1927.

QUEENSLAND.

TWENTY-SEVENTH ANNUAL REPORT OF THE BUREAU OF SUGAR EXPERIMENT STATIONS.

REPORT OF THE DIRECTOR

TO

THE HON. THE SECRETARY FOR AGRICULTURE AND STOCK

(*As required by "The Sugar Experiment Stations Act of* 1900").

PRESENTED TO PARLIAMENT BY COMMAND.

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DIRECTOR'S REPORT.

TO THE HONOURABLE THE SECRETARY FOR AGRICULTURE AND STOCK.

SIR,—I have the honour to submit the Twenty-seventh Annual Report of the Bureau of Sugar Experiment Stations up to the 15th November, 1927.

H. T. EASTERBY,

Brisbane, 1st December, 1927. Director.

1.—Introduction.

The production of raw sugar in Queensland in 1926 amounted to 389,272 tons, which was manufactured from 2,925,662 tons of cane. This was a considerable reduction on the 1925 crop, which was 485,585 tons of raw sugar of 94 net titre, a record for the State. This reduction in output was due to the abnormally dry season experienced, as the acreage from which the cane was harvested was practically the same as in 1925. In consequence of this, it was not necessary to export so great a quantity of sugar as in the previous year, when 211,000 tons were sent overseas. The surplus sugar exported from the 1926 crop was 74,777 tons. The proportion which the sugar required for consumption and use in the Commonwealth of Australia bore to the total production of Queensland and New South Wales in 1926 was 81·3242 per cent. The net value of the 94 net titre sugar sold abroad was £14 18s. 10d.—a higher price than that received the previous year, which amounted to only £11 5s. 9d. per ton. The average payment that the Queensland sugar industry received for the whole crop was £24 10s. 10d. per ton of 94 net titre sugar. This was much better than was realised in the previous year, when only £19 10s. 7d. was paid.

The agreement between the Governments of the State of Queensland and the Commonwealth of Australia, which expires next year, provides for a price of £27 per ton. Special concessions to consumers of sugar for manufacturing, and for administration and other costs of the Sugar Board, however, somewhat reduce this price.

The exports of sugar since 1924, when the first large surplus was manufactured, are as follows:—

1924	.. .. ..	74,000 tons
1925	.. .. ..	211,000 ,,
1926	.. .. ..	74,777 ,,
1927 (estimated)	..	150,000 ,,

The work of the Sugar Board in Queensland, constituted by the State Government, has been highly satisfactory to the industry in general, their operations entailing much careful consideration and anxiety.

The question of allocation has not received so much attention recently, due to the lower output in 1926, but the Central Sugar Cane Prices Board have given the question of surplus sugar consideration, and a member of the Board (Mr. A. Henry) has been for some time past collecting information to enable the Board to determine the area for which each grower is entitled to assignment. The lines upon which it is proposed to do this are published in the last award of the Board.

Apart from the industrial turmoil at the South Johnstone Sugar Mill, which lasted from May till September, and transport troubles at Cairns, Bowen, and latterly at Port Douglas, sugar-milling has not been greatly delayed. The railway trouble in September had the effect of closing for a few days two or three mills with insufficient sugar storage accommodation.

During the year the power alcohol distillery at Plane Creek, near Mackay, was opened, and the Australian National Power Alcohol Company is now making further additions to the plant. The manufacture of power alcohol from molasses alone is capable of great expansion, as last year no less than some 4,500,000 gallons were run to waste while 2,500,000 gallons were burnt as fuel in the sugar-mills.

The use of megasse for the manufacture of celotex and building board is also receiving consideration.

It is estimated that the Queensland sugar industry employs about 28,000 men in the fields, mills, and refineries, and that the sum of £6,000,000 is paid annually in wages. There are now thirty-five raw sugar mills in Queensland and two refineries.* Since last season two more of the smaller mills at Beenleigh have closed down, and there are now only three operating in that area.

* The Millaquin Refinery at Bundaberg, which was unfortunately destroyed by fire this year, is now being re-erected.

1. Introduction—*continued.*

It is somewhat difficult to understand the opposition of the Southern States to the Queensland sugar industry receiving fair consideration. The rise in the price of commodities generally since 1914, with the one exception of meat, shows that the price of sugar has increased least of all. This will be seen from the following table, kindly supplied to the writer by Mr. Albert Townsend, the representative of the Commonwealth Government on the Export Sugar Committee, and an officer of the Federal Trade and Customs Department:—

Table showing that Sugar has not increased in Price more proportionately than many other Commodities embraced in the Cost of Living.

Article.	1914.	June, 1927.	Increased Percentage of 1927 over 1914.
			Per cent.
Sugar, per lb.	3·0d.	4·50d.	50·0
Butter, per lb.	13·1d.	23·70d.	80·9
Meat, per lb. (average)	5·5d.	6·55d.	19·1
Bread, 2-lb. loaf	3·5d.	5·5d.	57·1
Jam, per lb.	4·1d.	7·55d.	84·1
Milk, per quart	4·7d.	7·67d.	63·2
Coal, per ton (wholesale at wharf)	23s. 9d.	46s. 3d.	94·7
Basic wage, per week	£2 12s.	£4 5s.	63·5

The average Commonwealth increase in cost of all foods and groceries has increased by 51·7 per cent. since 1914.

As the sugar industry has been influenced by the same laws which govern the higher cost of production of all other foodstuffs, it is extremely difficult to understand why the Southern press should be invariably antagonistic to the foodstuff sugar, and say nothing whatever about other commodities which are produced in Victoria.

It should also be widely recognised that the loss made by the Queensland sugar industry in exporting sugar is a great benefit to Australia. A few years ago Australia was sending out millions of pounds for sugar to countries raising sugar by coloured labour, and these countries took nothing from Australia in return. Now the position is reversed. Millions of pounds are coming into Australia as payment for our export sugar, swelling Australian revenue and helping to reduce the adverse trade balance. During the past three years over £5,000,000 have come into Australia from this source.

The embargo upon the importation of sugar expires next year, and it is expressly essential to the industry that it should be renewed. The Prime Minister of the Commonwealth, on his recent visit to Queensland, said, "The extension of the embargo will be necessary if we are to retain the Queensland sugar industry, keep the Northern areas populated, and maintain our ideals in respect of the White Australia policy." He pointed out that during the war period the Queensland sugar industry had saved the public enormous sums of money, and had not only saved many industries from suspending operations but had enabled manufacturers to increase their export trade amazingly. Owing to supplies of sugar grown in Queensland, condensed milk factories had increased their export trade during the war period from 1,000,000 to 35,000,000 lb. weight in one year, while the export of canned fruit was increased from 1,000,000 to 78,000,000 lb. weight.

2.—Approximate Estimate of the 1927 Cane Crop.

The present season, following the drought of 1926, has been, on the whole, very favourable to the growth of cane, though it was feared earlier in the year that the cyclone at Cairns on the 9th February, and the tremendous floods at Ingham would have caused enormous losses. The districts named, however, made good recoveries, though the great loss of life by floods in the Herbert River district will remain as a painful tragedy in the memories of many people.

It was estimated shortly after the cyclone that some 370,000 tons of cane had been lost, but the total loss from Cairns to Ingham does not appear to have been more than 120,000 tons at the most. Frosts were severe in the Moreton areas this year, and they also occurred in Bundaberg and other Southern places, but the loss in the latter districts was not so great as about Nambour. Dry weather following heavy rains also caused some check in growth in many sugar areas.

The Mackay district has a magnificent crop this year, constituting a record. It is anticipated that 100,000 tons of sugar may be produced.

2. Approximate Estimate of the 1927 Cane Crop—*continued.*

Estimated Crop of Cane, 1927 Season.

Mill.	Preliminary Estimate formed in June.	Approximate Estimate Furnished by Mills at end of October.	Remarks.
	Tons.	Tons.	
Mossman	80,000	75,000	Reduction due to dry weather
Hambledon	170,000	156,000	Reduction due to cyclone and dry weather
Babinda	190,000	180,000	Reduction due to cyclone and flood damage
Mulgrave	160,000	166,000	Crop turned out somewhat better than expected
Goondi	160,000	156,000	Reduction due to weather conditions
South Johnstone	207,000	155,750	Reduction due to long industrial trouble
Mourilyan	160,000	163,000	..
Tully	180,000	195,000	Crop better than anticipated in June
Victoria	150,000	172,000	Crop better than anticipated in June
Macknade	170,000	185,000	Crop better than anticipated in June
Invicta	60,000	65,000	Crop better than anticipated in June
Pioneer	100,000	95,750	..
Kalamia	100,000	108,000	..
Inkerman	130,000	126,000	..
Proserpine	90,000	120,000	Increase due to favourable weather conditions
Cattle Creek	60,000	62,000	Increase due to favourable weather conditions
Racecourse	98,000	108,000	Increase due to favourable weather conditions
Farleigh	123,000	126,000	Increase due to favourable weather conditions
North Eton	60,000	70,000	Increase due to favourable weather conditions
Marian	110,000	110,000	..
Pleystowe	130,000	138,000	Increase due to favourable weather conditions
Plane Creek	120,000	125,000	Increase due to favourable weather conditions
Qunaba	50,000	50,500	..
Millaquin	87,000	87,000	..
Bingera	105,000	114,000	Crop better than anticipated in June
Fairymead	100,000	110,500	Crop better than anticipated in June
Gin Gin	50,000	45,000	..
Childers	100,000	91,000	..
Isis	100,000	97,000	..
Maryborough	25,000	28,000	..
Mount Bauple	35,000	33,000	..
Moreton	50,000	47,000	Reduction due to frosts and dry weather
Eagleby	1,000	2,166	..
Alberton	1,200	1,892	..
Rocky Point	14,000	11,534	..
Total	3,526,200	3,576,092	

Due probably to the good rains in the early part of the year, followed by a dry winter and spring, the commercial cane sugar in the cane this year has been remarkably good. It is quite probable we may make a ton of 94 net titre sugar from about 7·4 tons of cane. If so, our production for this season should be somewhere about 483,000 tons of raw sugar of 94 net titre from the Queensland mills.

It is anticipated that New South Wales will produce 23,000 tons of raws, while the yield of white granulated sugar at the Maffra Beet Sugar Factory was 1,177 tons. The Australian production may, therefore, be some 507,000 tons, practically all 94 net titre raw sugar. At this time this is an approximation only, but should be very near the actual result.

COMPARATIVE PROGRESS OF THE INDUSTRY DURING THE PAST TWENTY-EIGHT YEARS.

The yield of cane per acre from 1918 to 1926 has been below the average for the previous decade, due to the number of dry seasons. On the other hand the yield of sugar per acre is considerably higher and the number of tons of cane required to manufacture 1 ton of raw sugar is much lower. The former is due to the better classes of cane now being grown, while the latter is attributable to the improved efficiency of the mills, and the work of the Cane Prices Board, while both factors are due in some measure to the work of the Sugar Experiment Stations.

Table showing Yield of Cane and Sugar per Acre and Tons of Cane required to make One Ton of Sugar during Twenty-eight 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	8·33
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
Ten Years' Average	14·76	1·60	9·20

2. Approximate Estimate of the 1927 Cane Crop—*continued.*

Table Showing Yield of Cane and Sugar per Acre and Tons of Cane required to make One Ton of Sugar during Twenty-eight Years.—*continued.*

Year.	Tons Cane Per Acre.	Tons Sugar Per Acre.	Tons Cane to 1 Ton Sugar.
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
1915	12·20	1·49	8·20
1916	20·81	2·33	8·93
1917	24·88	2·83	8·79
1918	15·01	1·70	8·82
Ten Years' Average	17·37	1·99	8·68
1919	14·83	1·91	7·76
1920	15·03	1·88	8·0
1921	18·60	2·30	8·11
1922	15·39	2·04	7·53
1923	14·75	1·94	7·60
1924	18·92	2·44	7·75
1925	19.36	2·56	7·55
1926	15·45	2·06	7·52
Eight Years' Average	16·54	2·14	7·72

In the following table is shown the improvement in area and amounts of cane harvested and sugar made during the past twenty-eight years.

Table showing Total Acres Cultivated and Crushed and Total Yields of Cane and Sugar per Acre for a Period of Twenty-eight Years.

Year.	Acres Cultivated.	Acres Crushed.	Yield.	
			Tons Cane.	Tons Sugar.
1899	110,657	79,435	1,176,466	123,289
1900	108,535	72,651	848,328	92,554
1901	112,031	78,160	1,180,091	120,858
1902	85,838	59,102	641,927	76,626
1903	111,536	60,375	823,875	91,828
1904	120,317	82,741	1,326,989	147,688
1905	134,107	96,093	1,415,745	152,722
1906	133,284	98,194	1,728,780	184,377
1907	126,810	94,384	1,665,028	188,307
1908	123,902	92,219	1,433,315	151,098
1909	128,178	80,095	1,163,569	134,584
1910	141,779	94,641	1,840,447	210,756
1911	130,376	95,766	1,534,451	173,296
1912	141,652	78,142	994,212	113,060
1913	147,743	102,803	2,085,588	242,837
1914	161,195	108,013	1,922,633	225,847
1915	153,027	94,459	1,152,516	140,496
1916	167,221	75,914	1,579,514	176,973
1917	175,762	108,707	2,704,211	307,714
1918	160,534	111,572	1,674,829	189,978
1919	148,469	84,877	1,258,760	162,136
1920	162,619	89,142	1,339,455	167,401
1921	184,513	122,956	2,287,416	282,198
1922	202,303	140,850	2,167,990	287,785
1923	219,965	138,742	2,045,808	269,175
1924	253,519	167,649	3,171,341	409,136
1925	269,509	189,466	3,668,252	485,585
1926	266,519	189,312	2,952,662	*389,272

* This is raw sugar of 94 net titre.

PROGRESS MADE IN THE DEVELOPMENT OF THE SUGAR INDUSTRY IN THOSE DISTRICTS SITUATE NORTH OF TOWNSVILLE, SINCE 1910.

The great progress that has been made in the development of the sugar industry in those areas north of Townsville in recent years has been a remarkable achievement, and one that ought to be a sufficient reply to the critics of the sugar industry. To take and change dense tropical jungle into beautiful canefields, with prosperous townships connected by railways and with modern conveniences, has been work of a most arduous nature, and the pioneers of the sugar industry in North Queensland deserve well of their fellow Australians, as the opening up of this country entailed great hardships and inconvenience in transport in the early days in a tropical climate.

2. Approximate Estimate of the 1927 Cane Crop—*continued.*

The increase in population in the belt of country referred to since 1910 is stated to be larger than in any other part of Queensland. These areas, with their high rainfalls and humid conditions, are especially suited to the growth of cane.

