cane to be harvested this season for Pioneer and Kalamia Sugar Mills is estimated to be about one-fifth of last year. This district then, this year, will fall from its usually high place to the probable bottom of the list. In addition to climatic drawbacks this season, grasshoppers have been unusually numerous and have caused serious damage to the cane. At the Haughton sugar district the rainfall has been somewhat better than at Ayr or Inkerman, and the unirrigated cane is not quite so backward. Some cane is dead or dying, but, taken as a whole, it shows up well beside the Inkerman cane. As this sugar area is situated at the foot of Mount Elliott, the rainfall is higher than the other Lower Burdekin districts.

*Proserpine District.*—One mill. In the Proserpine District, except in the locality known as Kelsey Creek, things were on the whole better than in many other districts, although it was stated by many growers that such a season had not been experienced since land was first put under cane in the district. At Cannon Valley and Preston the cane was fair, and in many places along the river good crops were noted. The appearance of the cane, however, was patchy, good crops being seen in one locality and very poor ones in another. At Kelsey Creek the rainfall for the first three months of the year was stated to be only 1½ inches in place of the usual 30 to 40. All the cane in this part of the district presented a drought-stricken appearance. This district was visited in April last; and since then a fair amount of rain has fallen, ensuring a fairly good crop for the mill.

*Mackay District.*—Nine mills. In December last all the indications at Mackay pointed to a big crop; since then, however, the rainfall has been small and patchy, and the crops have suffered badly in most parts of the district. The rainfall for the first three months of this year was lower than it had been in the drought year of 1902, when 16 inches had fallen for January, February, and March. This year the fall had varied in different parts of the district from less than 2 inches up to 13 inches for the same period. In those areas where the lower precipitation had taken place the cane was in a deplorable condition; but a few miles further on, where more rains had been experienced, the crops were very much better. It was noticed in several localities that New Guinea 15 or Badila appeared to be standing the drought better than many other canes.

It is estimated that there will only be a half crop in Mackay this season.*

*Bundaberg District.*—Ten mills. This district has also suffered greatly from dry-weather conditions. In February last a fine crop was hoped for; but since then little or no rain has fallen up till a few weeks ago, and even that was very partial. The Woongarra Scrub lands have had hardly any rain; and what did fall was immediately followed by high north winds which depleted the soil of what little moisture there was. The strike of young plant cane in many places has been unsatisfactory, and is now at a standstill. Gin Gin and Bingera have been more fortunate regarding rainfall, and have recently benefited from thunderstorms. Some of the river-bank cane lands are also in a more favourable condition. At the best, however, less than half a crop is all that can be expected.

*Childers District.*—Three mills. Childers was visited in May. At that time the crop was found to be suffering from dry conditions, and in many instances severely. Since February to that time only about half an inch of rain had fallen. The newly-planted cane, of which large areas were seen, were holding out well, making but little demand on the moisture at that time of the year. At South Isis the 1900 Seedling variety was found to be standing drought better than at Mackay, but it was not quite so good at the Cordalba end. D 1135 was doing fairly well, but in places was subject to disease, and many sticks had died out in the dry spell. Childers has latterly received more rain than the Woongarra Scrub, but the crop has been a light one. Grubs at North Isis had done great damage; but the Local Authorities at Isis are to be congratulated on the good work accomplished by them in connection with the pest. The collection of beetles and grubs had enormously decreased the damage hitherto done.

*Goodwood District.*—One mill. This locality is situated between Bundaberg and Childers. There are about 1,000 acres of good red soil supplying cane; but the season here has also been most unfavourable.

*Maryborough District.*—One mill. This embraces Yerra, Degilbo, Muan, Pialba, and Maryborough. At Yerra the land is broken and hilly, and a good deal of it stony in character. However, it is capable of growing good crops in many places, and tonnages of from 20 to 40 tons per acre are frequently obtained. The locality so far has been immune to the grub pest, and a good deal more cane would be grown if there were any certainty of market. As matters stand now, however, farmers are considerably handicapped; and many of them turn their attention to fruit-growing—principally bananas, pineapples, and oranges, which appear to thrive well. The cane—which is mostly of the Rappoe and

* Since the above was written good rains fell in the Mackay District at the end of November.

Striped Singapore varieties, with some D 1135—appears healthy and vigorous; and though growers in many cases had to cart their cane a considerable distance to the station, they were fairly well satisfied with cane as a crop worth going in for on a more extensive scale. The land is all scrub.

At Degilbo cane is found growing farther west of the sea-coast than in any other part of Queensland, and in some places in land so covered with stones that the soil cannot be seen until a stone is pulled out of the way. On this class of ground this practice is observed in planting cane—that is to say, a stone is first removed and the cane laid in its place and covered with soil brought for the purpose, and it is surprising how strongly these plants come away and grow to maturity. Speaking generally, the cane in this district grows well, and all the crops visited were of promising appearance. On certain places frost does some damage, and on forest soils considerable injury is done to the cane by a weed which is undoubtedly parasitic on the cane roots. Above the surface the weed grows to the height of about a foot, and the leaves are small and closely compressed to the stem. On taking hold of the plant it is found to be harsh and disagreeable to the touch, and it bears a small pinkish flower. Below the surface the roots are convoluted and pinkish to white in colour. They were found to go down into the soil to some depth, and to attach themselves to the cane roots. When this occurs, the cane commences to die off. So far the parasite has not been observed in any other class of land than forest, or anywhere else but where cane is growing. If the cane is ploughed out and corn planted, the weed is stated to disappear. There are 15 growers of cane in the district, who produce about 2,000 tons of cane, the area of land under cane being 130 acres. Rappoe and Striped Singapore were the favoured canes in this district, though some of the new varieties sent down by the Sugar Experiment Stations were under trial and are likely to be favoured. This year the drought has been most severe.

*The Pialba District*—which embraces Nikenbah and Takura—is, like the Yerra and Degilbo areas, without a mill of its own; consequently, the cane has to be sent long distances to a market. In some instances the facilities for loading at the railway stations are of an indifferent nature, and farmers are obliged to suffer great loss of time in getting their cane into trucks, and many of them are further handicapped by the long distances they live from the railway. There is generally quite enough cane grown to support a small mill, the amount harvested last year and sent in for manufacture reaching 22,000 tons. Of this amount upwards of 9,000 tons were sent in to the Doolbi Mill at Childers, 8,427 tons went to the Maryborough Factory, and about 4,000 tons to Mount Bauple, there being about 160 suppliers. The principal varieties grown are D 1135, Striped Singapore, Green Seedling, 1900 Seedling, Mahova, and some of the newer varieties from Mackay. The farms are practically all on localities where there was standing scrub, and the soils are largely grey and stony, though patches of rich-looking red soils also are in cultivation.

The lands upon which cane is raised in the Maryborough District are composed principally of fine alluvial deposit with isolated areas of volcanic red soil. The alluvial formation which extends along the banks of the river Mary is subject to floods, frosts, and washaways, and at no great distance back is found to be of a shallow nature overlying a subsoil of clay.

Here, like Pialba, cane is grown in conjunction with other crops (lucerne principally). The farms are small, and the distance from the sugar factory is great, necessitating transportation of crops by drays or punts; therefore, areas of cane are not large, but what is raised is apparently well cared for.

The varieties of cane grown are not numerous, and are as follow:—D 1135, Striped Singapore, Rappoe, and M 1900. The latter grows vigorously, and is fast becoming a favourite upon the lowlands.

The principal and only manure applied is mill composition (filter press) obtained from the old sugar factory Yengarie.

*Mount Bauple District.*—The above-mentioned sugar lands are situated on the coastal side of the North Coast Railway; and the crops raised are treated at the Mount Bauple Central Mill, some 8 miles distant from the main line, but connected by rail at Gundiah Railway Station.

The soils, which are mostly scrub of a volcanic origin, vary in colour from brown to almost white. These, generally speaking, were found to be unusually rough and containing much small stone.

The crops being harvested were disappointing, and, owing to shortness and lightness, it was found necessary to burn.

The principal varieties of cane raised here are:—D 1135, Striped Singapore, Rappoe (a little M 1900 and Mahona). D 1135 for all classes of land has best weathered the dry conditions; but, all the same, it is not favoured by many, due to it producing canes of a thin nature after several cuttings, which certainly is one of its faults. This, to a certain extent, may be obviated if care is exercised when harvesting to see that it is cut below the soil.

Only small areas of cane have been planted this year, due to past unfavourable conditions. However, what has been lately planted has been favoured by ideal conditions, and it is hoped will germinate satisfactorily.

Much elevated forest red soil of a superior class was seen not far from the mill. If this were cleared, cane of a high sucrose content could be raised and the mill supply increased.

New areas of scrub land have lately been felled upon the mountain, where much still remains standing, but apparently of a too broken nature for profitable cane-raising.

*Nambour District.*—One mill. The four districts from which the principal supply of cane for the Nambour Sugar Factory is obtained are:—Maroochy, Yandina, Petrie's Creek, and Dulong. The former three districts, particularly the Maroochy lands, are composed of rich fertile alluvial deposits which, with favourable seasons, raise prolific crops of a recumbent nature and containing a satisfactory sugar content. Portions of the aforesaid districts during periods of wetness and coldness are subjected to flooding and frosts. Dulong is highly situated; nature of country, volcanic and rather broken. Here the crops raised

were observed principally to be upon the sidelands; and it is reported that these recently have diminished considerably, preference now being given to fruit-raising and dairying, probably due to the costly production of cane and harvesting upon such sidelands. The transportation of crops from these parts is rather interesting. The method adopted is by a 2-feet tram line which contours up the range; the cars utilised for transportation are drawn to and fro by a 13-ton Shay locomotive, which has a gradient of 1 inch in 13 inches and curves of a half-chain radius to negotiate.

In several places where preparatory work for planting was being performed, the soil was noted to be wet and of a cohesive nature, apparently due to inferior drainage and possibly possessing a high percentage of clay.

The Moreton District, owing to its satisfactory rainfall and a climate in the summer time akin to the tropics, is about the best of the Southern sugar-cane districts. As a matter of fact, this district very frequently leads the State in tonnage of cane per acre, and it is further fortunate in so far being entirely free from the grub pest.

*Albert, Logan, and Nerang Districts.*—Seven mills. These districts are amongst the oldest cane lands in Queensland, and, though the areas planted with cane are not relatively large, they still continue to produce most satisfactory crops, and in company with the Maroochy usually lead the way in tonnage of cane per acre. This year, while almost every other sugar district has suffered severely from drought, the Logan and Nerang crops have a generally fine appearance; and cane-growers in these localities have been able to materially assist their fellow-farmers on the Downs by supplying large quantities of cane for forage purposes. The estimated crop in these districts is about 19,000 tons of cane for the mills; this, with about 4,000 tons sold for fodder, would make 23,000 tons—not enough to keep one Northern mill in operation for more than a few weeks.

At Nerang the mill this year has been handicapped by the sale of cane as fodder. Varieties have during the past few years been sent down from the Mackay Sugar Experiment Station, and they are in most cases doing excellently. At Mr. Hicks's farm N.G. 24, 24B, Malagache, and Badila were found to have made remarkably fine growth, and so had Badila on Mr. McMahon's farm.

It is unfortunate that when cane grows so well more of it is not produced for the Nerang Mill.

## 4.—NEW VARIETIES OF CANE.

Many of the canes introduced from New Guinea by Mr. T. H. Wells have been under experiment conditions this year at the Mackay Sugar Experiment Station, and particulars will be found under that section of the Report. A proportion of these varieties have developed the "gumming disease" in the same way as a proportion of the earlier introduced New Guinea canes did, and these are being carefully watched and noted. These varieties have also been planted out at Bundaberg, but, owing to severe frost in 1914 and dry weather during this year, they have not yet made much progress. A new cane from the Shahjahanpur Sugar Experiment Station, United Provinces, India, has been introduced at the Bundaberg Sugar Experiment Station. This is known as Shahjahanpur 10, and is recommended as a good variety for severe winters. Of the five cuttings sent, three germinated, and these are being carefully tended with a view to their being planted out to provide seed for experiments. The canes known as "Gingraya" and "Gingor," claimed to have been produced by grafting by Mr. Crofton, of the Lower Burdekin, are still maintaining their characteristics.

The Colonial Sugar Refining Company have also introduced some new seedling varieties from Fiji to their Nursery at Macnade.

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

The work performed at the Mackay Sugar Experiment Station continues to prove of the greatest interest to visiting farmers; and the experiments carried out during the past season have been watched with great care by a number of delegates from various farmers' associations, who have reported in the most favourable terms to their executives upon the methods practised at the Station.

The Sugar Station and Laboratory at Mackay is in the charge of Mr. L. C. McCready, a capable and trustworthy officer, whose work is highly appreciated not only by the General Superintendent, but by the large body of farmers with whom he comes in contact. In the Laboratory Mr. McCready is assisted by Mr. V. J. Barke, whose duties are carefully and accurately carried out. During the analytical period Mr. Von Stieglitz also rendered useful assistance in the Laboratory.

The following portion of the Annual Report has been largely compiled by Mr. McCready, to which comments have been added where necessary by the General Superintendent:—

### Meteorological.

From a climatic standpoint the weather conditions during the latter part of 1914 were ideal, and, following on a good germination, the crops made fine growth, and were in a very forward condition by the beginning of this year. From January on till the time of harvesting, however, what is without doubt the most adverse season in the history of the Station has been experienced. The insufficient supply of moisture during the months of January, February, March, and April—which are the best growing months of the year—could not but fail to have a most injurious effect on the young crop, a position which was added to by the setting in of an early winter, which caused a further check to growth. The almost complete absence of the usual wet season during the early part of the year has resulted in poor and light crops; the canes on the lower portion of the Station, which is composed of sandy soil, suffered most severely and in some cases died out completely.

The weather conditions during the growing periods will be found in the following tables. The first table is given because part of it embraces the autumn planting:—

ABSTRACT OF METEOROLOGICAL OBSERVATIONS MADE AT THE SUGAR EXPERIMENT STATION, MACKAY, ON 1ST SEPTEMBER, 1913, TO 31ST AUGUST, 1914, COVERING GROWTH OF EXPERIMENTAL CROPS.

| Month. | Rainfall. | Highest Shade Maximum. | Lowest Shade Maximum. | Mean Shade Maximum. | Highest Shade Minimum. | Lowest Shade Minimum. | Mean Shade Minimum. | Mean Diurnal Range. | Mean Temperature. | Mean Relative Humidity of the Air. Saturation equalling 100 at 9 a.m. | Mean Daily Evaporation in Cubic Inches. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| September .. .. .. .. | 0·19 | 87·6 | 75·2 | 81·4 | 66·4 | 44·0 | 55·2 | 27·8 | 68·3 | 72·4 | 0·287 |
| October .. .. .. .. | .. | 93·0 | 78·5 | 85·7 | 65·2 | 52·5 | 58·8 | 26·2 | 72·2 | 63·6 | 0·373 |
| November .. .. .. .. | 0·06 | 101·0 | 85·0 | 93·0 | 83·6 | 57·5 | 70·5 | 24·9 | 81·7 | 67·8 | 0·456 |
| December .. .. .. .. | 14·21 | 99·5 | 84·6 | 92·0 | 82·2 | 61·0 | 71·6 | 20·3 | 81·8 | 69·9 | 0·333 |
| January .. .. .. .. | 24·88 | 91·0 | 79·2 | 85·1 | 78·6 | 64·0 | 71·3 | 17·2 | 78·2 | 76·5 | 0·234 |
| February .. .. .. .. | 5·55 | 90·4 | 79·5 | 84·9 | 76·0 | 64·5 | 70·2 | 16·6 | 77·5 | 73·3 | 0·253 |
| March .. .. .. .. | 12·49 | 89·5 | 79·8 | 84·6 | 72·0 | 64·2 | 68·1 | 17·3 | 76·3 | 81·6 | 0·188 |
| April .. .. .. .. | 5·67 | 88·0 | 80·0 | 84·0 | 70·6 | 61·8 | 66·2 | 18·9 | 75·1 | 82·4 | 0·190 |
| May .. .. .. .. | 3·89 | 84·5 | 70·0 | 77·2 | 67·0 | 39·0 | 53·0 | 21·4 | 65·1 | 77·8 | 0·177 |
| June .. .. .. .. | 8·98 | 78·0 | 66·0 | 72·0 | 62·0 | 40·0 | 51·0 | 22·0 | 61·5 | 79·0 | 0·161 |
| July .. .. .. .. | .. | 81·0 | 62·5 | 71·7 | 65·5 | 34·0 | 49·7 | 27·7 | 60·7 | 81·0 | 0·180 |
| August .. .. .. .. | 0·21 | 81·0 | 70·0 | 75·5 | 60·0 | 42·0 | 51·0 | 25·7 | 63·2 | 81·3 | 0·197 |
| Total .. .. .. .. | 76·13 | | | | | | | | | | |

ABSTRACT OF METEOROLOGICAL OBSERVATIONS MADE AT THE SUGAR EXPERIMENT STATION, MACKAY, FROM 1ST SEPTEMBER, 1914, TO 31ST AUGUST, 1915, COVERING GROWTH OF EXPERIMENTAL CROPS.

| Month. | Rainfall. | Highest Shade Maximum. | Lowest Shade Maximum. | Mean Shade Maximum. | Highest Shade Minimum. | Lowest Shade Minimum. | Mean Shade Minimum. | Mean Diurnal Range. | Mean Temperature. | Mean Relative Humidity of the Air. Saturation equalling 100 at 9 a.m. | Mean Daily Evaporation in Cubic Inches. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| September .. .. .. .. | 1·68 | 87·2 | 72·5 | 79·8 | 69·2 | 46·4 | 57·8 | 24·82 | 68·8 | 91·8 | ·239 |
| October .. .. .. .. | 4·75 | 87·2 | 76·8 | 82·0 | 63·0 | 52·2 | 57·6 | 24·49 | 69·6 | 88·5 | ·208 |
| November .. .. .. .. | 1·14 | 90·8 | 84·6 | 87·7 | 79·0 | 58·8 | 64·4 | 23·5 | 76·0 | 64·3 | ·278 |
| December .. .. .. .. | 2·47 | 98·8 | 86·0 | 92·4 | 77·8 | 60·0 | 68·9 | 23·2 | 80·3 | 60·6 | ·277 |
| January .. .. .. .. | 1·96 | 105·0 | 86·1 | 95·5 | 75·0 | 64·0 | 69·5 | 25·1 | 82·5 | 57·7 | ·223 |
| February .. .. .. .. | 7·51 | 102·5 | 85·3 | 93·9 | 76·0 | 65·0 | 70·5 | 21·9 | 82·2 | 78·5 | ·249 |
| March .. .. .. .. | 3·97 | 90·0 | 82·5 | 86·2 | 73·5 | 57·3 | 65·4 | 21·8 | 75·8 | 63·5 | ·214 |
| April .. .. .. .. | 2·57 | 89·8 | 75·3 | 82·5 | 69·4 | 56·9 | 62·7 | 23·2 | 72·6 | 72·6 | ·199 |
| May .. .. .. .. | 2·12 | 86·4 | 74·0 | 80·2 | 63·0 | 38·4 | 50·7 | 29·2 | 65·4 | 79·5 | ·210 |
| June .. .. .. .. | ·42 | 83·4 | 70·4 | 76·9 | 59·4 | 36·5 | 47·9 | 31·0 | 62·4 | 72·5 | ·205 |
| July .. .. .. .. | ·94 | 84·1 | 72·0 | 78·0 | 59·3 | 38·3 | 48·8 | 28·9 | 63·4 | 75·5 | ·202 |
| August .. .. .. .. | 1·05 | 86·0 | 76·0 | 81·0 | 59·0 | 42·0 | 50·5 | 32·3 | 65·7 | 79·6 | ·174 |

## EXPERIMENTS AT PRESENT IN HAND.

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

*Ratooning Experiment.*—A comparison of four different methods of ratooning 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 the crop from arrowed cane sets and from non-arrowed cane sets, with relation to crop and germination; the crop this year being in the first ratoon stage.

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

*Analytical Tests.*—A comparison of the sugar values of the varieties known as Cheribon, Makabar, and Otamite, in competition with the varieties known as Badila, Goru, and Hambledon Queensland 426 (sometimes known as Clark's Seedling).

*Spraying Experiments for the Destruction of Weeds.*—A test of the values of different sprays with a view to economising on hand labour.

*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 determining 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 tested and distributed by this Station are rapidly coming into prominence. These experiments comprise:—

*Experiments with Canes from Louisiana—Experiments with Canes from Queensland Acclimatisation Society.*—Both of the above experiments are now in the second ratoon stage, and will be found completed, under their respective headings, further on in this report.

*Further Experiments with Canes from the Queensland Acclimatisation Society, Secondary Selection.*—This experiment is in the first ratoon stage.

*Experiments with Papuan Canes (Wells Collection, First Selection).*—This experiment was planted last year, and will be continued through ratoon crops.

*Further Experiments with Papuan Canes (Wells Collection).*—This experiment has been initiated during the year, and details will be found under the heading "New Experiments."

### Ratooning Experiments.

This experiment was planted out in August, 1912, with a view to arriving at the best system of treating ratoons.

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, and again deeply ploughed with a swing plough to a depth of 14 inches, followed by the subsoiler to a further depth of 6 inches, thus securing a seed bed of from 18 to 20 inches in depth of loose soil. The land was then divided into 4 plots of 5 drills each, and planted with cane known as New Guinea 40. In order to secure accuracy in detail, all plants were carefully cut to three eyes each, the same number planted in each drill. A departure was also made from the usual system of planting in 5-ft. drills, the rows in this case having been drawn at 6 ft. This was with the object of allowing more room for the implements in the carrying out of the different systems detailed hereafter.

The results of the plant and first ratoon crops have already appeared in the report for 1913-1914.

Immediately after harvesting the first ratoon crop, the plots received similar treatment to the previous year, details of which appear below:—

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 in normal seasons.

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 Experiments—Second Ratoon Crops—June, 1915.

| No. of Plot. | Country. | Variety of Cane. | Date of Analysis. | Age of Cane. | Density of Juice (Brix.) | °/₀ Sucrose in Juice. | °/₀ Glucose in Juice. | Purity of Juice. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | New Guinea.. .. | New Guinea 40 .. .. | 10-6-15 | 8 mo's | 16·7 | 14·20 | 1·47 | 85·0 | 10·8 |
| 2 | Do. .. .. | do. .. .. .. | 10-6-15 | do. | 16·1 | 13·63 | 1·22 | 84·6 | 10·3 |
| 3 | Do. .. .. | do. .. .. .. | 10-6-15 | do. | 16·0 | 13·50 | 1·40 | 84·3 | 10·2 |
| 4 | Do. .. .. | do. .. .. .. | 10-6-15 | do. | 16·8 | 14·25 | 1·25 | 84·8 | 10·8 |

Second Progressive Examination of Canes in the Ratoon Experiments—Second Ratoon Crop—July, 1915.

| No. of Plot. | Country. | Variety of Cane. | Date of Analysis. | Age of Cane. | Density of Juice (Brix. | °/₀ Sucrose in Juice. | °/₀ Glucose in Juice. | Purity of Juice. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | New Guinea.. .. | New Guinea 40 .. .. | 9-7-15 | 9 mo's | 17·6 | 15·42 | 1·19 | 87·6 | 12·0 |
| 2 | Do. .. .. | do. .. .. .. | 9-7-15 | do. | 17·6 | 15·40 | 1·02 | 87·5 | 11·9 |
| 3 | Do. .. .. | do. .. .. .. | 9-7-15 | do. | 18·2 | 15·54 | 1·11 | 85·3 | 11·9 |
| 4 | Do. .. .. | do. .. .. .. | 9-7-15 | do. | 18·8 | 16·76 | 0·74 | 89·1 | 13·1 |

THIRD PROGRESSIVE EXAMINATION OF CANES IN THE RATOON EXPERIMENTS—SECOND RATOON CROP—AUGUST, 1915.

| 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. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | New Guinea.. .. | New Guinea 40 .. .. | 6-8-15 | 10 mo's | 18·8 | 17·29 | 1·00 | 91·9 | 13·8 |
| 2 | Do. .. .. | do. .. .. .. | 6-8-15 | do. | 18·9 | 17·01 | 0·59 | 90·0 | 13·4 |
| 3 | Do. .. .. | do. .. .. .. | 6-8-15 | do. | 19·0 | 17·24 | 0·48 | 90·7 | 13·6 |
| 4 | Do. .. .. | do. .. .. .. | 6-8-15 | do. | 18·2 | 16·41 | 0·65 | 90·1 | 12·9 |

FINAL EXAMINATION OF CANES IN THE RATOON EXPERIMENTS—SECOND RATOON CROP—SEPTEMBER, 1915.

| No. of Plot. | Country. | Variety of Cane. | Date of Analysis. | Age of Cane. | Density of Juice (Brix) | % Sucrose in Juice. | % Glucose in Juice. | % Fibre in Cane. | % Sucrose in Cane. | Purity of Juice | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | New Guinea .. | New Guinea 40 | 8-9-15 | 11 mo's | 20·4 | 18·62 | 0·30 | 11·5 | 16·48 | 91·2 | 14·7 |
| 2 | Do. .. .. | do. .. .. | 8-9-15 | do. | 21·4 | 19·70 | 0·18 | 11·8 | 17·38 | 92·0 | 15·6 |
| 3.. | Do. .. .. | do. .. .. | 8-9-15 | do. | 20·8 | 19·21 | 0·19 | 11·8 | 16·94 | 92·3 | 15·3 |
| 4 | Do. .. .. | do. .. .. | 8-9-15 | do. | 21·1 | 19·34 | 0·23 | 11·8 | 17·06 | 91·6 | 15·4 |

It will be noted that the P.O.C.S. was the lowest in the volunteer crop, though there is not a great deal of difference in the purity.

On the crop being cut it was forwarded to Racecourse Mill, and from the weights supplied by that mill the following table of crop results has been compiled:—

CROP RESULTS OF RATOON EXPERIMENT—SECOND RATOON CROP—SEPTEMBER, 1915.

| No. of Plot. | Variety of Cane. | Treatment of Trash in Experiment. | Age of Cane. | Weight of Cane per Acre in English Tons. | Yield of Pure Obtainable Cane Sugar per Acre in Pounds. | Yield of Pure Obtainable Cane Sugar per Acre in English Tons. |
|---|---|---|---|---|---|---|
| 1 | New Guinea 40 .. .. | Trash left and volunteered .. | 11½ mo's | 15·9 | 5,234 | 2·33 |
| 2 | Do. .. .. .. | Trash ploughed under .. | do. | 12·3 | 4,308 | 1·92 |
| 3 | Do. .. .. .. | Trash relieved .. .. | do. | 14·1 | 4,857 | 2·16 |
| 4 | Do. .. .. .. | Trash burnt off .. .. | do. | 13·0 | 4,513 | 2·01 |

From the above it will be seen that on those plots where the trash was left or relieved the best results have been obtained this year, due to the severity of the drought. Last year, when conditions were normal, the Station method easily led, followed by the Relieved plot, in which cultivation is practised in every alternate row. The total crop for the first and second ratoons are given below. One lesson appears apparent, which is that the ploughing-under of trash in the ratoons does not pay. Not only is the cost greater, but the results are far lower.

TOTAL CROP RESULTS TO DATE OF CANES IN THE RATOON EXPERIMENTS—FIRST AND SECOND RATOON CROPS—1914 AND 1915.

| No. of Plot. | Variety of Cane. | Treatment of Trash in Experiment. | First Ratoon Crop, 1914. | | Second Ratoon Crop, 1916. | | 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. |
| 1 | New Guinea 40 .. | Trash left and volunteered .. | 21·5 | 3·2 | 15·9 | 2·62 | 37·4 | 5·82 |
| 2 | Do. .. .. | Trash ploughed under .. | 17·7 | 2·6 | 12·3 | 2·13 | 30·0 | 4·73 |
| 3 | Do. .. .. | Trash relieved .. .. | 23·3 | 3·6 | 14·1 | 2·38 | 37·4 | 5·98 |
| 4 | Do. .. .. | Trash burnt off .. .. | 25·9 | 4·0 | 13·0 | 2·21 | 38·9 | 6·61 |

## Experiments with Seedling Canes from the Queensland Acclimatisation Society, Brisbane.

*Second Ratoon Crop.*

In the report for 1913 all preliminary details of the cane above-mentioned appeared. It was shown therein that of the original 144 varieties received owing to drought and disease, only 30 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 |
| Barbados .. .. .. | 3412 | Barbados .. .. .. | 3922 |
| Barbados .. .. .. | 3747 | Barbados .. .. .. | 306 |
| Queensland .. .. .. | 1112 | Queensland .. .. .. | Badila Seedling |
| Queensland .. .. .. | Hybrid No. 1 | Queensland .. .. .. | 903 |
| Queensland .. .. .. | 1049 | Queensland .. .. .. | 1121 |

Of the above 30 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 | Barbados .. .. .. | 306 |
| Queensland .. .. .. | 437 | Barbados .. .. .. | 3412 |
| Queensland .. .. .. | 694 | Barbados .. .. .. | 3922 |
| Queensland .. .. .. | 695 | Barbados .. .. .. | 3747 |
| Queensland .. .. .. | 795 | Queensland .. .. .. | 1133 |

These 24 varieties were planted on uniform land, and descriptions of the canes appear in previous reports, together with the results of the plant and first ratoon crops.

The canes were again 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.

Taking into consideration the drought, the canes have on the whole made good growth, more especially Q 813, Q 855, Q 970, Q 135, Q 1092, Q 1098, Q 1133, and Q 137. Q 307 and Q 1001, mentioned in previous reports as promising canes, have, unfortunately, developed the gumming disease in the present crop, and will therefore be discarded.