The table following shows the progress made:—

Year.	Locality.	Number of Mills.	Tons of Sugar Produced.
1910	Above Townsville	7	57,135
	Below Townsville	42	153,621
1913	Above Townsville	7	62,414
	Below Townsville	41	180,423
1916	Above Townsville	9	98,396
	Below Townsville	38	78,577
1919	Above Townsville	9	101,351
	Below Townsville	33	60,785
1922	Above Townsville	9	120,617
	Below Townsville	31	167,618
1923	Above Townsville	9	161,227
	Below Townsville	29	107,948
1924	Above Townsville	9	189,947
	Below Townsville	29	219,189
1925	Above Townsville	10	216,755
	Below Townsville	27	268,830
1926	Above Townsville	10	221,104
	Below Townsville	26	168,168
1927	Above Townsville	10	230,000 (Estimate)
	Below Townsville	25	253,000 (Estimate)

3.—General Work of the Bureau, with Survey of the Various Sugar Districts.

Sugar Experiment Stations are established at South Johnstone near Innisfail (Northern), Mackay (Central), and Bundaberg (Southern). These stations have laboratories attached. Entomological laboratories are situated at Meringa near Cairns (Northern) and at Bundaberg (Southern). It is proposed to establish a pathological laboratory next year.

Outside the Experiment Station work the director is assisted by three field officers—Messrs. J. C. Murray (Southern), E. H. Osborn (Central), and A. P. Gibson (Northern). The Southern districts take in from Logan to Rockhampton, Central from Rockhampton to Rollingstone, and the Northern from the Herbert River to Mossman.

All three officers have done exceedingly careful work this year, and have afforded great assistance to the Bureau and canegrowers generally in the noting of soil conditions, cane varieties, presence of pests and diseases, and in advising cane farmers re fertilisation, soil data, and cultivation methods.

The pathological work of the bureau has this year been carried out by Mr. E. J. Ferguson Wood, B.Sc., who is now permanently on the staff of the Experiment Stations. Mr. Wood has made many detailed investigations into cane diseases, and his report on this year's work appears later. Next year it is hoped that the Bureau will have four pathologists working at disease problems.

The term for which the three travelling students were sent abroad is now drawing to a close, and it is anticipated that Messrs. A. F. Bell, H. W. Kerr, and N. Bennett will join the staff of the Bureau next year. Mr. A. F. Bell has studied pathology, Dr. H. W. Kerr soil physics and technology, and Mr. N. Bennett sugar technology.

In addition to the inspection of cane areas and the giving of advice to growers, the Field Assistants also supply the Bureau with observations on each farm visited. These notes are tabulated and sent in to the head office monthly, and include such subjects as the following:—Soils, crops, liming, green manuring, fertilising, drainage, irrigation, ploughing, planting, cultivation, harvesting, labour, trashing, ratooning, pests and diseases, varieties of cane in general use, climatic conditions, and arrowing of cane.

So far the Field Assistants have sent in reports upon 5,247 farms. Upon these 444 farmers have used lime, 951 have practised green manuring, and 1,242 have used fertilisers.

The percentage of farmers using green manures and fertilisers still remains very low, and as far as fertilisers are concerned is much below the percentage in other States.

From the figures collected it is shown that the lowest amount of fertilisers used is in the Lower Burdekin district. On the other hand, the chemical plant foods in this area are remarkably good on the whole.

It has been pointed out in previous reports that growers should go in for more intensive farming. For the most part too much land is used to grow crops. From smaller areas a better aggregate tonnage could be secured if better methods of

3. Survey of Sugar Districts—*continued.*

farming were practised, and more control could be exercised in relation to cane diseases—another method for increasing tonnage. The time will come when we will be needing more land to supply Australia's sugar needs, when surplus sugar will be a thing of the past. This side of the question must then be dealt with, and the necessity be faced for raising more cane and sugar per acre. In comparison with many other cane lands, our field production and efficiency is not as good as it should be, though it is constantly improving.

The Director or his Field Officers have during the past twelve months visited every sugar district in Queensland.

The supervision and direction of the Experiment Stations, together with correspondence on sugar and cultivation questions, and the furnishing of statistics of the industry, occupy much time. A large foreign correspondence on sugar matters has also to be dealt with, and the office work of the Director has materially increased in the past few years. In addition, about 1,500 soils have now been analysed for growers, and a letter of advice is sent with each analysis.

Annual field days were held at the Bundaberg and Mackay Stations this year. These aroused considerable interest amongst cane farmers, and were largely attended. Details of these functions will appear in connection with the work of the respective stations.

SURVEY OF DISTRICTS VISITED BY THE FIELD OFFICERS.

Mossman (One Mill).

The Mossman cane areas are the most northern in the State, lying about 30 miles above Cairns. The mill is the only one north of Townsville that suffers from an under-supply of cane; because of this and the district's isolation it has not progressed as others have done. Its available land is inadequate under most favourable conditions and seasons to provide cane enough to profitably supply the seasonal requirements of the mill.

The following is interesting and shows the upward progress of the mill since 1923:—

Particulars.	1923.	1924.	1925.	1926.
Number of Suppliers	120	125	146	153
Tons Cane Crushed	75,544	83,460	80,276	84,579
Tons Sugar at 94 N.T.	10,320	9,495	10,503	11,130
Average c.c.s. ..	15·07	12·64	14·2	13·72
Co-efficient of work	90·65	90·0	92·14	95·91

Hereunder is the average c.c.s. of the main varieties milled, together with the area under crop of each:—

Variety.	Area under Crop.	Percentage Area.	Percentage c.c.s.
H.Q. 426	1,579	26·4	14·65
N.G. 15 (Badila)	1,321	22·1	14·21
Q. 813	131	2·2	14·17
M.Q. 1	45	0·7	13·89
D. 1135	1,635	27·5	12·95
M. 189 (Black Innis) ..	120	2·0	12·85
Green Goru N.G. 24B ..	234	4·0	12·49
B. 147	557	9·3	12·37
Mixed Canes	348	5·8	..

It will be seen that H.Q. 426 is again leader in the field as far as quality is concerned.

The Crop.—The sugar lands are scattered, and, in parts, vary much in quality; with judicious tilling and manuring, followed by more thoughtful plant selection, they could possibly be made to yield a higher tonnage. Early in the year the crop prospects appeared most promising, though the area to cut was known to be some 300 acres less. Generally, it was thought the tonnage to crush would not fall far short of that milled in 1926. Heavy wind and flood damage followed; this, coupled with dry-weather periods and much pest destruction, had reduced the early crop forecast of 82,000 tons to 75,000. One redeeming feature, however, is the good millwork and the phenomenal quality of the crop. Many hundreds of people depend on this mill for their living; should it not be able to profitably carry on in the near future, they would be compelled to seek work elsewhere. This would be a tragedy, as the far North is yet too empty.

Harvesting and Milling.—There appeared more harmony between employee and employer, and increased efficiency in field and factory. Practically all the cane is burnt prior to its harvesting; this improper practice results in untold all-round losses. Cane enough to keep the harvesters engaged for two days is burned. This is supposed to be fired between 6 p.m. and 6 a.m. It is truly difficult to accurately estimate the amount required. This, combined with fire getting out of control, frequently results in overmuch being burned. The mill average c.c.s., however, has been surprisingly high. The cane appeared to have reached the peak of quality about the end of September. It is indeed refreshing to note the general improvement in the condition of harvested cane and crop transportation. Rapidity in removing harvested cane from field to mill cannot be over-estimated. The factory has 25 miles of portable rails. During the slack season two bridges and some 28 chains of a 30-lb. line were constructed. Upwards of fifty truck wagons are used for transporting cane from field to permanent way. The weather has been ideal for their use. The factory is crushing about 4,700 tons weekly, and making upwards of 700 tons of sugar. This quantity is removed as soon as bagged to Port Douglas, from whence it is shipped to Cairns.

3. Survey of the Sugar Districts—*continued.*

Varieties.—Many varieties are raised. The area truly cannot be classified as being a Badila growing one, yet more might be successfully grown. H.Q. 426 is highly favoured, and is a cane difficult to replace. Less D. 1135 and B. 147 might be grown, and the planting of Q. 813, Oramboo, Korpi, and possibly E.K. 28 increased. H.Q. 285 has been recommended in previous reports as being a kind suitable for this area. E.K. 28 requires studying, especially the time of planting and cutting. Pompey or 7 R. 428 could be tried in the poorest of soil in a small way first of all; it should do better here than farther south.

This district is much troubled with leaf stripe disease. Goru should not be planted at Mossman; that seen is badly diseased with leaf scald.

Cultivation.—This is decidedly better. There, however, is still room for much improvement. Farmers generally devote more time cultivating the plant part of the crop, but too frequently neglect the ratoons. Fields that had been harvested some six or eight weeks back had not been worked since. The lack of timely cultivation is responsible for loss of soil moisture and poorer crops. When the cane is cut most of the old roots perish, then is the time to ratoon; if delayed, the new roots are severed, and the crop growth naturally is retarded.

Diseases and Pests.—Leaf stripe is the main disease, and is found mainly in B. 147, D. 1135, and to a lesser degree in H.Q. 426 and Badila. To control this disease the following is recommended:—

(A) Better plant selection;
(B) Dig out affected stools in less-infected areas;
(C) Plough out severely diseased fields as soon as possible;
(D) Important—See that none of the old stubble remains prior to planting;
(E) Rotation; plant with leguminous crop after ploughing out;
(F) Plant with a resistant variety change;
(G) Do not use tops from diseased fields for feed purposes.

Leaf scald was also noted on many fields. Grub and rat destruction was great in parts.

Cairns District (Two Mills).

The following are the particulars of the 1926 crop at Cairns:—

SEASON 1926.

Mill	Tonnage.	Area Harvested.	Tons per Acre.
Hambledon	193,116	9,295	20·8
Mulgrave	189,349	10,005	18·9

SEASON 1927.

Mill.	Tonnage expected.
Hambledon	156,000
Mulgrave	166,000

It will be seen that the 1927 crop is below that of 1926. The reduction in tonnage is largely due to the cyclone which struck Cairns in February last.

Varieties.—The principal varieties grown are as follows:—N.G. 15 (Badila): Where this kind will grow there is none just as good. The continual growing of this most popular cane without change, coupled with careless plant selection and improper cultivation, is slowly bringing degeneration, consequently it is becoming more susceptible to diseases.

H.Q. 426 is giving satisfaction; it is an excellent ten to twelve months' cane for well-drained medium-quality soils. It is outstanding in quality, but, unfortunately, is one rather subject to most diseases.

B. 147, D. 1135, and 7 R. 428 really cannot be classified as good all-round canes in this district, yet are suitable for some of our drier and less fertile soils. The growing of Q. 813, Korpi, and E.K. 28 might be extended with profit to growers and manufacturers alike on selected soils.

The waterside dispute at Cairns prevented the getting away of sugar for some time, and the new season's yield was stored in the spacious sugar store on the Cairns wharf. The extra handling, however, adds to the cost of manufacture.

Cultivation.—This part of the business is worthy of more consideration. Some fields have been ratooned when they should have been ploughed out. Ratooning should be performed as soon after trash-burning as practicable; if delayed serious consequences may follow. Harvested fields are sometimes cross-harrowed by discs prior to ratooning; this is to be highly recommended, especially in poorly harvested fields. Tractors big and small are going their hardest and are indispensable in these days for the general advancement of all classes of field work. Recently harvested fields are being prepared for immediate planting. This is the time when surface soil tilling of interspaces is of much value; it controls weeds, conserves moisture, promotes growth, and in every way benefits the present and subsequent crops. Neglected headlands are a danger to clean fields. Home-made weeders were doing good work. It should be understood that as much as possible of the plant foods of a crop raised in a field should be returned to the soil; if not, the soil from whence they were taken is so much the poorer.

Pests.—Grubs and bud moth borer were killing more shoots than usual; midrib borer frequently occasions dead stripes in leaves; army worms, leaf hoppers, and linear bugs were plentifully found.

Diseases.—To prevent the ever-spreading of these we must endeavour to eradicate the source of infection. If our farmers would co-operate more, the annual losses would be lessened. The good achieved by some is being undone by others. Leaf scald is very prevalent in Badila in parts of the area. Leaf stripe was seen on three farms at Sawmill Pocket. It is gratifying to note the energy displayed by the farmers that have this. The varieties affected are Pompey and D. 1135. Top-rot is less severe now. Spindle-top and much leaf rust were noted.

Gumming disease is still at Aloomba, and little difficulty was experienced in locating this. Gum oozed freely from the cut cane ends of the variety H. 109 growing on two farms adjacent to the

3. Survey of Sugar Districts—*continued.*

southern banks of the Mulgrave River. Mosaic disease was abundantly noted in the same variety.

Filter Press Cake.—The value of this was clearly indicated on a Highleigh farm, where about a chain of poor soil extending right along a big block had received a good dressing; here the cane had not arrowed, and was outstanding in colour and growth.

The cyclone which occurred at Cairns in February did considerable damage to the Mulgrave Mill, where the steel chimney was blown over. In its collapse it destroyed a section of the mill roof, the greater part of the conical subsider, some iron columns, the main steam piping, and sundry tanks. A new steel chimney stack has now been erected, and repairs to other damaged portions of the mill have been carried out.

Babinda (One Mill).

At Babinda last season 235 farmers delivered cane to the mill, and the crop was cut by 275 cane-cutters, whose daily average was just upon 4 tons per man.

Exceedingly heavy rains fell during the first part of this year, the total for the first six months being some 140 inches.

It is customary to burn all trash as soon after harvesting as possible. The prevailing wet conditions early in the season were responsible for most unsatisfactory burns. The resultant rubbish formed a breeding ground for some of our pests, and hindered the necessary interspace cultivation. To enable this to be carried out, the rubbish should have been horse-raked into lines and burnt when conditions were favourable. The rotary cultivator is popular and doing good work.

Early plant cane had germinated favourably, and was making good growth, but the ground surface appeared hard in places. Farmers are preparing more land for planting, others are planting. It is not advisable to plant the following:—

(1) Severely grub-eaten cane—this is lacking in vitality;

(2) Borer-tunnelled or badly rat-eaten cane; the former may spread the pest to clean fields, while the injury caused by the latter serves as an easy inlet for either pests or fungi, and frequently is responsible for unsightly misses.

Some growers appeared disappointed because of the poor and patchy nature of their fields; such alternating conditions appeared to be occasioned by one or more of the following conditions:—

(*a*) Late harvesting;

(*b*) Inferior drainage, coupled with early grub destruction;

(*c*) Improper and insufficient tilling.

Harvesting and Milling.—The cane supply is being well maintained, and good progress is being made. The mill continues to run smoothly and well, turning out some 1,000 tons of sugar per week. It is working a greater number of hours weekly; this appears to be a judicious move and some of the benefits therefrom are as follows:—

(1) The period of crushing is shortened;

(2) The subsequent crop is benefited thereby;

(3) A greater percentage of the crop is milled when the cane possesses its maximum amount of sugar, therefore more sugar is made.

Against this, of course, is the payment of much factory overtime. One hundred and five thousand tons of cane had been milled, and the percentage of burnt cane was gradually increasing. The average crop quality was exceptionally high, the greatest weekly c.c.s. being 16.12 per cent., which is the highest since the inception of the mill. It seems obvious that the factory must carry on into January to complete fully the matured cane still offering, in spite of the increased number of hours crushing.

Ratooning and Cultivation.—The unusually long stretch of rainless weather that prevailed later in the year enabled most farmers to do more and better field work; this has been of great advantage in promoting the growth of the new crop as well as assisting to conserve the soil moisture. Ratooning is too frequently delayed; improved returns would be obtained by performing this necessary work as soon as practicable after trash-burning.

Varieties.—Three main sorts are grown—Badila, still the king of its kind under the Northern sun and one suitably raised in the better lands; H.Q. 426, the best medium land cane and leader in the field so far as sugar is concerned. We are afraid to recommend overmuch of this being grown owing to its great susceptibility to most diseases. This variety, however, is too valuable to lose, for, if lost, the industry would be much the poorer; therefore it behoves our farmers to devote more time when selecting seed; this alone will save it from possible extinction. The third variety consists of the Goru canes, which could easily be discarded.

Innisfail District (Three Mills).

The following is a table giving the areas harvested and tonnages of cane crushed by each of the three district mills during the 1926 crushing season:—

Mill.	Area Cut.	Tons Cane Crushed.	Weeks Crushing.
Mourilyan	7,624	135,473	25
Goondi	7,500	170,006	26
South Johnstone ..	9,575	165,442	30

In addition to this, the Tully Sugar Mill crushed 16,291 tons of cane from the South Johnstone area.

Innisfail is a wonderfully rich and picturesque cane-producing district, possessing great possibilities. It is the home of three of Queensland's greatest mills. South Johnstone Mill had its

3. Survey of Sugar Districts—*continued.*

maiden run in 1916, and was controlled by the Government since its inception until 1926, during which time it milled 1,395,354 tons of cane.

The annual crushings are as follows:—

Year.	Cane Crushed. Tons.	
1916	56,205	
1917	81,584	
1918	47,106	(reduction due to cyclone)
1919	86,554	
1920	126,017	
1921	120,686	
1922	107,897	
1923	173,862	
1924	232,257	(12,262 tons sent to Giru)
1925	197,744	(19,469 tons sent to Tully)
1926	165,442	(16,291 tons sent to Tully)
11 years (total)	1,395,354	(of which 48,022 tons was sent to other Mills)

Early this year the South Johnstone Mill was offered to its suppliers on certain conditions. The growers from the outset unanimously agreed to accept. A farmers' directorate and a staff to manage same were appointed.

At that time it was computed that 10,347 acres of cane would be harvested this year, comprising the following:—

	Acres.
Standover	719
Plant Cane	2,756
First Ratoon	1,888
Second Ratoon	1,610
Other Ratoons	3,374
	10,347

(This does not include unpermitted cane).

The seasonal average cane tonnage per acre may be put down at 20 tons; this being so, some 9,000 acres annually harvested should yield enough cane to keep this factory profitably engaged.

The Innisfail district experienced heavy flooding in February last, which was rather an anxious month, the outstanding feature being high winds accompanied by torrential rain. At the beginning it was exceptionally hot; spasmodic and heavy falls of rain were frequently experienced; these were sandwiched by outbreaks of brilliant sunshine. Such growing conditions forced the crop of cane and weeds along at an extraordinary pace. On the afternoon of the 8th February suspicious signs were noted, and the barograph commenced to fall rapidly, thus foretelling a fast approaching change. Local residents heeded the warning and prepared for the worst. Within the next forty-eight hours the area was severely swept by a high gale and torrential rain, the latter soon deeply inundating the lowlands and converting peaceful running creeks and rivers into raging torrents. The wind continued to increase in velocity until about 10 p.m. on the 9th, at which time the barograph had fallen to 29·28, after which it commenced to rise, when the wind gradually quietened.

When the wind had passed away, and the inundated lowlands became uncovered, it was found that the combined action of wind and water had occasioned severe destruction to property, roads, and crops. The crop damage roughly may be put down as follows:—

By wind—Levelled cane crops, leaves generally tattered and torn, tops and stems more or less twisted, tangled, or broken;

By water—The finer soil had been washed off many farms, and silt upwards of 3 inches deposited on the flooded lowlands.

Patches of cane twice deeply submerged had been killed or damaged, more so that covered by still water, because of the fact that this contained an enormous quantity of fine earth held in suspension, and which when standing was precipitated, much of the precipitation (mud) lodging in the heart or pores of the leaves having a smothering effect. Such damaged tops invariably occasion stem-sprouting (mainly the top eyes), and this has a great tendency to considerably lower the crop's quality and quantity.

Varieties.—N.G. 15 (Badila)—the admitted all-round favourite variety grown in these parts—is the leader in most Northern fields. This popular variety weathered the gale and torrential rain better than the small percentage of other varieties grown. The flattened canes speedily recovered, and within a day or two following the storm were upstanding, but that showing stem was bow-shaped and had produced much aerial roots.

The South Johnstone Sugar Mill, after being taken over by the farmers, was the scene of a long drawn out industrial turmoil, which lasted from May till September. The mill, however, kept on crushing during this period, at first with one and subsequently with two shifts. After the settlement of the trouble the mill got steadily to work, but owing to the time lost it will now be impossible to crush all the cane, so that the estimate has been reduced from 207,000 to 155,000 tons.

The Goondi Mill was doing excellent work, and expected to finish at the end of November.

At Mourilyan a new fourth mill had been put in. This factory was experiencing a good run. The average commercial cane sugar for the season had been 14·5 per cent., but at the end of October it was 15·3 per cent. Many new improvements to the mill were noticed.

This progressive company for many years past has been gradually improving its plant; it is quite evident they realise the great importance of having an efficient mill.

Owing to shipping shortage, sugar stocks were not getting away as rapidly as desired. Two thousand five hundred tons of raw sugar were stored at Mourilyan, and 3,500 at the South Johnstone Mill, at the end of October.

Milling.—The factory is working splendidly and treating its greatest crop in record time. One thousand two hundred and thirty-five tons

3. Survey of Sugar Districts—*continued.*

of cane were milled during the twenty-four hours ended 4 p.m. on the 9th September. The weekly mill average c.c.s. is excellent; 6·4 tons of cane are used to make 1 ton of sugar, while the weekly output of sugar is now over 900 tons. It seems very evident that the number of ships visiting this port is inadequate to remove the district's ever-growing annual supply of manufactured sugar. What would the position have been had the South Johnstone Mill been crushing normally?

The Crop.—Chief among the varieties grown is Badila (N.G. 15). Of this kind there is about 99 per cent. It is gratifying to note that the management is endeavouring to eliminate Pompey (7 R. 428), a cane generally low in quality and purity, at Mourilyan. The following is what the mill management have to say about it in a circular recently issued to their growers:—

"Already 1,000 tons of this kind have been milled. The average c.c.s. of the plant has been 8·9 per cent., and that of ratoons 10·65 per cent. The minimum c.c.s. was 7·05 per cent., and the maximum 10·9 per cent. In addition to the low c.c.s., the purity of the juice is also low. As a comparison with Badila treated at the same time, the following figures may serve to explain further the unprofitableness of growing this variety:—

"With sugar at £21 1s. per ton—

Pompey (7 R. 428) plant, 8·9 c.c.s.—19s. 6½d. per ton.

Pompey (7 R. 428) ratoons, 10·65 c.c.s.—26s. 1¼d. per ton.

Badila plant and ratoons, 13·65 c.c.s.—37s. 4¼d. per ton."

The foregoing remarks are interesting and make good advice; if the growers are wise they will refrain from the further planting of this kind in the Mourilyan area.

Goondi Area.—This mill does not depend on the Government railroad for the transport of its cane supply or the getting away of its sugar; the latter is removed by several small ships which steam up the Johnstone River to the factory and take the sugar direct to Cairns. The factory is expected to crush some 156,000 tons of cane; it has had a good run, and is treating big weekly tonnages, and speedily clearing its area of millable cane. The prevailing dry condition has considerably raised the quality of the 1927 crop, and to the present moment this is harvesting about up to expectations. Some neglected fields were noted; these are generally a menace to the surrounding good ones.

Grubs were not very bad this season, but the beetle borer was greatly in evidence. The most serious disease is leaf scald, to which the pathologist of the Bureau was devoting considerable attention.

El Arish.—This area is estimated to yield some 34,000 tons of cane. It is gratifying to note that the older planted fields are being cleared up in readiness for the plough; explosives and fire are great helpers in reducing this laborious and costly work.

Tully (One Mill).

Last year (1926) this mill crushed 148,006 tons of cane, of which 16,291 tons came from the South Johnstone area. The length of crushing was twenty-eight and a-half weeks. The greatest tonnage of cane crushed in any one week of forty-four hours was 7,289 tons.

During the period of the cyclonic blow and floods in February last very heavy rains fell, 52·26 inches being recorded in three days; such a deluge occasioned widespread flooding, great alarm, and destruction. The mill floor was inundated to a depth of 11 inches, and the railway station yard had 7 feet of water covering it. Had the town been built adjacent to the station, where it was desired by many, loss of life and much destruction obviously would have resulted.

The rainfall for the month of January was 34·58 inches, while in February 65·65 inches fell, making a total of 100·23 inches for the first two months of the year.

The town and its surrounding canefields continue to spread. More scrub has been felled and further areas planted to cane. In the early part of the year clearing operations were difficult and costly owing to the prevailing wetness, which prevented the fallen timber drying, and promoted undesirable vine and undergrowth, the former quickly overrunning the lying tangled mass and preventing a satisfactory burn. Fortunately, most of the timber is suitable for mill firewood, and when cut into desired lengths is removed from field to factory by the aid of portable trams and trucks. The money received for this assists materially in meeting the very heavy clearing costs.

The Crop.—The crop for the greater part consisted of N.G. 15 (Badila); interplanted among this kind in parts were stools of H.Q. 426, which in growth were really outstanding, being fully 2 feet in advance of the surrounding cane. Generally the entire crop possessed a fine healthy colour. It had apparently suffered little by wind, and to a very much lesser degree by water than generally was expected. The maximum amount of damage was noted on the somewhat alternating lands of the Lower Tully; here several great riverside basins held the water for many days, hence the increased destruction. Consideration should be devoted to the draining of such cavities.

Pests and Diseases.—Leaf hoppers are more numerous here than elsewhere. It is highly possible that fewer of its parasites are present. Leaf scald was not largely noticed, although known to be prevalent in parts; fields which appeared healthy early in the year were found to be affected later in the season. Top-rot was considered severe in some of the Lower Tully River farms; one or two canes in many stools had died from the effects; chocolate to red leaf streaks were abundantly found. Much leaf sheath fungus was noticed; this is one which occasions the binding of leaf sheath to stem.

This area, with its many winding creeks having thickly grassed banks, is the home of the rat. The destruction from this pest is great in

3. Survey of Sugar Districts—*continued.*

parts, and farmers should co-operate and endeavour to keep this most destructive pest under control by systematic poisoning. Scrub turkeys did severe damage to the matured crops adjacent to the standing scrubs. Army worms were badly eating the leaves of ratoons. Weevil borer was not plentiful; it is, however, only a matter of time when this pest must become established in the area, being transported in the harvested cane from infested adjacent areas, also by the introduction of infected canes intended for plant use.

Mill operations commenced on the 26th May, and with a few minor interruptions have proceeded smoothly up to the present. The favourable weather has permitted the harvesters to maintain an adequate supply of cane. Twenty-five per cent. of the mill supply is burned, by permission, before harvesting. Most of the cane coming in for milling could be much cleaner; where farmers own the portable rails and have engaged three men-gangs to harvest the crop, the cane is wondrously clean, and is a credit to them.

The Tully Mill has put up a record this year in crushing over 9,000 tons in a single week.

Herbert River (Two Mills).

The Herbert River district was discovered in 1870. Sugar-cane culture commenced soon afterwards. The first sugar was manufactured at the Gairloch Mill in 1872. The varieties raised at the beginning were Bourbon and Black Java. These were badly rusted in 1876, and were supplanted by other less susceptible varieties. In 1890 a wave of prosperity appeared, and has continued. Some small, early erected mills did not carry on for long. The factories that prospered were the Macknade, established by Messrs. Neames Brothers in 1874 (afterwards purchased by the Colonial Sugar Refining Company), and Victoria, put up by the company about seven years later. During the last three years the two mills have crushed 1,115,662 tons of cane for 146,974 tons of sugar, valued at some £3,367,030.

Particulars of the crop for the 1926 season are interesting, and are as follow:—

Macknade Mill—
Season commenced 22nd June.
Season finished 11th December.

Victoria Mill—
Season commenced 12th June.
Season finished 4th January.

	Tons.	Tons Sugar.
Macknade Mill Crushed	158,477 for	21,414
Victoria Mill Crushed ..	167,040 for	21,578
Total Tons Cane ..	325,517 for	42,992

Macknade Mill—Average tons cane crushed weekly, 6,468.
Victoria Mill—Average tons crushed cane weekly, 5,377.
Macknade Mill—Average price per ton cane paid, 47s. 4·8d.
Victoria Mill—Average price per ton cane paid, 42s. 5·1d.
Macknade Mill—Average price per ton cane paid to cutters, 8s. 7d.
Victoria Mill—Average price per ton cane paid to cutters, 8s. 9·3d.

Lack of rain during the growing period and unusual frosts severely affected last year's crop. Those, however, whose memories encompass fifty years cannot recall anything to equal the rain which took place in February of this year, followed by such a disastrous flood which occasioned great loss of life and destruction to property. A small percentage of the cane farms was very badly washed, holed, or heavily sanded, and parts temporarily or permanently ruined in so far as cane culture is concerned. Other farms benefited by the enormous quantity of valuable silt deposited upon them. Nutgrass had been transported by water to pastures new; this is a source of annoyance in germinating cane paddocks, but may be regarded as a blessing in disguise, for it makes farmers cultivate. Crops had badly shot or perished where they were long and deeply submerged; since, most of this had been ploughed and replanted.

Crop damage, although severe in isolated parts, is now generally found to be considerably less than was first reported. Had this crop reduction not occurred, it is questionable whether the two local mills could have fully milled the seasonal crop. The increased number of bridges spanning the many waterways became fouled by the enormous quantity of water-borne débris, and in conjunction with railroad embankments prevented the great sea of water getting away quickly. Enormous river-bank erosion had taken place.

When a later visit was paid to this district it was found that it had made a wonderful recovery from the disaster which overtook it in February last. Nature can overcome its ravages, but the large loss of life which then took place will not be forgotten quickly. Large plantings of cane have taken place in all areas, and if favourable weather ensues a tremendous crop is anticipated for next year. Grubs were not doing much damage, and the beetle borer is not affecting more than 1 per cent. of the cane. The disease situation is being kept well in hand by the company.