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 determinations made in September:—

First Preliminary Examination of Canes from the Queensland Acclimatisation Society—Second Ratoon Crop—June, 1915.

| Country. | Variety of Cane. | Date of Analysis. | Age of Cane. | Density of Juice (Brix.) | Sucrose in Juice. | Glucose in Juice. | Purity of Juice. | P.C.S. |
|---|---|---|---|---|---|---|---|---|
| Queensland .. .. | Q. 58 .. .. .. | 1-6-15 | 8 months | 14·7 | 10·26 | 2·77 | 69·8 | 6·6 |
| Do. .. .. | Q. 59 .. .. .. | 1-6-15 | do. | 17·2 | 14·17 | 1·66 | 82·3 | 10·6 |
| Do. .. .. | Q. 135 .. .. .. | 1-6-15 | do. | 17·0 | 13·10 | 2·45 | 77·0 | 9·3 |
| Do. .. .. | Q. 137 .. .. .. | 1-6-15 | do. | 18·2 | 15·56 | 1·20 | 85·4 | 11·8 |
| Do. .. .. | Q. 286 .. .. .. | 1-6-15 | do. | 19·6 | 17·95 | 0·66 | 91·5 | 14·2 |
| Do. .. .. | Q. 303 .. .. .. | 1-6-15 | do. | 14·2 | 10·01 | 2·27 | 70·4 | 6·5 |
| Do. .. .. | Q. 307 .. .. .. | 1-6-15 | do. | 14·6 | 10·39 | 2·27 | 71·1 | 6·9 |
| Do. .. .. | Q. 365 .. .. .. | 1-6-15 | do. | 12·2 | 7·44 | 2·50 | 60·9 | 4·1 |
| Do. .. .. | Q. 437 .. .. .. | 1-6-15 | do. | 12·6 | 7·18 | 3·57 | 56·9 | 3·6 |
| Do. .. .. | Q. 694 .. .. .. | 2-6-15 | do. | 17·7 | 12·79 | 2·60 | 71·7 | 8·5 |
| Do. .. .. | Q. 695 .. .. .. | 2-6-15 | do. | 15·2 | 10·89 | 2·65 | 71·6 | 7·3 |
| Do. .. .. | Q. 795 .. .. .. | 2-6-15 | do. | 15·4 | 13·56 | 1·54 | 88·0 | 10·5 |
| Do. .. .. | Q. 813 .. .. .. | 2-6-15 | do. | 17·3 | 15·32 | 1·08 | 88·5 | 11·9 |
| Do. .. .. | Q. 855 .. .. .. | 2-6-15 | do. | 17·5 | 16·01 | 1·01 | 91·4 | 12·7 |
| Do. .. .. | Q. 970 .. .. .. | 2-6-15 | do. | 17·7 | 15·42 | 1·27 | 87·1 | 11·9 |
| Do. .. .. | Q. 1001 .. .. .. | 2-6-15 | do. | 17·5 | 13·82 | 1·46 | 78·9 | 9·9 |
| Do. .. .. | Q. 1092 .. .. .. | 2-6-15 | do. | 17·3 | 13·26 | 2·27 | 76·6 | 9·3 |
| Do. .. .. | Q. 1098 .. .. .. | 2-6-15 | do. | 17·3 | 13·47 | 2·27 | 77·8 | 9·6 |
| Do. .. .. | Q. 1110 .. .. .. | 2-6-15 | do. | 17·5 | 14·46 | 1·48 | 82·6 | 10·8 |
| Do. .. .. | Q. 1133 .. .. .. | 2-6-15 | do. | 17·7 | 14·60 | 1·66 | 82·4 | 10·9 |
| Barbados .. .. | B. 306 .. .. .. | 2-6-15 | do. | 10·6 | 5·38 | 3·57 | 50·7 | 2·2 |
| Do. .. .. | B. 3412 .. .. .. | 2-6-15 | do. | 14·2 | 9·79 | 2·50 | 68·9 | 6·2 |
| Do. .. .. | B. 3747 .. .. .. | 4-6-15 | do. | 17·1 | 14·92 | 0·55 | 87·2 | 11·5 |
| Do. .. .. | B. 3922 .. .. .. | 4-6-15 | do. | 17·9 | 16·41 | 0·49 | 91·6 | 13·1 |

SECOND PROGRESSIVE EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—SECOND RATOON CROP—JULY, 1915.

| Country. | 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. |
|---|---|---|---|---|---|---|---|---|
| Queensland .. .. | Q. 58 .. .. .. | 1-7-15 | 9 months | 16·5 | 12·59 | 2·08 | 76·3 | 8·8 |
| Do. .. .. | Q. 59 .. .. .. | 1-7-15 | do. | 18·9 | 16·31 | 1·06 | 86·2 | 12·5 |
| Do. .. .. | Q. 135 .. .. .. | 1-7-15 | do. | 18·3 | 14·81 | 2·08 | 80·9 | 10·8 |
| Do. .. .. | Q. 137 .. .. .. | 1-7-15 | do. | 17·6 | 14·87 | 1·21 | 84·4 | 11·2 |
| Do. .. .. | Q. 286 .. .. .. | 1-7-15 | do. | 20·6 | 19·44 | 0·38 | 94·3 | 15·8 |
| Do. .. .. | Q. 303 .. .. .. | 1-7-15 | do. | 13·1 | 8·74 | 2·50 | 66·7 | 5·4 |
| Do. .. .. | Q. 307 .. .. .. | 1-7-15 | do. | 16·0 | 12·44 | 2·13 | 77·7 | 8·9 |
| Do. .. .. | Q. 365 .. .. .. | 2-7-15 | do. | 15·2 | 10·94 | 1·52 | 71·9 | 7·4 |
| Do. .. .. | Q. 437 .. .. .. | 2-7-15 | do. | 15·5 | 11·03 | 1·42 | 71·1 | 7·4 |
| Do. .. .. | Q. 694 .. .. .. | 2-7-15 | do. | 19·4 | 16·07 | 1·38 | 82·8 | 12·0 |
| Do. .. .. | Q. 695 .. .. .. | 2-7-15 | do. | 17·7 | 14·46 | 1·35 | 81·7 | 10·6 |
| Do. .. .. | Q. 795 .. .. .. | 2-7-15 | do. | 19·1 | 16·00 | 1·13 | 83·7 | 12·0 |
| Do. .. .. | Q. 813 .. .. .. | 2-7-15 | do. | 20·7 | 18·35 | 0·66 | 88·6 | 14·3 |
| Do. .. .. | Q. 855 .. .. .. | 2-7-15 | do. | 18·8 | 16·05 | 0·60 | 85·3 | 12·2 |
| Do. .. .. | Q. 970 .. .. .. | 2-7-15 | do. | 19·7 | 17·32 | 0·90 | 87·9 | 13·4 |
| Do. .. .. | Q. 1061 .. .. .. | 2-7-15 | do. | 20·1 | 16·91 | 0·93 | 84·1 | 12·8 |
| Do. .. .. | Q. 1092 .. .. .. | 2-7-15 | do. | 19·5 | 15·88 | 1·45 | 81·4 | 11·6 |
| Do. .. .. | Q. 1098 .. .. .. | 2-7-15 | do. | 19·0 | 15·55 | 1·56 | 81·8 | 11·5 |
| Do. .. .. | Q. 1110 .. .. .. | 2-7-15 | do. | 19·4 | 17·13 | 0·96 | 88·2 | 13·4 |
| Do. .. .. | Q. 1133 .. .. .. | 2-7-15 | do. | 19·2 | 15·95 | 0·83 | 83·0 | 11·9 |
| Barbados .. .. | B. 306 .. .. .. | 2-7-15 | do. | 16·7 | 13·32 | 1·56 | 79·7 | 9·7 |
| Do. .. .. | B. 3412 .. .. .. | 2-7-15 | do. | 19·2 | 17·06 | 1·26 | 88·8 | 13·3 |
| Do. .. .. | B. 3747 .. .. .. | 2-7-15 | do. | 20·0 | 17·78 | 0·34 | 88·9 | 13·9 |
| Do. .. .. | B. 3922 .. .. .. | 2-7-15 | do. | 19·2 | 17·09 | 0·61 | 89·0 | 13·3 |

THIRD PROGRESSIVE EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—SECOND RATOON CROP—AUGUST, 1915.

| Country. | 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. |
|---|---|---|---|---|---|---|---|---|
| Queensland .. .. | Q. 58 .. .. | 2-8-15 | 10 months | 19·9 | 18·08 | 0·60 | 90·8 | 14·3 |
| Do. .. .. | Q. 59 .. .. | 2-8-15 | do. | 20·5 | 18·83 | 0·52 | 91·8 | 15·0 |
| Do. .. .. | Q. 135 .. .. | 2-8-15 | do. | 20·0 | 17·25 | 1·21 | 86·2 | 13·2 |
| Do. .. .. | Q. 137 .. .. | 2-8-15 | do. | 21·5 | 19·52 | 0·59 | 90·7 | 15·5 |
| Do. .. .. | Q. 286 .. .. | 2-8-15 | do. | 21·7 | 19·70 | 0·55 | 90·7 | 15·6 |
| Do. .. .. | Q. 303 .. .. | 2-8-15 | do. | 19·7 | 16·28 | 0·78 | 82·6 | 12·1 |
| Do. .. .. | Q. 307 .. .. | 2-8-15 | do. | 19·9 | 15·55 | 1·30 | 81·8 | 11·5 |
| Do. .. .. | Q. 365 .. .. | 2-8-15 | do. | 19·7 | 17·10 | 1·25 | 86·8 | 13·2 |
| Do. .. .. | Q. 437 .. .. | 2-8-15 | do. | 19·7 | 17·07 | 1·25 | 86·6 | 13·1 |
| Do. .. .. | Q. 694 .. .. | 2-8-15 | do. | 21·7 | 18·62 | 1·09 | 85·8 | 14·2 |
| Do. .. .. | Q. 695 .. .. | 3-8-15 | do. | 20·5 | 17·61 | 1·27 | 85·9 | 13·5 |
| Do. .. .. | Q. 795 .. .. | 3-8-15 | do. | 21·2 | 18·42 | 0·74 | 86·8 | 14·2 |
| Do. .. .. | Q. 813 .. .. | 3-8-15 | do. | 22·1 | 19·95 | 0·41 | 90·2 | 15·8 |
| Do. .. .. | Q. 855 .. .. | 3-8-15 | do. | 21·1 | 18·16 | 1·15 | 86·0 | 13·9 |
| Do. .. .. | Q. 970 .. .. | 3-8-15 | do. | 21·0 | 18·16 | 1·13 | 86·4 | 13·9 |
| Do. .. .. | Q. 1001 .. .. | 3-8-15 | do. | 20·2 | 17·52 | 1·04 | 86·7 | 13·5 |
| Do. .. .. | Q. 1092 .. .. | 3-8-15 | do. | 22·2 | 19·66 | 0·94 | 88·5 | 15·3 |
| Do. .. .. | Q. 1098 .. .. | 3-8-15 | do. | 21·3 | 18·99 | 0·83 | 89·1 | 14·9 |
| Do. .. .. | Q. 1110 .. .. | 3-8-15 | do. | 21·7 | 19·22 | 0·52 | 88·5 | 15·0 |
| Do. .. .. | Q. 1133 .. .. | 3-8-15 | do. | 19·7 | 16·18 | 1·35 | 82·1 | 12·0 |
| Barbados .. .. | B. 306 .. .. | 3-8-15 | do. | 16·0 | 11·27 | 2·40 | 70·4 | 7·4 |
| Do. .. .. | B. 3412 .. .. | 3-8-15 | do. | 19·3 | 16·68 | 1·30 | 86·4 | 12·8 |
| Do. .. .. | B. 3747 .. .. | 3-8-15 | do. | 19·7 | 15·66 | 1·15 | 83·7 | 11·7 |
| Do. .. .. | B. 3922 .. .. | 3-8-15 | do. | 19·6 | 16·52 | 1·52 | 84·2 | 12·5 |

FINAL EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—SECOND RATOON CROP—SEPTEMBER, 1915.

| Country. | Variety of Cane. | Date of Analysis. | Age of Cane. | Density of Juice (Brix). | % Sucrose in Juice. | % Glucose in Juice. | % Fibre in Cane. | % Sucrose in Cane. | Purity of Juice. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|
| Queensland .. .. | Q. 58 .. .. | 6-9-15 | 11 months | 20·4 | 18·57 | 0·62 | 14·0 | 15·97 | 91·0 | 14·2 |
| Do. .. .. | Q. 59 .. .. | 6-9-15 | do. | 21·5 | 19·81 | 0·24 | 14·0 | 17·04 | 92·1 | 15·3 |
| Do. .. .. | Q. 135 .. .. | 6-9-15 | do. | 21·0 | 19·14 | 0·59 | 11·6 | 16·92 | 91·1 | 15·1 |
| Do. .. .. | Q. 137 .. .. | 6-9-15 | do. | 22·2 | 20·56 | 0·20 | 14·0 | 17·68 | 92·6 | 15·9 |
| Do. .. .. | Q. 286 .. .. | 6-9-15 | do. | 22·0 | 20·58 | 0·33 | 15·0 | 17·50 | 93·5 | 15·9 |
| Do. .. .. | Q. 303 .. .. | 6-9-15 | do. | 17·4 | 14·68 | 0·78 | 15·0 | 12·48 | 84·3 | 10·6 |
| Do. .. .. | Q. 307 .. .. | 6-9-15 | do. | 18·8 | 16·58 | 0·68 | 14·5 | 14·18 | 88·1 | 12·4 |
| Do. .. .. | Q. 365 .. .. | 6-9-15 | do. | 19·3 | 16·79 | 0·96 | 12·0 | 14·78 | 86·9 | 12·8 |
| Do. .. .. | Q. 437 .. .. | 6-9-15 | do. | 21·1 | 18·68 | 0·94 | 10·5 | 16·72 | 88·5 | 14·6 |
| Do. .. .. | Q. 694 .. .. | 6-9-15 | do. | 21·3 | 18·07 | 1·52 | 10·6 | 16·16 | 84·8 | 13·8 |
| Do. .. .. | Q. 695 .. .. | 6-9-15 | do. | 20·0 | 17·75 | 1·25 | 10·0 | 15·98 | 88·7 | 14·0 |
| Do. .. .. | Q. 795 .. .. | 6-9-15 | do. | 20·7 | 18·19 | 1·10 | 13·0 | 15·83 | 87·8 | 13·7 |
| Do. .. .. | Q. 813 .. .. | 6-9-15 | do. | 23·2 | 21·38 | 0·21 | 12·3 | 18·75 | 92·1 | 16·8 |
| Do. .. .. | Q. 855 .. .. | 6-9-15 | do. | 22·4 | 20·48 | 0·78 | 11·5 | 18·13 | 91·4 | 16·2 |
| Do. .. .. | Q. 970 .. .. | 6-9-15 | do. | 22·3 | 20·40 | 0·27 | 9·8 | 18·40 | 91·4 | 16·4 |
| Do. .. .. | Q. 1001 .. .. | 6-9-15 | do. | 22·0 | 19·87 | 0·62 | 9·8 | 17·92 | 90·3 | 15·9 |
| Do. .. .. | Q. 1092 .. .. | 6-9-15 | do. | 21·6 | 18·91 | 0·81 | 13·0 | 16·45 | 87·5 | 14·4 |
| Do. .. .. | Q. 1098 .. .. | 6-9-15 | do. | 22·1 | 20·34 | 0·51 | 10·0 | 18·31 | 92·0 | 16·4 |
| Do. .. .. | Q. 1110 .. .. | 6-9-15 | do. | 20·9 | 18·32 | 1·04 | 10·0 | 16·49 | 87·6 | 14·4 |
| Do. .. .. | Q. 1133 .. .. | 6-9-15 | do. | 20·1 | 17·28 | 1·05 | 11·0 | 15·38 | 85·9 | 13·2 |
| Barbadoes .. .. | B. 306 .. .. | 6-9-15 | do. | 18·0 | 15·45 | 1·56 | 14·0 | 13·29 | 85·8 | 11·4 |
| Do. .. .. | B. 3412 .. .. | 6-9-15 | do. | 19·7 | 17·37 | 0·41 | 9·5 | 15·72 | 88·1 | 13·7 |
| Do. .. .. | B. 3747 .. .. | 6-9-15 | do. | 20·6 | 18·43 | 0·78 | 11·5 | 16·31 | 89·4 | 14·4 |
| Do. .. .. | B. 3922 .. .. | 6-9-15 | do. | 20·1 | 18·36 | 0·71 | 12·5 | 16·07 | 91·3 | 14·4 |

In the following table the analytical results for the plant and first and second ratoons are given together, for purposes of easy reference. The average sucrose and purity are good in the majority of instances:—

ANALYTICAL RESULTS TO DATE OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—PLANT, FIRST, AND SECOND RATOON CROPS—1913, 1914, AND 1915.

| Name or Number of Cane. | Plant Crop, 1913. | | | | First Ratoon Crop, 1914. | | | | Second Ratoon Crop, 1915. | | | | 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. | Purity. | P.O.C.S. |
| Queensland .. .. 58 | 17·4 | 15·51 | ·78 | 89·13 | 19·5 | 17·82 | ·51 | 91·38 | 20·4 | 18·57 | ·62 | 91·0 | 17·30 | 90·5 | 13·7 |
| Do. .. .. 59 | 18·6 | 17·58 | ·28 | 94·51 | 19·9 | 18·44 | ·38 | 92·66 | 21·5 | 19·81 | ·24 | 92·1 | 18·61 | 93·0 | 15·0 |
| Do. .. .. 135 | 18·2 | 16·25 | ·83 | 89·28 | 19·9 | 18·23 | ·50 | 91·60 | 21·0 | 19·14 | ·59 | 91·1 | 17·87 | 90·7 | 14·1 |
| Do. .. .. 137 | 20·0 | 19·21 | ·12 | 96·05 | 21·6 | 19·96 | ·31 | 92·40 | 22·2 | 20·56 | ·20 | 92·6 | 19·91 | 93·6 | 16·1 |
| Do. .. .. 286 | 19·4 | 18·66 | ·17 | 96·18 | 19·3 | 17·52 | ·53 | 90·77 | 22·0 | 20·58 | ·33 | 93·5 | 18·92 | 93·6 | 15·3 |
| Do. .. .. 303 | 20·3 | 19·30 | ·14 | 95·07 | 20·4 | 18·85 | ·45 | 92·40 | 17·4 | 14·68 | ·78 | 84·3 | 17·61 | 90·9 | 14·0 |
| Dit. .. .. 307 | 18·8 | 17·24 | ·38 | 91·70 | 19·2 | 17·45 | ·40 | 90·88 | 18·8 | 16·58 | ·68 | 88·1 | 17·09 | 90·4 | 13·5 |
| Do. .. .. 365 | 18·8 | 17·27 | ·64 | 91·86 | 16·2 | 13·04 | 2·33 | 80·49 | 19·3 | 16·79 | ·96 | 86·9 | 15·70 | 86·7 | 12·1 |
| Do. .. .. 437 | 17·0 | 13·69 | 2·45 | 80·52 | 15·3 | 11·50 | 2·42 | 75·16 | 21·1 | 18·68 | ·94 | 88·5 | 14·62 | 82·1 | 10·8 |
| Do. .. .. 694 | 20·3 | 18·65 | ·80 | 91·87 | 20·5 | 17·75 | 1·63 | 86·58 | 21·3 | 18·07 | 1·52 | 84·8 | 18·16 | 87·7 | 14·1 |
| Do. .. .. 695 | 18·1 | 15·98 | 1·22 | 88·28 | 18·6 | 16·80 | 1·43 | 90·32 | 20·0 | 17·75 | 1·25 | 88·7 | 16·84 | 89·1 | 13·2 |
| Do. .. .. 795 | 21·0 | 20·03 | ·25 | 95·38 | 20·7 | 18·99 | ·51 | 91·73 | 20·7 | 18·19 | 1·10 | 87·8 | 19·07 | 91·6 | 15·2 |
| Do. .. .. 813 | 21·4 | 20·41 | ·19 | 95·37 | 22·5 | 21·12 | ·19 | 93·86 | 23·2 | 21·38 | ·21 | 92·1 | 20·97 | 93·7 | 16·9 |
| Do. .. .. 855 | 19·6 | 18·69 | ·34 | 95·35 | 20·7 | 19·18 | ·60 | 92·65 | 22·4 | 20·48 | ·78 | 91·4 | 19·45 | 93·0 | 15·7 |
| Do. .. .. 970 | 21·1 | 19·93 | ·35 | 94·45 | 22·3 | 20·79 | ·29 | 93·23 | 22·3 | 20·40 | ·27 | 91·4 | 20·37 | 93·0 | 16·4 |
| Do. .. .. 1001 | 19·4 | 18·27 | ·30 | 94·17 | 20·1 | 19·03 | ·18 | 94·67 | 22·0 | 19·87 | ·62 | 90·3 | 19·06 | 92·9 | 15·3 |
| Do. .. .. 1092 | 18·5 | 15·55 | 1·49 | 84·05 | 19·0 | 16·34 | 1·85 | 86·00 | 21·6 | 18·91 | ·81 | 87·5 | 16·93 | 85·9 | 13·0 |
| Do. .. .. 1098 | 20·1 | 18·80 | ·51 | 93·98 | 21·0 | 19·61 | ·66 | 93·38 | 22·1 | 20·34 | ·51 | 92·0 | 19·61 | 93·1 | 15·8 |
| Do. .. .. 1110 | 20·3 | 18·74 | ·57 | 92·31 | 20·6 | 18·59 | 1·04 | 90·24 | 20·9 | 18·32 | 1·04 | 87·6 | 18·55 | 90·0 | 14·6 |
| Do. .. .. 1133 | 17·8 | 15·61 | 1·28 | 87·69 | 18·9 | 16·76 | 1·20 | 88·67 | 20·1 | 17·28 | 1·05 | 85·9 | 16·55 | 87·5 | 12·8 |
| Barbadoes .. .. 306 | 18·3 | 16·60 | 1·06 | 90·71 | 18·4 | 16·48 | 1·20 | 89·56 | 18·0 | 15·45 | 1·56 | 85·8 | 16·18 | 88·9 | 12·6 |
| Do. .. .. 3412 | 16·9 | 14·38 | 1·36 | 85·08 | 16·0 | 13·74 | 1·17 | 85·87 | 19·7 | 17·37 | ·41 | 88·1 | 15·16 | 86·6 | 11·5 |
| Do. .. .. 3747 | 18·4 | 16·99 | ·59 | 92·33 | 18·7 | 17·28 | ·72 | 92·40 | 20·6 | 18·43 | ·78 | 89·4 | 17·57 | 91·5 | 14·0 |
| Do. .. .. 3922 | 18·1 | 17·32 | ·23 | 95·69 | 19·4 | 18·38 | ·21 | 94·74 | 20·1 | 18·36 | ·71 | 91·3 | 18·02 | 93·8 | 14·6 |

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

(*a*) The results of the second ratoon crop for the present season.

(*b*) The total results to date of the plant, first, and second ratoon crops.

CROP RESULTS OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—SECOND RATOON CROP—SEPTEMBER, 1915.

| Country. | Variety of Cane. | Age of Cane. | Weight of Cane per Acre in English Tons. | Yield of Pure Obtainable Cane Sugar per Acre in Pounds. | Yield of Pure Obtainable Cane Sugar per Acre in English Tons. |
|---|---|---|---|---|---|
| Queensland | Queensland Seedling 58 | 11½ mo's | 16·4 | 5,226 | 2·33 |
| Do. | do. 59 | do. | 14·8 | 5,098 | 2·27 |
| Do. | do. 135 | do. | 21·7 | 7,366 | 3·28 |
| Do. | do. 137 | do. | 24·9 | 8,899 | 3·97 |
| Do. | do. 286 | do. | 15·3 | 5,471 | 2,44 |
| Do. | do. 303 | do. | 4·0 | 969 | ·43 |
| Do. | do. 307 | do. | 17·4 | 4,834 | 2·15 |
| Do. | do. 365 | do. | 13·0 | 3,735 | 1·66 |
| Do. | do. 437 | do. | 3·5 | 1,144 | ·51 |
| Do. | do. 694 | do. | 19·8 | 6,131 | 2·73 |
| Do. | do. 695 | do. | 15·3 | 4,817 | 2·15 |
| Do. | do. 795 | do. | 14·9 | 4,595 | 2·05 |
| Do. | do. 813 | do. | 21·4 | 8,122 | 3·62 |
| Do. | do. 855 | do. | 20·6 | 7,495 | 3·34 |
| Do. | do. 970 | do. | 17·4 | 6,393 | 2·85 |
| Do. | do. 1001 | do. | 11·2 | 4,016 | 1·79 |
| Do. | do. 1092 | do. | 19·1 | 6,178 | 2·75 |
| Do. | do. 1098 | do. | 22·1 | 8,143 | 3·63 |
| Do. | do. 1110 | do. | 14·5 | 4,704 | 2·10 |
| Barbadoes | Barbadoes Seedling 306 | do. | 10·1 | 2,582 | 1·15 |
| Do. | do. 3412 | do. | 8·1 | 2,506 | 1·11 |
| Do. | do. 3922 | do. | 16·7 | 5,934 | 2·40 |
| Do. | do. 3747 | do. | 13·6 | 4,390 | 1·96 |
| Queensland | Queensland Seedling 1133 | do. | 14·1 | 4,197 | 1·87 |

CROP RESULTS TO DATE OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—PLANT, FIRST, AND SECOND RATOON CROPS—1913, 1914, AND 1915.

| Country. | Variety of Cane. | Plant Crop, 1913. | | First Ratoon Crop, 1914. | | Second Ratoon Crop, 1915. | | 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. |
| Queensland | Q. Seedling 58 | 38·6 | 5·2 | 38·6 | 6·1 | 16·4 | 2·6 | 93·6 | 13·9 |
| Do. | do. 59 | 35·6 | 5·4 | 40·8 | 6·5 | 14·8 | 2·5 | 91·2 | 14·4 |
| Do. | do. 135 | 52·6 | 7·7 | 43·1 | 7·0 | 21·7 | 3·6 | 117·4 | 18·3 |
| Do. | do. 137 | 40·8 | 6·9 | 39·7 | 6·9 | 24·9 | 4·4 | 105·4 | 18·2 |
| Do. | do. 286 | 48·0 | 7·9 | 40·1 | 6·2 | 15·3 | 2·6 | 103·4 | 16·7 |
| Do. | do. 303 | 25·8 | 4·3 | 17·6 | 2·9 | 4·0 | ·5 | 47·4 | 7·7 |
| Do. | do. 307 | 51·9 | 8·0 | 50·1 | 7·8 | 17·4 | 2·4 | 119·4 | 18·2 |
| Do. | do. 365 | 42·9 | 6·5 | 44·6 | 5·2 | 13·0 | 1·9 | 100·5 | 13·6 |
| Do. | do. 437 | 23·9 | 2·9 | 16·8 | 1·7 | 3·5 | ·58 | 44·2 | 5·18 |
| Do. | do. 694 | 48·8 | 7·9 | 61·6 | 9·7 | 19·8 | 3·2 | 130·2 | 20·8 |
| Do. | do. 695 | 45·4 | 6·6 | 44·9 | 6·7 | 15·3 | 2·4 | 105·6 | 15·7 |
| Do. | do. 795 | 31·9 | 5·7 | 23·1 | 4·0 | 14·9 | 2·3 | 69·9 | 12·0 |
| Do. | do. 813 | 43·8 | 7·9 | 38·3 | 7·2 | 21·4 | 4·0 | 103·5 | 19·1 |
| Do. | do. 855 | 31·3 | 5·1 | 37·4 | 6·2 | 20·6 | 3·7 | 89·3 | 15·0 |
| Do. | do. 970 | 47·2 | 8·4 | 40·8 | 7·6 | 17·4 | 3·2 | 105·4 | 19·2 |
| Do. | do. 1001 | 33·7 | 5·4 | 21·0 | 3·4 | 11·2 | 2·0 | 65·9 | 10·8 |
| Do. | do. 1092 | 46·4 | 6·5 | 41·7 | 6·2 | 19·1 | 3·1 | 107·2 | 15·8 |
| Do. | do. 1098 | 53·5 | 9·2 | 42·2 | 7·3 | 22·1 | 4·0 | 117·8 | 20·5 |
| Do. | do. 1110 | 39·2 | 6·5 | 32·2 | 5·4 | 14·5 | 2·4 | 85·9 | 14·3 |
| Barbadoes | B. Seedling 306 | 45·3 | 6·9 | 34·1 | 5·2 | 10·1 | 1·3 | 89·5 | 13·4 |
| Do. | do. 3412 | 49·5 | 6·4 | 26·7 | 3·2 | 8·1 | 1·2 | 84·3 | 10·8 |
| Do. | do. 3922 | 49·8 | 7·9 | 36·9 | 6·0 | 16·7 | 2·6 | 103·4 | 16·5 |
| Do. | do. 3747 | 52·7 | 8·2 | 38·4 | 6·0 | 13·6 | 2·2 | 104·7 | 16·4 |
| Queensland | Q. Seedling 1133 | 55·4 | 7·9 | 39·1 | 5·9 | 14·1 | 2·1 | 108·6 | 15·9 |

The testing of this series of varieties has now been completed. From the average analytical results, Q 813 appears to be the best cane from the standpoint of sugar content followed by Q 990 and 137. Q 813 also stands up well as a cropper. B 3922 and 3747 are also worthy of trial in other sugar districts. The best of these new seedlings, from a sugar-producing and cropping point of view, which have not developed disease, have been reserved for distribution purposes; and cane farmers may obtain same at the periods of distribution upon application, free of charge.

## CONTINUATION OF EXPERIMENTS WITH CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY.

### *Second Ratoon Crop.*

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 as with the 24 canes just dealt with.

A description of these canes will be found in the Annual Report for 1913. They were:—Q 1112, Badila Seedling, Hybrid No. 1, Q 903, Q 1049, and Q 1121.

Immediately following the harvesting of the first ratoon crop last September, the canes were again ratooned and treated in a similar manner to the other 24 varieties.