Varieties.—Many varieties were noted. Below is given a complete list, coupled with the percentage of each grown in the two mill areas:—

Variety.	Percentage Grown at Macknade.	Percentage Grown at Victoria.
N.G. 15 (Badila)	38·7	46·2
H.Q. 426	35·4	28·6
Coru Family	4·6	12·2
Korpi	10·9	2·0
Q. 813	6·7	5·2
H.Q. 426	0·4	2·0
Oramboo	0·9	1·5
M. 189 (Black Innis) ..	0·9	1·3
Nanemo	1·2	0·8
7 R. 428 (Pompey)	0·4	0·8
M. 1900 (Seedling)	0·3	..
Mixed	2·6	..

Planting so far this season has been conducted under really perfect conditions, consequently a satisfactory germination of the early planted crop is seen. Cane rows are commonly made by a big drill plough, being 10 to 12 inches deep, with interspaces varying from 4 feet 6 inches to

3. Survey of Sugar Districts—*continued.*

5 feet. The seed is very thickly deposited, and the soil covered by a scarifier, which is frequently followed by different kinds of home-made soil packers. The plant-cutting waste should be removed from the fields. The popular varieties being planted are N.G. 15 (Badila), Korpi, Oramboo, Q. 813, and H.Q. 409.

Diseases.—Very little disease was evidenced in this area. The judicious elimination of the one-time popular but severely gummed H.Q. 426 variety, coupled with improved plant selection methods, has in no small degree been responsible for its now almost gum-free condition. What has been achieved here can be accomplished elsewhere by more careful plant selection and greater co-operation betweeen farmer and the mill field men. Planters here have been well schooled; they realise the value and benefit of expert advice.

Pests.—Shoot killers, wire worms, *Pentodon australis* (black beetles), and innumerable black ground crickets were present. The latter attack the plant ends and the growing point of primary plant shoots. A great many brown and green medium-sized frogs were observed amongst the cane foliage. Scanty fungus abundantly seen. Weevil borers were not plentiful.

The Colonial Sugar Refining Company are carrying out a number of experiments at their Macknade Mill, and are also raising new seedling canes.

Giru (One Mill).

This district is situated about half-way between Townsville and Ayr. In addition to the cane grown locally, large tonnages of cane are railed to this mill from several railway stations on the Townsville-Ingham line. The mill is known as Invicta, and was at one time in the Bundaberg district. This mill had accounted for about one-half its crop when the area was inspected. Good growing conditions had been experienced, and, in consequence, the crops were both heavy and rich in sugar. Heavy plantings had taken place, the early plant looking uncommonly well. The ratoons, where worked up in time, were also very promising; some third and even fourth ratoons of N.G. 15 were carrying good growth.

Varieties.—Practically the same as upon the Lower Burdekin. Of the newer ones E.K. 28 is very satisfactory, tonnage and density both being good. 40-ton crops averaging about 15·5 c.c.s. being noticed in several places. Large areas of it are now being worked for 1928.

Disease.—Very little of any sort was apparent, although doubtless present. Growers are advised to use the greatest care in seed selection, and on no account to obtain seed from another area unless the same has been thoroughly inspected by a competent man.

Pests.—Grubs and borers have accounted for minor losses.

The cane areas from Rollingstone to Ingham represent some 32,000 tons sent to Giru by about 100 growers.

Although the conditions were dry, the crops were cutting out very well for both tonnage and density.

As regards planting for next year, it seemed to be heavy, especially about Yuruga, Helen's Hill, and Toobanna. These latter sub-areas have progressed wonderfully, and quite a number of new growers were noticed.

At these three places crops of splendid Badila were seen growing upon soil that was formerly considered too poor and badly drained to cultivate, and yet is now turning out very good crops, although in many cases the cultivation has been somewhat rough.

Lower Burdekin District (Two Mills).

This district has experienced a fine season this year, and up to the end of July 43·21 inches of rain had fallen, but the conditions were much drier from then on to October, and nearly all the irrigation plants were busy. The crops were generally cutting up to about their estimate, but were carrying a very high density, as the following figures show for the week ending 24th September:—Kalamia, 16 c.c.s.; Pioneer, 16·16 c.c.s.

As well as the present season being satisfactory, next year's crop prospects are good, for large areas of early-planted young cane were seen and are so far forward that they cannot fail to grow into heavy crops next year. Wherever one went, surprisingly good crops were seen, and at present it seems that the two local mills will be heavily taxed to handle the 1928 crop. Where ratooning had been carried out straight away after harvesting the young cane was looking well, too.

Varieties.—N.G. 15, H.Q. 426, B. 208, Goru, M. 1900, E.K. 28, and Q. 813 are grown, with the first three easily in the lead. Extremely good returns have been obtained from the first-named cane so far; one Norham grower started the season with a weekly average of 16·06 c.c.s. and cut 800 tons for just over 16 c.c.s., all in heavy plant cane.

B. 208 was also wonderfully high, another grower averaging 17·3 c.c.s. for eleven weeks, whilst another averaged 18·3 c.c.s. for one week. Its great danger to disease is of course the drawback, because if leaf stripe spreads from this variety to the others then the damage would be immense.

E.K. 28 has given surprisingly good results this season, from August to date, one of the best being that of a Brandon grower, who for a weekly average delivery of about 45 tons for the last month has averaged 16·6 c.c.s. for a 40-ton crop, his last c.c.s. being 17·6, and he still has a fair tonnage to harvest. Practically every grower has some of this variety planted for 1928.

Diseases were very hard to discern at this period, leaf stripe in B. 208 being the only one apparent.

Pests.—White ants, grubs, borers, &c., have done a certain amount of damage in isolated places, but only to a limited extent.

3. Survey of Sugar Districts—*continued.*

Green Manuring.—Examples of typical Burdekin soils indicate clearly that the above is to be highly recommended. Corn, on account of its relation to mosaic, should not be grown anywhere near the cane paddock, therefore cow-pea should be used. The Kalamia Mill management have had very good results from the use of this latter crop.

Home Hill (One Mill).

At this centre weather conditions were upon the dry side, and practically all the growers were watering. Very satisfactory work was being carried out by the Inkerman Mill, and the estimated tonnage of 130,000 tons was expected to be put through by about the third week in December.

Unusually high density returns have so far characterised the season's operations, for good sugar contents as well as heavy tonnages have been obtained from many of the rich, deep, alluvial flats that are generally low in c.c.s. As regards the prospects for 1928, there is every appearance that a large crop will be harvested.

Expansive areas of young plant cane were seen to be well forward, the majority being early plant, which should develop into a splendid crop unless some unexpected circumstance intervenes. The young ratoons were also showing very healthy growth.

Taking the Home Hill area as a whole, it is progressing markedly. The benefits of the irrigation system are being experienced now that it has become properly established, and despite the surplus sugar to be exported the local growers are far more satisfied than formerly.

Cane Varieties.—These are practically the same as grown upon the Ayr side of the river. Of the newer canes E.K. 28 is easily the most popular, and has given most satisfactory results both in tonnage and density, for it roughly averages from 35 to 40 tons per acre with an average density of, say, from 15·5 to 16 per cent. It is also worth mentioning that in many cases these returns were obtained from land that was formerly considered too rich for this cane. So satisfactory has it proved that nearly every grower has a large area of the cane planted for next year. Q. 813 has also given consistently good returns on several farms, and as it becomes more acclimatised to local conditions will get more popular on some of the poorer classes of soil.

Diseases.—Very little disease was seen. A little mosaic and leaf stripe were noticed in B. 208 young plant and young ratoons. Growers are again cautioned against planting too much of this cane, which is so susceptible to disease, for there is nothing to stop it spreading its diseases to the other standard canes of the Burdekin, and surely growers have already enough troubles without looking for more.

Top Rot.—The after effects of same were noticed in the quantity of dead stalks on many farms that otherwise would have cut very heavy tonnages. In one or two places red streaks were noticed in young plant Badila, but only to a limited extent.

Pests.—White ants were noticed doing minor damage in parts adjoining headlands, and in the vicinity of dead timber, &c. Borers had also done slight damage in many places, generally near a main drain.

Proserpine (One Mill).

Some cane is usually sent from the Bowen areas to Proserpine, but very little cane is now being grown, fruit and vegetables being the main products. The small tonnage harvested this year, however, gave better density returns than in past years. Some good Badila, in particular, as well as N.G. 24 B (green Goru) was seen. Inquiries were made for E.K. 28 for plants for next year, so it is probable that a little extra may be planted either this year or early in 1928.

At Proserpine itself the township and district are steadily increasing in importance. Some fine new buildings, such as a private hospital and a new public hall, are being erected, and a number of new houses were also seen adjacent to the township.

During the 1926 season 72,200 tons of cane, with an average c.c.s. of 13·3, were crushed, representing 1,060 samples being taken, or one for every 7·2 tons of cane, whilst 375 growers supplied cane to the mill.

The following list of varieties, giving percentage of each and average density, is of interest:—

Variety.	Per Cent. Grown.	Average C.C.S.
H.Q. 426 (Clark's Seedling) ..	22·3	14·3
Q. 813	22·0	13·4
M. 1900	13·0	12·9
N.G. 15 (Badila)	19·4	13·4
Malagache	4·0	11·8
Mixed	8·7	13·7
D. 1135	1·6	12·2
Goru	3·6	12·8
Q. 1121	·81	13·6
Q. 116	·32	12·4
Q. 114	1·00	14·0
7 R. 428 (Pompey)	·93	10·7
E.K. 28	·84	11·5
Striped Singapore	1·50	12·5
	100	

The present year will be a record for the Proserpine Mill, as it is anticipated that the tonnage of cane will reach 120,000.

Varieties.—H.Q. 425 (Clark's Seedling), Q. 813, M. 1900, and N.G. 15 (Badila) are about the principal varieties grown in this area, and are all good canes upon certain soils, H.Q. 426 giving good returns in the early part of the season. Q. 813 is still gaining more friends as it is such a good striker and gives such consistently good c.c.s. figures both early and late. M. 1900 is also suitable to this area, coming to its best about the middle of September. N.G. 15 (Badila) upon alluvial soil gives good results, and is worth growing wherever such soils are. E.K. 28 has rapidly become popular in this area, and some splendid crops of it are being cut, carrying exceptionally good tonnage and fair density values. Nearly every grower is trying to plant some of this cane this year. E.K. 1 is grown in small quantities, and one Glen Isla

3. Survey of Sugar Districts—*continued.*

grower speaks very well of it. Good crops of 7 R. 428 (Pompey) are being harvested, some ratoons yielding about 14 c.c.s. and from 25 to 30 tons per acre.

Diseases.—Red-rot and a little mosaic are the main diseases noticed, with the first-named easily the worst, especially in low, badly drained heavy soil. H.Q. 426 (Clark's seedling) seems to suffer far more than any other cane, and in nearly all fields of this cane inspected it was seen from an odd stool or two to quite a few sticks in a stool nearly dead. B. 208 (plant) was also noticed to be suffering from same in a Glen Isla farm, and Striped Singapore upon a hillside farm near Cannon Valley was in a bad way.

Growers are advised to be careful of their seed, throwing out any stick that shows the slightest sign of redness when being cut into plants.

Mosaic was noticed in an odd stool of N.G. 24 B on the river bank, and in M. 1900 and Malagache second ratoons at Waterson.

Banana Pocket.—A short visit was paid to this fertile area in the middle of September, when the conditions were found to be good, for practically all varieties of cane were yielding a good tonnage and satisfactory density. Each visit to this area emphasises the progress it is making, and its distance from Proserpine seems negligible as it is aided by a good telephone system and motor transport. Many new residences were noticed, and three substantial bridges over Saltwater Creek had been erected. One of these had as substantial work put into it as if built under the strictest supervision, whilst the other two were each a credit to the men who built them. Vegetables seem to grow splendidly hereabouts, potatoes especially being a very payable proposition, one grower having disposed of 10 tons at £16 per ton, with yet another 4 tons to get rid of.

Mackay (Seven Mills).

The capacity of many of the Mackay mills has been considerably enlarged recently, and the area is still maintaining its claim to be considered the largest sugar centre in Queensland. The crops to be harvested there this year will be a record. The official estimate towards the end of the year was 97,750 tons of sugar, but it is easily possible that 100,000 tons may be manufactured. This district is in a prosperous condition as land values have never been inflated.

The following are brief notes on some of Mackay's sugar areas:—

Mia Mia.—Some really nice country was seen on both sides of the river, which is, roughly, running in a northerly direction. Upon both sides of the river, but seemingly to a larger extent on the western side, are some exceedingly rich deep alluvial flats capable of growing splendid crops of cane, and, moreover, carrying high sugar contents. The following varieties were noticed to be growing most vigorously:—Q. 813, M. 1900, N.G. 15, H.Q. 426, Gingor, Malagache, D. 1135, 7 R. 428 (Pompey), and E.K. 28. As usual the favourite canes are Q 813, H.Q. 426 (Clark's seedling), and M. 1900, and a grower can usually be assured of good average density returns from these varieties when cut at the right times.

Some fine crops of Gingor were seen both on the alluvial land and upon the poorest forest soils, also some E.K. 28, but it is probable that upon the good soil the density of the latter would be inferior to the same cane upon a poorer class of land.

Cane-killing Weed.—A solitary specimen of this weed was found on the roadway near Mia Mia, and led to inquiries from farmers hereabouts, who formerly suffered cane losses, whether it was now doing any damage to the crops, but they all replied in the negative.

Farleigh.—The Farleigh Mill at Mackay has a big crop this year, and since it was taken over by the farmers last season has been doing well. A large tonnage of cane (55,000 tons) is now drawn from the northern coastal areas opened up by the railway. It is contemplated to put in a new large fourth mill next year. The mill has done and is continuing to do good work. At one time a large quantity of Uba cane was grown (up to 25 per cent.). This has now declined to 2 per cent.

Farleigh country is a good deal broken in character; steep ridges carrying stones and boulders of all sizes are very common. Luckily most of these ridges carry good soil enabling ratoons to grow, otherwise the difficulties of transportation to the tramway system would make the cost of production too great. Cane was grown on most of these ridges, under coloured labour conditions many years ago, but had gone out of cultivation, and when re-planted thick dense lantana had first to be removed. The good quality of the present crops speaks well for the value of lantana as a fertilising agent after same has been grubbed out and burnt off. The mill was running smoothly, the staff showing a fine example of the value of co-operation.

Cane Varieties.—Q. 813, H.Q. 426, M. 1900, N.G. 15, D. 1135, Malagache, Cheribon, Innis, E.K. 28, Q. 1092, and Uba are all grown hereabouts, the first four named being the most popular, with Q. 813 easily in the lead. N.G. 15 upon the newer lands is also very good. The E.K. 28 that had come to the mill was fair in c.c.s. value. Q. 1092 as a cropper seemed good, but it arrows too freely and the density was only medium. Innis is still being grown, but owing to its partiality to red rot and mosaic is likely to go out at any time. Uba is probably grown here in larger quantities than elsewhere in the Mackay area, but is not recommended. It is gradually going out of cultivation. Q. 855 is only grown in odd places, but one Richmond grower claims very fair returns from it.

Mosaic disease is far too prevalent in the Farleigh area.

Mount Martin.—A large proportion of this area is practically new as it is only about four years ago that cane replaced cattle hereabouts. In the area under review, heavy dark soils predominated, parts of which would be benefited

3. Survey of Sugar Districts—*continued.*

by the use of lime as a means of sweetening same and making it more friable, whilst lower lying portions now carrying dense masses of grass could be profitably put under cane after some necessary draining operations were carried out.

Canes showing well here are M. 1900, Q. 813, H.Q. 426, E.K. 28, Badila (N.G. 15), and Malagache, some very good crops of each being noticed, and ratoons of N.G. 15 (Badila) were looking particularly well.

The Oakenden cane, which went formerly to Homebush and then to Farleigh, is now being treated at North Eton, and a tramway to take this cane has been built.

A good deal of mosaic is present in many of the North Eton farms.

Kungurri.—During a couple of days spent in this area some exceptionally nice cane was noticed between here and Dow's Creek, more especially at the Kungurri end of the railway. The soil varies to a great extent from rich dark volcanic on the foothills and hillsides to a dark stiff alluvial and a greyish forest soil. Upon the volcanic soil splendid cane was noticed, some Badila and M. 1900 first ratoons showing very fine growth. Nearby was seen a good crop of N.G. 15 plant.

Upon the poorer classes of soils Q. 813 ratooned well, especially when one remembers what a bad year 1926 was. 7 R. 428 (Pompey) was also cropping well and is credited with good density upon certain classes of soil, but is so patchy that growers are chary of planting more than a small area. Q. 970 looked well, both in plant and ratoons. It is said to mature about a month later than Q. 813, but seems to give better ratoons than Q. 813.

Particular attention was given to disease infection, and out of nineteen farms visited mosaic was seen in M. 87 on only one, and to a very slight extent there. Such being the case local growers were advised not to get seed from any other area unless absolutely convinced that it was clean.

Grubs were noticed in some half-dozen farms, principally at the Kungurri end, where in one case they had done heavy damage, nearly every variety of cane suffering.

Borers were doing minor damage in several places, generally adjoining headlands.

From a scenic and climatic point of view, Kungurri is amongst one of the most favoured spots in the Mackay area.

Racecourse.—The Racecourse Co-operative Sugar Milling Association has now taken over the Homebush cane and has built a tramline 6 miles in length to Baker's Creek, which it joins up with the old Homebush tramline. This mill was crushing splendidly, averaging about 4,200 tons week after week, and showing an average c.c.s. for the season of a shade under 15. Crushing had been greatly facilitated by the fresh state of the cane hauled along the recently completed Homebush tramway.

Varieties.—H.Q. 426 (Clark's seedling), Q. 813, N.G. 15 (Badila), Malagache, E.K. 28, 7 R. 428 (Pompey), and M. 1900 are the most popular, with Q. 813, H.Q. 426, and M. 1900 being the chief favourites. Of these Q. 813 certainly seems the most suitable on account of its being so free from disease, its good striking qualities, and rapid growth. H.Q. 426, unfortunately, is liable to disease. M. 1900 is a good cane to cut late, but wants watching for red rot. E.K. 28 is giving good returns, and is likely to become more popular; it is also a late cane. 7 R. 428 (Pompey), upon suitable ground, gives good results, and is also a late cane to harvest. Badila, upon the rich deep flats, is easily the most suitable cane, both for tonnage and density.

Diseases.—Red rot in H.Q. 426 plant and ratoons and in M. 1900 plant and ratoons was doing a great deal of damage, being responsible for losses in weight and c.c.s. The dangers of this disease were outlined by Mr. E. J. F. Wood (Assistant Pathologist), and control measures suggested, which should be given a trial by the growers to prevent the spread of the disease.

Mirani.—In this centre the crops presented a healthy appearance, and in most places showed an even growth. Active farm operations were noted upon all sides. Tractors (amongst which were two Cletracs) and horse-drawn ploughs were working full time everywhere.

Q. 813, M. 1900, and H.Q. 426 (Clark's seedling) are the most popular varieties, the first named being the favourite.

Bundaberg (Five Mills).

The present season in this district has been a remarkably good one. After the prolonged dry period of last year, splendid rains fell early in the year, and in parts of the area as much as 50 inches fell in six weeks. The remaining part of the season has been most favourable. Some frosts were experienced during the winter months, but, on the whole, these did not do much damage.

The most unfortunate fact to record in connection with this district has been the severe outbreak of the gumming disease. Great care and supervision in the growth of varieties will be needed in this respect, and resistant varieties will have to be tried out. At the present time Q. 813 and H. 227 have been found highly resistant to this disease. The Southern Field Assistant gives some good advice on the selection of varieties, stating that cane requires about six years' trial before grower and miller are clear on the following points:—

(1) Striking properties;
(2) Early growth properties;
(3) Maturing periods;
(4) Standover properties;
(5) C.c.s. values;
(6) Milling qualities;
(7) Cutting and handling qualities;
(8) Disease resistant qualities to major diseases:—(*a*) mosaic, (*b*) gumming, (*c*) root rot, (*d*) leaf-attacking fungi;

3. Survey of Sugar Districts—*continued.*

(9) Root system. (Upon the root development of the cane depends the method of fertilising);

(10) Resistance to grubs and earth parasites;

(11) Resistance to drought;

(12) Resistance to frost;

(13) Class of soil variety likes.

The last and the third points are of great importance, as very often through insufficient knowledge of these a valuable cane is discarded.

The following are further notes respecting this area:—

Ploughing.—This section of field work is being done thoroughly and scientifically. Tractors and modern ploughs are in use, also subsoilers and rotary cultivators. Extensive subsoiling is done when there is strong tractor power.

Planting.—Various types of planters are in use, the smaller growers using the horse implements, while the plantations are using double drillers and planters. The cane is being planted on an average of 8 inches deep with about 3 inches of covering, the average grower covers his plants too much. Nearly everywhere this spring there can be observed farmers relieving their sets. It is one distinct drawback in regard to the planting implement that the amount of covering cannot be controlled. Rain or shine, the same heavy covering goes on. This does not matter greatly in the porous red soils, but it is very important to study the amount of covering in badly-drained lands.

Plant Selection.—Everything a grower does goes for nothing if he cannot obtain good plants. Often a grower, through oversight or lack of conviction, allows affected or poor plants to be planted.

It must be borne in mind by every grower that diseases such as mosaic, gumming, and Fiji are a serious menace to the industry if not controlled, and it is only by collective effort that they can be kept in check, and the sooner the farmer who pooh-poohs the likelihood of disease decimating his crop realises his foolishness the better. The soundest recommendations that the whole field of science can furnish have been presented to the Queensland sugar-growers from time to time on disease control, and it is in their own interests to apply those recommendations.

Goodwood.—This red volcanic soil area is yielding a good crop this season. Varieties making fine growth are E.K. 1, E.K. 28, H.Q. 285, M. 1900 Seedling, D. 1135, and Uba. Growers are recommended to practice lengthy, systematic fallows of the land, as this is the best method of combating root rot disease, which is prevalent in this area.

Gin Gin.—It is said that fortune favours the brave, and it must be said that the growers in this area, having shown great courage and resource in meeting their difficulties, have been rewarded with an excellent crop. The variety probably looking the best is the M. 1900 Seedling. H.Q. 285 is showing good results, also D. 1135 and Q. 813. There is a certain amount of mosaic disease to be combated, but this only presents a real problem on the Burnett River. It will mean disaster to the growers in this latter locality if they neglect to be careful in plant selection, but with reasonable care in this respect the disease is readily enough controlled.

Growers are advised to plant buffer strips of the immune variety, Uba, round their headlands, and if they cannot mill this cane it always makes excellent forage. The reason for making this suggestion is that the other canes would not be so closely in contact with disease-carrying grasses.

Maroondan.—The cane in this district looks well also. This black soil is very productive, provided it gets fair rains, and these, fortunately, have fallen this year. Provided no late frosts occur the growers are assured of good crops next season. Cane varieties doing well are H.Q. 285, Q. 813, and M. 1900 Seedling. Disease does not present a problem here, but nevertheless the growers are reminded that, in common with other areas, the principal cane maladies are present, furnishing evidence for incessant care in plant selection.

Bingera.—Cane varieties doing well in this area are N.G. 16, Q. 813, Q. 855, Q. 812A, Black Innis, and H.Q. 285. The first named is giving excellent results as a standover, particularly that which has been fertilised with molasses. There is no doubt that this product greatly improves the texture of some soils, as marked results from its use have been obtained in Queensland. Q. 812A is an excellent cane, very like Q. 813, excepting that it is a slightly heavier stooler, with a greener foliage and leaf sheath. It is a cane worth carefully watching.

Bucca.—It is some years since the tonnage per acre equalled the present one in this district. This is due to several important factors—namely, good rains early in the year, fertilising, improved cultivation, and draining. The growers deserve their measure of success, for they are certainly a progressive group. There is still a fair amount of work in relation to draining in this area, as well as other districts.

Childers (Two Mills).

A splendid recovery was made in the Childers district from possibly the worst drought on record. One drawback in this area was that a large amount of land was lying ready for planting when the great downpour of rain fell in January. This caused considerable washaways of the red soil on hillsides. Some satisfactory work in planting has been carried out on the farm of Mr. A. Adie at North Isis, where 12 acres of cane per day were planted with a double machine planter drawn by a tractor. This machinery required three men to supervise it.

There are several matters upon which the Isis growers can be congratulated, and one particularly is the clean state of the farms as far as weeds are concerned. This is due to plenty of surface cultivation. Weeds are a curse; they injure the plant and reduce the yield in many ways. They crowd and shade the young canes,

3. Survey of Sugar Districts—*continued.*

keeping away the sunshine and making them spindly. They steal food from the plants, disputing with the young crop Nature's storehouse of soil food. Weeds rob the crop of water as well as food. They use as much and sometimes more, in proportion to their size, than cultivated plants. It is in this way they inflict the greatest damage on crops.

Booyal.—Cane varieties making a good showing here are Q. 1098, H. 227, N.G. 16, Q. 813, E.K. 1, M. 1900 Seedling, B. 146, H.Q. 285, and E.K. 28. New canes amongst the above that the growers are advised to try carefully are H. 227 and E.K. 28. The latter is fairly well known, and the H. 227 can generally be distinguished by its leaves, which are very erect, after the manner of D. 1135. The E.K. 1 is a variety that is now doing much better than originally thought, and is finding a good deal of favour with the growers.

Dallarnil.—The cane in this area is looking well. Long haulage has in the past been against the farmers, but if they get a turn of seasons like the present, the good crops will compensate them for this. Canegrowers here and elsewhere are advised to do as much green manuring as possible, also, if they can, to carry out manurial experiments. It pays to fertilise, provided the correct ingredients are used.

Remarks regarding varieties at Booyal apply to this area.

Maryborough (One Mill).

In the Maryborough district the cane is looking well and should harvest a good crop. Varieties making an excellent showing are H. 227, Q. 813, H.Q. 285, and M. 1900 Seedling. Growers are recommended to be careful in regard to disease, and follow carefully the instructions given by the field officers of the Bureau.

Referring again to varieties, the H. 227 is making a good showing, both in plant and ratoon. One grower at Melrose, in this district, has a very good crop of this cane, although only on a small scale yet. The E.K. 1 is also beginning to attract the attention of cane farmers here. Growers in this district as elsewhere should remember that fallowing is a cardinal principle of farming.

Fiji disease is prominent in the Maryborough areas, and farmers should do their utmost to get rid of this. Plants are not allowed to be transferred from farm to farm without a permit from an Inspector under the Diseases in Plants Acts.

Pialba.—This beautiful district has seldom looked better than it does at present. The ground has had a thorough saturation, too much in fact, but nevertheless some fine cane is in evidence.

Varieties looking well are H. 227, E.K. 28, Q. 813, N.G. 81, H.Q. 285, M. 1900 Seedling, D. 1135, and E.K. 1. This is a group of thoroughly good varieties, with the exception, perhaps, of D. 1135, and growers in Southern Queensland should make a note of the fact.

Pialba areas are fairly free from disease, but farmers should not relax their vigilance on that account.

Mount Bauple (One Mill).

The Mount Bauple Central Sugar Mill was taken over from the Government by the local farmers this year. Some frosts were experienced during the winter. This district is a good one with a well-organised system of haulage, and it is earnestly hoped that the farmers will do well in their venture.

Cooroy and Eumundi.—These districts are unimportant from a cane-growing point of view. The farms are mostly dairying, hardly any farmers having more than 6 or 7 acres of cane.

Mary Valley.—Fairly heavy crops have been grown here this year, although the c.c.s. value has, on the whole, been low. Taking this and long haulage into consideration, the growers have not done very well.

Varieties growing are Q. 813, M. 1900, D. 1135, and Badila. H.Q. 285 is also making good growth. Farmers are recommended to grow principally Q. 813 and H.Q. 285. The cane in this district is, on the whole, healthy and free from disease.

Moreton (One Mill).

The cane in this area is backward, principally owing to the severe droughts before Christmas last year and the very heavy rain that fell during the months of January, February, and March. During these months the Maroochy River, for the first time for many years, overflowed its banks and almost covered the cane. In a few cases the cane was actually washed away. Only the legends of the blacks record such a flood before. The effect of this flooding will be beneficial, however, as silt deposits, so formed, greatly add to the fertility of the soil. These heavy rains were followed by a succession of winter frosts and then more rain, so it can be seen that conditions at Nambour have not been favourable this year.

Coolum.—Cane varieties growing here include Q. 813, Q. 970, Q. 1098, D. 1135, and N.G. 15. The farmers generally consider that the first named is the best of these. As is well known, in the Coolum area drainage is the most serious problem facing the growers. It is understood there is a comprehensive scheme afoot at the present time for the purpose of effectively draining the Coolum farms, and if this is brought to maturity then some fine cane-growing land will be at the disposal of the farmers, who, up till now, have had an up-hill fight in this particular district.

Maroochy River.—A good deal of the agricultural troubles encountered this year have been caused by the bad weather conditions early in the year. However, good tillage has greatly improved matters, and just at present the young plant and ratoon crops look well.

The principal enemy the farmers in this area have to combat is the ever-present gumming disease. It is almost impossible to completely rid the canefields of this serious menace, but by

3. Survey of Sugar Districts—*continued.*

growing resistant varieties from carefully selecting plants, the malady may be prevented from doing serious damage. Farmers seeking information on gumming disease (and they always should be) are asked to write to the Director of Sugar Experiment Stations, or ask the officer visiting the district as many questions as they can think of.

At a field day held on the Maroochy River two years ago in connection with gumming disease, the farmers were recommended to plant Q. 813 and try as extensively as possible H. 227. This recommendation is repeated here. The first-named variety proved its resistance to gum and the latter is also showing resistance to a fair degree.

Beenleigh (Three Mills).

Two more of the smaller mills in this district have ceased operating, and there now only remain Rocky Point, Alberton, and Eagleby.