The analytical data of these six varieties appear hereunder:—

FIRST PRELIMINARY EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—SECOND RATOON CROP—JUNE, 1915.

| Country. | 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. |
|---|---|---|---|---|---|---|---|---|
| Queensland .. .. | Q. 903 .. .. .. | 8-6-15 | 8 months .. | 17·2 | 13·53 | 1·66 | 78·6 | 9·7 |
| Do. .. .. | Q. 1049 .. .. .. | 3-6-15 | do. .. | 16·3 | 12·48 | 1·62 | 76·5 | 8·8 |
| Do. .. .. | Q. 1112 .. .. .. | 8-6-15 | do. .. | 17·4 | 13·58 | 1·98 | 78·0 | 9·7 |
| Do. .. .. | Q. 1121 .. .. .. | 9-6-15 | do. .. | 16·7 | 13·18 | 1·89 | 78·9 | 9·5 |
| Do. .. .. | Badila Seedling .. .. | 9-6-15 | do. .. | 19·5 | 17·07 | 1·06 | 87·5 | 13·2 |
| Do. .. .. | Hybrid No. 1 .. .. .. | 9-6-15 | do. .. | 20·2 | 18·55 | 0·57 | 91·8 | 14·8 |

SECOND PROGRESSIVE EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—SECOND RATOON CROP—JULY, 1915.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Queensland .. .. | Q. 903 .. .. .. | 5-7-15 | 9 months .. | 20·1 | 17·52 | 1·13 | 87·1 | 13·5 |
| Do. .. .. | Q. 1049 .. .. .. | 5-7-15 | do. .. | 18·9 | 15·97 | 1·08 | 84·4 | 12·0 |
| Do. .. .. | Q. 1112 .. .. .. | 5-7-15 | do. .. | 18·3 | 14·67 | 2·08 | 80·1 | 10·6 |
| Do. .. .. | Q. 1121 .. .. .. | 5-7-15 | do. .. | 17·6 | 14·12 | 0·89 | 80·2 | 10·3 |
| Do. .. .. | Badila Seedling .. .. | 5-7-15 | do. .. | 22·4 | 20·40 | 0·72 | 91·0 | 16·1 |
| Do. .. .. | Hybrid No. 1 .. .. .. | 5-7-15 | do. .. | 21·3 | 19·60 | 0·51 | 92·0 | 15·7 |

THIRD PROGRESSIVE EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—SECOND RATOON CROP—AUGUST, 1915.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Queensland .. .. | Q. 903 .. .. .. | 5-8-15 | 10 months | 21·3 | 19·30 | 0·44 | 90·6 | 15·3 |
| Do. .. .. | Q. 1049 .. .. .. | 5-8-15 | do. .. | 20·9 | 19·11 | 0·40 | 91·4 | 15·2 |
| Do. .. .. | Q. 1112 .. .. .. | 5-8-15 | do. .. | 21·2 | 18·21 | 0·50 | 85·8 | 13·9 |
| Do. .. .. | Q. 1121 .. .. .. | 5-8-15 | do. .. | 19·1 | 17·78 | 0·34 | 93·0 | 14·3 |
| Do. .. .. | Badila Seedling .. .. | 5-8-15 | do. .. | 23·4 | 21·47 | 0·40 | 91·7 | 17·1 |
| Do. .. .. | Hybrid No. 1 .. .. .. | 5-8-15 | do. .. | 20·3 | 19·10 | 0·25 | 94·0 | 15·5 |

FINAL EXAMINATION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—SECOND RATOON CROP—SEPTEMBER, 1915.

| Country. | Variety of Cane. | Date of Analysis. | Age of Cane. | Density of Juice (B | % Sucrose in Juice. | % Glucose in Juice. | % Fibre in Cane. | % Sucrose in Cane. | Purity of Juice | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|
| Queensland .. | Q. 903 .. .. | 7-9-15 | 11 months | 22·1 | 20·45 | 0·29 | 12·0 | 18·00 | 92·5 | 16·2 |
| Do. .. | Q. 1049 .. .. | 7-9-15 | do. | 22·0 | 20·45 | 0·31 | 9·8 | 18·45 | 92·9 | 16·6 |
| Do. .. | Q. 1112 .. .. | 7-9-15 | do. | 21·1 | 19·37 | 0·65 | 11·3 | 17·18 | 91·8 | 15·4 |
| Do. .. | Q. 1121 .. .. | 7-9-15 | do. | 22·0 | 20·45 | 0·39 | 10·0 | 18·40 | 92·9 | 16·6 |
| Do. .. | Badila Seedling .. | 7-9-15 | do. | 23·7 | 22·20 | 0·09 | 11·0 | 19·76 | 93·6 | 17·9 |
| Do. .. | Hybrid No. 1 .. .. | 7-9-15 | do. | 23·0 | 21·60 | 0·12 | 11·0 | 19·22 | 93·9 | 17·5 |

It will be noticed from these that Badila Seedling and Hybrid No. 1 have given the highest P.O.C.S. Q 1121 is also a good variety. Badila Seedling is apparently the same cane as Badila itself, but having been raised in Brisbane it should do well in taking the place of the older variety in the North. Hybrid No. 1 may also give good results in North Queensland, and is well worth trying. The analytical results covering the plant and two ratoon crops are presented below:—

ANALYTICAL RESULTS TO DATE OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—PLANT, FIRST, AND SECOND RATOON CROPS—1913, 1914, AND 1915.

| Variety of Cane. | Plant Crop, 1913. | | | | First Ratoon Crop, 1914. | | | | Second Ratoon Crop, 1915. | | | | Average of 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. | P.O.C.S. |
| Queensland .. .. 903 | 19·8 | 18·76 | ·32 | 94·74 | 19·5 | 18·19 | ·32 | 93·28 | 22·1 | 20·45 | ·29 | 92·5 | 19·13 | 93·4 | 15·5 |
| Do. .. .. 1049 | 22·9 | 21·56 | ·23 | 93·58 | 21·3 | 20·07 | ·30 | 94·22 | 22·0 | 20·45 | ·31 | 92·9 | 20·56 | 94·4 | 16·7 |
| Do. .. .. 1112 | 18·6 | 16·64 | ·99 | 89·46 | 19·6 | 17·23 | ·74 | 87·89 | 21·1 | 19·37 | ·65 | 91·8 | 17·74 | 89·7 | 14·4 |
| Do. .. .. 1121 | 20·3 | 19·39 | ·29 | 95·57 | 21·0 | 19·26 | ·15 | 91·71 | 22·0 | 20·45 | ·39 | 92·9 | 19·67 | 93·2 | 15·8 |
| Q. Badila Seedling .. .. | 21·2 | 20·39 | ·30 | 95·23 | 22·0 | 20·82 | ·19 | 94·63 | 23·7 | 22·20 | ·09 | 93·6 | 21·07 | 94·4 | 17·1 |
| Q. Hybrid No. 1 .. .. | 20·2 | 19·42 | ·17 | 95·64 | 19·8 | 18·35 | ·32 | 95·07 | 23·0 | 21·60 | ·12 | 93·9 | 19·78 | 94·8 | 16·1 |

The second ratoon crop is as follows:—

CROP RESULTS OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—SECOND RATOON CROP—SEPTEMBER, 1915.

| Country. | Variety of Cane. | Age of Cane. | Weight of Cane per Acre in English Tons. | Yield of Pure Obtainable Cane Sugar per Acre in Pounds. | Yield of Pure Obtainable Cane Sugar per Acre in English Tons. |
|---|---|---|---|---|---|
| Queensland .. .. .. | Queensland Seedling 903 .. | 11½ months | 14·8 | 5,398 | 2·41 |
| Do. .. .. .. | do. 1049 .. | do. | 6·5 | 2,422 | 1·08 |
| Do. .. .. .. | do. 1112 .. | do. | 14·5 | 5,031 | 2·24 |
| Do. .. .. .. | do. 1121 .. | do. | 17·5 | 6,543 | 2·92 |
| Do. .. .. .. | Badila Seedling .. .. .. | do. | 19·8 | 7,953 | 3·55 |
| Do. .. .. .. | Hybrid No. 1 .. .. .. | do. | 12·1 | 4,764 | 2·12 |

The summary of results of the three crops is given below:—

CROP RESULTS TO DATE OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—PLANT, FIRST, AND SECOND RATOON CROPS—1913, 1914 AND 1915.

| Country. | Variety of Cane. | PLANT CROP, 1913. | | FIRST RATOON CROP, 1914. | | SECOND RATOON CROP, 1915. | | 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. |
| Queensland | Q. Seedling 903 | 35·4 | 5·7 | 30·3 | 4·9 | 14·8 | 2·6 | 80·5 | 13·2 |
| Do. | do. 1049 | 23·3 | 4·5 | 15·4 | 2·8 | 6·5 | 1·2 | 45·2 | 8·5 |
| Do. | do. 1112 | 42·5 | 6·1 | 20·0 | 3·1 | 14·5 | 2·5 | 77·0 | 11·7 |
| Do. | do. 1121 | 40·2 | 6·9 | 45·1 | 7·6 | 17·5 | 3·2 | 102·8 | 17·7 |
| Do. | Badila Seedling | 47·1 | 8·6 | 46·2 | 8·7 | 19·8 | 3·9 | 113·1 | 21·2 |
| Do. | Hybrid No. 1 .. | 43·7 | 7·6 | 34·4 | 5·8 | 12·1 | 2·3 | 90·2 | 15·7 |

This experiment is now concluded; and Q 903, 1121, Badila Seedling, and Hybrid No. 1 will be retained for distribution purposes.

EXPERIMENTS WITH CANES FROM LOUISIANA AND CANE KNOWN AS CASSILIS.

These experiments included Trinidad 211 (sent to the Mackay Station from Louisiana, though originally propagated in Trinidad) and Louisiana Striped. To these were added a cane called "Cassilis," forwarded to the Station by Mr. Scougall, of Mount Bauple. As Trinidad Seedling has proved too low in sugar to be of value, and the other two have developed disease, the experiment has been discontinued and the canes discarded. Cassilis, however, will be given another chance at the Bundaberg Experiment Station. In order that they may be on record, however, in the event of the two first canes being reintroduced at any time, the analytical results of the three canes from 1913 to 1915 are set out hereunder:—

ANALYTICAL RESULTS TO DATE OF CANES FROM LOUISIANA AND CANE KNOWN AS CASSILIS—PLANT, FIRST, AND SECOND RATOON CROPS, 1913, 1914, AND 1915.

| Name or Number of Cane. | PLANT CROP, 1913. | | | | FIRST RATOON CROP, 1914. | | | | SECOND RATOON CROP, 1915. | | | | AVERAGE OF 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. | P.O.C.S. |
| Louisiana T. 211 .. .. | 18·4 | 15·15 | 1·85 | 82·33 | 19·1 | 16·56 | 1·43 | 86·70 | 19·4 | 15·09 | 2·50 | 77·7 | 15·60 | 82·2 | 11·6 |
| Louisiana La Striped .. .. | 20·4 | 19·49 | ·20 | 95·53 | 18·4 | 16·37 | ·95 | 88·96 | 20·9 | 19·48 | ·32 | 93·2 | 18·44 | 92·6 | 14·8 |
| Cassilis .. .. .. .. | 20·5 | 19·52 | ·14 | 95·21 | 19·8 | 18·81 | ·35 | 95·00 | 21·3 | 19·96 | ·16 | 93·7 | 19·42 | 94·7 | 15·8 |

FURTHER EXPERIMENTS WITH CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY.

*First Ratoon Crop.*

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 experiment, and in consequence had to be replanted in order that sufficient cane might be obtained. They were, therefore, planted out in September, 1912. The season being favourable, these canes made good growth, and by the latter end of July of 1913 a further selection of the most promising was made and the canes planted out in competition. The treatment of the land has been detailed in previous reports.

The following canes were planted out:— 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, Barbados 244, New Guinea 41 Sport, Q. 1004, Q. 1009, Q. 1013, and Q. 1025.

Immediately following the harvesting of the plant crop early in October of last year, the trash was burned and the cane ratooned in the usual manner in vogue at the Station. Owing to the dry weather prevailing, the results from these canes have been very disappointing; and at present it does not seem as though, with the exception of Q. 812A, Q. 698, Q. 745, Q. 779, and D. 115, any of these varieties will be of value, and, therefore, worthy of retaining. This being the case, the tables of monthly and final analyses have been omitted, the analytical results to date being furnished in the following tables together with the results of the two crops:—

ANALYTICAL RESULTS TO DATE OF CANE FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—PLANT AND FIRST RATOON CROPS—1914-1915.

| Name or Number of Cane. | Plant Crop, 1914. | | | | First Ratoon Crop, 1915. | | | | 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. | P.O.C.S. |
| Queensland 112 | 17·7 | 14·89 | 1·43 | 84·12 | 19·6 | 16·84 | 1·02 | 85·9 | 15·86 | 85·0 | 12·0 |
| Do. 115 | 17·8 | 14·62 | 1·43 | 82·13 | 18·1 | 15·04 | 1·13 | 83·0 | 14·83 | 82·6 | 11·0 |
| Do. 554 | 17·7 | 14·94 | 1·28 | 84·40 | 20·8 | 17·82 | ·70 | 85·6 | 16·38 | 85·0 | 12·4 |
| Do. 558 | 16·9 | 14·17 | 1·40 | 83·84 | 18·1 | 14·38 | 1·60 | 79·4 | 14·27 | 81·5 | 10·5 |
| Do. 684 | 14·6 | 9·02 | 4·20 | 61·78 | 17·7 | 11·63 | 2·04 | 65·7 | 10·32 | 63·9 | 6·1 |
| Do. 698 | 18·4 | 15·01 | 1·85 | 81·57 | 20·2 | 17·07 | 1·25 | 84·5 | 16·04 | 83·1 | 12·0 |
| Do. 719 | 17·8 | 15·39 | 1·75 | 86·46 | 20·6 | 18·04 | ·78 | 87·5 | 16·71 | 87·0 | 12·9 |
| Do. 721 | 20·6 | 18·83 | ·67 | 91·40 | 22·7 | 21·35 | ·40 | 94·0 | 20·09 | 92·7 | 16·1 |
| Do. 745 | 21·0 | 19·87 | ·34 | 94·61 | 22·3 | 20·93 | ·14 | 93·8 | 20·40 | 94·2 | 16·5 |
| Do. 748 | 14·8 | 11·53 | 2·21 | 77·90 | 20·2 | 18·23 | ·74 | 90·2 | 14·88 | 85·0 | 11·3 |
| Do. 750 | 15·6 | 12·04 | 2·00 | 77·17 | 21·2 | 18·95 | ·22 | 89·3 | 15·49 | 84·1 | 11·7 |
| Do. 763 | 18·0 | 16·55 | ·44 | 91·94 | 19·0 | 15·66 | 1·25 | 82·4 | 16·10 | 87·0 | 12·4 |
| Do. 767 | 17·6 | 15·42 | ·90 | 87·61 | 20·7 | 18·85 | ·20 | 91·0 | 17·13 | 89·6 | 13·5 |
| Do. 768 | 20·4 | 18·46 | ·56 | 90·49 | 22·8 | 20·36 | ·27 | 89·2 | 19·41 | 89·8 | 15·3 |
| Do. 779 | 20·0 | 18·50 | ·42 | 92·50 | 21·5 | 19·44 | ·31 | 90·4 | 18·97 | 91·6 | 15·1 |
| Do. 812 | 17·6 | 15·75 | ·98 | 89·48 | 20·7 | 19·20 | ·31 | 92·7 | 17·47 | 91·2 | 13·9 |
| Do. 812A | 21·5 | 20·27 | ·21 | 94·27 | 22·6 | 21·09 | ·19 | 93·3 | 20·68 | 93·7 | 16·7 |
| Do. 822 | 20·4 | 18·83 | ·80 | 92·30 | 22·1 | 20·71 | ·30 | 93·7 | 19·77 | 93·0 | 15·9 |
| Do. 840 | 17·0 | 14·28 | 1·43 | 84·00 | 20·0 | 17·97 | ·61 | 89·8 | 16·12 | 87·1 | 12,4 |
| Do. 887 | 18·8 | 16·98 | 1·17 | 90·31 | 20·2 | 17·83 | ·61 | 88·2 | 17·40 | 89·2 | 13,6 |
| Do. 900 | 20·5 | 19·55 | ·18 | 95·36 | 20·4 | 17·93 | ·36 | 87·8 | 18·74 | 91·6 | 14·9 |
| Do. 999 | 15·4 | 14·07 | ·67 | 80·86 | .. | .. | .. | .. | .. | .. | .. |
| Do. 1004 | 20·1 | 18·50 | ·64 | 92·03 | 20·2 | 17·57 | 1·20 | 86·9 | 18·03 | 89·5 | 14·2 |
| Do. 1009 | 17·3 | 15·59 | ·84 | 90·11 | 21·0 | 19·06 | ·30 | 90·7 | 17·32 | 90·4 | 13·7 |
| Do. 1013 | 19·2 | 17·37 | ·70 | 90·46 | 20·3 | 17·35 | ·89 | 85·4 | 17·36 | 87·8 | 13·5 |
| Do. 1025 | 19·2 | 17·35 | ·70 | 90·36 | 19·8 | 17·47 | ·41 | 88·2 | 17·41 | 89·2 | 13·6 |
| New Guinea 41 Sport | 18·8 | 16·84 | ·88 | 89·57 | 23·0 | 20·93 | ·44 | 91·0 | 18·88 | 90·3 | 14·9 |
| Demerara 115 | 18·8 | 17·37 | ·55 | 92·39 | 22·4 | 20·61 | ·31 | 92·0 | 18·99 | 92·1 | 15·2 |
| Do. 1483 | 18·5 | 16·80 | ·94 | 90·81 | 22·2 | 20·64 | ·37 | 92·9 | 18·72 | 91·9 | 15·0 |
| Barbadoes 244 | 18·5 | 16·00 | 1·14 | 86·48 | 21·2 | 18·42 | 1·04 | 86·8 | 17·21 | 86·7 | 13·2 |

CROP RESULTS TO DATE OF THE SECONDARY SELECTION OF CANES FROM THE QUEENSLAND ACCLIMATISATION SOCIETY—PLANT AND FIRST RATOON CROPS—1914-1915.

| Country. | Variety of Cane. | Plant Crop, 1914. | | First Ratoon Crop, 1915. | | 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 112 | 49·0 | 6·5 | 13·8 | 2·0 | 62·8 | 8·5 |
| Do. | do. 115 | 57·9 | 7·4 | 24·5 | 1·9 | 72·4 | 9·3 |
| Do. | do. 554 | 24·1 | 3·2 | 13·4 | 2·0 | 37·5 | 5·2 |
| Do. | do. 558 | 72·1 | 9·3 | 21·5 | 2·7 | 93·6 | 12·0 |
| Do. | do. 684 | 33·5 | 2·7 | 11·8 | 1·2 | 45·4 | 3·9 |
| Do. | do. 698 | 52·3 | 6·8 | 43·5 | 6·4 | 95·8 | 13·2 |
| Do. | do. 719 | 41·4 | 5·7 | 11·8 | 1·8 | 53·2 | 7·5 |
| Do. | do. 721 | 22·5 | 3·7 | 12·4 | 2·3 | 34·9 | 6·0 |
| Do. | do. 745 | 39·4 | 7·2 | 15·7 | 2·9 | 55·1 | 10·1 |
| Do. | do. 748 | 40·2 | 4·2 | 13·2 | 2·1 | 53·4 | 6·3 |
| Do. | do. 750 | 38·5 | 4·2 | 27·6 | 4·7 | 66·1 | 8·9 |
| Do. | do. 763 | 53·0 | 8·9 | 11·6 | 1·5 | 64·0 | 9·5 |
| Do. | do. 767 | 38·1 | 5·3 | 11·4 | 1·8 | 49·5 | 7·1 |
| Do. | do. 768 | 35·9 | 6·0 | 11·8 | 2·1 | 47·7 | 8·1 |
| Do. | do. 779 | 42·2 | 7·0 | 15·3 | 2·6 | 57·5 | 9·6 |
| Do. | do. 812 | 42·2 | 6·1 | 15·9 | 2·6 | 58·1 | 8·9 |
| Do. | do. 812A | 35·9 | 6·4 | 22·1 | 4·1 | 58·0 | 10·5 |
| Do. | do. 822 | 53·8 | 9·1 | 20·6 | 3·7 | 74·4 | 12·8 |
| Do. | do. 840 | 27·2 | 3·5 | 7·5 | 1·2 | 34·7 | 4·7 |
| Do. | do. 887 | 34·2 | 5·1 | 3·5 | ·56 | 37·7 | 5·66 |
| Do. | do. 900 | 45·8 | 7·9 | 12·2 | 1·9 | 58·0 | 9·8 |
| Do. | do. 999 | 4·6 | ·5 | Failed | Failed | 4·6 | ·5 |
| Demerara | Demerara Seedling 115 | 47·0 | 7·3 | 18·4 | 3·3 | 65·4 | 10·6 |
| Do. | do. 1483 | 48·0 | 7·4 | 24·6 | 4·5 | 72·6 | 11·9 |
| Do. | Barbadoes 244 | 54·5 | 8·9 | 14·3 | 2·3 | 68·9 | 10·3 |
| New Guinea | Sport from N.G. 41 | 62·6 | 9·6 | 9·5 | 1·8 | 72·1 | 11·4 |
| Queensland | Queensland Seedling 1004 | 47·6 | 7·8 | 14·5 | 2·2 | 62·1 | 10·0 |
| Do. | do. 1009 | 30·9 | 4·4 | 7·9 | 1·3 | 38·8 | 5·7 |
| Do. | do. 1013 | 27·2 | 4·2 | 6·6 | 1·0 | 33·8 | 5·2 |
| Do. | do. 1025 | 40·0 | 6·2 | 3·6 | ·55 | 43·6 | 6·75 |

As the land upon which these experiments have been growing is required for other purposes, the best of these canes only will be retained for distribution purposes. The remainder are too light in weight, and appear low in vitality and prone to disease.

### 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 initiated 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 tillage 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 ratoon crop of varieties for distribution, and its preparation is given in last year's report.

Immediately following the harvesting of the plant crop (details of which have already appeared in the report for 1914), the trash was burned and the cane ratooned in the usual manner, the plots being again subjected to the same treatment as the plant crop.

Owing to the drought, the cane on the whole made little growth, and no apparent difference was to be detected between the plots.

In the following table will be found analytical data:—

Analytical Results of Canes in the Cultivation Experiments—First Ratoon Crop—September, 1915.

| 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. | P.O.C.S. | % Sucrose in Cane. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | N.G. 24B | Shallow cultivation with duck-foot hoes on Planet Junior cultivator. Depth, 3 in. | 7-9-15 | 11 months | 21·4 | 19·44 | 0·24 | 90·8 | 12·0 | 15·2 | 17·11 |
| 2 | Do. | Deeper cultivation with digging hoes fitted on Planet Junior cultivator. Depth, 4 in. | 7-9-15 | do. | 20·7 | 18·46 | 0·53 | 89·1 | 11·8 | 14·3 | 16·28 |
| 3 | Do. | Combination of pony plough and Planet Junior cultivator fitted with digging hoes. Depth, 6 in. | 7-9-15 | do. | 20·7 | 18·59 | 0·71 | 89·8 | 11·8 | 14·5 | 16·40 |
| 4 | Do. | Spring tooth harrowed to depth of 6 in. | 7-9-15 | do. | 21·4 | 19·17 | 0·48 | 89·5 | 11·5 | 14·9 | 16·97 |
| 5 | Do. | Cultivated with light drill harrow fitted with straight sharp tines. Depth, 3 in. | 8-9-15 | do. | 21·4 | 19·44 | 0·34 | 90·8 | 12·0 | 15·2 | 17·11 |

The table appearing below gives the crop results:—

CROP RESULTS OF CANES IN THE CULTIVATION EXPERIMENTS—FIRST RATOON CROP—SEPTEMBER, 1915.

| Number of Plot. | Variety of Cane. | Method of Subsequent Cultivation. | Age of Cane. | Weight of Cane per Acre in English Tons. | Yield of Pure Obtainable Cane Sugar per Acre in Pounds. | Yield of Pure Obtainable Cane Sugar per Acre in English Tons. |
|---|---|---|---|---|---|---|
| 1 | New Guinea 24B | Shallow cultivation with duck-foot hoes on Planet Junior cultivator. Depth, 3 in. | 11½ mths. | 19·6 | 6,694 | 2·98 |
| 2 | Do. .. | Deeper cultivation with digging hoes fitted on Planet Junior cultivator. Depth, 4 in. | do. | 18·1 | 5,819 | 2·59 |
| 3 | Do. .. | Combination of pony plough and Planet Junior cultivator fitted with digging hoes. Depth, 6 in. | do. | 17·0 | 5,541 | 2·47 |
| 4 | Do. .. | Spring tooth harrowed to depth of 6 in... .. .. | do. | 20·0 | 6,697 | 2·99 |
| 5 | Do. .. | Cultivated with light drill harrow fitted with straight sharp tines. Depth, 3 in. | do. | 19·6 | 6,694 | 2·98 |

This year the subsequent cultivation by means of scarifiers has again given much better results than where the plough was used, although the results have not been so pronounced in favour of the broad hoes as they were in the plant crop. The results of the two years' experiment are set out hereunder:—

TOTAL CROP RESULTS TO DATE OF CANES IN THE CULTIVATION EXPERIMENTS—PLANT AND FIRST RATOON CROPS—1914-1915.

| No. of Plot. | Variety of Cane. | Method of Subsequent Cultivation. | Plant Crop, 1914. | | First Ratoon Crop, 1915. | | 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. |
| 1 | New Guinea 24B .. | Shallow cultivation with duck-foot hoes on Planet Junior cultivator. Depth, 3 in. | 54·4 | 8·6 | 19·6 | 3·35 | 74·0 | 11·95 |
| 2 | Do. .. .. | Deeper cultivation with digging hoes fitted on Planet Junior cultivator. Depth, 4 in. | 45·6 | 7·2 | 18·1 | 2·94 | 63·7 | 10·14 |
| 3 | Do. .. .. | Combination of pony plough and Planet Junior cultivator fitted with digging hoes. Depth, 6 in. | 49·5 | 8·1 | 17·0 | 2·78 | 66·5 | 10·88 |
| 4 | Do. .. .. | Spring tooth harrowed to depth of 6 inches | 51·6 | 8·3 | 20·0 | 3·4 | 71·6 | 11·7 |
| 5 | Do. .. .. | Cultivated with light drill harrow fitted with straight sharp tines. Depth, 3 in. | 53·4 | 7·9 | 19·6 | 3·35 | 73·0 | 11·25 |

In the above it is seen that cultivation with the broad hoes and light drill harrow so far leads.

## 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 careful and accurate manner. An absolutely uniform piece of land was chosen and 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. Each plant was 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 above details refer to the plant crop, and the particulars concerning the count of canes will be found in last year's report. From it will be seen that the arrowed canes finally produced almost as many sticks as the non-arrowed and actually beat the latter in weight per acre.

The crop dealt with this year is a first ratoon one, and the anaytical data will be found in the following table:—

FINAL EXAMINATION OF CANES IN THE ARROWED AND NON-ARROWED PLANT EXPERIMENT—FIRST RATOON CROP—SEPTEMBER, 1915.

| 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. | % Fibre in Cane. | % Sucrose in Cane. | Purity of Juice. | P.C.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Q. 116 .. | Arrowed cane .. .. | 8-9-15 | 11 months | 21·1 | 18·84 | 0·52 | 11·0 | 16·77 | 89·2 | 14·8 |
| 2 | Q. 116 .. | Non-arrowed cane .. | 8-9-15 | do. | 21·2 | 18·79 | 0·60 | 11·0 | 16·72 | 88·6 | 14·7 |

It was stated last year that the cane from non-arrowed cane sets appeared to have some advantage in sucrose and purity, while the fibre was also lower under these conditions. This year little difference is noticeable.

Owing to the dry weather, the yield of the ratoon crop fell off considerably, the crop results being tabulated below:—

CROP RESULTS OF CANES IN THE ARROWED AND NON-ARROWED PLANT EXPERIMENT—FIRST RATOON CROP—SEPTEMBER, 1915.

| No. of Plot. | Variety of Cane. | Plants Cut from. | Age of Cane. | Actual Count of Canes per Plot made on 1st Sept. | Weight of Cane per Acre in English Tons. | Yield of Pure Obtainable Cane Sugar per Acre in Pounds. | Yield of Pure Obtainable Cane Sugar per Acre in English Tons. |
|---|---|---|---|---|---|---|---|
| 1 | Q'land Seedling .. 116 | Arrowed cane .. .. .. | 11½ mths. | 979 | 29·7 | 9,877 | 4·40 |
| 2 | Do. .. .. 116 | Non-arrowed cane .. .. | do. | 779 | 27·3 | 9,019 | 4·02 |

From the above table it will be seen that the cane plants from arrowed cane sets not only produced a greater stand of cane, but also a greater yield. This is interesting, and the result of the third crop will be awaited with interest.

The crop results for the two seasons are as under:—

TOTAL CROP RESULTS TO DATE OF CANE IN THE ARROWED AND NON-ARROWED PLANT EXPERIMENT—PLANT AND FIRST RATOON CROPS—1914-1915.

| No. of Plot. | Variety of Cane. | Plants Cut from. | Plant Crop, 1914. | | First Ratoon Crop, 1915. | | 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. |
| 1 | Q'land Seedling .. 116 | Arrowed cane .. .. | 55·5 | 8·2 | 29·7 | 4·9 | 85·2 | 13·1 |
| 2 | Do. .. .. 116 | Non-arrowed cane .. | 51·9 | 8·0 | 27·3 | 4·5 | 79·2 | 12·5 |

ANALYTICAL TESTS OF MALABAR (GREEN TANNA), OTAMITE, AND CHERIBON IN COMPETITION WITH NEW GUINEA 15 (BADILA), NEW GUINEA 24 (GORU), AND H.MEELEDON 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 cane 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 were commenced in June, 1914, and were carried on for six months with a view of 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 as a plant crop 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.

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 | 17·63 | ·64 | 90·41 |
| Badila .. .. .. .. .. | 8-6-14 | do. | 18·4 | 16·03 | 1·35 | 87·11 |
| Goru .. .. .. .. .. | 8-6-14 | do. | 16·5 | 13·16 | 2·01 | 79·75 |
| Cheribon .. .. .. .. .. | 8-6-14 | do. | 13·9 | 9·20 | 2·97 | 66·18 |
| 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 | 11·88 | 2·50 | 76·64 |
| Goru .. .. .. .. .. | 9-6-14 | do. | 16·4 | 13·66 | 1·58 | 83·29 |
| Cheribon .. .. .. .. .. | 9-6-14 | do. | 14·1 | 10·55 | 2·71 | 74·82 |
| 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 | 19·32 | ·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 | 85·69 |
| 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 | 16 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.

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | 15·97 | 1·39 | 86·79 |
| 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 Arrowing. |
|---|---|---|---|---|---|---|---|---|---|---|
| Hambledon, Q. 426 .. | 10-9-14 | 13 months | 22·25 | 21·25 | ·10 | 94·44 | 10·60 | 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 | 92·58 | 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 | 87·94 | 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 | 12·49 |
| 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 | 89·53 | 13·24 |
| Otamite .. .. .. .. | 7-10-14 | do. | 18·6 | 16·69 | 1·00 | 89·73 | 13·45 |

SIXTH PROGRESSIVE EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENT—PLANT CROP—NOVEMBER, 1914.

| Variety of Cane. | Date of Analysis. | Age of Cane. | Brix. | Sucrose. | Glucose. | Purity. | Fibre in Cane. | P.O.C.S. in Cane. |
|---|---|---|---|---|---|---|---|---|
| H.Q. 426 .. .. | 2-11-14 | 15 months | 22·8 | 21·56 | ·07 | 94·56 | 8·56 | 17·98 |
| Badila .. .. | 2-11-14 | do. | 23·9 | 22·43 | ·09 | 93·84 | 7·30 | 18·88 |
| Goru .. .. | 2-11-14 | do. | 21·9 | 20·48 | ·14 | 93·51 | 9·80 | 16·75 |
| Cheribon .. .. | 2-11-14 | do. | 21·8 | 20·11 | ·30 | 92·24 | 10·20 | 16·24 |
| Malabar .. .. | 2-11-14 | do. | 19·7 | 17·95 | ·41 | 91·11 | 12·80 | 13·97 |
| Otamite .. .. | 2-11-14 | do. | 19·7 | 17·82 | ·47 | 90·45 | 8·84 | 14·44 |
| H.Q. 426 .. .. | 2-11-14 | 20 months | 21·0 | 19·48 | ·10 | 92·76 | 10·60 | 15·71 |
| Badila .. .. | 2-11-14 | do. | 23·4 | 21·99 | ·08 | 93·97 | 9·62 | 18·06 |
| Goru .. .. | 2-11-14 | do. | 20·4 | 19·12 | ·14 | 93·72 | 10·58 | 15·51 |
| Cheribon .. .. | 2-11-14 | do. | 20·8 | 19·37 | ·26 | 93·12 | 11·02 | 15·58 |
| Malabar .. .. | 2-11-14 | do. | 20·6 | 18·85 | ·36 | 91·59 | 13·42 | 14·61 |
| Otamite .. .. | 2-11-14 | do. | 19·9 | 17·86 | ·81 | 89·74 | 10·18 | 14·19 |

FINAL EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENT—PLANT CROP—DECEMBER, 1914.

| Variety of Cane. | Date of Analysis. | Age of Cane. | Brix. | Sucrose. | Glucose. | Purity. | Fibre in Cane. | P.O.C.S. in Cane. |
|---|---|---|---|---|---|---|---|---|
| H.Q. 426 .. .. | 1-12-14 | 16 months | 22·7 | 21·49 | ·08 | 94·67 | 8·56 | 17·93 |
| Badila .. .. | 1-12-14 | do. | 22·2 | 20·58 | ·21 | 92·70 | 7·30 | 17·21 |
| Goru .. .. | 1-12-14 | do. | 19·8 | 18·23 | ·39 | 92·07 | 9·80 | 14·77 |
| Cheribon .. .. | 1-12-14 | do. | 21·7 | 20·17 | ·23 | 92·95 | 10·20 | 16·36 |
| Malabar .. .. | 1-12-14 | do. | 20·5 | 18·72 | ·40 | 91·31 | 12·80 | 14·59 |
| Otamite .. .. | 1-12-14 | do. | 20·4 | 18·43 | ·46 | 90·34 | 8·84 | 14·92 |
| H.Q. 426 .. .. | 1-12-14 | 21 months | 20·6 | 18·88 | ·13 | 91·65 | 10·60 | 15·12 |
| Badila .. .. | 1-12-14 | do. | 23·1 | 21·93 | ·07 | 94·93 | 9·62 | 18·12 |
| Goru .. .. | 1-12-14 | do. | 19·1 | 17·64 | ·24 | 92·35 | 10·58 | 14·19 |
| Cheribon .. .. | 1-12-14 | do. | 21·7 | 20·15 | ·25 | 92·85 | 11·02 | 16·18 |
| Malabar .. .. | 1-12-14 | do. | 21·1 | 19·11 | ·46 | 90·56 | 13·42 | 15·57 |
| Otamite .. .. | 1-12-14 | do. | 20·4 | 18·80 | ·41 | 92·15 | 10·18 | 15·18 |

These tables have been summarised to show the purity and P.O.C.S. in each month from June to December, and are set out below:—

ANALYTICAL TESTS—EARLY PLANTING—MARCH, 1913.

| Variety—Planted March, 1913. | JUNE, 15 MONTHS. | | JULY, 16 MONTHS. | | AUGUST, 17 MONTHS. | | SEPTEMBER, 18 MONTHS. | | OCTOBER, 19 MONTHS. | | NOVEMBER, 20 MONTHS. | | DECEMBER, 21 MONTHS. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Purity. | P.O.C.S. | Purity. | P.O.C.S. | Purity. | P.O.C.S. | Purity. | P.O.C.S. | Purity. | P.O.C.S. | Purity. | P.O.C.S. | Purity. | P.O.C.S. |
| H.Q. 426 .. | 92·32 | 14·62 | 93·03 | 14·8 | 95·39 | 15·89 | 96·72 | 18·71 | 95·50 | 17·46 | 92·76 | 15·71 | 91·65 | 15·12 |
| Badila .. | 76·64 | 8·40 | 88·44 | 12·8 | 93·16 | 14·48 | 94·00 | 16·03 | 93·80 | 17·23 | 93·97 | 18·06 | 94·93 | 18·12 |
| Goru .. | 83·29 | 10·23 | 84·47 | 11·5 | 87·37 | 12·64 | 89·45 | 14·24 | 91·26 | 14·58 | 93·72 | 15·51 | 92·35 | 14·19 |
| Cheribon .. | 74·82 | 7·32 | 76·66 | 8·6 | 86·79 | 12·30 | 92·58 | 15·06 | 91·21 | 13·83 | 93·12 | 15·58 | 92·85 | 16·18 |
| Malabar .. | 73·72 | 7·3 | 78·36 | 8·9 | 84·34 | 10·76 | 89·04 | 12·85 | 89·53 | 13·24 | 91·5 | 14·61 | 90·56 | 15·57 |
| Otamite .. | 66·10 | 5·56 | 66·41 | 6·10 | 80·71 | 9·9 | 87·94 | 13·31 | 89·73 | 13·45 | 89·74 | 14·19 | 92·15 | 15·18 |

ANALYTICAL TESTS—LATE PLANTING—AUGUST, 1913.

| Variety Planted August, 1913. | JUNE, 10 MONTHS. | | JULY, 11 MONTHS. | | AUGUST, 12 MONTHS. | | SEPTEMBER, 13 MONTHS. | | OCTOBER, 14 MONTHS. | | NOVEMBER, 15 MONTHS. | | DECEMBER, 16 MONTHS. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Purity. | P.O.C.S. | Purity. | P.O.C.S. | Purity. | P.O.C.S. | Purity. | P.O.C.S. | Purity. | P.O.C.S. | Purity. | P.O.C.S. | Purity. | P.O.C.S. |
| H.Q. 426 .. | 90·41 | 13·92 | 92·44 | 15·50 | 95·61 | 16·59 | 94·44 | 17·31 | 95·24 | 17·23 | 94·56 | 17·98 | 94·67 | 17·93 |
| Badila .. | 87·11 | 12·38 | 91·74 | 14·71 | 94·1 | 16·16 | 95·47 | 18·20 | 95·94 | 19·05 | 93·84 | 18·88 | 92·70 | 17·21 |
| Goru .. | 79·75 | 9·5 | 85·69 | 11·72 | 88·75 | 12·85 | 94·65 | 16·61 | 91·21 | 15·08 | 93·51 | 16·75 | 92·07 | 14·77 |
| Cheribon .. | 66·18 | 5·6 | 80·12 | 9·30 | 85·45 | 11·91 | 88·16 | 13·86 | 90·85 | 13·43 | 92·24 | 16·24 | 92·95 | 16·36 |
| Malabar .. | 73·67 | 7·4 | 81·84 | 10·18 | 83·02 | 10·66 | 88·86 | 13·15 | 88·75 | 12·49 | 91·11 | 13·97 | 91·31 | 14·59 |
| Otamite .. | 62·86 | 4·7 | 84·47 | 10·86 | 76·16 | 8·94 | 87·04 | 12·62 | 90·0 | 13·82 | 90·45 | 14·44 | 90·34 | 14·92 |

The average P.O.C.S. in the different canes for the seven months comprising early planting (March) and late planting (August) are as under:—

| Variety. | Early Planting, March, 1913. P.O.C.S. Average, 7 months. | Late Planting. August, 1913. P.O.C.S. Average, 7 months. |
|---|---|---|
| H.Q. 426 .. .. .. .. .. | 16·0 .. | 16·6 |
| Badila .. .. .. .. .. .. | 15·1 .. | 16·6 |
| Goru .. .. .. .. .. .. | 13·2 .. | 13·9 |
| Cheribon .. .. .. .. .. | 12·6 .. | 12·6 |
| Malabar .. .. .. .. .. | 11·8 .. | 11·8 |
| Otamite .. .. .. .. .. | 11·0 .. | 11·4 |

These are not what are known as "true averages," but are sufficiently accurate for comparative purposes. It will be seen that the first three canes are much the better varieties from the point of production of sugar, H.Q. 426 and Badila particularly so. It is true that Cheribon, Malabar, and Otamite improve considerably from September, but, taking this in, the points are decidely in favour of the first three. It will also be noted that the early or late planting makes no apparent difference in the average sugar content of Cheribon, Malabar, and Otamite: but in the case of H.Q. 426, Badila, and Goru, the late planting gives better average analyses. From these tables and what is known of it in other parts of Queensland, H.Q. 426 appears to be an early-maturing cane, and it will be observed that in the March planting it loses sugar after October, while Badila maintains its sweetness more evenly during the last six months of the year. The figures are exceedingly interesting, and should be of value to the Mackay millers and growers alike. Mackay is mentioned, because Cheribon and Otamite are grown to a very limited extent in other sugar districts.

In order that these experiments might be continued as ratoon crops and further data obtained, a portion of the above varieties was cut early in October of 1914 and ratooned.

Analyses from each variety were again carried out monthly, the ages of the cane in this case being, of course, all the same. The analyses of the ratoons from the earlier planting, however, are shown first in this series. The following are the results to date:—

FIRST PRELIMINARY EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENT—FIRST RATOON CROP—JUNE, 1915.

| Variety of Cane. | Date of Analysis. | Age of Cane. | Density of Juice (Brix). | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | P.O.C.S. |
|---|---|---|---|---|---|---|---|
| Hambledon, Queensland 426.. | 9-6-15 | 8 months | 19·6 | 17·55 | 0·66 | 89·5 | 13·8 |
| Badila .. .. .. | 9-6-15 | do. | 20·0 | 18·74 | 0·80 | 93·7 | 15·1 |
| Goru .. .. .. | 9-6-15 | do. | 16·2 | 13·90 | 1·56 | 85·8 | 10·6 |
| Cheribon .. .. .. | 9-6-15 | do. | 16·5 | 13·13 | 1·78 | 79·5 | 9·5 |
| Malabar .. .. .. | 9-6-15 | do. | 16·2 | 11·21 | 1·83 | 69·1 | 7·2 |
| Otamite .. .. .. | 9-6-15 | do. | 17·0 | 11·44 | 2·08 | 67·2 | 7·1 |
| Hambledon, Queensland 426.. | 9-6-15 | 8 months | 19·4 | 17·07 | 0·89 | 87·9 | 13·2 |
| Badila .. .. .. | 9-6-15 | do. | 19·7 | 17·37 | 1·00 | 88·1 | 13·5 |
| Goru .. .. .. | 9-6-15 | do. | 17·0 | 13·37 | 1·71 | 78·6 | 9·6 |
| Cheribon .. .. .. | 9-6-15 | do. | 16·0 | 12·51 | 2·08 | 78·1 | 8·9 |
| Malabar .. .. .. | 9-6-14 | do. | 16·3 | 12·48 | 2·23 | 76·5 | 8·8 |
| Otamite .. .. .. | 9-6-15 | do. | 16·7 | 13·13 | 1·83 | 78·6 | 9·4 |

SECOND PROGRESSIVE EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENT—FIRST RATOON CROP—JULY, 1915.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Hambledon, Queensland 426.. | 8-7-15 | 9 months | 21·5 | 19·17 | 0·81 | 89·1 | 15·0 |
| Badila .. .. .. | 8-7-15 | do. | 21·7 | 20·27 | 0·51 | 93·4 | 16·3 |
| Goru .. .. .. | 8-7-15 | do. | 19·8 | 17·30 | 0·86 | 87·3 | 13·4 |
| Cheribon .. .. .. | 8-7-15 | do. | 18·2 | 15·29 | 1·45 | 84·0 | 11·5 |
| Malabar .. .. .. | 8-7-15 | do. | 19·0 | 16·26 | 1·10 | 85·5 | 12·4 |
| Otamite .. .. .. | 8-7-15 | do. | 18·6 | 14·73 | 1·54 | 81·8 | 10·9 |
| Hambledon, Queensland 426.. | 8-7-15 | 9 months | 20·7 | 19·07 | 0·58 | 92·1 | 15·2 |
| Badila .. .. .. | 8-7-15 | do. | 21·1 | 19·51 | 0·50 | 92·4 | 15·7 |
| Goru .. .. .. | 8-7-15 | do. | 18·6 | 16·00 | 1·01 | 86·0 | 12·2 |
| Cheribon .. .. .. | 8-7-15 | do. | 18·0 | 14·91 | 1·92 | 82·8 | 11·1 |
| Malabar .. .. .. | 8-7-15 | do. | 19·3 | 15·99 | 1·45 | 82·8 | 11·9 |
| Otamite .. .. .. | 8-7-15 | do. | 17·5 | 14·01 | 1·56 | 80·0 | 10·2 |

THIRD PROGRESSIVE EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENT—FIRST RATOON CROP—AUGUST, 1915.

| Variety of Cane. | Date of Analysis. | Age of Cane. | Density of Juice (Brix). | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | P.O.C.S. |
|---|---|---|---|---|---|---|---|
| Hambledon, Queensland 426.. | 6-8-15 | 10 months | 22·7 | 21·09 | 0·25 | 92·4 | 15·8 |
| Badila .. .. .. | 6-8-15 | do. | 23·7 | 22·26 | 0·16 | 93·9 | 18·0 |
| Goru .. .. .. | 6-8-15 | do. | 21·6 | 19·70 | 0·55 | 91·2 | 15·2 |
| Cheribon .. .. .. | 6-8-15 | do. | 18·5 | 15·71 | 0·78 | 84·9 | 11·9 |
| Malabar .. .. .. | 6-8-15 | do. | 20·6 | 17·45 | 1·13 | 84·7 | 13·2 |
| Otamite .. .. .. | 6-8-15 | do. | 20·1 | 17·78 | 0·99 | 88·4 | 13·8 |
| Hambledon, Queensland 426.. | 6-8-15 | do. | 22·0 | 20·61 | 0·27 | 93·6 | 16·6 |
| Badila .. .. .. | 6-8-15 | do. | 20·2 | 18·18 | 0·32 | 90·0 | 14·3 |
| Goru .. .. .. | 6-8-15 | do. | 19·2 | 17·14 | 0·64 | 89·2 | 13·4 |
| Cheribon .. .. .. | 6-8-15 | do. | 21·1 | 16·87 | 0·96 | 79·9 | 12·2 |
| Malabar .. .. .. | 6-8-15 | do. | 20·4 | 18·27 | 1·11 | 89·5 | 14·3 |
| Otamite .. .. .. | 6-8-15 | do. | 20·5 | 18·32 | 0·91 | 89·3 | 14·4 |

FOURTH PROGRESSIVE EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENT—FIRST RATOON CROP—SEPTEMBER, 1915.

| 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. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|
| Hambledon, Qld. 426 .. | 9-9-15 | 11 mths. | 23·2 | 21·52 | ·10 | 92·7 | 10·8 | 17·3 |
| Badila .. .. .. | 9-9-15 | do. | 24·0 | 22·16 | ·10 | 92·3 | 9·8 | 18·0 |
| Goru .. .. .. | 9-9-15 | do. | 21·9 | 20·21 | ·20 | 92·2 | 10·8 | 16·2 |
| Cheribon .. .. .. | 9-9-15 | do. | 21·2 | 18·68 | ·32 | 88·1 | 11·5 | 14·4 |
| Malabar .. .. .. | 9-9-15 | do. | 20·8 | 18·21 | ·54 | 87·5 | 13·0 | 13·8 |
| Otamite .. .. .. | 9-9-15 | do. | 21·0 | 18·29 | ·62 | 87·0 | 11·0 | 14·1 |
| Hambledon, Qld. 426 .. | 9-9-15 | do. | 23·3 | 21·62 | ·32 | 92·7 | 10·0 | 17·6 |
| Badila .. .. .. | 9-9-15 | do. | 23·0 | 21·26 | ·32 | 92·4 | 9·1 | 17·4 |
| Goru .. .. .. | 9-9-15 | do. | 22·7 | 20·98 | ·24 | 92·4 | 10·5 | 16·9 |
| Cheribon .. .. .. | 9-9-15 | do. | 21·2 | 18·42 | ·76 | 86·8 | 10·9 | 14·2 |
| Malabar .. .. .. | 9-9-15 | do. | 20·2 | 17·49 | ·61 | 86·5 | 12·5 | 13·2 |
| Otamite .. .. .. | 9-9-15 | do. | 20·2 | 17·83 | ·67 | 88·2 | 10·6 | 13·9 |

FIFTH PROGRESSIVE EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENTS—OCTOBER, 1915.

| Variety of Cane. | Date of Analysis. | Age of Cane. | Density of Juice (Brix). | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | P.O.C.S. |
|---|---|---|---|---|---|---|---|
| Hambledon, Queensland 426 .. | 4-10-15 | 13 months | 24·4 | 22·76 | ·09 | 93·2 | 18·3 |
| Badila .. .. .. .. | 4-10-15 | do. | 24·3 | 22·33 | ·12 | 91·8 | 17·9 |
| Goru .. .. .. .. | 4-10-15 | do. | 23·6 | 21·74 | ·24 | 92·1 | 17·4 |
| Cheribon .. .. .. .. | 4-10-15 | do. | 21·3 | 19·17 | ·38 | 90·0 | 15·1 |
| Malabar .. .. .. .. | 4-10-15 | do. | 21·5 | 18·65 | ·54 | 86·7 | 14·4 |
| Otamite .. .. .. .. | 4-10-15 | do. | 20·5 | 18·54 | ·60 | 90·4 | 14·7 |
| Hambledon, Queensland 426 .. | 4-10-15 | do. | 22·7 | 21·44 | ·09 | 94·4 | 17·4 |
| Badila .. .. .. .. | 4-10-15 | do. | 24·5 | 22·84 | ·26 | 93·2 | 18·4 |
| Goru .. .. .. .. | 4-10-15 | do. | 21·8 | 20·13 | ·22 | 92·3 | 16·1 |
| Cheribon .. .. .. .. | 4-10-15 | do. | 21·8 | 19·66 | ·58 | 90·1 | 15·5 |
| Malabar .. .. .. .. | 4-10-15 | do. | 22·0 | 19·79 | ·50 | 89·9 | 15·6 |
| Otamite .. .. .. .. | 4-10-15 | do. | 19·4 | 18·09 | ·57 | 92·7 | 14·4 |

SIXTH PROGRESSIVE EXAMINATION OF CANES IN THE ANALYTICAL TEST EXPERIMENT—FIRST RATOON CROP—NOVEMBER, 1915.

| Variety of Cane. | Date of Analysis. | Age of Cane. | Density of Juice (Brix). | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | P.O.C.S. |
|---|---|---|---|---|---|---|---|
| Hambledon Queensland 426 .. | 2-11-15 | 14 months | 21·0 | 19·49 | ·10 | 92·3 | 15·6 |
| Badila .. .. .. .. | 2-11-15 | do. | 22·0 | 21·12 | ·08 | 94·8 | 16·9 |
| Goru .. .. .. .. | 2-11-15 | do. | 20·6 | 19·18 | ·16 | 92·7 | 15·3 |
| Cheribon .. .. .. .. | 2-11-15 | do. | 20·8 | 19·27 | ·30 | 92·5 | 15·5 |
| Malabar .. .. .. .. | 2-11-15 | do. | 20·0 | 18·12 | ·40 | 90·6 | 14·3 |
| Otamite .. .. .. .. | 2-11-15 | do. | 20·1 | 18·10 | ·75 | 90·0 | 14·3 |
| Hambledon, Queensland 426 .. | 2-11-15 | do. | 22·0 | 20·48 | ·10 | 93·0 | 16·5 |
| Badila .. .. .. .. | 2-11-15 | do. | 23·2 | 21·12 | ·08 | 91·0 | 16·8 |
| Goru .. .. .. .. | 2-11-15 | do. | 21·8 | 20·06 | ·17 | 92·0 | 16·0 |
| Cheribon .. .. .. .. | 2-11-15 | do. | 21·8 | 20·09 | ·30 | 91·7 | 15·9 |
| Malabar .. .. .. .. | 2-11-15 | do. | 20·0 | 17·90 | ·41 | 89·5 | 14·1 |
| Otamite .. .. .. .. | 2-11-15 | do, | 20·0 | 17·78 | ·55 | 88·9 | 13·9 |

From these it will be seen that the H.Q. 426, Badila, and Goru are again in the lead. This is worth noting by the Mackay farmers in view of the new Regulation of Cane Prices Boards.

### Papuan Canes Planted Out in Experiment—1st Selection Plant Crop.

As mentioned in last year's report a number of the varieties lately introduced from Papua had made such progress as to furnish sufficient seed to plant out in competition. During August of last year the following varieties were, therefore, selected and planted out in experiment:—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, 161. The preparation of the land will be found in last year's report.

Taking into consideration the unfavourable weather conditions, the following canes have made good growth:—Nos. 67, 69, 72, 74, 75, 77, 78, 79, 81, 83, 85, 87, 88, 90, 91, 114, 123, 161, and 158. Nos. 68, 73, 80, 84, and 86 are very weak; and in the cases of 80 and 84 the cane has practically all died out. Nos. 70, 72, 80, 84, and 86 have all developed the "gumming" disease.

As in other experiments, the usual preliminary and final analyses of these canes have been carried out, and details will be found in the following tables:—

First Preliminary Examination of Papuan Canes (Wells Collection)—Plant Crop—June, 1915.

| Country. | 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. |
|---|---|---|---|---|---|---|---|---|
| New Guinea | N.G. 67 | 11-6-15 | 10 months | 15·1 | 10·78 | 2·35 | 71·3 | 7·1 |
| Do. | N.G. 68 | 11-6-15 | do. | 15·0 | 10·35 | 2·35 | 69·0 | 6·6 |
| Do. | N.G. 69 | 11-6-15 | do. | 14·9 | 9·29 | 3·12 | 62·3 | 5·3 |
| Do. | N.G. 70 | 11-6-15 | do. | 14·8 | 8·78 | 3·78 | 59·3 | 4·7 |
| Do. | N.G. 72 | 11-6-14 | do. | 17·2 | 14·06 | 1·52 | 81·7 | 10·4 |
| Do. | N.G. 73 | 11-6-15 | do. | 15·5 | 12·04 | 1·78 | 77·6 | 8·6 |
| Do. | N.G. 74 | 11-6-15 | do. | 18·0 | 14·57 | 1·56 | 80·9 | 10·7 |
| Do. | N.G. 75 | 11-6-15 | do. | 16·0 | 13·50 | 1·76 | 84·3 | 10·2 |
| Do. | N.G. 77 | 11-6-15 | do. | 15·9 | 12·46 | 1·60 | 78·3 | 8·9 |
| Do. | N.G. 78 | 11-6-15 | do. | 15·7 | 11·69 | 2·08 | 74·4 | 8·1 |
| Do. | N.G. 79 | 11-6-15 | do. | 18·0 | 14·73 | 1·30 | 81·8 | 10·9 |
| Do. | N.G. 80 | 14-6-15 | do. | 17·0 | 13·53 | 1·81 | 79·5 | 9·8 |
| Do. | N.G. 81 | 14-6-15 | do. | 16·7 | 13·56 | 1·47 | 81·1 | 10·0 |
| Do. | N.G. 82 | 14-6-15 | do. | 15·7 | 12·02 | 1·92 | 76·5 | 8·4 |
| Do. | N.G. 83 | 14-6-15 | do. | 16·1 | 12·00 | 2·11 | 74·5 | 8·3 |
| Do. | N.G. 84 | 14-6-15 | do. | 18·4 | 14·54 | 1·71 | 79·0 | 10·5 |
| Do. | N.G. 85 | 14-6-15 | do. | 15·6 | 11·83 | 2·04 | 75·8 | 8·2 |
| Do. | N.G. 86 | 14-6-15 | do. | 16·2 | 12·13 | 2·35 | 74·8 | 8·4 |
| Do. | N.G. 87 | 14-6-15 | do. | 16·1 | 11·30 | 2·55 | 70·1 | 7·3 |
| Do. | N.G. 88 | 14-6-15 | do. | 16·3 | 13·05 | 1·95 | 80·0 | 9·5 |
| Do. | N.G. 89 | 14-6-15 | do. | 17·8 | 14·65 | 1·71 | 82·3 | 10·9 |
| Do. | N.G. 90 | 14-6-15 | do. | 16·5 | 12·97 | 1·95 | 78·6 | 9·3 |
| Do. | N.G. 91 | 14-6-15 | do. | 16·7 | 13·13 | 2·04 | 78·6 | 9·4 |
| Do. | N.G. 114 | 14-6-15 | do. | 16·6 | 13·40 | 2·08 | 80·7 | 9·8 |
| Do. | N.G. 123 | 14-6-15 | do. | 15·5 | 11·86 | 2·23 | 76·5 | 8·4 |
| Do. | N.G. 158 | 14-6-15 | do. | 15·9 | 11·59 | 3·47 | 72·8 | 7·8 |
| Do. | N.G. 161 | 14-6-15 | do. | 16·9 | 13·93 | 1·66 | 82·4 | 10·3 |

Second Progressive Examination of Papuan Canes (Wells Collection)—Plant Crop—July, 1915.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| New Guinea | N.G. 67 | 9-7-15 | 11 months | 19·2 | 15·49 | 1·92 | 80·6 | 11·3 |
| Do. | N.G. 68 | 9-7-15 | do. | 14·8 | 9·81 | 2·31 | 66·2 | 6·1 |
| Do. | N.G. 69 | 9-7-15 | do. | 17·4 | 12·81 | 2·55 | 73·6 | 8·7 |
| Do. | N.G. 70 | 9-7-15 | do. | 17·9 | 13·24 | 2·27 | 73·9 | 9·1 |
| Do. | N.G. 72 | 9-7-15 | do. | 18·0 | 15·23 | 1·05 | 84·6 | 11·5 |
| Do. | N.G. 73 | 9-7-15 | do. | 17·7 | 14·01 | 1·76 | 79·1 | 10·1 |
| Do. | N.G. 74 | 9-7-15 | do. | 20·7 | 17·53 | 1·15 | 84·6 | 13·3 |
| Do. | N.G. 75 | 12-7-15 | do. | 19·1 | 16·58 | 1·02 | 86·8 | 12·7 |
| Do. | N.G. 77 | 12-7-15 | do. | 18·0 | 15·64 | 1·12 | 86·8 | 12·0 |
| Do. | N.G. 78 | 12-7-15 | do. | 18·2 | 15·45 | 1·45 | 84·8 | 11·7 |
| Do. | N.G. 79 | 12-7-15 | do. | 21·1 | 17·84 | 0·98 | 84·5 | 13·5 |
| Do. | N.G. 80 | 12-7-15 | do. | 18·7 | 13·71 | 1·22 | 73·3 | 9·3 |
| Do. | N.G. 81 | 12-7-15 | do. | 18·7 | 15·01 | 1·27 | 80·2 | 10·9 |
| Do. | N.G. 82 | 12-7-15 | do. | 19·4 | 15·40 | 1·89 | 79·3 | 11·1 |
| Do. | N.G. 83 | 12-7-15 | do. | 19·7 | 16·41 | 1·42 | 83·2 | 12·3 |
| Do. | N.G. 84 | 12-7-15 | do. | 19·5 | 14·24 | 2·11 | 73·0 | 9·6 |
| Do. | N.G. 85 | 13-7-15 | do. | 17·9 | 13·79 | 1·76 | 77·6 | 9·7 |
| Do. | N.G. 86 | 13-7-15 | do. | 18·2 | 15·02 | 1·42 | 82·5 | 11·1 |
| Do. | N.G. 87 | 13-7-15 | do. | 19·7 | 16·53 | 1·25 | 84·1 | 12·5 |
| Do. | N.G. 88 | 13-7-15 | do. | 20·2 | 17·35 | 1·30 | 85·4 | 13·2 |
| Do. | N.G. 89 | 13-7-15 | do. | 21·2 | 18·05 | 1·37 | 85·1 | 13·7 |
| Do. | N.G. 90 | 13-7-15 | do. | 18·8 | 15·33 | 1·85 | 81·5 | 11·3 |
| Do. | N.G. 91 | 13-7-15 | do. | 19·8 | 16·64 | 1·62 | 84·0 | 12·5 |
| Do. | N.G. 114 | 13-7-15 | do. | 19·2 | 16·31 | 1·62 | 84·9 | 12·5 |
| Do. | N.G. 123 | 13-7-15 | do. | 17·6 | 14·32 | 2·04 | 80·2 | 10·1 |
| Do. | N.G. 158 | 13-7-15 | do. | 17·9 | 14·11 | 2·23 | 78·8 | 10·1 |
| Do. | N.G. 161 | 13-7-15 | do. | 19·5 | 16·81 | 1·54 | 86·2 | 12·9 |

THIRD PROGRESSIVE EXAMINATION OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—AUGUST, 1915.

| Country. | 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. |
|---|---|---|---|---|---|---|---|---|
| New Guinea .. .. | N.G. 67 .. .. .. | 9-8-15 | 12 months | 20·7 | 17·86 | 1·00 | 86·2 | 13·7 |
| Do. .. .. .. | N.G. 68 .. .. .. | 9-8-15 | do. | 18·1 | 13·63 | 1·38 | 75·3 | 9·5 |
| Do. .. .. .. | N.G. 69 .. .. .. | 9-8-15 | do. | 18·1 | 13·98 | 1·78 | 77·2 | 9·8 |
| Do. .. .. .. | N.G. 70 .. .. .. | 9-8-15 | do. | 19·3 | 15·06 | 1·86 | 78·0 | 10·7 |
| Do. .. .. .. | N.G. 72 .. .. .. | 9-8-15 | do. | 17·7 | 13·10 | 1·50 | 74·0 | 9·0 |
| Do. .. .. .. | N.G. 73 .. .. .. | 9-8-15 | do. | 18·9 | 14·85 | 1·42 | 78·5 | 10·6 |
| Do. .. .. .. | N.G. 74 .. .. .. | 9-8-15 | do. | 21·3 | 18·43 | 1·38 | 86·5 | 14·2 |
| Do. .. .. .. | N.G. 75 .. .. .. | 9-8-15 | do. | 20·8 | 18·29 | 0·36 | 87·9 | 14·2 |
| Do. .. .. .. | N.G. 77 .. .. .. | 9-8-15 | do. | 19·9 | 17·65 | 0·52 | 88·6 | 13·8 |
| Do. .. .. .. | N.G. 78 .. .. .. | 9-8-15 | do. | 19·8 | 17·28 | 0·73 | 87·2 | 13·3 |
| Do. .. .. .. | N.G. 79 .. .. .. | 9-8-15 | do. | 20·8 | 17·92 | 0·48 | 86·1 | 13·7 |
| Do. .. .. .. | N.G. 80 .. .. .. | 9-8-15 | do. | 18·9 | 15·23 | 1·26 | 80·6 | 11·1 |
| Do. .. .. .. | N.G. 81 .. .. .. | 9-8-15 | do. | 19·0 | 16·69 | 0·73 | 87·8 | 12·9 |
| Do. .. .. .. | N.G. 82 .. .. .. | 9-8-15 | do. | 19·9 | 17·17 | 0·89 | 86·2 | 13·1 |
| Do. .. .. .. | N.G. 83 .. .. .. | 9-8-15 | do. | 21·5 | 19·49 | 0·32 | 90·6 | 15·4 |
| Do. .. .. .. | N.G. 84 .. .. .. | 9-8-15 | do. | 19·6 | 15·60 | 1·56 | 79·5 | 11·2 |
| Do. .. .. .. | N.G. 85 .. .. .. | 9-8-15 | do. | 20·7 | 17·56 | 0·82 | 84·8 | 13·3 |
| Do. .. .. .. | N.G. 86 .. .. .. | 9-8-15 | do. | 20·5 | 18·40 | 0·42 | 89·7 | 14·4 |
| Do. .. .. .. | N.G. 87 .. .. .. | 9-8-15 | do. | 21·9 | 19·18 | 0·44 | 87·5 | 14·8 |
| Do. .. .. .. | N.G. 88 .. .. .. | 9-8-15 | do. | 20·4 | 17·86 | 0·62 | 87·5 | 13·8 |
| Do. .. .. .. | N.G. 89 .. .. .. | 9-8-15 | do. | 22·4 | 19·88 | 0·53 | 88·7 | 15·5 |
| Do. .. .. .. | N.G. 90 .. .. .. | 9-8-15 | do. | 21·0 | 18·71 | 0·58 | 89·0 | 14·6 |
| Do. .. .. .. | N.G. 91 .. .. .. | 9-8-15 | do. | 21·4 | 19·04 | 0·56 | 88·9 | 14·9 |
| Do. .. .. .. | N.G. 114 .. .. .. | 9-8-15 | do. | 20·4 | 17·33 | 0·83 | 84·9 | 13·1 |
| Do. .. .. .. | N.G. 123 .. .. .. | 9-8-15 | do. | 20·9 | 17·89 | 0·73 | 85·5 | 13·6 |
| Do. .. .. .. | N.G. 158 .. .. .. | 9-8-15 | do. | 19·9 | 15·98 | 1·35 | 80·3 | 11·6 |
| Do. .. .. .. | N.G. 161 .. .. .. | 9-8-15 | do. | 20·0 | 17·25 | 0·71 | 86·2 | 13·2 |