This district, unfortunately, has developed a large amount of Fiji disease, and if prompt steps had not been taken there would have been very little cane unaffected with Fiji in this area a few years hence. It is almost tragic to see the way big well-grown stools of cane get cut down with this disease.

The farmers are advised to be constantly on the alert and not to neglect to destroy affected stools as soon as they are located.

Growers are advised to plant Q. 813 and H.Q. 285 entirely because they show, so far, a greater degree of resistance to Fiji disease than the other canes. Quite apart from disease, however, these two canes are well suited for the Beenleigh district.

4.—Work of the Division of Entomology.

NORTHERN DIVISION.

The Northern Entomological Laboratory is situated at Meringa, near Cairns, and the Southern at the Bundaberg Sugar Experiment Station.

The Northern Entomologist is Mr. Edmund Jarvis, whose work in connection with cane pests has been widely recognised both at home and in other countries. The scientific, artistic, and literary abilities of Mr. Jarvis have been of the greatest assistance in the preparation of the technical and popular bulletins prepared by him. Mr. Jarvis has been assisted by Mr. A. N. Burns and Mr. J. H. Buzacott, who have been of much help to canegrowers.

The following is the report of the Northern Entomologist at Meringa for the past twelve months:—

Annual Report of Entomologist 1926-1927.

To the Director,
Bureau of Sugar Experiment Stations.

Sir,—I have the honour to submit the following report dealing with the various activities of Meringa Experiment Station during the period of twelve months ended August, 1927:—

Present Position of the Cane-Grub Problem.

Since the publication of my last Annual Report, in which it was stated that owing to continual drought our principal cane-beetle, *Lepidoderma albohirtum* Waterh., had again received a decided set back, we have, unfortunately, during the last twelve months (1926-27) experienced climatic conditions somewhat favourable to the numerical increase of this cockchafer beetle.

Its activity has been induced chiefly by the occurrence of unusually wet weather throughout the time occupied by its egg and early larval stages (November 1926 to May 1927); during which period 82·38 inches of rain fell in the Cairns district, this amount being 65 points in excess of the average precipitation for these six months.

Again, although adverse climatic influences occurred during its pupal stage in 1926 (June to October), such natural control was not severe enough to materially check the increase of this cockchafer. During the following seven months (November 1926 to June 1927), however, the weather proved favourable to normal development of the species, while the subsequent months of July and August last happen to have been much the same as those recorded for these months during 1925, when the rainfall was 2·57 inches, as compared with 2·54 inches for 1927, both these records being about 82 points less than the average rainfall.

Reports have recently reached this station to the effect that grub damage has been very noticeable this season on certain cane farms in both the Cairns and Innisfail districts, the general impression being that such injury is more widely spread than was the case last year.

In an article by the present writer, discussing the varying degrees of grub infestation experienced in the former district during the past twenty-three years ("Queensland Agricultural Journal," vol. xxviii., pages 110-113) it is shown that heavy annual rainfalls are not, as

4. Division of Entomology—*continued.*

some growers would have us believe, invariably followed by serious grub damage, but that such outbreaks of this pest are usually determined by the quantity of rain chancing to fall during the period passed in its pupal and early beetle conditions.

For example, there was not much difference between the rainfalls for 1912 and 1915 (55·26 and 44·97 inches respectively), and yet grubs were far more in evidence during the latter year.

Comparing the infestation of 1917 with that of 1918, we find that despite the rainfall in the latter year being heavier (69·18 inches) beetles were far more numerous during the preceding season (1917), in which the precipitation was 66·41 inches.

Similarly, in 1922, the rainfall was 64·70 inches, as against 52·55 inches received in 1923, and yet grubs gave more trouble during the latter year.

Summing up the present situation, it should be mentioned that no really alarming outbreak of *L. albohirtum* in North Queensland has occurred since the 1920-1921 season.

As a result of four or five years of comparative freedom from disastrous infestation of our canefields, the growers in this district (Cairns) appear to have lost interest in the cane-grub problem, having made little or no attempt of late years to prepare for or combat any possible future attacks from this notorious beetle pest.

The Cane-Borer Situation.

At the present time this serious cane insect (*Rhabdocnemis obscurus* Boisd.) continues, as in past years, to be held in check or well controlled by the dipterous parasite *Ceromasia sphenophori* Vill.

It is regrettable to report, however, that last February the work of this well-known tachinid fly received what was probably a severe natural check, owing to the occurrence of a cyclone. Thousands of species of weak-flying, soft-bodied insects such as mosquitoes, two-winged flies, &c., frequenting open forest country, are resistlessly swept away while harbouring amongst vegetation by disturbances of this nature, and either carried many miles distant or battered to death against opposing obstacles.

In all probability most of the adult tachinids breeding in our canefields at this critical time were thus destroyed, with the result that egg-laying could not be recommenced until additional specimens of this fly parasite had again emerged from puparia present in borer-affected cane sticks.

Rhabdocnemis Obscurus infesting Cyclone-damaged Cane.

Although operating as a natural check to the increase of some species of insects, a cyclonic disturbance also favours the development and activities of others. Our weevil cane-borer, for example, reaps a twofold advantage at such times—viz., (1) the set back given to one of its chief natural enemies, and (2) the establishment in canefields levelled by the cyclone of ideal conditions for breeding, as this insect thrives best in damp, sheltered, densely-shaded positions such as would be afforded amongst a mass of cane sticks lying close to the ground and covered by a canopy of tangled leaves sufficiently thick to obscure most of the sunlight.

During the last twelve months applications from farmers for tachinid parasites have been fewer than usual. Liberations, however, have been made by us in thirteen different localities affected by weevil-borers, the various districts visited in this connection being Innisfail, Daradgee, South Johnstone, Goondi, Japoon, and Babinda. The number of parasites distributed comprised 378 living specimens and about 525 puparia of the fly, contained in cane sticks taken from breeding-cages at our laboratory. Much satisfaction has been expressed by various cane-growers, particularly those in the Babinda and South Johnstone districts, at the excellent work being performed by this useful parasitic fly.

Primary Insect Pests of Cane.

It is satisfactory to be able to record that during the last twelve months no additional cane insects of serious importance have been added to our list of destructive species found in North Queensland. Out of thirty-nine species affecting either the roots, stem, or leaves of sugar-cane, sixteen of these effect damage of a more or less serious nature, while the remaining twenty-three are minor pests, being for the most part well controlled by their various natural enemies.

At present our cane insects may be classed in relative order of destructiveness as follows:—

(1) *Lepidoderma albohirtum* Waterh., (2) *Rhabdocnemis obscurus* Boisd., (3) *Lepidiota frenchi* Blkb., (4) *Mastotermes darwiniensis* Frogg., (5) *Lepidiota caudata* Blkb., (6) *Cirphis unipuncta* Haw., (7) *Cirphis loreyi* Dup., (8) *Phragmatiphila truncata* Walk., (9) *Fossi frontia* sp., (10) *Ephysteris chersæa* Meyr., (11) *Locusta danica* Linn., (12) *Locusta australis* Brunn., (13) *Rhyparida morosa* Jac., (14) *Opogona glycyphaga* Meyr., (15) *Pseudococcus calceolariæ* Mask., (16) *Aphis sacchari* Zehn.

It will be of interest to mention that one of the above species, *Ephysteris chersæa* Meyr., appears to be gaining a foothold in our canefields, having been recorded this year from several widely separated localities. An occurrence of this tiny moth borer was noticed at Redlynch, Stratford, and Freshwater, near Cairns, during August, 1926, on four different selections; affecting collectively about 7 acres of young cane, growing both on alluvial sandy soils and friable land of volcanic origin.

Most of the damage, as usual, was confined to shoots from 7 to 9 inches high, but in the present instance Mr. G. Bates, Assistant to Entomologist, noticed that cane 18 inches high had been destroyed. Quite recently (September, 1927) an infestation was reported by Mr. J. H. Buzacott, of this Experiment Station, from various areas around Mooliba, in the Babinda district; so that since its first discovery by the writer at Pyramid, Kamma, and Meringa, in the year 1919, this pest has apparently become established over a wide tract of country.

4. Division of Entomology—*continued.*

Ants (Formicidæ) nesting under Cane Stools.

Advice has been sought by a few growers of late relative to the control economic possibilities of certain ants found nesting under stools of cane. The chief species implicated—which has been identified I believe by Mr. J. Clark as being *Aphænogaster longiceps* Sm.—is, perhaps, synonymous with *Monomorium destructor*, which, according to Froggatt (to whom specimens procured from Innisfail were submitted), happens to be a common house species in the Solomon Islands, and is most likely one of our indigenous ants. Growers need be under no apprehension with regard to the work of this ant, as it is not likely to ever become a serious pest of sugar-cane, and apparently is not difficult to cope with.

Carbon bisulphide should prove a successful fumigant for destroying colonies of such ants around stools of cane or tree-stems, &c. Before treatment, however, it is of the utmost importance to see that the soil be thoroughly free from excessive moisture to a depth of about 9 inches, as otherwise the fumes will not be able to penetrate deeply enough to kill all the ants and their larvæ. Well worked soils of light mechanical nature are the most suitable for such fumigation, but should not be treated until about a week has elapsed after heavy soaking rain. Clays or clay-loams, on the other hand, naturally retain the moisture for a longer period, and, unless well drained and cultivated, a fortnight should be allowed to elapse before injecting the above fumigant.

Cane-Grub Control.

Remedial Measures Against the Adult Beetle.

Additional data was obtained during the flighting season in connection with the possibilities of destroying cane-beetles by means of spraying the leaves of their favourite feeding-trees with arsenicals. Initial experiments were carried out by the writer during the year 1915, when it was found that lead arsenate (2 lb. in 50 gallons of water) proved fatal after nine days ("Australian Sugar Journal," vol. vii., p. 62). During the present season, final laboratory tests were made with lead arsenate, this being a cheap form of arsenical and practically harmless to vegetation. With a view to securing a more rapid mortality the spray used was made much stronger than any previously employed—viz., 2 lb. in 10 gallons of water. This was applied to the leaves of native figs placed in cages of moist soil, each containing a single greyback beetle. Eleven out of the twenty-six beetles which individually devoured from half to three-quarters of a square inch of poisoned foliage died within twenty-four hours after feeding; two died after an interval of forty-eight hours; four after two and a-half days; one after three days; three after four days; two after seven days; and one after ten days. On the other hand, of twenty-five beetles in control cages only four fed upon the untreated leaves supplied, consuming individually from three-quarters to 10 square inches. One of these beetles lived for fourteen days after feeding, while the remaining three were still alive at the conclusion of the experiment.

Results were sufficiently conclusive to warrar field trials next season in canefields with sui able trap-trees.

Seeing that food is partaken of mostly duri the first week of their aerial existence, the should be sprayed as soon as possible aft emergence of the beetles from the ground. Tl importance of this point was again amp demonstrated during the present season, wh out of 100 caged beetles captured from three sixteen days after the primary emergence, on thirty specimens (including controls), fed upc the leaves supplied to them.

Effect of Calcium Cyanide Upon Eggs o "Greyback."

Laboratory experiments conducted duri January last (1927) demonstrated the efficien of calcium cyanide as a fumigant for destroyi the eggs of *Lepidoderma albohirtum* Waterh.

Eggs were buried a few days after depositi in cages of moist earth, which was then inject with 10-grain doses of the flaked form of t fumigant, placed about 2 inches above whe the eggs were lying. Twenty-four hours lat they were removed from the cages and laid up damp soil in Petrie dishes, in order that subs quent developments might be easily note Those taken from control cages increased in si from day to day, remaining throughout t experiment a creamy white colour, and final at the end of a fortnight producing grub whereas, all the eggs that had been fumigate failed to develop, turned brown in a few da and became mouldy-looking; thus giving mortality of 100 per cent. as a direct result the treatment.

Some Phases of Natural Control Affecting Cane-Beetles.

Effect on Beetles of Drought Conditions.

When a check of this nature is experienc over an extent of several square miles of cou try, growers can hardly fail to notice the almc total absence of grubs the following seaso while in the event of such a setback chanci to occur in a locality free from patches of timb &c., these beneficial effects may continue f several years. (See "Queensland Agricultur Journal," vol. xxviii., pp. 110-113.)

Effect on Beetles of Position of Feeding trees.

Directions were given to our canegrowers wi regard to the destruction of food-plants of t greyback cockchafer, the following advice bei of special importance: —

In the event of a belt or clumps of timber co taining food-plants of this beetle chancing occur in the midst of, or to separate two adjace plantations, and to lie in a south-westerly situ tion about a mile from the southern headlan such trees should be cut down. Similarly, wh either one, or opposite sides of an area of ca land happen to run in a south-east directio and be closely bounded by forest country, it often advisable to cut out all trees, &c., growi near such headlands to a distance of about half mile from the nearest rows of cane.

4. Division of Entomology—*continued.*

Further injunctions with regard to the best treatment for land permanently grub-infested, &c., can be found, if desired, in the "Queensland Agricultural Journal," vol. xxviii., p. 212.

PROTECTION OF INSECTIVOROUS BIRDS.

Endeavours have been made to impress upon canegrowers the necessity for protecting certain native birds which are known to eat cane-grubs and beetles. This matter was again discussed in a recent Monthly Report (July to August, 1927), and its importance emphasised.

BIOLOGICAL CONTROL OF CANE BEETLES.

On 14th June, 1926, four living and two dead specimens of the Scoliid wasp, *Triscolia rubiginosa* Fab., were brought to this office by Mr. Hunter Freeman, of the Colonial Sugar Refining Company, who had just returned from a trip to Java. These specimens, which consisted of one female and three males, together with an egg and cocoon obtained from parasitised grubs of *Xylotrupes gideon* during transit, were handed over to this Experiment Station, in order that we might determine whether this wasp would attack grubs of our so-called "elephant beetle" (*Xylotrupes australicus* Thomp.) or possibly those of one of our cane beetles.

Being a much bigger parasite, however, than the species of *Campsomeris* which destroy grubs of our most serious cane beetle, *Lepidoderma albohirtum* Waterh., *rubiginosa* refused, as anticipated, to either paralyse or lay eggs upon the grubs of our formidable greyback cockchafer. Such indifference was not to be wondered at, seeing that this beetle is not closely related to *X. gideon* (the usual host of *rubiginosa* in Java) but belongs to quite a different sub-family, viz., the Melolonthidæ, many of the grubs of which feed on living vegetable tissue, whereas those of the Dynastidæ, which includes genus Xylotrupes, subsist for the most part on dead matter, such as humus, rotting wood, twigs, or leaves, &c.

Although this introduced digger wasp ovipositedupon larvæ of our elephant beetle, its maggots after hatching from such eggs failed to mature or to produce wasps of *rubiginosa*; so that in all probability the parasite in question would be of no use for combating grubs of our cane beetles.

The parasite phase of natural control of any insect pest constitutes a study presenting such difficulties as only a trained entomological expert can hope to fully appreciate. Many exceedingly complex agencies affecting what is termed the balance of nature call for serious consideration, a perception or knowledge of which often necessitates the employment of special apparatus and original methods of scientific experimentation.