FINAL EXAMINATION OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—SEPTEMBER, 1915.

| 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. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|
| New Guinea .. .. | N.G. 67 .. .. | 8-9-15 | 13 months | 19·4 | 16·34 | 0·88 | 84·2 | 11·0 | 12·3 |
| Do. .. .. | N.G. 68 .. .. | 8-9-15 | do. | 17·8 | 14·81 | 0·84 | 83·2 | 12·5 | 10·9 |
| Do. .. .. | N.G. 69 .. .. | 8-9-15 | do. | 18·4 | 15·58 | 1·04 | 84·6 | 12·0 | 11·7 |
| Do. .. .. | N.G. 70 .. .. | 8-9-15 | do. | 18·7 | 15·09 | 1·19 | 80·6 | 12·8 | 10·8 |
| Do. .. .. | N.G. 72 .. .. | 8-9-15 | do. | 18·9 | 15·49 | 1·04 | 81·9 | 12·0 | 11·3 |
| Do. .. .. | N.G. 73 .. .. | 8-9-15 | do. | 18·7 | 15·15 | 1·35 | 81·0 | 11·5 | 11·0 |
| Do. .. .. | N.G. 74 .. .. | 8-9-15 | do. | 21·5 | 19·17 | 0·41 | 89·1 | 11·0 | 15·0 |
| Do. .. .. | N.G. 75 .. .. | 8-9-15 | do. | 21·0 | 19·21 | 0·35 | 91·4 | 10·0 | 15·5 |
| Do. .. .. | N.G. 77 .. .. | 8-9-15 | do. | 20·2 | 18·89 | 0·14 | 93·5 | 11·0 | 15·2 |
| Do. .. .. | N.G. 78 .. .. | 8-9-15 | do. | 20·8 | 19·48 | 0·30 | 93·6 | 12·0 | 15·5 |
| Do. .. .. | N.G. 79 .. .. | 8-9-15 | do. | 22·2 | 19·92 | 0·33 | 89·7 | 12·0 | 15·5 |
| Do. .. .. | N.G. 80 .. .. | 8-9-15 | do. | 19·7 | 15·88 | 0·89 | 80·6 | 11·6 | 11·5 |
| Do. .. .. | N.G. 81 .. .. | 8-9-15 | do. | 21·0 | 18·95 | 0·40 | 90·2 | 11·5 | 14·8 |
| Do. .. .. | N.G. 82 .. .. | 8-9-15 | do. | 20·7 | 18·06 | 1·13 | 87·2 | 11·0 | 13·9 |
| Do. .. .. | N.G. 83 .. .. | 8-9-15 | do. | 21·8 | 19·92 | 1·02 | 91·3 | 11·0 | 15·9 |
| Do. .. .. | N.G. 84 .. .. | 8-9-15 | do. | 20·3 | 16·61 | 0·61 | 81·8 | 11·5 | 12·2 |
| Do. .. .. | N.G. 85 .. .. | 8-9-15 | do. | 20·4 | 17·48 | 0·55 | 85·6 | 12·0 | 13·2 |
| Do. .. .. | N.G. 86 .. .. | 8-9-15 | do. | 20·2 | 17·97 | 0·41 | 88·9 | 12·8 | 13·6 |
| Do. .. .. | N.G. 87 .. .. | 8-9-15 | do. | 21·8 | 19·51 | 0·55 | 89·4 | 12·8 | 14·8 |
| Do. .. .. | N.G. 88 .. .. | 8-9-15 | do. | 20·9 | 17·48 | 1·56 | 83·6 | 11·0 | 13·1 |
| Do. .. .. | N.G. 89 .. .. | 8-9-15 | do. | 22·2 | 19·29 | 1·04 | 86·8 | 12·0 | 14·7 |
| Do. .. .. | N.G. 90 .. .. | 8-9-15 | do. | 20·8 | 18·42 | 0·76 | 88·5 | 10·5 | 14·4 |
| Do. .. .. | N.G. 91 .. .. | 8-9-15 | do. | 21·4 | 19·17 | 0·57 | 89·5 | 12·0 | 14·9 |
| Do. .. .. | N.G. 114 .. .. | 8-9-15 | do. | 20·7 | 18·57 | 0·83 | 89·7 | 13·0 | 14·3 |
| Do. .. .. | N.G. 123 .. .. | 8-9-15 | do. | 19·9 | 17·44 | 0·62 | 87·6 | 10·5 | 13·6 |
| Do. .. .. | N.G. 158 .. .. | 8-9-15 | do. | 20·1 | 17·70 | 0·76 | 88·0 | 12·0 | 13·6 |
| Do. .. .. | N.G. 161 .. .. | 8-9-15 | do. | 20·6 | 18·85 | 0·13 | 91·5 | 11·0 | 15·0 |

From the analytical results set out above it will be seen that there are several fair to good canes in the above number, though so far nothing so good as Badila. It has to be remembered, however, that this experiment comprises only a small number out of the total.

The crop results appear below. Due to the drought, these are not nearly so satisfactory as anticipated; and it is not fair to judge these canes on this season's crop.

CROP RESULTS OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—SEPTEMBER, 1915.

| Country. | Variety of Cane. | Age of Cane. | Weight of Cane per Acre in English Tons. | Yield of Pure Obtainable Cane Sugar per Acre in Pounds. | Yield of Pure Obtainable Cane Sugar per Acre in English Tons. |
|---|---|---|---|---|---|
| New Guinea | New Guinea 67 | 13 months | 23·7 | 6,536 | 2·91 |
| Do. | do. 68 | do. | 8·3 | 2,041 | ·91 |
| Do. | do. 69 | do. | 29·9 | 7,848 | 3·50 |
| Do. | do. 70 | do. | 10·8 | 2,634 | 1·17 |
| Do. | do. 72 | do. | 22·0 | 5,586 | 2·49 |
| Do. | do. 73 | do. | 8·7 | 2,156 | ·96 |
| Do. | do. 74 | do. | 26·0 | 8,755 | 3·90 |
| Do. | do. 75 | do. | 20·3 | 7,055 | 3·15 |
| Do. | do. 77 | do. | 17·6 | 5,991 | 2·67 |
| Do. | do. 78 | do. | 26·7 | 9,275 | 4·14 |
| Do. | do. 79 | do. | 28·1 | 9,756 | 4·35 |
| Do. | do. 80 | do. | 8·5 | 2,204 | ·98 |
| Do. | do. 81 | do. | 33·6 | 11,152 | 4·98 |
| Do. | do. 82 | do. | 22·5 | 7,023 | 3·13 |
| Do. | do. 83 | do. | 26·7 | 9,515 | 4·24 |
| Do. | do. 84 | do. | 5·9 | 1,620 | ·72 |
| Do. | do. 85 | do. | 25·0 | 7,417 | 3·31 |
| Do. | do. 86 | do. | 5·4 | 1,658 | ·74 |
| Do. | do. 87 | do. | 29·1 | 9,670 | 4·31 |
| Do. | do. 88 | do. | 26·3 | 7,732 | 3·45 |
| Do. | do. 89 | do. | 22·9 | 7,555 | 3·37 |
| Do. | do. 90 | do. | 24·6 | 7,966 | 3·55 |
| Do. | do. 91 | do. | 18·4 | 6,165 | 2·75 |
| Do. | do. 114 | do. | 21·9 | 7,038 | 3·14 |
| Do. | do. 123 | do. | 20·6 | 6,279 | 2·80 |
| Do. | do. 158 | do. | 22·9 | 6,990 | 3·12 |
| Do. | do. 161 | do. | 18·7 | 6,305 | 2·81 |

The following are descriptions of the above varieties :—

*Descriptions of Papuan Canes Planted in Experiment.*

N.G. 67.—Stout green-coloured cane with pink to red blush, parallel-sided joints 3 to 5 in. long, eyes flat and acute, lying in deep groove, stool good and growth erect, foliage broad and heavy, trashes easily, germination good.

68.—Thin green-coloured cane with heavy white wax, barrel-shaped joints 3 to 4 in. in length, eyes large full and acute, grooved, stool fair and growth inclined to lodge, foliage thin, sparse, and dull in colour, trash clinging, and germination poor.

69.—Stout green-coloured cane with claret-coloured stripe, parallel-sided joints 4 to 6 in. in length, eyes medium and acute, slightly grooved, stool fair and growth erect, foliage medium and bright, showing white stripe in sheath, trashes easily, and germination good.

70.—Rose to salmon-coloured cane with olive-green stripe, stout in habit, joints 3 to 5 in. in length, parallel-sided and slightly oval, eyes full and acute, grooved, foliage medium and showing striped leaf sheath, stool good and erect in habit, trash inclined to cling, germination poor.

72.—Dark blue-coloured cane with white wax, similar in all other respects to 67. Both 67 and 72 very much resemble the original New Guinea canes 47 and 48 (Red and Green Baruma).

73.—Black-coloured cane with yellow to olive-green stripe, zigzag joints 2 to 4 in. in length, eyes large full and acute, no groove, foliage sparse dry and diseased, stool fair, erect habit, trashes easily, germination poor.

74.—Thin cane green to yellow colour with light red stripe, joints parallel-sided 4 to 6 in. in length, eyes large full and acute, slight groove, foliage thin and sparse, stool good semi-erect in habit, trash inclined to cling, germination good.

75.—Thin olive-green-coloured cane with longitudinal skin crack and brown blotches where exposed to sun, and very prone to crack, joints 4 to 5 in. in length, parallel-sided, eyes medium and slightly acute, no groove, foliage medium and full, stool good, habit erect, trashes easily, germination good.

77.—Stout yellow to pink-coloured cane with green stripe, joints 2 to 4 in. in length, slightly barrel and zigzag, eyes small and round, no groove, stool fair and habit erect, foliage broad and heavy, trashes easily, germination good.

78.—Cane apparently identical with No. 75, growth though seems heavier. Both 75 and 78 are practically identical with the old New Guinea 4.

79.—Same cane as 74.

80.—Blue-coloured cane, practically died out from top rot disease and gum.

81.—Stout brown-coloured cane with white wax, joints 2 to 5 in. in length, barrel-shaped and inclined to crack, eyes medium full and slightly acute, grooved, stool good, habit erect, foliage medium bright and heavy, trashes easily, germination good, very similar to N.G. 26, but a heavier cropper.

82.—Light green-coloured cane with black wax, joints 2 to 4 in. in length, parallel-sided, eyes small and round, slight groove, stool fair, habit erect, foliage medium, trashes easily, germination good.

83.—Light green-coloured cane of medium thickness, joints 2 to 5 in. in length, inclining to barrel, eyes full and acute, no groove, foliage medium bright and heavy, stool good, inclining to lodge, trashes easily, germination good.

84.—Olive-green-coloured cane with broad claret stripe and heavy white wax. Practically died out from disease (top rot and gumming).

85.—Similar in all respects to No. 72, but apparently a heavier cropper.

86.—Similar to 68.

87.—Similar in all respects to 67, with exception that crop is heavier and canes show light olive-green stripe.

88.—Light green-coloured cane of medium stoutness with pale somewhat indistinct red stripe, heavily waxed with white wax, joints 3 to 5 in. in length, barrel-shaped and zigzag, eyes medium full and slightly acute, no groove, foliage medium, stool good, inclining to lodge, trashes easily, germination good.

89.—Stout red cane with green stripe, joints 2 to 4 in. in length, slightly barrel and zigzag, eyes small full and round, no groove, foliage medium and striped on sheath and midrib, stool fair and habit erect, trashes easily, and germination good.

90.—Thin light brown-coloured cane with green stripe, joints 3 to 5 in. in length, slightly barrel, eyes medium slightly acute, grooved, foliage thin and sparse, stool good and semi-erect, trashes easily, and germination good.

91.—Stout cane similar to No. 87.

114.—Stout bright green-coloured cane, joints 4 to 6 in. in length, contracted at nodes, eyes small full slightly acute, grooved, foliage broad and heavy, stool good and semi-erect, trashes easily, and germination good.

123.—Stout yellow-coloured cane with bright green stripe, joints 4 to 5 in. in length, parallel-sided and bulging at nodes, eyes medium full and acute, deeply grooved, foliage broad and heavy showing white stripe on sheath and midrib, stool good and semi-erect in habit, trashes easily, and germination good.

158.—Yellow-coloured cane with olive-green stripe and red blush, of fair stoutness, joints 3 to 5 in. in length, parallel-sided and zigzag, eyes small flat and acute, grooved, foliage narrow straight and striped, stool good and of erect habit, trashes very easily, and germination good.

161.—Similar to No. 67.

## NEW EXPERIMENTS.

In last year's report details of a number of canes introduced from Papua were supplied. With the exception of the 27 varieties already mentioned above as having been planted out in experiment, all those canes which had failed to provide sufficient seed, or else, on account of lack of space, it had been impossible to get out under experimental conditions, were again planted out in September of last year. By August of this year most of the canes were available for planting out. Owing to the lack of space at this Station, and the number of canes to be tested, it has been found impossible to plant all these canes on the same block of ground. They have, therefore, been planted in different plots.

The preparation of the land in every case has been identical with the usual work of the Station. Due to its being necessary to conserve space, these experiments have been laid out in three-row plots, so that when results are calculated the data will be obtained from the middle row only, the outside rows acting as guardians. This will do away with the necessity for interspaces which cannot be spared at present, and will eliminate expenditure in keeping these spaces clean, besides approximating more nearly to large field trials.

The whole of the new Papuan canes were analysed in July, in order that an idea might be secured of their relative sugar values at that time of the year. This analysis is set out below :—

ANALYTICAL EXAMINATION OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—JULY, 1915.

| Country. | 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. |
|---|---|---|---|---|---|---|---|---|
| New Guinea | N.G. 67 | 14-7-15 | 10½ months | 17·6 | 12·94 | 2·45 | 73·5 | 8·8 |
| Do. | N.G. 68 | 14-7-15 | do. | 16·7 | 12·67 | 1·89 | 75·8 | 8·9 |
| Do. | N.G. 69 | 14-7-15 | do. | 15·1 | 10·40 | 2·60 | 68·8 | 6·7 |
| Do. | N.G. 70 | 14-7-15 | do. | 16·3 | 10·37 | 3·12 | 63·6 | 6·1 |
| Do. | N.G. 71 | 14-7-15 | do. | 17·0 | 10·10 | 3·37 | 59·4 | 5·5 |
| Do. | N.G. 72 | 14-7-15 | do. | 17·8 | 14·04 | 1·64 | 78·8 | 10·0 |
| Do. | N.G. 73 | 14-7-15 | do. | 17·7 | 13·77 | 1·76 | 77·7 | 9·7 |
| Do. | N.G. 74 | 14-7-15 | do. | 20·9 | 17·58 | 1·38 | 84·1 | 13·2 |
| Do. | N.G. 75 | 14-7-15 | do. | 20·3 | 16·51 | 2·27 | 81·3 | 12·2 |
| Do. | N.G. 76 | 14-7-15 | do. | 17·0 | 9·92 | 4·16 | 58·3 | 5·3 |
| Do. | N.G. 77 | 14-7-15 | do. | 20·9 | 17·40 | 1·27 | 83·2 | 13·0 |
| Do. | N.G. 78 | 14-7-15 | do. | 18·1 | 14·86 | 2·27 | 82·0 | 11·0 |
| Do. | N.G. 79 | 15-7-15 | do. | 21·0 | 16·84 | 1·76 | 80·1 | 12·2 |
| Do. | N.G. 80 | 15-7-15 | do. | 17·4 | 12·27 | 3·12 | 70·5 | 8·0 |
| Do. | N.G. 81 | 15-7-15 | do. | 18·0 | 14·54 | 1·62 | 80·7 | 10·6 |
| Do. | N.G. 82 | 15-7-15 | do. | 16·5 | 12·21 | 2·50 | 74·0 | 8·4 |
| Do. | N.G. 83 | 15-7-15 | do. | 19·5 | 16·41 | 1·25 | 84·1 | 12·4 |
| Do. | N.G. 84 | 15-7-15 | do. | 19·1 | 14·32 | 2·08 | 74·9 | 9·8 |
| Do. | N.G. 85 | 16-7-15 | do. | 18·8 | 14·78 | 1·73 | 78·6 | 10·5 |
| Do. | N.G. 86 | 16-7-15 | do. | 18·4 | 14·67 | 1·62 | 79·7 | 10·6 |
| Do. | N.G. 87 | 16-7-15 | do. | 19·5 | 15·52 | 2·04 | 79·5 | 11·2 |
| Do. | N.G. 88 | 16-7-15 | do. | 18·0 | 14·32 | 2·35 | 79·5 | 10·3 |
| Do. | N.G. 89 | 16-7-15 | do. | 18·7 | 15·15 | 1·78 | 81·0 | 11·1 |
| Do. | N.G. 90 | 16-7-15 | do. | 18·4 | 15·31 | 1·60 | 83·2 | 11·4 |
| Do. | N.G. 91 | 16-7-15 | do. | 18·7 | 15·31 | 1·76 | 81·8 | 11·3 |
| Do. | N.G. 92 | 16-7-15 | do. | 18·8 | 16·31 | 1·10 | 86·7 | 12·6 |
| Do. | N.G. 93 | 16-7-15 | do. | 19·1 | 15·68 | 1·92 | 82·0 | 11·6 |
| Do. | N.G. 94 | 16-7-15 | do. | 18·1 | 12·81 | 2·97 | 70·7 | 8·4 |
| Do. | N.G. 95 | 19-7-15 | do. | 17·3 | 13·39 | 1·78 | 77·3 | 9·5 |
| Do. | N.G. 96 | 19-7-15 | do. | 17·6 | 14·62 | 1·45 | 83·0 | 10·9 |
| Do. | N.G. 97 | 19-7-15 | do. | 16·6 | 11·52 | 3·12 | 69·3 | 7·5 |
| Do. | N.G. 98 | 19-7-15 | do. | 18·5 | 14·88 | 1·92 | 80·4 | 10·7 |
| Do. | N.G. 99 | 19-7-15 | do. | 18·2 | 14·51 | 2·08 | 79·7 | 10·5 |

ANALYTICAL EXAMINATION OF PAPUAN CANES (WELLS COLLECTION)—PLANT CROP—JULY, 1915—*continued.*

| Country. | 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. |
|---|---|---|---|---|---|---|---|---|
| New Guinea | N.G. 100 | 19-7-15 | 10½ months | 15·8 | 11·48 | 2·60 | 72·6 | 7·7 |
| Do. | N.G. 101 | 19-7-15 | do. | 17·8 | 12·46 | 3·04 | 70·0 | 8·1 |
| Do. | N.G. 102 | 19-7-15 | do. | 20·0 | 16·43 | 1·66 | 82·1 | 12·2 |
| Do. | N.G. 103 | 19-7-15 | do. | 19·2 | 15·38 | 1·86 | 80·1 | 11·1 |
| Do. | N.G. 104 | 19-7-15 | do. | 19·2 | 14·93 | 2·08 | 77·7 | 10·6 |
| Do. | N.G. 104A | 19-7-15 | do. | 18·1 | 15·10 | 1·68 | 83·4 | 11·3 |
| Do. | N.G. 105 | 19-7-15 | do. | 17·8 | 13·96 | 1·54 | 78·4 | 9·9 |
| Do. | N.G. 106 | 19-7-15 | do. | 16·1 | 10·59 | 3·28 | 65·7 | 6·5 |
| Do. | N.G. 107 | 20-7-15 | do. | 19·2 | 16·48 | 1·40 | 85·8 | 12·5 |
| Do. | N.G. 108 | 20-7-15 | do. | 20·7 | 18·04 | 1·15 | 87·1 | 13·9 |
| Do. | N.G. 109 | 20-7-15 | do. | 18·3 | 14·32 | 1·56 | 78·2 | 10·2 |
| Do. | N.G. 110 | 20-7-15 | do. | 20·6 | 17·83 | 1·19 | 86·5 | 13·7 |
| Do. | N.G. 111 | 20-7-15 | do. | 19·8 | 16·67 | 1·25 | 84·1 | 12·5 |
| Do. | N.G. 112 | 20-7-15 | do. | 19·7 | 16·68 | 1·76 | 84·6 | 12·6 |
| Do. | N.G. 113 | 20-7-15 | do. | 19·7 | 16·57 | 1·35 | 84·1 | 12·5 |
| Do. | N.G. 114 | 20-7-15 | do. | 19·4 | 16·62 | 1·28 | 85·6 | 12·7 |
| Do. | N.G. 115 | 20-7-15 | do. | 20·0 | 17·55 | 1·06 | 87·7 | 13·6 |
| Do. | N.G. 116 | 20-7-15 | do. | 20·0 | 17·52 | 1·04 | 87·6 | 13·6 |
| Do. | N.G. 117 | 20-7-15 | do. | 20·0 | 17·55 | 1·00 | 87·7 | 13·6 |
| Do. | N.G. 118 | 20-7-15 | do. | 19·4 | 16·49 | 1·25 | 85·0 | 12·5 |
| Do. | N.G. 119 | 20-7-15 | do. | 18·4 | 15·77 | 1·19 | 85·7 | 12·0 |
| Do. | N.G. 120 | 20-7-15 | do. | 17·6 | 12·81 | 1·98 | 72·7 | 8·7 |
| Do. | N.G. 122 | 20-7-15 | do. | 17·4 | 12·06 | 3·57 | 69·3 | 7·8 |
| Do. | N.G. 123 | 20-7-15 | do. | 17·6 | 13·85 | 2·55 | 78·6 | 9·9 |
| Do. | N.G. 124 | 22-7-15 | do. | 18·8 | 14·29 | 2·27 | 76·0 | 9·9 |
| Do. | N.G. 125 | 22-7-15 | do. | 18·7 | 15·47 | 1·81 | 82·7 | 11·5 |
| Do. | N.G. 126 | 22-7-15 | do. | 17·7 | 13·99 | 2·23 | 79·0 | 10·0 |
| Do. | N.G. 127 | 22-7-15 | do. | 18·1 | 14·01 | 2·50 | 77·4 | 9·9 |
| Do. | N.G. 128 | 22-7-15 | do. | 18·7 | 16·14 | 1·37 | 86·3 | 12·4 |
| Do. | N.G. 129 | 22-7-15 | do. | 14·9 | 9·70 | 4·16 | 65·1 | 5·9 |
| Do. | N.G. 130 | 22-7-15 | do. | 18·8 | 15·63 | 1·83 | 83·1 | 11·7 |
| Do. | N.G. 131 | 22-7-15 | do. | 21·0 | 18·87 | 1·02 | 89·8 | 14·8 |
| Do. | N.G. 132 | 22-7-15 | do. | 16·3 | 11·44 | 2·50 | 70·1 | 7·5 |
| Do. | N.G. 133 | 22-7-15 | do. | 18·9 | 15·28 | 1·76 | 80·8 | 11·1 |
| Do. | N.G. 134 | 22-7-15 | do. | 19·5 | 16·26 | 1·50 | 83·3 | 12·1 |
| Do. | N.G. 135 | 22-7-15 | do. | 19·3 | 16·60 | 1·38 | 86·0 | 12·7 |
| Do. | N.G. 136 | 22-7-15 | do. | 16·9 | 12·35 | 2·08 | 73·0 | 8·4 |
| Do. | N.G. 137 | 22-7-15 | do. | 15·0 | 9·97 | 3·37 | 66·4 | 6·1 |
| Do. | N.G. 138 | 22-7-15 | do. | 14·9 | 9·40 | 2·97 | 63·0 | 5·5 |
| Do. | N.G. 139 | 22-7-15 | do. | 18·1 | 13·05 | 3·12 | 72·0 | 8·7 |
| Do. | N.G. 140 | 23-7-15 | do. | 15·2 | 9·81 | 2·84 | 64·5 | 5·9 |
| Do. | N.G. 141 | 23-7-15 | do. | 18·8 | 13·92 | 2·23 | 74·0 | 9·5 |
| Do. | N.G. 142 | 23-7-15 | do. | 15·5 | 11·40 | 2·31 | 73·5 | 7·8 |
| Do. | N.G. 143 | 23-7-15 | do. | 16·0 | 11·54 | 1·95 | 72·1 | 7·8 |
| Do. | N.G. 144 | 23-7-15 | do. | 16·8 | 11·81 | 2·77 | 70·2 | 7·3 |
| Do. | N.G. 146 | 23-7-15 | do. | 17·3 | 12·27 | 2·97 | 70·9 | 8·1 |
| Do. | N.G. 147 | 26-7-15 | do. | 21·4 | 18·73 | 1·12 | 87·5 | 14·5 |
| Do. | N.G. 148 | 26-7-15 | do. | 20·1 | 17·65 | 0·94 | 87·8 | 13·7 |
| Do. | N.G. 149 | 26-7-15 | do. | 19·1 | 16·84 | 0·96 | 88·1 | 13·1 |
| Do. | N.G. 150 | 26-7-15 | do. | 20·3 | 17·61 | 0·96 | 86·7 | 13·6 |
| Do. | N.G. 151 | 26-7-15 | do. | 21·1 | 19·06 | 0·73 | 90·3 | 15·0 |
| Do. | N.G. 152 | 26-7-15 | do. | 18·1 | 14·24 | 2·08 | 78·6 | 10·2 |
| Do. | N.G. 153 | 26-7-15 | do. | 18·2 | 14·96 | 1·58 | 82·1 | 11·0 |
| Do. | N.G. 154 | 26-7-15 | do. | 18·7 | 14·88 | 2·15 | 79·5 | 10·7 |
| Do. | N.G. 156 | 26-7-15 | do. | 17·7 | 13·34 | 2·77 | 75·3 | 9·3 |
| Do. | N.G. 157 | 26-7-15 | do. | 19·8 | 17·04 | 1·00 | 86·0 | 13·0 |
| Do. | N.G. 158 | 26-7-15 | do. | 18·1 | 14·11 | 1·78 | 77·9 | 10·0 |
| Do. | N.G. 159 | 26-7-15 | do. | 19·5 | 16·39 | 1·56 | 84·0 | 12·3 |
| Do. | N.G. 160 | 26-7-15 | do. | 19·0 | 15·66 | 1·78 | 82·4 | 11·6 |
| Do. | N.G. 161 | 26-7-15 | do. | 19·1 | 16·05 | 1·98 | 84·0 | 12·1 |
| Do. | N.G. 162 | 26-7-15 | do. | 19·9 | 17·07 | 1·11 | 85·7 | 13·0 |
| Do. | N.G. 163 | 26-7-15 | do. | 19·9 | 16·57 | 1·64 | 83·2 | 12·4 |
| Do. | N.G. 164 | 26-7-15 | do. | 20·7 | 18·09 | 1·25 | 87·3 | 13·9 |
| Do. | N.G. 165 | 26-7-15 | do. | 19·2 | 16·98 | 1·04 | 88·4 | 13·2 |
| Do. | N.G. 166 | 26-7-15 | do. | 18·3 | 14·38 | 2·11 | 78·5 | 10·2 |
| Do. | N.G. 167 | 26-7-15 | do. | 19·1 | 14·85 | 2·50 | 77·7 | 10·5 |
| Do. | N.G. 168 | 27-7-15 | do. | 19·7 | 17·74 | 1·76 | 90·0 | 14·0 |
| Do. | N.G. 169 | 27-7-15 | do. | 17·5 | 13·07 | 2·50 | 74·6 | 9·0 |
| Do. | N.G. 170 | 27-7-15 | do. | 18·3 | 14·40 | 2·01 | 78·6 | 10·3 |
| Do. | N.G. 171 | 27-7-15 | do. | 20·2 | 16·38 | 2·11 | 81·0 | 12·0 |
| Do. | N.G. 172 | 27-7-15 | do. | 21·1 | 18·24 | 1·16 | 86·4 | 14·0 |
| Do. | N.G. 173 | 27-7-15 | do. | 20·3 | 16·27 | 0·97 | 80·1 | 11·8 |
| Do. | N.G. 174 | 28-7-15 | do. | 19·4 | 16·79 | 1·09 | 86·5 | 12·9 |
| Do. | N.G. 175 | 28-7-15 | do. | 18·9 | 16·37 | 1·14 | 86·6 | 12·5 |
| Do. | N.G. 176 | 28-7-15 | do. | 16·5 | 12·70 | 2·27 | 76·9 | 9·0 |
| Do. | N.G. 177 | 28-7-15 | do. | 19·8 | 17·12 | 8·62 | 86·4 | 13·1 |
| Do. | N.G. 178 | 28-7-15 | do. | 18·1 | 14·57 | 1·40 | 80·4 | 10·6 |
| Do. | N.G. 179 | 28-7-15 | do. | 17·3 | 13·88 | 1·60 | 80·2 | 10·0 |
| Do. | N.G. 180 | 28-7-15 | do. | 15·8 | 11·27 | 2·23 | 71·3 | 8·7 |
| Do. | N.G. 181 | 28-7-15 | do. | 15·9 | 10·92 | 2·50 | 68·6 | 7·0 |
| Do. | N.G. 182 | 28-7-15 | do. | 17·5 | 13·34 | 2·77 | 76·2 | 9·4 |
| Do. | N.G. 183 | 28-7-15 | do. | 17·0 | 12·59 | 3·04 | 74·0 | 8·6 |
| Do. | N.G. 184 | 28-7-15 | do. | 20·5 | 17·53 | 1·25 | 85·5 | 13·4 |
| Do. | N.G. 185 | 28-7-15 | do. | 19·4 | 14·72 | 2·71 | 75·8 | 10·2 |
| Do. | N.G. 186 | 28-7-15 | do. | 18·1 | 14·81 | 1·31 | 81·8 | 10·9 |

It will be noted that a P.O.C.S. or Pure Obtainable Cane Sugar Column has been added to the usual details of analyses hitherto presented in the report. This formula was originally devised by the Colonial Sugar Refining Company as applied to their own experience in manufacture, and was never intended by them to apply to other mills with differing standards of efficiency. It has, however, come into such general use in Queensland as a basis of cane valuation that it has been included in this report. As a comparative figure it is generally known to farmers, and probably all of the mills in Queensland also use it.

The formula is as follows:—

$$\text{P.O.C.S. in cane} = \left[\tfrac{.95}{100}\text{ sucrose in juice} - \frac{\tfrac{.97}{100}\text{ brix} - \tfrac{.95}{100}\text{ sucrose in juice}}{2}\right]\frac{100 - \text{fibre in cane}}{100}$$

## EXPERIMENTS WITH POISONOUS SPRAYS FOR THE DESTRUCTION OF WEEDS.

Some time ago it was promised that the Sugar Bureau would undertake experiments with arsenical sprays for the purpose of determining whether weeds could be successfully and economically destroyed. In the composition of the sprays used it was determined to follow the experience of other countries, and accordingly two mixtures were made up.

The first solution was made up as follows:—8 lb. arsenic and 2 lb. caustic soda were mixed together in the dry state, and water slowly added until dissolved. Sufficient heat was generated to bring the mixture to almost boiling point. This was then made up to 5 gallons, and for use was diluted to 300 gallons.

The second solution was made in the same way as the first, but about 40 oz. of washing soda was added.

The Chemist in Charge of the Experiment Station at Mackay (Mr. L. C. McCready) states:—

The experiments were divided into two series as follows:—

*Series No.* 1.—Sprays used on growing cane with a view to testing their effects on the destruction of weeds, and also to determine whether their use had an injurious effect on the growing cane.

*Series No.* 2.—Sprays used on open headlands solely with a view to the destruction of weeds and grasses.

*No. 1 Series.*

1. All the ground between cane drills on inside and half the space on the outside received a fortnightly spraying at the rate of approximately 75 gallons to the acre. Great care was exercised in this case that the cane itself received none of the spray.

2. This section received the same treatment as the first section, with the exception that the No. 2 Spray Formula was used.

3. This section received a spraying with No. 2 Spray Formula at the same rate as Nos. 1 and 2; but in this case the cane was also sprayed around the bottoms.

*No. 2 Series.*

In this Series two portions of headlands were sprayed as under, using the same quantity per acre as in the first series:—

1. Sprayed with No. 1 Formula Solution;
2. Sprayed with No. 2 Formula Solution.

The spraying was at first carried out every fortnight; but, as this made little or no impression on the grass, the application was increased to a weekly spraying.

*Results.*

The results in No. 1 Series cannot be taken as conclusive for the reason that when the experiment was first started the cane was well advanced in growth, and as a consequence soon reached a stage where it was impossible to walk between the rows with a spray outfit. The cane having closed in rows, many of the softer grasses perished naturally by the exclusion of sunlight. It is, therefore, a debatable point whether the dying of some of the weeds should be attributed to the above factor or to the effects of the sprays. No positive conclusion can, therefore, be drawn from this series until the experiment is again tried on cane of younger growth.

The following notes have been made, although from the reasons stated above they must not be taken as positive:—

*Section No.* 1.—Weeds such as pig weed, billy-goat weed, and red asthma were destroyed almost on the first spraying; whilst grasses such as couch and crowsfoot, beyond a slight yellowing during the first few days after spraying, soon recovered and grew as robustly as ever. Summer grass and mystery grass in some cases were killed, and in others survived.

*Section No.* 2.—The results in this section were identical with those found in the first section.

*Section No.* 3.—The effects of the spraying on this section with reference to weeds and grasses were identical with the former two sections. With regard to its effect on the cane, no real damage has been done, the cane having at the present time survived and thrown off any apparent injury.

A day or two after spraying, the leaves and bottoms of the stool presented a very withered and burnt-looking appearance. In one or two individual cases where the spray reached into the heart of the cane sucker or shoot, the leader has been burnt out and the cane killed. According to the writer's mind,

the wilting and burning of the leaves cannot fail to have anything but a prejudicial effect on the growth and vitality of the crop—first, by limiting transpiration on account of the wilting of its foliage, and, secondly, by the set-back to growth, and the subsequent struggle rendered necessary to throw off the ill-effects and re-establish growth.

*Series* 2.

In this case both sprays have given equal results, and have been successful in destroying all weeds with the exception of couch grass and crowsfoot grass. The couch at first appears wilted, but soon overcomes the effects, and three or four days after spraying has again established itself. With reference to star grass, the effects of the poison to date have failed to kill it. The individual plants are, however, very small and stunted in appearance, and there is no doubt that eventually the grass will succumb to the poisons.

The cost of material and labour amounted to £1 17s. 7d. per acre for work amongst cane rows, and £1 0s. 7d. per acre for headlands, for one spraying only.

Commenting on the above, the General Superintendent considers the growth of weeds to be too great at certain seasons of the year on our Northern cane fields to be economically dealt with by means of arsenical spraying. In the red soils of Childers and Isis, where weeds do not grow to any extent, the work might be done at a considerably lower cost; and this land is similar to the Hawaiian lands, where spraying has been cheaply carried out.

## 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 best order. Notwithstanding the fact that many farmers in the different districts have availed themselves of the opportunity of securing new varieties from the different experimental plots established in their districts, there has been very little falling off in the number of applications dealt with by the Station. The varieties sent to Southern districts have again been forwarded through Gladstone with most satisfactory results.

Unfortunately, on account of the drought, this year the supply of cane was not equal to the demand, and it was necessary to cut the usual amount sent down to a minimum to avoid disappointment to many of the applicants; in all, 24 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 36 persons. In addition to the above, a number of local farmers called and received an assortment of canes. Owing to the fact above stated, there was insufficient cane this year for a general local distribution, but cane was reserved for those farmers whose names appeared on the Station register as applicants.

## SUBSIDIARY CROPS.

### Sorghums and Cow Cane.

Sufficient of the above crops have been grown during the year to provide feed for station horses and seed for distribution purposes. Of the Sorghums, the kind chiefly grown are Early Orange and Mixed American. These varieties are preferred to the Giant Honduras, on account of their quicker growth. The Cow Cane as a fodder crop has proved fairly successful, but apparently does not come away in the succeeding ratoon crops with the same amount of vigour as the old Yuban, and it is intended to again revert to the cultivation of Yuban for feed purposes. Seed of the Sorghums is collected when applied for, owing to the difficulty experienced in keeping this seed in stock. Cuttings of cow cane are also usually distributed as applied for.

### Fruit Trees.

A small demand still exists for mango, paw-paw, and tamarind 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. During the year the vines have also received attention, and the cuttings referred to in last report having grown exceptionally well they have now been transplanted to a new piece of ground, where it is expected that they will quickly establish themselves.

### Green Manure Crops.

Green manuring crops of different kinds have been grown during the year, and where possible seed has been collected. A good deal of this has been distributed, but, on account of the dry weather, the crop has been very disappointing.

### Field Day at Experiment Station.

The Annual Field Day at the Experiment Station was held on the 26th June, and proved an unqualified success, close on 300 farmers attending. These were shown over the numerous experiments by the General Superintendent and Mr. L. C. McCready (the Chemist in Charge of the Mackay Station). The greatest interest was displayed by the visiting farmers, particularly in the variety trials. Most of the growers brought books, and made notes at various stages of the proceedings. After light

refreshments were served, a trial of various implements in the experimental stage was made. These were being designed to carry out more of the cultivation work by means of teams. An exhibition of new harrows and ploughs followed, and addresses were delivered during the day. Included in the visitors were the delegates to the United Cane Growers' Association, who were sitting in conference at Mackay during the week. The whole of the Station staff worked hard to make the day a complete success, and the appreciation of the visitors was freely accorded to them.

The following table shows the rainfall at the Mackay Experiment Station from 1901 to date:—

RAINFALL AT EXPERIMENT STATION, MACKAY.

| —— | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. | 1915. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| January .. .. | 23·895 | 3·382 | 9·715 | 16·440 | 36·860 | 15·563 | 2·453 | 13·24 | 13·48 | 36·72 | 28·46 | 3·35 | 19·54 | 24·88 | 1·96 |
| February .. .. | 9·800 | 8·462 | 6·926 | 3·435 | 3·680 | 11·353 | 7·178 | 5·13 | 2·18 | 9·54 | 14·02 | 8·26 | 24·09 | 5·55 | 7·51 |
| March .. .. .. | 10·860 | 4·171 | 13·867 | 5·026 | 3·470 | 19·573 | 8·941 | 24·24 | 9·92 | 24·94 | 14·45 | 5·89 | 13·15 | 12·49 | 3·97 |
| April .. .. .. | 6·290 | 6·286 | 1·979 | 8·090 | 14·835 | 5·037 | 1·002 | 20·55 | 2·87 | 6·50 | 3·15 | 3·19 | 5·15 | 5·67 | 2·57 |
| May .. .. .. | 1·145 | ·947 | 6·701 | 2·750 | 1·760 | 13·638 | 6·919 | 3·61 | 1·47 | 3·33 | 1·09 | 4·03 | 4·36 | 3·89 | 2·12 |
| June .. .. .. | ·122 | 1·296 | 2·193 | 1·120 | 2·075 | 4·351 | 4·838 | 1·09 | 1·89 | 5·14 | ·17 | 5·03 | 3·83 | 8·98 | ·42 |
| July .. .. .. | 1·000 | ·370 | 2·397 | ·260 | ·780 | ·587 | ·244 | 1·97 | ·427 | 1·21 | ·34 | 1·01 | ·58 | .. | ·94 |
| August .. .. | 4·720 | ·306 | 2·836 | ·120 | ·550 | 1·196 | ·331 | 1·88 | ·80 | ·77 | ·13 | ·18 | .. | ·21 | 1·05 |
| September .. .. | 2·903 | .. | ·525 | 11·100 | 1·140 | 5·130 | ·312 | 2·46 | ·62 | 6·31 | ·05 | ·08 | ·19 | 1·68 | ·53 |
| October .. .. | ·836 | ·313 | 1·545 | 10·530 | ·355 | 3·385 | ·157 | 2·21 | 1·93 | ·11 | ·85 | 6·86 | .. | 4·75 | 1·61 |
| November .. .. | 1·664 | ·901 | 9·751 | ·030 | 3·050 | 2·845 | 6·592 | 4·48 | 2·85 | 3·57 | ·38 | 2·60 | ·06 | 1·14 | 5·25 |
| December .. .. | ·223 | 7·500 | 6·505 | 1·680 | ·948 | 17·181 | 12·814 | ·19 | 23·07 | 3·73 | 2·37 | 1·59 | 14·21 | 2·47 | .. |
| TOTALS .. | 63·458 | 33·934 | 64·934 | 60·581 | 69·503 | 99·839 | 51·781 | 81·05 | 65·35 | 101·87 | 65·46 | 42·07 | 85·16 | 71·71 | .. |

## 6.—LABORATORY WORK.

During the past year the Mackay Laboratory has been kept exceedingly busy, and from the table given it will be noticed that a large increase in the volume of work is evident. This is more noticeable in the number of canes analysed for farmers, who are every year making more use of the Station in this line. The Lower Burdekin District this year alone forwarded 45 samples of cane.

In addition to the volume of chemical work recorded in the tables which have already appeared, a number of soil, fertiliser, and other analyses have been performed. Testing of canes was also carried out at the request of the Committee of the Mackay District Show in June last.

The following tables show the total number of analyses made at the Mackay Station Laboratory from 1st July, 1914, to the 30th June, 1915:—

DETAILED REPORT OF ANALYTICAL WORK PERFORMED IN THE LABORATORY OF THE SUGAR EXPERIMENT STATION, MACKAY, FROM 1ST JULY, 1914, TO 30TH JUNE, 1915.

| Materials. | Number of Samples Analysed. | Number of Analyses. |
|---|---|---|
| Soils— | | |
| Agricultural Method .. .. .. .. .. .. .. | 21 | 42 |
| Nitrogen Determinations .. .. .. .. .. .. | 21 | 42 |
| Humus Determinations .. .. .. .. .. .. | 21 | 42 |
| Mechanical Analysis .. .. .. .. .. .. .. | 21 | 21 |
| Citric Method .. .. .. .. .. .. .. .. | 21 | 42 |
| Fertilisers .. .. .. .. .. .. .. .. | 3 | 6 |
| Lime .. .. .. .. .. .. .. .. | 3 | 6 |
| Sugar Cane and Juices (Farmers') .. .. .. .. .. | 77 | 129 |
| Sugar Cane and Juices (Station) .. .. .. .. .. | 595 | 1,190 |
| Sugars .. .. .. .. .. .. .. .. | 6 | 12 |
| Sugar-cane Fibres .. .. .. .. .. .. .. | 110 | 110 |
| Water Analysis .. .. .. .. .. .. .. | 2 | 4 |
| Bone Ash .. .. .. .. .. .. .. .. | 1 | 2 |
| Total .. .. .. .. .. | 902 | 1,648 |

A Laboratory has also been established at the Bundaberg Sugar Experiment Station during the year, at which analyses of canes for farmers have been made in addition to the testing of the experiments at the Station. This work has been capably and accurately carried out by the Chemist (Mr. James Pringle). The table appearing hereunder sets forth the number of analyses made by him during the season to date:—

CANE ANALYSIS CARRIED OUT AT THE SUGAR EXPERIMENT STATION LABORATORY, BUNDABERG, SEASON 1915.

| Materials. | Number of Samples Analysed. | Number of Analyses. |
|---|---|---|
| Sugar canes and juices for farmers .. .. .. .. .. .. | 309 | 618 |
| Sugar canes and juices for Agricultural Show at Bundaberg .. .. | 40 | 80 |
| Sugar canes and juices for Experiment Station .. .. .. .. | 148 | 296 |
| Total .. .. .. .. .. .. .. .. | 497 | 994 |

The free testing of canes for Bundaberg and other farmers in the South was largely taken advantage of and appreciated.

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

| Materials. | Number of Samples Analysed. | Number of Analyses. |
|---|---|---|
| Sugar-cane ashes | 48 | 96 |
| Soils | 46 | 92 |
| Sugar-canes | 18 | 36 |
| Juices | 7 | 14 |
| Syrups and molasses | 6 | 12 |
| Water | 1 | 2 |
| Megasse | 5 | 10 |
| Manure, lime, &c. | 3 | 6 |
| Sugars | 25 | 50 |
| Totals | 159 | 318 |

In last year's report a table containing percentages of nitrogen and mineral constituents of the ash of sugar-canes of different varieties and grown in various districts was published. It was then stated that separate determinations would be made on the tops and leaves of the cane plant with the view of seeking information respecting the weights of elements removed from the soil. This has now been done, the materials for analyses being provided from the analytical experiment at Mackay. The following highly interesting table has been prepared by the Agricultural Chemist for the Sugar Bureau from analyses made from samples sent down from Mackay:—

PLOT NO. 1—CANE PLANTED IN APRIL, 1913, AND CUT OCTOBER, 1914.

| Laboratory No. | Variety of Cane. | Estimated Tons per Acre. | Ash. | | Lime. | | Potash. | | Phosphoric Acid. | | Nitrogen. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | % | Lb. per Acre. | % | Lb. per Acre. | % | Lb. per Acre. | % | Lb. per Acre. | % | Lb. per Acre. |
| 1269 | Hambledon, Q. 426 C.C. | 40 | ·480 | *430* | ·054 | *48* | ·057 | *51* | ·063 | *56* | ·067 | *60* |
| 1271 | Do. do. T. and L. | 10 | 1·545 | *346* | ·117 | *26* | ·384 | *86* | ·096 | *21* | ·202 | *45* |
| .. | Do. do. T.C.P. | .. | .. | *776* | .. | *74* | .. | *137* | .. | *77* | .. | *105* |
| 1255 | Badila .. .. C.C. | 45 | ·486 | *490* | ·052 | *52* | ·061 | *61* | ·037 | *37* | ·065 | *66* |
| 1274 | Do. .. .. T. and L. | 95 | 1·818 | *387* | ·108 | *23* | ·495 | *105* | ·105 | *22* | ·204 | *43* |
| .. | Do. .. .. T.C.P. | .. | .. | *877* | .. | *75* | .. | *166* | .. | *59* | .. | *109* |
| 1277 | Goru .. .. C.C. | 35 | ·294 | *230* | ·044 | *34* | ·072 | *56* | ·019 | *15* | ·052 | *41* |
| 1273 | Do. .. .. T. and L. | 4·4 | 1·608 | *158* | ·117 | *11* | ·351 | *35* | ·084 | *8* | ·198 | *19* |
| .. | Do. .. .. T.C.P. | .. | .. | *388* | .. | *45* | .. | *91* | .. | *23* | .. | *60* |
| 1252 | Cheribon .. .. C.C. | 50 | ·270 | *302* | ·033 | *37* | ·056 | *63* | ·021 | *23* | ·021 | *23* |
| 1258 | Do. .. .. T. and L. | 10·2 | 1·650 | *377* | ·134 | *31* | ·445 | *102* | ·076 | *17* | ·131 | *30* |
| .. | Do. .. .. T.C.P. | .. | .. | *679* | .. | *68* | .. | *165* | .. | *40* | .. | *53* |
| 1256 | Malabar .. .. C.C. | 30 | ·350 | *235* | ·033 | *22* | ·083 | *56* | ·024 | *16* | ·029 | *19* |
| 1270 | Do. .. .. T. and L. | 6·1 | 1·685 | *230* | ·134 | *18* | ·327 | *45* | ·056 | *8* | ·161 | *22* |
| .. | Do. .. .. T.C.P. | .. | .. | *465* | .. | *40* | .. | *101* | .. | *24* | .. | *41* |
| 1268 | Otamite .. .. C.C. | 50 | ·390 | *437* | ·036 | *40* | ·090 | *101* | ·036 | *40* | ·042 | *47* |
| 1250 | Do. .. .. T. and L. | 7·7 | 1·572 | *271* | ·097 | *17* | ·390 | *67* | ·050 | *9* | ·140 | *24* |
| .. | Do. .. .. T.C.P. | .. | .. | *708* | .. | *57* | .. | *168* | .. | *49* | .. | *71* |

PLOT NO. 1—CANE PLANTED IN AUGUST, 1913, AND CUT DECEMBER, 1914.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1265 | Hambledon, Q. 426 C.C. | 48 | ·377 | *405* | ·043 | *46* | ·058 | *62* | ·055 | *59* | ·055 | 59 |
| 1248 | Do. do. T. and L. | 11·5 | 1·512 | *389* | ·132 | *34* | ·405 | *104* | ·120 | *31* | ·244 | *63* |
| .. | Do. do. T.C.P. | .. | .. | *794* | .. | *80* | .. | *166* | .. | *90* | .. | *122* |
| 1257 | Badila .. .. C.C. | 40 | ·351 | *314* | ·039 | *35* | ·054 | *48* | ·042 | *38* | ·046 | *41* |
| 1236 | Do. .. .. T. and L. | 8·5 | 1·630 | *310* | ·103 | *20* | ·521 | *99* | ·118 | *22* | ·212 | *40* |
| .. | Do. .. .. T.C.P. | .. | .. | *624* | .. | *55* | .. | *147* | .. | *60* | .. | *81* |
| 1254 | Goru .. .. C.C. | 35 | ·434 | *340* | ·041 | *32* | ·035 | *27* | ·025 | *20* | ·040 | *31* |
| 1237 | Do. .. .. T. and L. | 5·8 | 1·550 | *201* | ·132 | *17* | ·467 | *61* | ·082 | *10* | ·190 | *25* |
| .. | Do. .. .. T.C.P. | .. | .. | *541* | .. | *49* | .. | *88* | .. | *30* | .. | *56* |
| 1235 | Cheribon .. .. C.C. | 55 | ·352 | *434* | ·024 | *30* | ·092 | *113* | ·030 | *37* | ·037 | *46* |
| 1245 | Do. .. .. T. and L. | 12·2 | 1·260 | *344* | ·096 | *26* | ·366 | *100* | ·066 | *18* | ·156 | *43* |
| .. | Do. .. .. T.C.P. | .. | .. | *778* | .. | *56* | .. | *213* | .. | *55* | .. | *89* |
| 1241 | Malabar .. .. C.C. | 35 | ·589 | *462* | ·054 | *42* | ·180 | *140* | ·109 | *85* | ·028 | *22* |
| 1262 | Do. .. .. T. and L. | 7·3 | 1·118 | *160* | ·096 | *14* | ·305 | *44* | ·060 | *9* | ·131 | *19* |
| .. | Do. .. .. T.C.P. | .. | .. | *622* | .. | *56* | .. | *184* | .. | *94* | .. | *41* |
| 1249 | Otamite .. .. C.C. | 55 | ·441 | *543* | ·036 | *44* | ·132 | *162* | ·030 | *37* | ·042 | *52* |
| 1260 | Do. .. .. T. and L. | 9·5 | 1·236 | *263* | ·095 | *20* | ·380 | *81* | ·060 | *13* | ·140 | *30* |
| .. | Do. .. .. T.C.P. | .. | .. | *806* | .. | *64* | .. | *243* | .. | *50* | .. | *82* |

PLOT NO. 2—CANE PLANTED IN APRIL, 1913, AND CUT OCTOBER, 1914.

| Laboratory No. | Variety of Cane. | Estimated Tons per Acre. | Ash. | | Lime. | | Potash. | | Phosphoric Acid. | | Nitrogen. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | % | Lb. per Acre. | % | Lb. per Acre. | % | Lb. per Acre. | % | Lb. per Acre. | % | Lb. per Acre. |
| 1264 | Hambledon Q. 426 C.C. | 40 | ·447 | *400* | ·045 | *40* | ·081 | *73* | ·048 | *43* | ·130 | *116* |
| 1275 | Do. do. T. and L. | 11·2 | 1·503 | *377* | ·077 | *19* | ·431 | *108* | ·071 | *18* | ·161 | *40* |
| .. | Do. do. T.C.P. | .. | .. | *777* | .. | *59* | .. | *181* | .. | *61* | .. | *156* |
| 1276 | Badila .. .. C.C. | 45 | ·264 | *266* | ·033 | *33* | ·049 | *49* | ·027 | *27* | ·064 | *64* |
| 1234 | Do. .. .. T. and L. | 10 | 1·495 | *335* | ·130 | *29* | ·404 | *90* | ·077 | *17* | ·192 | *43* |
| .. | Do. .. .. T.C.P. | .. | .. | *601* | .. | *62* | .. | *139* | .. | *44* | .. | *107* |
| 1279 | Goru .. .. C.C. | 35 | ·480 | *376* | ·060 | *47* | ·060 | *47* | ·021 | *16* | ·067 | *52* |
| 1272 | Do. .. .. T. and L. | 4·6 | 1·713 | *176* | ·117 | *12* | ·396 | *41* | ·090 | *9* | ·219 | *23* |
| .. | Do. .. .. T.C.P. | .. | .. | *552* | .. | *59* | .. | *88* | .. | *25* | .. | *75* |
| 1266 | Cheribon .. .. C.C. | 50 | ·354 | *396* | ·034 | *38* | ·097 | *109* | ·023 | *26* | ·036 | *40* |
| 1261 | Do. .. .. T. and L. | 10·7 | 1·758 | *421* | ·111 | *27* | ·561 | *134* | ·063 | *15* | ·173 | *41* |
| .. | Do. .. .. T.C.P. | .. | .. | *817* | .. | *65* | .. | *243* | .. | *41* | .. | *81* |
| 1280 | Malabar .. .. C.C. | 30 | ·610 | *410* | ·055 | *37* | ·152 | *102* | ·039 | *26* | ·060 | *40* |
| 1281 | Do. .. .. T. and L. | 6·4 | 2·197 | *315* | ·177 | *25* | ·533 | *76* | ·067 | *10* | ·173 | *25* |
| .. | Do. .. .. T.C.P. | .. | .. | *725* | .. | *62* | .. | *178* | .. | *36* | .. | *65* |
| 1278 | Otamite .. .. C.C. | 50 | ·357 | *400* | ·036 | *40* | ·090 | *101* | ·024 | *27* | ·059 | *66* |
| 1259 | Do. .. .. T. and L. | 9·6 | 1·362 | *285* | ·093 | *19* | ·504 | *105* | ·078 | *16* | ·185 | *39* |
| .. | Do. .. .. T.C.P. | .. | .. | *685* | .. | *59* | .. | *206* | .. | *43* | .. | *105* |

PLOT NO. 2—CANE PLANTED IN AUGUST, 1913, AND CUT DECEMBER, 1914.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1239 | Hambledon Q. 426 C.C. | 48 | ·367 | *395* | ·069 | *74* | ·055 | *59* | ·061 | *66* | ·049 | *53* |
| 1246 | Do. do. T. and L. | 10·7 | 1·626 | *390* | ·102 | *24* | ·432 | *104* | ·072 | *17* | ·181 | *43* |
| .. | Do. do. T.C.P. | .. | .. | *785* | .. | *98* | .. | *163* | .. | *83* | .. | *96* |
| 1243 | Badila .. .. C.C. | 40 | ·400 | *358* | ·034 | *30* | ·060 | *54* | ·040 | *36* | ·040 | *36* |
| 1263 | Do. .. .. T. and L. | 7·9 | 1·341 | *237* | ·078 | *14* | ·428 | *76* | ·064 | *11* | ·155 | *27* |
| .. | Do. .. .. T.C.P. | .. | .. | *595* | .. | *44* | .. | *130* | .. | *47* | .. | *63* |
| 1242 | Goru .. .. C.C. | 35 | ·244 | *191* | ·031 | *24* | ·044 | *34* | ·019 | *15* | ·035 | *27* |
| 1247 | Do. .. .. T. and L. | 73 | 1·456 | *238* | ·104 | *17* | ·389 | *64* | ·098 | *16* | ·200 | *33* |
| .. | Do. .. .. T.C.P. | .. | .. | *429* | .. | *41* | .. | *98* | .. | *31* | .. | *60* |
| 1240 | Cheribon .. .. C.C. | 55 | ·529 | *652* | ·051 | *63* | ·080 | *99* | ·029 | *36* | ·199 | *245* |
| 1244 | Do. .. .. T. and L. | 10·8 | 1·698 | *411* | ·146 | *35* | ·376 | *91* | ·058 | *14* | ·151 | *36* |
| .. | Do. .. .. T.C.P | .. | .. | *1,063* | .. | *98* | .. | *190* | .. | *50* | .. | .. |
| 1253 | Malabar .. .. C.C. | 35 | ·690 | *541* | ·048 | *38* | ·183 | *143* | ·123 | *96* | ·059 | *46* |
| 1251 | Do. .. .. T. and L. | 6·0 | 1·089 | *146* | ·096 | *13* | ·271 | *36* | ·041 | *5* | ·126 | *17* |
| .. | Do. .. .. T.C.P. | .. | .. | *687* | .. | *51* | .. | *179* | .. | *101* | .. | *63* |
| 1267 | Otamite .. .. C.C. | 55 | ·359 | *442* | ·033 | *41* | ·101 | *124* | ·030 | *37* | ·085 | *105* |
| 1238 | Do. .. .. T. and L. | 12·0 | 1·624 | *436* | ·154 | *41* | ·420 | *113* | ·068 | *18* | ·177 | *48* |
| .. | Do. .. .. T.C.P. | .. | .. | *878* | .. | *82* | .. | *237* | .. | *55* | .. | *153* |

C.C., Crushable Cane. T. and L., Tops and Leaves. T.C.P., Total Cane Plant.

This shows the pounds of lime, potash, phosphoric acid, and nitrogen removed in crops of cane of the weight grown. It is noteworthy that more potash is removed than nitrogen, lime, or phosphoric acid in these cane crops. This table requires special study in relation to the application of fertilisers.

The Sugar Bureau desire to thank Mr. Brünnich for the work carried out and the promptness with which results come to hand.

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

At the end of 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.

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

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 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.

Various experiments have been initiated for the purpose of demonstrating to farmers whether manuring will or will not pay, or whether liming and green manuring are sufficient in themselves to

ensure good crops, whether subsoiling is advantageous on red soils, and are different methods of cultivation payable. Farmers generally cannot afford either the time or the money to carry out such experiments for themselves, and the Station must prove whether such methods of treatment are likely to be profitable or not. In this way it can be of greatest assistance to growers in saving them large sums of money. One successful experiment, or the introduction of one good variety of cane, can save the cost of the experiment stations many times over. In order that these demonstrations, however, may be of the greatest value, it is essential that farmers should take an interest in the Station and visit it at intervals. All cane-growers are cordially welcomed at both the Experiment Stations, and are earnestly invited to come as often as they can, when they will be met and shown round and afforded all information.

It has been asked why good land was selected for an experiment station, and why experiments were not conducted on the poorest land to be found. In reply to this, it may be said that the Southern Experiment Station contains a portion of as poor exhausted soil as may be found anywhere on the Woongarra. When this soil was analysed by the Agricultural Chemist it was found to only contain 127 lb. of phosphoric acid and 13 lb. of potash per acre in an available form. There are two classes of soil on the Station—one a fair average of soil (but not so good as the lands nearer the Hummock), upon which varieties will be tested; the other, once good but now exhausted, upon which experiments will be conducted. This land is on the southern side of the Station, and the poor quality of crops on that side has been noted for a long time past.

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.

During the short period the Station has been in existence it has had the misfortune to encounter frost in 1914 and to pass through a severe drought this year. This has not only interfered with the experiments, but it has had the effect of delaying operations in connection with variety tests to a most marked degree as will be pointed out hereafter. No irrigation is practised at the Station, and, though this would be of inestimable value, it would not be fair to use any method of watering canes unless the farmers in the district could do so also. This is not feasible at the present time, though the writer is convinced that the red soils of Woongarra and Childers would respond notably to such treatment.