Even when fully satisfied as to the advisability of introducing any insect into another country, "in no case will it suffice," says Dr. L. O. Howard, "to turn the imported material loose, even under the most apparently favourable conditions. The original supply must be multiplied by breeding, and experimental loosings must be made."

Minor Cane-Pests.

During the past season some of our minor cane insects which had previously caused little or no financial losses were responsible for noticeable damage to the leaves and shoots of young cane. For instance, a decided outbreak of *Melanitis leda* Linn., the familiar "Leaf Butterfly," occurred last October at Sawmill Pocket, the caterpillars of this insect being present in great numbers and effecting decided injury to cane plants.

From specimens collected for breeding, in order to discover what control was being exercised by natural enemies, a species of tachinid fly was bred, the only other parasite obtained being a braconid wasp. Amongst the large number of butterflies that emerged at the laboratory, one specimen only was of the variety *banksia*, all the others being examples of the form known as *barnardi*. This butterfly was first recorded by the writer as being harmful to cane in June, 1916, at which time both its eggs and larvæ were found in fair numbers on young cane-plants at Meringa.

It may be mentioned that this insect has been recorded as damaging leaves of sugar-cane in Java and Mauritius, while a closely related species, *Melanitis ismene* Cr., is similarly destructive in the Orient.

Other minor pests coming under notice last season were as follows:—(1) *Parnara mathias* Fab., (2) *Telicota augias-kreffti* Me.L., (3) *Gonocephalum carpentariæ* Blkb., (4) *Coptotermes acinaciformis* Frogg., &c.

Experiments against the Giant Termite.

During December last Mr. J. H. Buzacott (Assistant to Entomologist) was sent into the Ayr district to inspect the condition of some experiment plots laid down by him last season on cane land infested by the giant termite (*Mastotermes darwiniensis* Frogg.). It was found that dipping the ends of sets in dehydrated tar before planting gave negative results, as these termites were observed to enter the treated ends, and also to bore through the rind between nodes. Examples of three species of predatory ants (Formicidæ) were procured, viz., *Camponotus nigriceps* (var. *dimidiatus*); *Iridomyrmex detectus*, and a third species, not yet identified. The simplest, cheapest, and most effective of the poison baits experimented with was sodium arsenite, which was applied by soaking pieces of split cane in a 10 per cent. solution. Mortality was secured by this bait in about twenty-four hours.

Breeding and Study of Economic Insects.

During the past year the life-cycle stages of many species of cane-insects have been studied by us, and various hymenopterous and dipterous parasites bred out from the larvæ or pupæ of destructive species. Of these insects, the following are of more or less economic interest:—

Coleoptera—

Agrypnus mastersi Pase.—The soil-frequenting larva of which is predaceous on various cane grubs.

4. Division of Entomology—*continued.*

Lepidiota caudata Blkb.—Third-stage grubs of this cane beetle were collected by Mr. G. Bates (Assistant to Entomologist) at Babinda on 12th August, 1926, and seven weeks later seven had transformed to pupæ, although others were still feeding. About two months later beetles were obtained in the breeding-cages.

Gonocephalum carpentariæ Blkb.—Occurring commonly in canefields, where the larvæ damage cane roots.

Pseudoholophylla furfuracea Burm.—Grubs of this Southern cane beetle were sent to us by the Assistant Entomologist at Bundaberg, Mr. R. W. Mungomery, in order that we might by breeding them obtain pupal and adult forms of this cockchafer as specimens for our office collection of insects. The pupal period was found by us to last from three to four weeks; the beetles, after transformation, remaining three weeks or longer in the pupal cells before leaving the soil.

Lepidiota trichosterna Lea.—The pupal stage of this Southern cockchafer—bred here from grubs forwarded by Mr. Mungomery—occupies a period of about four weeks, the beetles continuing in the pupal chambers for about three weeks longer.

Pentodon australis Blkb.—Third-stage grubs of this dynastid, received from Mr. Mungomery last December (1926), yielded six pupæ and one beetle about a month later. The pupal period was found to last nine to ten days.

Lepidoptera—

Cirphis unipuncta Haw.—Outbreaks of this "army worm" occurred at Mooliba during August; Hambledon in November; Woree, and elsewhere. Many specimens of the caterpillars were collected for breeding, in order to study various phases of parasitic control.

Cirphis loreyi Dup.

Laphygma exempta Walk.

Phragmatiphila truncata Walk.—Many caterpillars of this moth-borer were collected at various times, in the hope of obtaining specimens of *Apanteles nonagriæ* Oliff. or other parasites; but without success attending our efforts.

Fossifrontia sp. ("Pyralid Moth-borer").

Ephysteris chersæa Meyr.

Opogona glycyphaga Meyr.—Suspected of occasionally boring into young cane shoots.

Padraona marnas Feld.

Parnara mathias Fab.

Telicota augias-kreffti Macl.

Melanitis leda Linn.

Chusaris rhodias Turn.—The pupal period was found to be nine days.

Orthoptera—

Locusta danica Linn.

Locusta australis Brunn.—Eggs laid in soil at bottom of breeding-cages during the month of May hatched after an interval of fourteen to eighteen days, while those deposited in July took thirty-six days.

Isoptera—

Mastotermes darwiniensis Frogg. ("Giant Termite").

Coptotermes acinaciformis Frogg.

Eutermes vernoni Hill.

Hymenoptera—

Campsomeris tasmaniensis Sauss.

Campsomeris radula Fab.

Scolia formosa Guer.

Perga sp. ?

Discolia soror Smith.

Triscolia rubiginosa Fab.

Diptera—

Metoponia rubriceps Macq.

Promachus doddi Bezzi.

Field Experiments in Grub Control.

A few experiment plots were laid down during October last on high land of volcanic origin at Meringa, the soil being of a friable nature, well drained, and situated on land that is usually more or less badly grub-infested each season.

No rain worth mentioning fell until 28th December, 1926, when 1·16 inches were registered at Meringa. During the cyclone of 10th February, the young cane on these plots did not suffer much, being only 12 to 18 inches high, but three days later, on the 13th when 14·70 inches of rain fell, growth was much checked owing to the planting furrows having been filled in by the surface water.

Amongst results obtained it was further demonstrated that both paradichlor and carbon bisulphide should never be injected amongst the tender roots of young cane shoots, such procedure being always liable to injure or kill them, especially at a time when the sets are beginning to root freely. Later on, when the cane has attained a height of 3 or 4 feet, and is well rooted, no ill effects occur, although carbon bisulphide, if injected into the centre of a big cane stool, will sometimes check plant growth for a few weeks. Ratoon cane is not injuriously affected by either of these soil fumigants. It is regrettable that owing to drought conditions having delayed planting up of these experiment plots at Meringa a decent strike was not secured until the beginning of February. Growth of the young shoots from deeply planted sets was severely checked by flood rains occurring on the 9th and 14th of February, which, as above stated, filled the planting furrows, nearly burying the tender shoots, leaving the surface of the ground as uniformly level as a table. Further trouble was subsequently caused by stray horses getting into the selection on which these plots are situated—probably through portions of boundary fences that had been damaged by the cyclone—and eating down the young cane.

4. Division of Entomology—*continued.*

Despite such unfavourable conditions, however, two of these test plots have given encouraging results, viz., that treated with "Chlorocide B."; and the one fumigated with paradichlor applied by horse power. Both these experiments are well worth repeating next season. The results from other fumigants tested, such as "Chlorocide A.," Carbosyl, Calcium Cyanide, &c., were rendered inconclusive owing to the various causes mentioned above.

Museum devoted to Sugar Entomology.

The space devoted at our laboratory to the exhibition of organisms destructive to sugar-cane and their various natural parasitic and predaceous enemies, together with the life-cycle stages of primary cane insects, has gradually become cramped, all available wall space being practically occupied at present.

The spirit collection, which is contained in about 400 glass exhibition jars and vials, comprises specimens of eggs, grubs, and pupæ of several species of scarabæidæ affecting cane in our Northern districts; including also termites and early stages of insects predaceous on the larvæ of economic species.

The metamorphosis and ecology of some of our chief cane pests are shown in several large glass-topped exhibition cases; while the activities of the greyback cockchafer (*Lepidoderma albohirtum* Waterh.) are clearly explained by a large diagrammatic coloured chart measuring about 5 by 16 feet. Additional diagrams to those already on view at our museum might be prepared if more room could be made available for such educational displays, and our growers could be induced to take notice of matters so closely affecting their material welfare.

Examples of injury to cane caused by termites and beetle-borers form attractive exhibits; while a small collection of snakes and other reptiles in spirits has also been gradually acquired, and is not without interest to visitors from Southern States.

Our insect collection in August, 1925, numbered over 4,000 specimens, comprising nearly 2,000 species, but since that date we have added more than 1,000 specimens and a few hundred species. At present this collection is kept in store boxes, and is invaluable for reference purposes, seeing that most of the species have been named.

Publications.

The following Monthly Reports, dealing with research work, &c., carried out by us in connection with the control of cane insects, and various publications, were supplied by the writer during the last twelve months:—

Monthly Progress Reports.—"Queensland Agricultural Journal": September, 1926, vol. xxvi., pp. 284-285; November, vol. xxvi., pp. 478-481; December, vol. xxvii., pp. 85-88; January, vol. xxvii., pp. 179-182; February, vol. xxvii., pp. 270-271; March, vol. xxvii., pp. 398-399; April, vol. xxviii., pp. 7-8; June, vol. xxviii., pp. 110-113; July, vol. xxviii., pp. 212-215; August, vol. xxviii., pp. 211-212.

"Australian Sugar Journal."—September, vol. xviii., pp. 424-426; October, vol. xviii., pp. 553-554; November, vol. xviii., pp. 546-547; December, vol. xviii., pp. 613-614; January, vol. xviii., pp. 673-674; February, vol. xviii., pp. 743-745; March, vol. xix., pp. 13-14; April, vol. xix., pp. 136-137; May, vol. xix., pp. 162; June, vol. xix., pp. 215-218; July, vol. xix., pp. 276-278; August, vol. xix., pp. 335-337.

Entomological Hints.—"Queensland Agricultural Journal": September, 1926, vol. xxvi., pp. 285-286; October, vol. xxvi., pp. 378-379; December, vol. xxvii., pp. 88-89; January, vol. xxvii., pp. 182-183; March, vol. xxvii., pp. 275-276; April, vol. xxvii., pp. 276-277; May, vol. xxvii., pp. 399-400; June, vol. xxviii., p. 4; July, vol. xxviii., pp. 114-115; August, vol. xxviii., pp. 206-207.

"Australian Sugar Journal."—September, vol. xviii., pp. 423-424; November, vol. xviii., pp. 487-489; December, vol. xviii., pp. 543-544; January, vol. xviii., pp. 607-610; March, vol. xviii., pp. 741-742; April, vol. xix., pp. 11-12; May, vol. xix., pp. 118-119; June, vol. xix., p. 147; July, vol. xix., pp. 213-215; August, vol. xix., pp. 274-275.

Bulletin No. 3 (revised edition), Division of Entomology, entitled Notes on Insects Damaging Sugar Cane in Queensland, 1927, 94 pages, 7 plates, and 23 inset illustrations.

Miscellaneous articles, dealing with sugar entomology, were contributed to the "Cairns Post," "Bank Notes," and "Journal of Tropical Agriculture."

A report dealing with a visit to the Tully district made by Mr. A. N. Burns, Assistant Entomologist, will be found in the "Queensland Agricultural Journal," vol. xxvii., p. 85.

A second report dealing with a visit to South Johnstone in connection with spread of the beetle borer of cane, issued by Mr. A. N. Burns, appeared in the "Queensland Agricultural Journal," vol. xxvi., p. 221.

Report of Assistant Entomologist, Mr. A. N. Burns, of a visit to the Innisfail and Tully districts, "Australian Sugar Journal," vol. xviii., p. 615.

I have, &c.,

EDMUND JARVIS, Entomologist.

SOUTHERN DIVISION.

Mr. R. W. Mungomery, Assistant Entomologist, is in charge of the Southern Entomological Laboratory at Bundaberg, and has rendered excellent service during the year. One of his discoveries, in relation to proportion of sexes of the Childers cane beetle (*P. furfuracea*), will save large sums of money from being uselessly expended in that area. Mr. Mungomery is assisted by Mr. G. Bates, whose duties are carried out in a very satisfactory manner.

4. Division of Entomology—*continued.*

The following is the report of the work carried out by Mr. Mungomery and Mr. Bates in the cane areas from Mackay south:—

Southern Sugar Experiment Station,
Bundaberg, 28th October, 1927.

The Director,
Bureau of Sugar Experiment Stations.

SIR,—I have the honour to submit the following report of the activities and work carried out by the Division of Entomology, Southern Sugar Experiment Station, for the year ended October, 1927:—

Staff Movements.

Mr. G. Bates, Assistant to Entomologist, was transferred from the Meringa Laboratory, and detailed for work at this Station as from 18th February. His appointment to this staff was a desirable one in that it now permits of one officer being continually in attendance at the laboratory to carry out breeding work and other experiments, whilst the other is absent on inspection or investigation duties. Mr. Bates also took charge of all the entomological duties connected with this Station during the period April and May, when the writer was absent on recreation leave.

Review of Weather.

In reviewing the past year, the outstanding feature has been the diversity of the weather conditions. The droughty conditions which had prevailed for several months previous to October, 1926, continued throughout that month into December, when the position was suddenly relieved by the copious rains, which fell about the middle of the latter month. Thereafter, the frequent cyclonic disturbances which operated along the eastern coast yielded an abundant rainfall, which continued until April, 1927. During this period some torrential downpours were experienced at times when the ground was already in a thoroughly saturated condition, with the result that many of the lower lying fields were flooded and remained covered with water for many weeks. Thus the passing year has witnessed extremes in the vagaries of the weather.

Varied Effects of Weather in reference to different Cane Pests.

Although a continuance of a severe drought during the latter half of the year has frequently been observed in North Queensland to exercise a far-reaching check on the natural increase of the greyback cane beetle (*Lepidoderma albohirtum* Water.), by killing the beetles as they remain imprisoned and unable to escape from their pupal cells, yet it can hardly be said that the same state of affairs operates to a similar extent in regard to one of the Southern cane beetles (*Pseudholophylla furfuracea* Burm.). This species emerged soon after the first soaking rains about 15th December, notwithstanding that the last useful pentrating rains had fallen in June, six months previously.

It appears that although the grubs of *P. furfuracea* remain in the prepupal stage for some considerable time, pupation does not actually take place until late in September or early October, and consequently the first beetles do not appear in their underground cells until towards the end of October. Thus at most their period of confinement in these earthern chambers is less by about a month to six weeks than that occupied by the greyback beetles, and therefore long-continued dry conditions do not have the same devastating effect with the Southern beetles as they do with the Northern species. These observations being limited to the last two years are necessarily meagre on that account, but this, together with the fact that a double emergence of beetles is known to have taken place—a small one in early November, followed by a larger one in late December—in past years, points rather unmistakably to a generally later pupation and change to the adult condition than is the case with the species *L. albohirtum*.