The following are the results of the experiments initiated last year:—

### Experiments with Lime, Subsoiling, Mixed Manures, and Ordinary Cultivation.

The land upon which these experiments are planted has been under cultivation for nearly forty years. After the last crop of cane was removed, the ground was ploughed and then cross ploughed with the disc plough and harrowed. Lime at the rate of 1 ton per acre was then applied to those plots which were to receive lime. The whole piece was reploughed this time with the swing plough in February of 1914, the subsoiler following the plough on the subsoiled plots. The experiments were planted in March, and a good strike resulted, although the plants were old, being all that could be obtained at that time. The variety used was D. 1135. The cane came on well till July, when severe frosts were experienced night after night for 10 nights, cutting the whole of the cane to the ground. By August they had sprung again, though there is no doubt the plants received a great set-back which ultimately affected their yield per acre. In August this year the analyses were carried out, and the results of the various experiments, together with the yields of cane and sugar per acre, appear in the following tables, the cane being also cut in August and sent to Millaquin Factory:—

Analytical Results of Liming Experiments With and Without Subsoiling. Variety, D. 1135. Plant Crop.

| Plot No. | Variety of Cane. | Treatment. | Age of Cane. | Date of Analysis. | Density of Juice (Brix). | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | % Sucrose in Cane. | P.O.C.S |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | D. 1135 .. | Limed and Subsoiled .. | 13 months | 25-8-15 | 21·8 | 19·82 | ·17 | 90·91 | 17·64 | 15·91 |
| 2 | Do. .. | Limed only .. .. .. | do. | 25-8-15 | 20·8 | 19·56 | ·17 | 94·03 | 17·41 | 15·82 |

Yield of Cane and Sugar per Acre from Liming Experiments With and Without Subsoiling. Plant Crop, D. 1135.

| Plot No. | Treatment. | Tons of Cane per Acre. | Tons of Total Sugar per Acre. | Tons of Pure Obtainable Cane Sugar per Acre. |
|---|---|---|---|---|
| 1 | Limed and subsoiled .. .. .. .. .. .. | 20·69 | 3·65 | 3·29 |
| 2 | Limed only .. .. .. .. .. .. .. .. | 19·43 | 3·38 | 3·07 |

ANALYTICAL RESULTS OF LIMING EXPERIMENTS WITH AND WITHOUT MIXED MANURE. VARIETY, D. 1135. PLANT CROP.

| Plot No. | Variety of Cane. | Treatment. | Age of Cane. | Date of Analysis. | Density of Juice (Brix). | % Sucrose in Juice | % Glucose in Juice | Purity of Juice. | % Sucrose in Cane. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | D. 1135 .. | Mixed manure and lime .. | 13 months | 25-8-15 | 20·5 | 19·14 | ·14 | 93·36 | 17·04 | 15·42 |
| 2 | Do. .. | No manure and lime .. .. | do. | 25-8-15 | 20·4 | 19·00 | ·16 | 93·10 | 16·91 | 15·29 |

YIELD OF CANE AND SUGAR PER ACRE FROM LIMING EXPERIMENTS WITH AND WITHOUT MIXED MANURE. PLANT CROP. D. 1135.

| Plot No. | Treatment. | Tons of Cane per Acre. | Tons of Total Sugar per Acre. | Tons of Pure Obtainable Sugar per Acre. |
|---|---|---|---|---|
| 1 | Lime with mixed manure .. .. .. .. .. | 20·79 | 3·54 | 3·20 |
| 2 | Lime with no manure .. .. .. .. .. .. | 20·79 | 3·51 | 3·18 |

ANALYTICAL RESULTS OF EXPERIMENTS WITH AND WITHOUT SUBSOILING. VARIETY, D. 1135. PLANT CROP.

| Plot No. | Variety of Cane. | Treatment. | Age of Cane. | Date of Analysis. | Density of Juice (Brix). | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | % Sucrose in Cane. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | D. 1135 .. | Subsoiled; no lime or manures | 13 months | 25-8-15 | 20·8 | 19·10 | ·16 | 91·82 | 17·00 | 15·25 |
| 2 | Do. .. | Not subsoiled; no lime or manures | do. | 25-8-15 | 21·2 | 19·39 | ·17 | 91·46 | 17·26 | 15·44 |

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENTS WITH AND WITHOUT SUBSOILING. PLANT CROP. D. 1135.

| Plot No. | Treatment. | Tons of Cane per Acre. | Tons of Total Sugar per Acre. | Tons of Pure Obtainable Cane Sugar per Acre. |
|---|---|---|---|---|
| 1 | Subsoiled; no lime or manures .. .. .. .. .. | 22·31 | 3·79 | 3·40 |
| 2 | Not subsoiled; no lime or manures .. .. .. .. | 20·66 | 3·56 | 3·19 |

ANALYTICAL RESULTS OF EXPERIMENTS WITH AND WITHOUT MIXED MANURE. VARIETY, D. 1135. PLANT CROP.

| Plot No. | Variety of Cane. | Treatment. | Age of Cane. | Date of Analysis. | Density of Juice (Brix). | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | % Sucrose in Cane. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | D. 1135 .. | Mixed manure .. .. | 13 months | 25-8-15 | 20·6 | 19·22 | ·20 | 93·64 | 17·10 | 16·34 |
| 2 | Do. .. | No manure .. .. .. | do. | 25-8-15 | 20·0 | 18·84 | ·25 | 94·22 | 16·76 | 15·26 |

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENTS WITH AND WITHOUT MANURES. PLANT CROP. D. 1135.

| Plot No. | Treatment | Tons of Cane per Acre. | Tons of Total Sugar per Acre. | Tons of Pure Obtainable Cane Sugar per Acre. |
|---|---|---|---|---|
| 1 | Mixed manure; no lime or subsoiling .. .. .. .. | 21·90 | 3·74 | 3·57 |
| 2 | No manure; no lime or subsoiling .. .. .. .. | 20·04 | 3·36 | 3·06 |

From the crop results it will be seen that in the first series subsoiling with lime gives a slight advantage over the plot limed without subsoiling, but not enough to pay for the cost of subsoiling. In the second series lime with and without manure gave exactly the same result, so that the manures applied were so much waste money. In the third series the subsoiled plot gave 1.65 tons of cane more per acre, which just about paid for the extra act of subsoiling. In the fourth series manures without

lime or subsoiling have given a slight increase of 1.86 tons over the plot without manures. The results, however, from each series are so nearly equal that it is evident, in a year like the present, little or no advantage has been gained from the use of lime, fertilisers, or subsoiling. It does not, of course, follow that these agents would not pay in a normal season; and that is exactly the task the Experiment Station has before it, so that it can definitely and authoritatively advise farmers upon these subjects. The fertilisers applied were sulphate of ammonia, nitrate of soda, sulphate of potash, and superphosphate, and cost £4 per acre with the application. The lime cost £2 10s. per acre with application, and the subsoiling cost £2 per acre. A table showing cost of production of the various plots is given hereunder:—

COST OF PRODUCTION PER ACRE AND PROFIT ON ABOVE SERIES OF EXPERIMENTS.

| Operations. | Limed and Subsoiled. | Limed only. | Lime and Mixed Manure. | Lime and No Manure. | Subsoiled only. | Not Subsoiled. | Mixed Manures only. | No Manures. |
|---|---|---|---|---|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. |
| Three ploughings .. | 3 0 0 | 3 0 0 | 3 0 0 | 3 0 0 | 3 0 0 | 3 0 0 | 3 0 0 | 3 0 0 |
| One Harrowing .. | 0 1 6 | 0 1 6 | 0 1 6 | 0 1 6 | 0 1 6 | 0 1 6 | 0 1 6 | 0 1 6 |
| Subsoiling .. .. | 2 0 0 | .. | .. | .. | 2 0 0 | .. | .. | .. |
| Lime .. .. | 2 10 0 | 2 10 0 | 2 10 0 | 2 10 0 | .. | .. | .. | .. |
| Plants and Planting | 3 0 0 | 3 0 0 | 3 0 0 | 3 0 0 | 3 0 0 | 3 0 0 | 3 0 0 | 3 0 0 |
| Fertilisers .. .. | .. | .. | 4 0 0 | .. | .. | .. | 4 0 0 | .. |
| Cultivation (including hand hoeing) | 1 13 0 | 1 13 0 | 1 13 0 | 1 13 0 | 1 13 0 | 1 13 0 | 1 13 0 | 1 13 0 |
| Cutting .. .. | 5 3 5 | 4 17 1 | 5 3 11 | 5 3 11 | 5 11 6 | 5 3 3 | 5 9 6 | 5 0 2 |
| Carting .. .. | 1 0 8 | 0 19 5 | 1 0 9 | 1 0 9 | 1 2 3 | 1 0 8 | 1 1 10 | 1 0 0 |
| *Cost of production.. | 18 8 7 | 16 1 0 | 20 9 2 | 16 9 2 | 16 8 3 | 13 8 5 | 18 5 10 | 13 14 8 |
| Received from mill.. | 25 17 3 | 24 5 9 | 25 19 9 | 25 19 9 | 27 17 9 | 25 16 6 | 27 7 6 | 25 1 0 |
| Profit .. .. | 7 8 8 | 8 4 9 | 5 10 7 | 9 10 7 | 11 9 6 | 11 18 1 | 9 1 8 | 11 6 4 |

* Not including rent.

This also shows the profits made. Considering the season, the total yield has been satisfactory; but it is evident that good preliminary and subsequent cultivation was quite sufficient to ensure the crop this year, and that the extra work of subsoiling was not worth while, or the application of fertilisers either. The lime, however, will possibly benefit succeeding crops. It is seen that the largest profit was made on those plots which were neither manured nor subsoiled. The fertilisation of cane crops upon these red soils is a very interesting problem, and one upon which the Experiment Station hopes to be able to throw a good deal of light. It is too early to speak on the matter definitely yet.

Planting experiments for the purpose of determining the most suitable widths between rows—and whether it is more payable to use top plants, middles, or bottoms and middles—were carried out with N.G. 15 or Badila. The piece of land upon which these experiments were planted received the same preliminary cultivation as in the case of the last experiments, except that none of the plots were limed or subsoiled. Fertilisers at the same rate and cost, however, were applied. In this case also the only plants that could be secured were somewhat old. The analytical data of these trials appear hereunder, the purity and P.O.C.S. figures in this experiment being remarkably good:—

ANALYTICAL RESULTS OF CANE PLANTS IN DIFFERENT WIDTHS OF ROWS. VARIETY, BADILA. PLANT CROP.

| Plot No. | Variety of Cane. | Distance between Rows. | Age of Cane. | Date of Analysis. | Density of Juice (Brix). | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | % Sucrose in Cane. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Badila .. .. .. | 5 feet .. | 13 months | 25-8-15 | 22·4 | 20·77 | ·09 | 92·72 | 18·98 | 17·12 |
| 2 | Do. .. .. .. | 6 feet .. | do. | 25-8-15 | 22·5 | 21·23 | ·08 | 94·31 | 19·40 | 17·67 |
| 3 | Do. .. .. .. | 7 feet .. | do. | 25-8-15 | 22·6 | 21·33 | ·10 | 94·38 | 19·49 | 17·76 |

ANALYTICAL RESULTS OF EXPERIMENTS IN PLANTING TOPS, MIDDLES, AND MIDDLES AND BOTTOMS. VARIETY, BADILA. PLANT CROP.

| Plot No. | Variety of Cane. | Treatment. | Age of Cane. | Date of Analysis. | Density of Juice (Brix.) | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | % Sucrose in Cane. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Badila .. | Tops only planted .. | 13 months | 13-8-15 | 22·6 | 21·17 | ·06 | 93·66 | 19·34 | 17·55 |
| 2 | Do. .. | Middles only planted .. | do. .. | 19-8-15 | 22·1 | 21·18 | ·04 | 95·83 | 19·36 | 17·79 |
| 3 | Do. .. | Bottoms and middles only planted | do. .. | 19-8-15 | 22·0 | 20·87 | ·06 | 94·86 | 19·08 | 17·43 |

The crop results are as follows:—

YIELD OF CANE AND SUGAR PER ACRE FROM CANE PLANTED IN DIFFERENT WIDTHS OF ROWS. VARIETY, BADILA. PLANT CROP, 1915.

| Plot No.. | Distance Between Rows. | Yield of Cane per Acre. | Yield of Total Sugar per Acre. | Yield of Pure Obtainable Cane Sugar per Acre. |
|---|---|---|---|---|
| 1 | 5 feet .. .. .. .. | 15·04 | 2·85 | 2·57 |
| 2 | 6 feet .. .. .. .. | 12·74 | 2·47 | 2·25 |
| 3 | 7 feet .. .. .. .. | 11·91 | 2·32 | 2·01 |

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENTS IN PLANTING TOPS, MIDDLES, AND MIDDLES AND BOTTOMS. VARIETY, BADILA. PLANT CROP, 1915.

| Plot No. | Treatment. | Yield of Cane per Acre. | Yield of Total Sugar per Acre. | Yield of Pure Obtainable Cane Sugar per Acre. |
|---|---|---|---|---|
| 1 | Tops only planted .. .. .. .. .. .. .. | 17·84 | 3·45 | 3·13 |
| 2 | Middles only planted .. .. .. .. .. .. | 8·08 | 1·68 | 1·41 |
| 3 | Bottoms and middles planted .. .. .. .. .. | 6·95 | 1·34 | 1·23 |

From the first table it is apparent, as was demonstrated at Mackay some years ago, that closer planting produces better yields.

The experiment in planting tops as against bottoms and middles is an interesting one which has not been tried by the Bureau hitherto. The top plants led from the commencement; and in May and June, 1914, a count was made of the shoots on the middle rows of each plot. This resulted as follows:—

| Seed Used. | Count. | |
|---|---|---|
| | May. | June. |
| Top plants .. .. .. .. .. .. .. .. .. .. | 456 | 462 |
| Middle plants .. .. .. .. .. .. .. .. .. .. | 170 | 186 |
| Middles and Bottoms .. .. .. .. .. .. .. .. | 158 | 164 |

Of course it is not always possible for a farmer to secure top plants, but he can usually do so during the crushing period; and it appears to be well worth while from the results shown above.

Experiments with fertilisers upon a first ratoon crop were also carried out. This crop was one of a number upon the Station at the time of its purchase, being then in the plant stage. These crops were retained in order to help pay expenses. The following table comprises the analytical results of this trial:—

ANALYTICAL RESULTS OF EXPERIMENTS WITH AND WITHOUT MIXED MANURES. VARIETY, D. 1135. FIRST RATOON CROP.

| Plot No. | Variety of Cane. | Treatment. | Age of Cane. | Date of Analysis. | Density of Juice (Brix). | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | % Sucrose in Cane. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | D. 1135 .. | Mixed manure .. .. | 10 months | 19-8-15 | 20·6 | 18·59 | ·16 | 90·19 | 16·55 | 14·68 |
| 2 | Do. .. | No manure .. .. | do. .. | 19-8-15 | 21·4 | 19·55 | ·18 | 91·30 | 17·40 | 15·55 |

The yield of cane and sugar per acre is given below:—

YIELD OF CANE AND SUGAR PER ACRE ON A FIRST RATOON CROP WITH AND WITHOUT MANURES. D. 1135.

| Plot No. | Treatment. | Yield of Cane per Acre. | Yield of Total Sugar per Acre. | Yield of Pure Obtainable Cane Sugar per Acre. |
|---|---|---|---|---|
| 1 | Mixed manures .. .. .. .. .. .. .. | 17·45 | 2·88 | 2·56 |
| 2 | No manures .. .. .. .. .. .. .. .. | 14·85 | 2·58 | 2·31 |

In this case also the manures did not pay for their cost and application, which was £4.

The cost and profit per acre on each experiment are appended:—

| Operations. | Mixed Manure. | No Manure. |
|---|---|---|
| | £ s. d. | £ s. d. |
| Ratooning | 0 10 0 | 0 10 0 |
| Manure and application | 4 0 0 | .. |
| Subsequent cultivation | 0 9 0 | 0 9 0 |
| Hand hoeings | 1 4 0 | 1 4 0 |
| Cutting | 4 7 3 | 3 14 3 |
| Carting | 0 17 5 | 0 14 10 |
| *Cost of production | 11 7 8 | 6 12 1 |
| Price paid by Mill | 21 16 3 | 18 11 3 |
| Profit | 10 8 7 | 11 19 2 |

* Excluding rent.

From which it is noted that the larger profit has been made on the unmanured plot. This is an opposite result to that obtained last year. Of course, the dryness of the present year has had a good deal to do with the yield.

A similar experiment was carried out with second ratoon cane. The analytical data are as follow:—

Analytical Results of Manurial Experiments with Second Ratoon Cane. Variety, D. 1135.

| Plot. No. | Variety of Cane. | Treatment. | Age of Cane. | Date of Analysis. | Density of Juice (Brix). | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | % Sucrose in Cane. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | D. 1135 | Manured | 12 months | 1-9-15 | 21·6 | 19·99 | ·19 | 92·54 | 17·79 | 16·03 |
| 2 | Do. | Not manured | do. | 1-9-15 | 21·1 | 19·18 | ·45 | 90·9 | 17·07 | 15·22 |

The crop results were as under:—

Yield of Cane and Sugar per Acre from a Second Ratoon Crop With and Without Manures.

| No. of Plot | Treatment. | Yield of Cane per Acre. | Yield of Total Sugar per Acre. | Yield of Pure Obtainable Cane Sugar per Acre. |
|---|---|---|---|---|
| 1 | Mixed manures | 15·46 | 2·75 | 2·47 |
| 2 | No manures | 11·67 | 1·99 | 1·78 |

The difference in yield caused by fertilisers in this instance amounts to 3.79 tons per acre. The following table of cost and profit is presented:—

Cost and Profit per Acre: Manurial Experiment with Second Ratoons.

| Operations. | Mixed Manure. | No Manure. |
|---|---|---|
| | £ s. d. | £ s. d. |
| Ratooning | 0 10 0 | 0 10 0 |
| Manure and application | 3 8 0 | .. |
| Subsequent cultivation | 0 9 0 | 0 9 0 |
| Hand hoeings | 1 4 0 | 1 4 0 |
| Cutting | 3 17 3 | 2 18 4 |
| Cartage | 0 15 5 | 0 11 8 |
| Cost of production | 10 3 8 | 5 13 0 |
| Price paid by Mill | 18 11 0 | 14 0 0 |
| Profit | 8 7 4 | 8 7 0 |

This only shows a profit of 4d. per acre in favour of the manured plot after paying for the manures and their application.

A further series of experiments were undertaken with first ratoons. These were treated as under:—

*Plot* 1.—Ploughed and subsoiled, four furrows.

*Plot* 2.—Ploughed with four furrows only.

*Plot* 3.—Trash relieved and alternate rows cultivated.

*Plot* 4.—Cane volunteered through trash.

*Plot* 5.—Ordinary method; ploughed with three furrows only.

Analytical data will be found hereunder:—

ANALYTICAL RESULTS OF DIFFERENT METHODS OF RATOONING (FIRST RATOON CROP). VARIETY, D. 1135.

| Plot No. | Variety of Cane. | Treatment. | Age of Cane. | Date of Analysis. | Density of Juice Brix. | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | % Sucrose in Cane. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | D. 1135 .. | Ploughed and subsoiled between rows | 10 months | 31-8-15 | 20·4 | 18·97 | ·14 | 92·99 | 16·88 | 15·25 |
| 2 | Do. .. | Ploughed with four furrows between rows | do. .. | 31-8-15 | 20·1 | 18·80 | ·19 | 93·53 | 16·73 | 15·16 |
| 3 | Do. .. | Trash relieved and space between alternate rows ploughed | do. .. | 31-8-15 | 20·0 | 18·42 | ·17 | 92·10 | 16·39 | 14·72 |
| 4 | Do. .. | Cane allowed to volunteer through trash | do. .. | 31-8-15 | 19·9 | 18·45 | ·11 | 92·71 | 16·42 | 14·81 |
| 5 | Do. .. | Ordinary cultivation—viz., three furrows ploughed between rows | do. .. | 31-8-15 | 20·9 | 19·45 | ·14 | 93·06 | 17·31 | 15·64 |

The yield of cane and sugar per acre was as follows:—

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENTS WITH DIFFERENT METHODS OF RATOONING. (FIRST RATOON CROP, 1915—D. 1135.)

| Plot No. | Treatment. | Yield of Cane per Acre. | Yield of Total Sugar per Acre. | Yield of Pure Obtainable Cane Sugar per Acre. |
|---|---|---|---|---|
| 1 | Ploughed and subsoiled between rows .. .. .. .. | 13·61 | 2·29 | 2·07 |
| 2 | Ploughed with four furrows between rows .. .. .. | 13·33 | 2·23 | 2·02 |
| 3 | Trash relieved and alternate rows ploughed .. .. .. | 13·33 | 2·18 | 1·96 |
| 4 | Cane volunteered through trash .. .. .. .. | 12·94 | 2·12 | 1·92 |
| 5 | Ordinary method—viz., three furrows ploughed between rows | 12·16 | 2·10 | 1·90 |

From the above table it will be observed that the subsoiled plot did slightly the best, but its cost was too high to be profitable when the following table of expenses is considered. It is at once noticeable that the volunteer plot has given the largest margin of profit, owing to no cultivation work being performed. The drought has no doubt had this effect, as the results this year were much the same at the Mackay Station. This method is not advised, however, generally speaking, as the trash often proves a harbour for fungus and insect pests, and in a normal season the cultivation methods usually give much better results:—

COST AND PROFIT PER ACRE.

| Operations. | Ploughed and subsoiled. | Four Furrows | Relieving. | Voluntary. | Three Furrows. |
|---|---|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. |
| Ratooning and subsoiling .. .. .. | 1 0 0 | 0 13 4 | 0 13 0 | .. | 0 10 0 |
| Horse hoeing .. .. .. .. .. | 0 9 0 | 0 9 0 | 0 4 6 | .. | 0 9 0 |
| Hand hoeings .. .. .. .. .. | 0 12 0 | 0 12 0 | 0 12 0 | .. | 0 12 0 |
| Cutting .. .. .. .. .. .. | 3 8 0 | 3 6 7 | 3 6 7 | 3 4 8 | 3 0 8 |
| Cartage .. .. .. .. .. .. | 0 13 7 | 0 13 4 | 0 13 4 | 0 12 11 | 0 12 1 |
| Rolling trash .. .. .. .. .. | .. | .. | 1 0 0 | .. | .. |
| Cost of production .. .. .. | 6 2 7 | 5 14 3 | 6 9 5 | 3 17 7 | 5 3 9 |
| Price paid by Mill .. .. .. | 16 6 7 | 15 19 11 | 15 19 11 | 15 10 6 | 14 11 10 |
| Profit .. .. .. .. | 10 4 0 | 10 5 8 | 9 10 6 | 11 12 11 | 9 8 1 |

A further experiment was carried out with potash only *versus* no manure on a first ratoon crop. The analytical results are as under:—

ANALYTICAL RESULTS OF MANURIAL EXPERIMENTS (FIRST RATOON CROP). VARIETY, D. 1135.

| Plot No. | Variety of Cane. | Treatment. | Age of Cane. | Date of Analysis. | Density of Juice. | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | % Sucrose in Cane. | P.O.C.S. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | D. 1135 .. | Potash only .. .. | 11 months | 4-10-15 | 21·2 | 19·54 | ·25 | 92·17 | 17·39 | 15·63 |
| 2 | Do. .. | No Potash .. .. | do. .. | 4-10-15 | 21·3 | 19·81 | ·21 | 93·00 | 17·63 | 15·93 |

The yield of cane and sugar per acre will be found below :—

YIELD OF CANE AND SUGAR PER ACRE FROM FIRST RATOONS TREATED WITH AND WITHOUT POTASH.

| Plot No. | Treatment. | Yield of Cane per Acre. | Yield of Total Sugar per Acre. | Yield of Pure Obtainable Cane Sugar per Acre. |
|---|---|---|---|---|
| 1 | 4 cwt. potash per acre .. .. .. .. .. .. | 15·45 | 2·69 | 2·38 |
| 2 | No manure .. .. .. .. .. .. .. .. | 12·96 | 2·28 | 2·06 |

The potash has given 2.49 tons of cane per acre more for its use, but this was not enough to pay for the cost of the fertiliser and its application.

Experiments were also carried out with a mixture containing superphosphate *versus* a mixture containing meatworks instead of superphosphate. This resulted in the meatworks mixture giving a yield of 1.61 tons more cane than the superphosphate mixture. The figures are as under :—

EXPERIMENTS ON SECOND RATOONS WITH MANURIAL MIXTURES CONTAINING SUPERPHOSPHATE AND MEATWORKS. VARIETY, D. 1135.

| No. of Plot. | Treatment. | Tons of Cane per Acre. | Tons of Pure Obtainable Cane Sugar per Acre. |
|---|---|---|---|
| 1 | 4 cwt. mixed manures containing meatworks .. .. .. .. .. | 10·06 | 1·60 |
| 2 | 4 cwt. mixed manures containing superphosphate .. .. .. .. | 8·45 | 1·34 |
| 3 | No manures .. .. .. .. .. .. .. .. .. .. | 6·66 | 1·06 |

This crop was a very poor one at the far end of the Station. Due to good cultivation, however, it kept its colour remarkably well in spite of the drought. Cost of production and profit are shown in the table below :—

| Operations. | Mixed Manures with Meatworks. | Mixed Manures with Superphosphate. | No Manures. |
|---|---|---|---|
| | £ s. d. | £ s. d. | £. s. d. |
| Ratooning .. .. .. .. .. .. .. | 0 10 0 | 0 10 0 | 0 10 0 |
| Horse hoeings .. .. .. .. .. .. .. | 0 9 0 | 0 9 0 | 0 9 0 |
| Hand hoeings .. .. .. .. .. .. .. | 0 12 0 | 0 12 0 | 0 12 0 |
| Fertilisers and application .. .. .. .. .. | 3 10 0 | 3 10 0 | .. |
| Cutting .. .. .. .. .. .. .. .. | 2 10 3 | 2 2 3 | 1 13 3 |
| Carting .. .. .. .. .. .. .. .. | 0 10 1 | 0 8 5 | 0 6 7 |
| Cost per acre .. .. .. .. .. .. | 8 1 4 | 7 11 8 | 3 10 10 |
| Price received from Mill .. .. .. .. | 12 1 5 | 10 2 9 | 7 19 10 |
| Profit .. .. .. .. .. .. | 4 0 1 | 2 11 1 | 4 9 0 |

From this it is apparent again that the application of fertilisers this year has not been a payable proposition.

## TESTS OF BURNT CANES.

As the greater proportion of the cane upon the Woongarra Scrub was burnt this season, tests were made during ten days of the amount of deterioration taking place from day to day. From the table set out below it is indicated that the cane did not depreciate to any extent during the first 48 hours. After that the glucose content began to rapidly increase until on the tenth day it had increased almost 20 times as much as in the original. The weight of cane also goes steadily down, the loss in the last sample amounting to 16 per cent. The decrease in the purity of the juice is also considerable.

ANALYTICAL RESULTS OF BURNT CANE (D. 1135).

| Date when Burnt. | Weight when Cut. Lb. | Weight when Analysed. | Date of Analysis. | Total Solids (Brix). | % Sucrose in Juice. | % Glucose in Juice. | Purity of Juice. | P.O.C.S. on 11% Fibre. | P.O.C.S on 15.1 % Fibre. | % Fibre at End of 1st Week. |
|---|---|---|---|---|---|---|---|---|---|---|
| 12–10–15 | 7·25 | 7·25 | 13–10–15 | 22·5 | 21·12 | ·29 | 93·86 | 17·07 | .. | .. |
| 12–10–15 | 6·5 | 6·5 | 14–10–15 | 22·8 | 21·70 | ·22 | 95·17 | 17·68 | .. | .. |
| 12–10–15 | 7·25 | 7·0 | 15–10–15 | 22·7 | 21·10 | ·50 | 92·95 | 16·96 | .. | .. |
| 12–10–15 | 6·75 | 6·5 | 16–10–15 | 23·9 | 22·33 | ·71 | 93·43 | 18·00 | .. | .. |
| 12–10–15 | 6·0 | 5·5 | 18–10–15 | 23·5 | 20·70 | 1·00 | 88·08 | 16·11 | .. | .. |
| 12–10–15 | 6·75 | 6·0 | 19–10–15 | 23·9 | 21·80 | 1·51 | 91·21 | 17·33 | .. | .. |
| 12–10–15 | 6·25 | 5·75 | 20–10–15 | 24·6 | 21·60 | 2·52 | 87·80 | 16·77 | 16·00 | 15·10 |
| 12–10–15 | 6·75 | 5·75 | 21–10–15 | 25·3 | 22·20 | 3·02 | 87·74 | 17·23 | 16·43 | .. |
| 12–10–15 | 7·5 | 6·5 | 22–10–15 | 25·5 | 19·93 | 4·85 | 78·15 | 14·27 | 13·61 | .. |
| 12–10–15 | 7·75 | 6·5 | 23–10–15 | 25·3 | 18·73 | 5·23 | 74·07 | 12·83 | 12·24 | .. |

## NEW EXPERIMENTS.

It was intended to conduct an experiment with some 150 varieties of cane, a large number of these being the new Papuan Canes introduced by Mr. Wells. Due to the frost in 1914, the cane which was to provide seed for this trial was all cut back so that in March of this year there was not enough cane for the purpose. During July, however, the cane had grown sufficiently, and a piece of land, which had been carefully prepared with lime and green manure, was got ready for planting; and the following varieties were set out in plots in competition with one another:—N.G. 67, 69, 70, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 24A, 93, 94, 95, 96, 97, 98, 99, 100, 102, 103, 104, M. 1900, N.G. 92, 108, 110, H.Q. 285, N.G. 112, M. 189, N.G. 114, 115, 116, 117, 118, 119, 122, 123, 124, 125, 126, N.G. 24B, 128, 129, 130, 131, 133, 134, 135, 136, 137, 138, 139, M. 87, N.G. 141, 142, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 157, 158, 159, 161, H.Q. 14, N.G. 164, 165, 167, 168, 171, 174, 175, 176, 177, 178, 15, 181, 182, 41, Sport, 184, 185, D. 1135, M. 89, M. 55, Q. 115, 135, 137, 307, 365, 554, 558, 684, 694, 695, 698, 719, 721, Malagache, Q. 748, 750, 763, 767, 779, 795, 812A, 813, 822, 855, 900, 903, 970, 999, 1004, 1025, 1092, 1098, 1133, B. 244, 306, 3412, 3747, 3922, T. 211, D. 115, 1483, Badila Seedling, Hybrid 1, H.Q. 426, H.Q. 458, Gingila, Cassilis, N.G. 16.

The planting was followed by cold dry weather for some six weeks, and thereafter by hot droughty conditions accompanied by high northerly winds. As a consequence, only 61 of them have germinated in anything approaching a fair to good stand; while of the remainder some have not appeared at all.

While this indicates the superior drought-resisting capabilities of some of the varieties as compared with others, of which careful note is being taken, yet it is most disappointing to have lost so much time. Unfortunately, the present weather experienced at Bundaberg is highly prejudicial to those plants which did come up, and a percentage of these are already dying. Nothing less than a fall of 3 or 4 in. can now do much good, as the ground is bone dry and the moisture from small showers is at once carried away by the drying north winds. A number of varieties have also been planted out for distribution purposes, and they are also experiencing a difficult time.

Some of the old ratoon cane is now being ploughed out, and the land will be made ready for further experiments next season.

Due to the drought the experiment with lime and vetches has been allowed to stand over till next year.

The cane used in most of the experiments so far has been the D. 1135 variety. This cane has been the standard variety grown in the Bundaberg district for many years past, and it is now becoming a favourite at Mossman. In Hawaii it is stated the variety that is probably attracting the most attention is the Demerara 1135 or D. 1135, and 2,709 acres all told are planted to this variety for the 1915 crop. This is an increase of 1,300 acres over 1914 and 2,000 over the 1913 acreage of this variety. This kind seems to do well on all the Islands, and at present is more widely distributed than any other variety grown in the group.

## FREE DISTRIBUTION OF CANE AT BUNDABERG.

A distribution of cane took place at the Station during August of this year. About 100 farmers took advantage of the day, and packages of cane were sent to various mills, farmers' associations, and farmers along railway lines to the north and south of Bundaberg. Altogether it is estimated that upwards of 150 farmers received varieties. The work of variety distribution is one of the most important duties of the Station, and is highly appreciated. This work will be carried out on a larger scale next year if the climatic conditions are meantime favourable.

## RAINFALL AT SOUTHERN SUGAR EXPERIMENT STATION, BUNDABERG.

The following table gives the rainfall recorded at the Experiment Station during the growing period from August, 1914, to October, 1915:—

RAINFALL FROM AUGUST, 1914, TO OCTOBER, 1915.

| Month. | Rainfall. | Month. | Rainfall. |
|---|---|---|---|
| August, 1914 | ·100 | May, 1915 | 2·182 |
| September, 1914 | 1·015 | June, 1915 | ·615 |
| October, 1914 | 7·575 | July, 1915 | 1·375 |
| November, 1914 | ·950 | August, 1915 | 1·460 |
| December, 1914 | 2·475 | September, 1915 | ·530 |
| January, 1915 | 4·502 | October, 1915 | ·510 |
| February, 1915 | 11·370 | | |
| March, 1915 | ·060 | Total | 35·220 |
| April, 1915 | ·501 | | |

From the end of February to the end of October (eight months) only 7¼ in. of rain have fallen, and most of this fell in small showers at a time which were rapidly dissipated by high winds. The soils of Woongarra are so open and porous that they demand rain every week for good results.

## 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 Bureau 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 other 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 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 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."

To add to the difficulties expressed above, this year has seen another drought; and this fact has in some instances caused the abandonment of the experiments, which were in the second ratoon stage, owing to the partial failure of the crop.

In the statements which follow, the Field Assistant (Mr. Gibson) has supplied the particulars relating to the work done on the plots, while the analytical data and weights of cane have been compiled from figures kindly supplied by the various mills:—

### *Mr. Geo. Muntz's Plot, Mossman.*

August, 1914.—Plots 3, 4, 5, 6, 7, 8. First ratoon crop harvested from competitive plots.

Plots 3 to 7 ploughed and subsoiled. Plot 8 ordinary cultivation only.

September.—Plots 4 and 6: 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.

September.—All portions disc cultivated.

October.—All portions scarified and hoed.

November.—All portions scarified and hoed.

December.—All portions scarified and sulphate of ammonia applied

In August of 1914, the Replace plot was planted up in 5-ft. drills with varieties as under:—

| | | |
|---|---|---|
| Rows 1, 2, 3, East to West | M. | 55 |
| Rows 4, 5, and half of 6 | M. | 87 |
| Rows half of 6, 7, 8, 9, and 10 | M. | 1474 |
| Rows 11, 12, half of 13, (other half of 13 N.G. 40) | M. | 998 |
| Rows 14, 15, and half of 16 (other half of 16 D. 1135) | M. | 89 |
| Rows 17, 18, and 19 | M. | 779 |
| Rows 20, 21, and 22 | N.G.24B. | (Green Goru.) |
| Rows 23 to 33 | B. | 147 |
| Rows 34 to 39 | D. | 1135 |

The above-mentioned portion received a dressing of sulphate of ammonia in February (as directed), and was treated as follows:—

September.—Scarified and cultivated by disc (cotton king).

October.—Hoed and cultivated by disc.

November.—Scarified.

December.—Scarified.

On 28th and 29th July, 1915, varieties were distributed. The following are notes made on the growth of these:—

M. 55 showed some 5 ft. 6 in. of cane, was healthy, stooled satisfactorily, and seed obtained excellent.

M. 87, about the same length of cane, but stouter, cane healthy, seed excellent, stooled satisfactorily (arrowing).

M. 1474, 4 ft. 6in. of cane, heavy stooler, seed not healthy, much had to be discarded on account of red rot in skin.

M. 998—Little of this germinated, not much distributed for plants, some 6 ft. of stem was realised, but canes of a thin nature and arrowing.

M. 89—Some 5 to 6 ft. of stem, growing rapidly, seed good and arrowing.

M. 779—Germinated very well, seed good, growing rapidly.

N.G. 24B (Green Goru)—A nice crop showing, but badly rat-eaten.

B. 147 and D. 1135 have done very well indeed.

The Mauritius canes, which were only eleven months old, were analysed at the mill; three canes of each variety were taken some 50 ft. in from headland, and the results are as follow:—

| Variety. | Brix. | Sucrose. | Quot. | P.O.C.S. |
|---|---|---|---|---|
| M. 55 .. .. .. .. | 19·5 | 16·75 | 85·9 | 14·42 |
| M. 87 .. .. .. .. | 20·3 | 17·80 | 87·7 | 15·52 |
| M. 89 .. .. .. .. | 18·5 | 15·61 | 84·4 | 13·26 |
| M. 779 .. .. .. .. | 15·5 | 12·99 | 83·8 | 11·00 |
| M. 998 .. .. .. .. | 19·5 | 17·02 | 87·3 | 14·79 |
| M. 1474 .. .. .. .. | 17·7 | 15·40 | 87·0 | 13·37 |

September, 1915.—Competitive plots were harvested with following results:—

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENT PLOT UPON MR. GEO. MUNTZ'S FARM AT MOSSMAN. SECOND RATOON. VARIETY, N.G. 24 (GORU). 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 limed and green manured) .. .. | 11·02 | 2·13 | 1·92 |
| 4 | Subsoiled and mixed manured (plant crop had lime and green manure) | 11·27 | 2·09 | 1·87 |
| 5 | Subsoiled (plant crop had lime) .. .. .. .. .. | 10·04 | 1·85 | 1·67 |
| 6 | Subsoiled and mixed manured (plant crop had lime) .. .. | 10·87 | 2·04 | 1·84 |
| 7 | Subsoiled .. .. .. .. .. .. .. .. | 9·80 | 1·75 | 1·58 |
| 8 | Ordinary cultivation .. .. .. .. .. .. | 9·84 | 1·83 | 1·66 |

Divisions 1 and 2 varieties. Cane ratooned, August, 1914. Harvested, September, 1915.

The analytical results appear hereunder:—

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

| Division. | Treatment. | Density of Juice (Brix). | % Sucrose in Juice. | Quotient of Purity. | % Sucrose in Cane. | P.O.C.S. |
|---|---|---|---|---|---|---|
| 1 | As above .. .. .. .. .. .. .. | 23·5 | 21·75 | 92·5 | 19·36 | 17·44 |
| 2 | Do. .. .. .. .. .. .. .. | 23·0 | 20·93 | 91·0 | 18·63 | 16·62 |
| 3 | Do. .. .. .. .. .. .. .. | 22·4 | 20·74 | 92·6 | 18·46 | 16·63 |
| 4 | Do. .. .. .. .. .. .. .. | 22·7 | 21·11 | 93·0 | 18·79 | 16·97 |
| 5 | Do. .. .. .. .. .. .. .. | 21·7 | 20·09 | 92·5 | 17·89 | 16·11 |
| 6 | Do. .. .. .. .. .. .. .. | 22·5 | 20·93 | 93·0 | 18·63 | 16·83 |

Supplied by courtesy of the Mossman Mill Company.

No results were obtained from these plots this year from manures. The lime and green manure applied to the plant crop, however, has given some advantage over plots 7 and 8, which had none.

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

This crop was burnt and the results of each plot were not recorded.

*Mr. A. J. Draper's Plot, Gordonvale, Cairns.*

Varieties were distributed to farmers on 6th August, 1915.

Due to the experiments in the second ratoon stage being vitiated by severe attacks of grubs, the cane was burnt and sent to the mill without weighing separately.

*Experiment Plot upon Mr. Jas. McKersie's Farm at Ayr.*

The replace plot was planted with varieties in June, 1914, in the following order:—

| | | | |
|---|---|---|---|
| M. 55 | .. .. | Rows 1, 2, and 3. | |
| M. 1474 | .. .. | Rows 4, 5, and 6. | |
| M. 87 | .. .. | Rows 7 and 8. | |
| M. 998 | .. .. | Rows 9, 10, and 11. | |
| M. 1900 | .. .. | Rows 12 and 13. | |
| M. 779 | .. .. | Rows 14, 15, and 16. | |
| M. 89 | .. .. | Rows 17, 18 and 19. | |
| H.Q. 426 | .. .. | Rows 20 and 21. | |

These were distributed to farmers on the 11th August, 1915.

The six competitive plots while green had yet made such poor growth that it was decided to stand them over till 1916.

*Experiment Plot upon Messrs. H. Ruge and Sons' Farm, Proserpine.*

The replace plot upon this area was planted last year as follows:—

| Rows. | Cane. | Rows. | Cane. |
|---|---|---|---|
| 1 .. .. .. .. | Mixed varieties. | 8 and 9 .. .. | M. 998. |
| 2 and 3 .. .. .. | M. 55. | 10, 11, and 12 .. .. | 1900 Seedling. |
| 4 and 5 .. .. .. | M. 87. | 13, 14, and 15 .. .. | M. 89. |
| 6 and 7 .. .. .. | M. 1474. | 16, 17, and 18 .. .. | M. 779. |

These were distributed to growers in August of this year.

Three of the original six competitive plots were harvested in September. The results are given hereunder:—

YIELD OF CANE AND SUGAR PER ACRE FROM THE EXPERIMENT PLOTS UPON MESSRS. H. RUGE AND SONS' FARM AT PROSERPINE. SECOND 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 |
|---|---|---|---|---|
| 3 | Subsoiling (plant crop limed and green manured) .. .. | 7·26 | 1·05 | ·97 |
| 4 | Subsoiling and mixed manures (plant crop limed and green manured) | 13·70 | 2·13 | 1·99 |
| 6 | Subsoiling and mixed manures (plant crop limed) .. .. | 11·61 | 1·81 | 1·67 |

Plots 1 and 2 varieties. Plots 5, 7, and 8 were not weighed.
Ratooned, September, 1914. Harvested, September, 1915.

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

| Division. | Treatment. | Density of Juice. (Brix). | % Sucrose in Juice. | Quotient of Purity. | % Sucrose in Cane. | P.O.C.S. |
|---|---|---|---|---|---|---|
| 3 | As above .. .. .. .. .. .. .. | 19·00 | 17·10 | 90·0 | 14·53 | 13·49 |
| 4 | Do. .. .. .. .. .. .. .. | 20·20 | 18·35 | 90·84 | 15·59 | 14·55 |
| 6 | Do. .. .. .. .. .. .. .. | 20·70 | 18·40 | 88·88 | 15·64 | 14·40 |

Supplied by courtesy of the Proserpine Central Mill.

These represent two manured plots and one unmanured. The manure used consisted of 172 lb. sulphate of ammonia, 69 lb. sulphate of potash, and 207 lb. superphosphate, applied per acre; cost of same, £2 4s. This was subsequently supplemented by 1 cwt. sulphate of ammonia, the whole fertiliser costing £3. The results from the manures while low are still very much better than the unmanured division.

*Experiment Plot upon Messrs. Hocking's Farm at Wallaville, Gin Gin.*

This experiment was badly injured by frost, and all the cane was more or less affected both in sugar content and weight. The following table gives the crop results only:—

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENT PLOTS UPON MESSRS. HOCKING AND CO.'S FARM AT WALLAVILLE. SECOND 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. |
|---|---|---|---|---|
| 3 | Subsoiled (plant crop limed and green manured) | 14·49 | 1·67 | 1·35 |
| 4 | Subsoiled, mixed manures (plant crop limed and green manured) | 11·72 | 1·36 | 1·09 |
| 5 | Subsoiled (plant crop limed) | 13·41 | 1·31 | ·94 |
| 6 | Subsoiled, mixed manures (Plant crop limed) | 15·44 | 1·54 | 1·10 |
| 7 | Ordinary cultivation | 14·63 | 1·40 | ·98 |
| 8 | Subsoiled | 15·71 | 1·59 | 1·17 |

Plots 1 and 2 varieties. Ratooned, August, 1914. Harvested, August, 1915.

The subsoiling, as is usual on river banks, proved of great advantage. The manures, which were mixed and cost £3 per acre, have given very little account of themselves.

*Experiment Plot upon Mr. Stollznow's Land at Currajong.*

The replace plot was planted up with varieties on 6th April, 1914, as under:—

REPLACE PLOT, STOLLZNOW.

| Rows. | Varieties. | Rows. | Varieties. |
|---|---|---|---|
| 1, 2, and 3 | H. Q. 426. | 20 | H.Q. 285. |
| 4, 5, and 6 | M. 998 | 21 | B. 147. |
| 7, 8, and 9 | M. 55. | 22 | Q. 116. |
| 10, 11, and 12 | M. 1474. | 23 | N.G. 40. |
| 13 and 14 | M. 87 | 24 | Malagache. |
| 15 and 16 | M. 779. | 25 | N.G. 24B. |
| 17 and 18 | M. 89 | 26 | N.G. 24A. |
| 19 | H.Q. 114. | | |

These were distributed to farmers in October, 1915.

Due to the drought the second ratoons of the competitive plots made little or no growth, and were not cut for the mill.

*Experiment Plot upon Mr. J. Broadhurst's Farm at Childers.*

The replace plot was planted up on 1st April, 1914, as follows:—

| Rows. | Varieties. | Rows. | Varieties. |
|---|---|---|---|
| 1 | N.G. 24A. | 9 and 10 | M. 779. |
| 2 | N.G. 24B. | 11 and 12 | M. 89. |
| 3 | N.G. 40. | 13 and 14 | M. 1474. |
| 4 | H.Q. 5. | 15 and 16 | H.Q. 426. |
| 5 | Malagache. | 17 and 18 | M. 998. |
| 6 | Q. 116. | 19 and 20 | M. 87. |
| 7 | H.Q. 285. | 21, 22, and 23 | M. 55. |
| 8 | H.Q. 114. | 24 | H.Q. 426. |

These varieties have not yet been distributed.

The competitive plots were harvested in October of this year, being second ratoons. The soil is red volcanic and 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.

The following tables give the analytical and crop results:—

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENT PLOTS UPON THE FARM OF MR. J. BROADHURST, CHILDERS. SECOND 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. |
|---|---|---|---|---|
| 3 | Subsoiled (plant crop limed and green manured) | 9·66 | 1·34 | 1·25 |
| 4 | Subsoiled and mixed manured (plant crop limed and green manured) | 10·71 | 1·55 | 1·47 |
| 5 | Subsoiled (plant crop limed) | 10·33 | 1·46 | 1·37 |
| 6 | Subsoiled and mixed manured (plant crop limed) | 9·69 | 1·34 | 1·23 |
| 7 | Ordinary cultivation only | 7·31 | 1·02 | ·96 |
| 8 | Subsoiling only | 9·15 | 1·31 | 1·25 |

Plots 1 and 2 varieties. Ratooned, September, 1914. Harvested, October, 1915.

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

| Division. | Treatment. | Density of Juice (Brix). | % Sucrose in Juice. | Quotient of Purity | % Sucrose in Cane. | P.O.C.S. |
|---|---|---|---|---|---|---|
| 3 | As above | 18·3 | 16·7 | 89 | 13·9 | 13·01 |
| 4 | Do. | 18·8 | 17·5 | 91 | 14·5 | 13·80 |
| 5 | Do. | 18·7 | 17·1 | 89 | 14·2 | 13·34 |
| 6 | Do. | 18·4 | 16·7 | 89 | 13·9 | 12·97 |
| 7 | Do. | 18·4 | 16·9 | 90 | 14·0 | 13·22 |
| 8 | Do. | 18·8 | 17·4 | 90 | 14·4 | 13·68 |

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

The manures have given practically no results this year. Some advantage, however, has been gained by subsoiling compared with ordinary cultivation. The plots were scarified three times and hoed twice.

*Experiment upon Mr. A. Adie's Farm at Cordalba.*

The replace plot was planted with the following varieties:—

| Rows. | Varieties. | Rows. | Varieties. |
|---|---|---|---|
| 1 and 2 | M. 779. | 15 | H.Q. 285. |
| 3 and half of 4 | M. 55. | 16 | H.Q. 10. |
| Half of 4, 5, and 6 | H.Q. 426. | 17 | H.Q. 5. |
| 7 | M. 89. | 18 | Malagache. |
| 8 and 9 | M. 1474. | 19 | B. 147. |
| 10 and 11 | M. 998. | 20 | N.G. 40. |
| 12 | M. 87. | 21 | N.G. 24B. |
| 13 | Q. 121. | 22 | N.G. 24A. |
| 14 | Q. 116. | | |

The competitive plots were harvested in September, the analytical and crop results being shown below:—

YIELD OF CANE AND SUGAR PER ACRE FROM EXPERIMENT PLOT UPON THE FARM OF MR. A. ADIE, AT CORDALBA, ISIS. FIRST RATOON 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 | Subsoiled, mixed manured (plant crop limed and green manured) | 9·29 | 1·59 | 1·39 |
| 4 | Subsoiled, mixed manured (plant crop limed) | 8·85 | 1·56 | 1·38 |
| 5 | Subsoiled (plant crop limed and green manured) | 9·29 | 1·59 | 1·40 |
| 6 | Subsoiled (plant crop limed) | 9·52 | 1·63 | 1·45 |
| 7 | Ordinary cultivation | 8·89 | 1·53 | 1·35 |
| 8 | Subsoiled | Portion lost in transit. | | |

Ratooned, September, 1914. Harvested, September, 1915. Plots 1 and 2 varieties.

ANALYTICAL RESULTS FROM EXPERIMENT PLOTS UPON THE FARM OF MR. A. ADIE, CORDALBA, ISIS. 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 | As above | 21·8 | 19·2 | 88·07 | 17·08 | 14·95 |
| 4 | Do. | 22·1 | 19·8 | 89·59 | 17·62 | 15·58 |
| 5 | Do. | 21·7 | 19·3 | 88·94 | 17·17 | 15·13 |
| 6 | Do. | 21·4 | 19·3 | 90·18 | 17·17 | 15·25 |
| 7 | Do. | 21·8 | 19·4 | 88·9 | 17·26 | 15·20 |
| 8 | Do. | 21·4 | 18·7 | 87·3 | 16·64 | 14·49 |

Supplied by courtesy of the Isis Central Mill Company.

No advantage from the use of manures was secured.

## SUMMARY.

This year has been a trying one for experimental work with second ratoons, as, due to lack of moisture in all the sugar districts where the plots were situated, no benefits from the use of fertilisers was obtained except at Proserpine, where the ground, usually wet, was somewhat damper than most other places this season.

These experiments have, however, served the purpose they were intended for, and the yields of plant and first ratoon cane were satisfactory. The manure trials, as pointed out in the previous report, were eminently successful in the Northern sugar areas; while the good cultivation, lime, and green

manuring were in nearly every case sufficient for the Southern plots, where in some cases no difference for manures was gained, and in others only slight increases. The average yield of sugar in all these plots throughout—plant, first ratoon, and second ratoon—has been excellent, save only in the case of the experiment upon the river bank at Wallaville, where frost did more or less damage every year.

It was stated last year that, 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 competitive experiments on each plot, with the exception of Mr. Adie's, have now been concluded, having passed through plant, first, and second ratoons. It is intended, however, to retain the variety plots, as this is a specially useful portion of the work. The distribution of new varieties from these plots is taken advantage of in every district, and enables farmers to secure new canes fresh from the ground in their own districts without the trouble of sending to the Experiment Stations, from which place time is necessarily occupied in transit.

Other variety plots have already been established, and it is intended to add to this work.

Before closing this portion of the Report, the Bureau would like to convey its hearty thanks to those farmers who assisted in the carrying out of the work upon their plots. They have always done their level best to carry out instructions and make the plots successful; and it is in no small measure due to them that the results have been so uniformly good.

## 9.—WORK OF THE DIVISION OF ENTOMOLOGY.

This is a most important branch of the activities of the Sugar Bureau, and one upon which a great deal of attention is centred, more particularly in the North, where the damage by the grub pest often assumes colossal proportions. The entomological research work and control of the Entomological Laboratory at Gordonvale is under the care of Mr. Edmund Jarvis, a throughly conscientious and tireless observer. His monthly reports have been greatly valued by all persons interested in the Sugar Industry. He is assisted by Mr. Dodd, whose work is spoken well of by Mr. Jarvis.

During the past twelve months two interesting Bulletins of this Division have been published. The longer of these embodies the researches of Messrs. Girault and Dodd on the cane grubs of Australia, and is intended primarily for the information of entomologists. The second Bulletin is of a popular character, by Mr. Girault, and has been freely issued to cane farmers. Mr. Jarvis is also preparing a Bulletin to deal with insects affecting sugar-cane.

The following report by the Entomologist embodies briefly the twelve months' work at the Laboratory at Gordonvale:—

"I have the honour to submit, as desired, a short report embracing operations instituted at Gordonvale Laboratory during the past twelve months.

A review of such research work must necessarily embody matter already published in monthly progress reports emanating from this office, and in the present instance will take the form of a summary of general investigations, supplemented by a brief record of recently acquired knowledge regarding various means of coping with the cane-grub pest.

Upon commencing duties in September, 1914, I found that previous research work started by Mr. A. A. Girault had been practically confined to a study of the life-cycle and habits of our Mealy-backed Cockchafer (*Lepidiota albohirta*) and a few other beetles of economic interest. It was decided to continue this useful work, but to enter at once on the very urgent question of remedical measures; and with this object in view several lines of investigation were instituted, the nature of which will now be mentioned.

### Miscellaneous Cane Insects.

Whilst organising methods of procedure against the adult beetle, attention was given to the study of various insect pests of sugar-cane hitherto unrecorded, which, although at present comparatively harmless, may on occasion prove troublesome.

It was decided to form a reference collection of all insects frequenting cane-fields, including useful as well as harmful, and miscellaneous species of doubtful relationship to the foregoing. This plan has been put into practice, and at present our official collection contains over 1,000 insects, representing more than 400 distinct species; 50 or so of these are directly injurious to sugar-cane, and about 34 beneficial. It is proposed to publish descriptions and illustrations of the former as occasion may arise, including notes on their habits and methods of repression.

Field investigations associated with this phase of work have already led to discoveries of scientific interest; for example—it appears that several of our cane insects of minor importance occur also in Java, where they have long been known as harmful to this plant.

### Visits to Macknade and Mossman.

Towards the end of September a visit of inspection was paid to Macknade, and three new pests were discovered in sugar-cane from New Guinea. Two of these were Beetle Borers belonging to the genera *Rhabdocnamis* and *Cryptorhynchus*; and the third, a Scale Insect attacking the stalk, and subsequently

identified by Dr. A. Rutherford, of Ceylon, as a species of *Aulacaspis*, to which he has now given the name of *Aulacaspis major n.sp.*, Ruth. Towards the end of July I was asked to attend the Annual Conference of the Australian Sugar Producers' Association at Mossman, and whilst there read a paper reviewing past work at Gordonvale Laboratory. This paper appeared in the "Australian Sugar Journal."

THE QUESTION OF CANE-GRUB CONTROL.

*Light Traps for the Beetle.*—As a result of research work conducted during November and December, 1914, it was found that both sexes of our mealy-backed cockchafer are very susceptible to the influence of acetylene light throughout their aerial existence. Experiments were undertaken principally with a view to obtaining definite information on the question, some entomologists being of opinion that *Lepidiota albohirta* is negatively phototropic. This idea, however, proved to be erroneous, as a trap placed among young plant cane at a time when beetles were emerging from the soil captured no less than 170 specimens in six hours. Details of this investigation are given in my monthly report for December. As an outcome of observations relating to the movements of *albohirta* whilst under the influence of acetylene light, a new form of trap has been designed by the writer, and will be tested this season. As already pointed out, an interval of about three weeks elapsed between the acts of emergence and egg-laying, and the beetles do not, as a rule, all leave the ground on the same date.

It is possible that the individual grower may have to cope with two lots of adult females arising at different times from cultivated and forest lands, in which case the period preceding oviposition—the only profitable time for using light-traps—would necessarily be prolonged for a month or even eight weeks, dating from the first appearance of the beetles.

*Trapping by Means of Attractive Odours.*—Preliminary experiments in connection with this interesting branch of control were commenced last November, and we hope to go more fully into the matter during the coming season.

Before attempting to turn to account the various movements of insects induced by chemotropic influences—which cause them to react towards certain odours associated more or less remotely with the acts of nutrition or reproduction—several important factors need consideration. A few of these will be discussed in a later report, further comment on the subject being uncalled for just now.

Thirteen different preparations were tested last year, including essential oils of native food plants of the beetle, used both alone and in combination with other substances; but in no case was any reaction observed.

*Stomach Poisons for the Beetle.*—During February the question of poison sprays as a means of controlling the adult form of *albohirta* received attention, and experiments were started to test the insecticidal effect of lead arsenate and other chemicals applied to its favourite food plants. With reference to primary conclusions in this connection it may be mentioned that arsenate of lead combined with mill molasses (2-1-50 formula) proved fatal after nine days to beetles consuming about half a square inch of poisoned leafage. Stronger arsenate molasses solutions were less effective, while barium chloride 2 per cent. (6 lb.—30 galls. water) gave negative results, apparently rendering foliage distasteful.

The above experiments, although of preliminary character, proved that the beetle in question does not readily discriminate between sprayed and untreated leaves—a fact of no little economic interest, since this indifference to flavour will enable us to experiment with a great variety of insecticides. We may also assume that arsenate of lead might be serviceable if applied to trap crops immediately after the primary emergence of beetles, as under normal conditions food is partaken of shortly after copulation, and oviposition does not follow until about a fortnight later.

*Deterrents for Cane-grubs.*—An account of initial experiments carried out at the Laboratory for the purpose of determining the deterrent qualities of dichlorbenzole was published in April, 1915 (monthly report). Land treated with ¼-oz. injections became after nine days sufficiently impregnated to drive away or kill all grubs located within a distance of 8 in. from the chemical.

Its action as a deterrent against oviposition will be tested this season.

*Stomach Poisons for Grubs.*—Experiments were conducted with thirteen chemical combinations, including various arsenicals and other poisons, most of which proved valueless, being either non-injurious or too expensive for general use. A few yielded encouraging results, however, and will be further studied next season.

*Larvicides.*—This form of control was investigated in a preliminary way by testing the action of seven insecticidal solutions applied to grub-infested soil. In one instance good resulted; but, the application of larvicides being costly and necessarily limited to cases of gross infestation, the study of such means of repression were soon abandoned in favour of more promising methods.

*Notes on Meterrhizium Fungus.*—Abnormally dry weather experienced throughout the year interfered with research of this nature. Apparently our late autumn and early winter months offer the most favourable conditions for dissemination in the field; but results having on the whole proved inconclusive I cannot at present speak definitely.

*Parasite and Predaceous Insects.*—Several hitherto unrecorded parasites have been bred from the egg, larval, and pupal stages of coleopterous and lepidopterous cane pests. These comprise 16 species of *hymenoptera* belonging mostly to the Ichneumonidæ and Chalcididæ and 11 kinds of *diptera* (two-winged insects) representing the families Dexiidæ and Tachinidæ. Several predaceous insects were obtained, a couple of which—an elaterid beetle and asilid fly—are being reared at the Laboratory. The voracious habits of the former insect have been alluded to in previous reports, and we are hoping to breed numbers of this useful beetle and study its life-cycle and economy. Additional predators include larvæ of two species of Coccinellidæ, a syrphid and chrysopid fly, and three bugs belonging to the

families Reduviidæ and Pentatomidæ. Only a dozen or so cocoons of our common Digger Wasp (*Dielis formosus*) were collected from ploughed ground during the past year, and of these fully 75 per cent. were hyperparasitised. As already pointed out, I am inclined to belive that the hyperparasite in question is steadily increasing, and at present greatly limits the efficiency of its host. Swarms of these bombylid flies were noticed hovering over land at Greenhills during the recent serious cane-grub outbreak.

A second species of Digger Wasp (*Compsomeris radula*, Fab.) was bred last July from a larva of *Lepidiota albohirta*.

## OFFICE ROUTINE AND TECHNICAL WORK.

Correspondence and other official routine claimed an appreciable share of attention.

The time of Mr. A. P. Dodd (Assistant Entomologist) has been devoted principally to the arrangement and preservation of our economic collection, the breeding of insects, and other duties of a technical nature. He has also attended to the work of recording additional data respecting the life-histories and habitat of root-eating cockchafers derived from a continuous accumulation of grubs, &c., collected in the field from time to time by Assistant J. A. Hadley.

## PUBLICATIONS.

"The White Grubs of Sugar-Cane in Queensland"—A. A. Girault (Queensland Bureau Sugar Exp. Stat., Div. Ent., Bull. No. 1, 1914).

"The Cane Grubs of Australia"—A. A. Girault and A. P. Dodd (Queensland Bureau Sugar Exp. Stat., Div. Ent., Bull. No. 2, 1915).

"The Sugar-Cane Bud-Moth"—E. Jarvis ("Queensland Agricultural Journal," Vol. III., p. 72).

"Beetle Borers of Sugar-Cane"—E. Jarvis ("Queensland Agricultural Journal," Vol. III., p. 32).

"Monthly Progress Reports," Sept., 1914, to Aug., 1915—E. Jarvis ("Australian Sugar Journal," Vols. 6-7 .

I have, &c.,

EDMUND JARVIS, Entomologist."

## 10.—LIME AND FERTILISERS.

The price of lime in Northern Sugar districts is still unduly high, and efforts are being made by many of the Farmers' Associations to open up various lime deposits and also to procure coral lime, coral sand, and shell deposits. Some of the latter of these which are offered to farmers by private parties are fixed at far too high a price, and farmers are cautioned not to buy any substitutes for pure burnt lime without first submitting samples to the Bureau for free analyses. For instance, in this connection a deposit recently offered to farmers at £2 10s. per ton was found on analysis to only have an outside value of £1.

The present year, as pointed out in various parts of this year's report, has been a bad one for the use of lime and fertilisers; but this is only a passing phase, and the necessity for lime is as great as ever it was.

The fertiliser trade has suffered a great set-back this season on account of the drought and the war. Potash, so essential to our canefields, is now unprocurable, except at a prohibitive price. Potash in mixtures can still be obtained, but only to a limited extent. This will be a serious matter if the shortage continues for any great length of time.

## 11.—SEEDLING EXPERIMENTS AT KAMERUNGA AND OLD VARIETIES AT ATHERTON.

The seedling experiments at Kamerunga have so far proved unsuccessful, due, in the first place, to paucity of arrowing and mature arrows not being produced at the same moment, thus preventing cross fertilisation. Unfortunately, the canes growing at this Nursery were burnt by accident in July last, so that no work along these lines can be carried out this year.

The old varieties sent up to the Kairi State Farm upon the Atherton Tableland (including Rappoe, Striped Singapore, Meerah, and Badila) this year experienced a most severe drought. Little growth had been made, and the cane was fast going back.

It was proposed to cut them back, so that they should not make the same demand on the soil. These varieties are under the care of Mr. D. Macpherson, the Manager of Kairi, to whom the thanks of the Bureau are due for the care and attention bestowed upon them.

## 12.—MILL WORK AND ECONOMICS.

The Sugar Season of 1914, as anticipated, was a remarkably good one in the districts north of Proserpine.

The total acreage under cane in 1914 was stated to be 161,195 acres, of which 108,013 acres yielded cane for crushing. This was a larger area than in the previous year 1913 (which constituted a record in the amount of sugar produced), although the weight of cane grown and sugar manufactured was considerably less.

The tonnage of cane harvested reached a total of 1,922,633, from which 225,847 tons of sugar of 94 n.t. were manufactured. This was the largest yield since the commencement of the industry, saving the previous year of 1913, when 242,837 tons of sugar were produced. The average tons of cane per acre produced was 17.80, as against 20.29 the previous year. The tonnage of sugar per acre was 2.09, the previous year yielding 2.49. The highest production of cane per acre was at Maroochy. Cairns, Ingham, and Mourilyan and Ayr also showed good results; while Proserpine, Mackay, Bundaberg, and Childers were a good deal behind.

An interesting figure in the Statistician's Report is the average ton of cane to 1 ton of sugar. Last year this proved to be 8.51, a lower figure than has been secured for many years past.

Two sugar mills closed down this season (1915)—viz., Pemberton, on the Wongarra Scrub; and Rosevale, at Beenleigh. Due to lack of cane on account of the drought, the Inkerman Mill did not crush.

Owing chiefly to the low price of sugar last year, a number of the mills made a loss on the season's operations. It is generally admitted that the efficiency of many of the sugar mills operating in Queensland is not on the high level that it should be. However, if matters improve for the cane-grower they will naturally also do so for the mill, and possibly we shall see these brought up to date within the near future. As it is, some of the mills have been installing new appliances for the better manufacture of sugar. Farmers, it is supposed, will also grow better varieties of cane under the new Regulation of Sugar Cane Prices Act.

## GENERAL.

Before concluding the Annual Report, the writer desires to thank the various farmers' associations and their officers and the management of the mills in Queensland for their courtesy and readiness to assist the Sugar Bureau in its work upon every occasion.

The Press have also assisted the Sugar Bureau in no small measure in the publication of reports and the dissemination of information. Special thanks are due to the management of the "Australian Sugar Journal," also to the "Cane Grower," the latter being published at Mackay.

HARRY T. EASTERBY,
General Superintendent.

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