Another factor which appears to be of great importance is that these beetles (*P. furfuracea*) do not appear to feed after emerging, but have enough food material stored up in their bodies to serve them over the period of underground confinement, flight, and subsequent oviposition, and in the event of an unduly long imprisonment through drought, they probably draw on this reserve food supply. *L. albohirtum*, on the other hand, requires to feed on the foliage of various trees, and eggs are not fit for extrusion until about a fortnight after emergence. Hence these beetles do not have the same amount of food material stored up in proportion to the *furfuracea* beetles, and thus *furfuracea* beetles are better fitted to resist the hot, dry conditions of a long drought.

The long-continued rains, on the other hand, have had a twofold effect, at times tending to increase insect damage and in other instances materially lessening it. Several soils are such that they do not allow of cultivation until a considerable time after a fall of rain, and with showery weather continuing as it did, cultivation of this class of land was not possible. It resulted that in these cases weed growth was very prolific, and consequently the attacks of the large caterpillar borer (*Phragmataphila truncata* Walk.) were much severer than usual.

In the flatter areas of the Bundaberg district fields were often under water for many days, and grubs were found drowned floating on the top of the water (see "Queensland Agricultural Journal," April, 1927, page 272), showing that such periodical floodings have a beneficial effect, but the amount of submergence that these creatures will withstand before succumbing is truly surprising. Similarly, in the Nambour district grubs of the Christmas beetle (*Anoplognathus boisduvali* Bois.) suffered a high mortality.

At Pialba black beetles (*Pentodon australis* Blkb.) were also reported to have been drowned by flood waters, and the following is an extract from Mr. Bates's notes, giving the observations of a farmer in that district:—"Hundreds of black beetles were washed out of the cultivated fields, and these were scattered over the grass in a neighbouring horse paddock, all drowned by the torrential rain."

4. Division of Entomology—*continued.*

In parts of the Mackay sub-districts, damage by greyback grubs was of a severe nature, and undoubtedly greater losses would have been suffered had not timely rains fallen at the critical period, and helped to keep the cane alive until the mills commenced grinding operations.

Investigations on the Artificial Control of the Cane Beetle (P. furfuracea) by means of Light Traps.

The opportunity was availed of during the flighting season of the cane beetle *P. furfuracea* in December last, to carry out certain investigations in regard to the efficiency of one form of artificial control which has been practised in the Isis district. There it has long been the custom to collect beetles, which on being taken to a receiver appointed for that purpose were later destroyed. Payment for these beetles was then made at the rate of 1s. 6d. per quart. Such a method of capturing the adults and destroying them was considered one of the most important control measures, and this, together with the collection of grubs, was the most serious attempt made to control the pest. Sums amounting to upwards of £400 were paid out annually in this way. The means employed to collect these beetles was to attract them, when they flew as soon as darkness had set in, with artificial light to whose influence they were particularly sensitive. Lanterns were used for this purpose suspended over tubs of water, and beetles flying towards the light fell into the water, from which they were collected at leisure and placed into suitable containers. Investigations, however, revealed the fact that out of several thousand collected in this manner less than 1 per cent. were females. Now, as it is most important in a control measure of this kind that a fair proportion of those captured should be females, it was thought that in this instance the proportion of females secured was far too low to be of any great benefit in controlling the pest. Moreover, though this has been in vogue for the past thirty years, no really outstanding results have been obtained in lessening the grub damage, such as one would expect to find in dealing with a very compact area like the Isis district. Especially is this noticeable when comparing other districts, such as Gin Gin, Bucca, and Woongarra, where the same pest is in evidence and where no collecting of the beetles is practised, grub damage in these parts being certainly not greater than in the Isis district.

With this in mind, it was thought that the results obtained by this artificial control did not justify the amount expended from year to year, and accordingly at the writer's instigation recommendations were made to the Isis Shire Council (the body controlling the Pest Destruction Fund) to discontinue payment for beetles of this species, until a more effective way of trapping the female beetles was evolved. This recommendation the Council has, in consequence, agreed to adopt.

Experimental Work.

Field experiments during the past year have not been extensive, this being due to a variety of causes—namely, pressure of investigation and breeding work, the absence of certain pests during this period, and also the limitation of equipment at the laboratory.

The equipment necessary for conducting entomological experiments on large scales is always a factor to be considered when commencing work on new pests in new districts, and though we have at times suffered slight inconveniences through lack of implements and material, &c., when they were required, we now have in stock injectors, sprayers, fumigants, &c., suitable for whatever demands are made in this connection in the future.

The presence or absence of certain pests from year to year is often governed to a large extent by climatic conditions, as well as by the degree of parasitism suffered by previous generations of that insect. The Chrysomelid beetle (*Rhyparida morosa* Jac.) is a case in point. During the season 1925-26 this beetle did serious damage to young plant cane near Bingera, and preparations were made to conduct a campaign against it as soon as it appeared in such numbers again. Whether due to the above causes or not, it was only present in very small numbers on some of the native grasses this year, and no damage to cane was reported.

Investigation work for the term has extended the known sphere of the destructive activities of the Stratiomyid fly (*Metoponia rubriceps* Macq.) from Mackay to Bundaberg and Childers. The areas affected by it are, however, very small. The mound building ant (*Aphænogaster longiceps* Sm.) has also been observed at Oakwood, in the Bundaberg district. Field experiments conducted in July against this ant proved that carbon bisulphide was at that time more efficient than paradichlorobenzene in effecting a control. Associated with this ant is a subterranean aphid, as yet unidentified, but thought to be an undescribed indigenous species. At least two species of hoppers belonging to the families Jassidæ and Delphacidæ are present with this aphid on the cane roots, but they are all of minor importance and mentioned here for purposes of record only.

Laboratory tests with the weed "Stinking Roger" (*Tagetes glandulifer*) showed that it possessed no insecticidal properties as far as root-eating Scarabæid grubs were concerned, though they ate the leaves of this plant readily when it was incorporated with the soil. Any advantage, therefore, claimed for lands growing this weed is explained by the fact that it supplies a good quantity of organic matter to the soil when ploughed under, and grubs feeding on this weed will naturally not harass the cane to the same extent as they do on lands deficient in organic matter.

Districts Visited.

During the course of investigation work the following districts were visited:—

Mackay (visited by the writer in June and July).—As in previous years the greatest damage found was that caused by grubs (*L. albohirtum* Water.), and Sarina, Mount Jukes, and Kungurri have suffered the worst infestations. A pleasing feature was the decrease of

4. Division of Entomology—*continued.*

the weevil borer (*R. obscurus* Bois.) in the whole of the district, this being attributed in a large measure to the comparatively small amount of cane that was left to stand over from the previous season. The Stratiomyid fly (*M. rubriceps*) has not been troublesome at Finch Hatton this year, and with a good spring rainfall cane sets generally made an excellent "strike." Minor pests call for little comment.

Pialba (visited by Mr. Bates in August).—No serious damage is reported from this district, although wireworms (*Elateridæ*), moth borers (*P. truncata*), and the black beetle (*Pentodon australis* Blkb.) sometimes occasion losses. A Scarabæid grub was found to have damaged cane at The Mountain on red volcanic soil. This has not yet been bred to the adult stage to establish its identity, but it is in all probability a species of *Rhopæa*.

Maryborough and Mount Bauple (visited by Mr. Bates in September).—Insect pests of sugar-cane in this district do not call for repressive measures. Those noticed included *Dasygnathus australis dejeani*, *A. boisduvali*, *P. truncata*, and *Pseudococcus* sp.

Nambour (visited by Mr. Bates in September).—White grubs, those of the Christmas beetle (*A. boisduvali*), give trouble by damaging freshly-planted sets, and this trouble might well be overcome by handpicking the grubs whilst ploughing. Little damage is done to ratoon cane, so that once the cane is well established, trouble from this source is practically negligible. The losses due to the black beetle seem to be less severe than formerly. Rats and water hens have this year added their quota of damage and have injured mature cane by gnawing or pecking into it, and in this manner have snapped off and destroyed many times the quantity that they have actually eaten.

Breeding Work.

This work has been carried on extensively, and it has now become possible to establish relationships between many of our Scarabæid grubs and beetles. Thus the cane grub which was referred to in last year's report as causing damage in the Bundaberg district together with *Lepidiota frenchi* Blkb. and *P. furfuracea* Burm. is now definitely known to be *Lepidiota trichosterna* Lea.

For the purpose of housing the various species of grubs that are being bred, an insectary 14 feet by 7 feet and 6 feet 6 inches high has been built at the back of the laboratory. This insectary has been built so that it can be used as a quarantine, should ever the necessity arise in the future for introducing parasitic insects from foreign countries.

The following insects have been bred out to the imaginal stage or were being bred during the past year:—

Pseudholophylla furfuracea Burm.

Lepidiota trichosterna Lea.

Anoplognathus boisduvali Bois.

Dasygnathus sp.

Pentodon australis Blkb.

Rhopæa sp. (?)

Several small undetermined Scarabæid grubs from Bundaberg, Childers, and Nambour.

Lacon variabilis Cand.

Root-eating wireworms (*Elateridæ*).

Predaceous wireworms (*Elateridæ*).

Dipterous larvæ (*Asilidae*).

Psychidae sp.

Phragmataphila truncata Walk.

Apantelcs sp.

Metoponia rubriceps Macq.

Gonocephalum sp.

Campsomeris tasmaniensis Sauss.

Paranagrus optabilis Perk.

Official Collection.

The insect collection at this laboratory has been materially added to during the last twelve months, so that it now comprises most of the insects known to be detrimental to sugar-cane in Queensland. Various specimens of the egg, larval, and pupal stages have been preserved in spirits, and the imagines have been set out in their several orders in store boxes with descriptive notes. Thus the complete life-cycles of many insects have been represented, and where possible the damage shown. This is calculated to catch the eye of the farmer, so that he may see at a glance the pests which he is likely to encounter, and he is then prepared to attack them in an intelligent manner.

This collection, in conjunction with that of the pathological division, was displayed on both field days at the Bundaberg and Mackay Sugar Experiment Stations in May and June respectively. As well as being of great interest to growers generally, it proved to be instructive and of educational value, and judging by the amount of information sought after, the bond between farmers and this branch of the department's activities is gradually being linked closer together. Farmers in pest-stricken localities now eagerly look for the opinions and advice given by this branch to aid them in their war against pests. By a special request to the Director from the Committee of the Mackay Agricultural, Pastoral, and Industrial Society the collection was also present at their annual show in July, and being placed in a prominent position in the Exhibition Hall, brought forth many favourable comments from those who viewed it.

Appreciation.

As the entomological branch is ever ready to give advice and assistance to those seeking it, so conversely due appreciation is extended to those farmers who bring under our notice any new pests that they may happen to find when engaged in their farming operations, or who may tender any information relative to the foregoing subject which they consider of special value in research of this nature.

4. Division of Entomology—*continued.*

Finally, the writer wishes to thank the officers of the various mills and farmers' associations, who in their several ways have aided the staff when inspecting and carrying out investigation work in districts distant from headquarters, and especially those farmers who have placed their farms unreservedly at our disposal for the purposes of experiment. This in itself shows a splendid spirit, and it is due to such hearty co-operation that much of our information is gleaned, and which we are able to make use of when recommending lines along which to work in maintaining an efficient control over our pests.

I have, &c.,
R. W. MUNGOMERY,
Assistant Entomologist.

5.—Investigations into Diseases of Cane.

During the past year this work has been carried out by Mr. E. J. Ferguson Wood, B.Sc., Mr. N. L. Kelly having gone back to the University for further training. Mr. Dormer, who had charge of the work during 1925, is also at the University. Next year it is anticipated that the Bureau will be able to place the pathological side of the work on a firmer foundation, when Mr. A. F. Bell will return from abroad. The staff should then consist of Mr. Bell, Mr. Ferguson Wood, Mr. Kelly, and Mr. G. Wilson.

Mr. E. J. F. Wood has had an arduous year, it being necessary for him to visit every sugar area. His work has been well done and he has succeeded in gaining the confidence of the growers

The Director is also indebted to Mr. W. Cottrell-Dormer for investigations made into Fiji disease, more particularly in Beenleigh. Articles dealing with this disease have been published during the year by Messrs. Dormer and Wood, and re-prints may be obtained at the office of the Bureau. Mr. Dormer has also been of great assistance in a number of pathological matters submitted to him.

The following report has been submitted by Mr. E. J. Ferguson Wood, B.Sc., on his work during the year:—

Annual Report of Assistant to Pathologist.

In presenting my annual report to the Bureau, I wish to point out that, having been the only pathologist in the field, I have been forced to cover a large amount of ground in a short time, and so have endeavoured to see as many farmers as possible in the time available. The examinations I have made are by no means field to field inspections, but they attain their object, for they give a comparatively true idea of the disease situation in the different areas. This, and suggestions for the control of the troubles have been treated in my monthly reports, and are briefly summarised in the tables given below. No work has been done with regard to disease-resistance trials, and my criticism of the varieties is based on observations of results in the field. They can, however, be taken to be fairly accurate, though I would not dare to give a table of relative resistance. I desire, however, in this report to point out the factors which need improvement. The Bureau cannot control the disease situation without the co-operation of the farmers, and by paying attention to the suggestions given they will considerably facilitate matters.

But first I wish to draw attention to a conclusion from the data given in the tables below with regard to quarantine. It will be seen that the districts fall naturally into eight groups:—

1. Maryborough and south thereof.—Fiji disease and gumming.
2. Bundaberg and Isis.—Gumming and mosaic, little red rot.
3. Mackay and Proserpine.—Red rot and mosaic, little gum or scald, and little leaf stripe.
4. Burdekin and Giru.—Leaf stripe, mosaic, and top rot, no gum seen.
5. Ingham.—Gumming (under C.S.R. control), little mosaic or stripe.
6. Tully, Innisfail, Babinda.—Leaf scald and spindle top, no mosaic or stripe seen.
7. Cairns.—Leaf scald not so universal; leaf stripe, mosaic, and gum seen.
8. Mossman.—Leaf scald and stripe; no gum seen; one stool mosaic.

From this it will be seen that, with the exception of the Ingham line cane, quarantine would be easy, and I wish to suggest the inauguration of a district quarantine as early as possible. By this I mean that no farmer would be able to import plants from another area without previous inspection of the field by competent officers. This would safeguard the individual farmer and the district against the introduction of fresh diseases. It would facilitate the eradication of the troubles that are just obtaining a foothold, and enable the pathological staff to concentrate upon the more important problems. It is evident that every district has something to give its neighbours.

Field efficiency with regard to diseases lags far behind the mill efficiency, and until this is brought up we cannot hope appreciably to reduce the cost of production. To-day is the day of scientific work, and science is sadly lacking in the field, many farmers being content to do as their fathers did, irrespective of the changed conditions. I wish to point out some places where improvement can be made.

(1) *Selection of Plants.*—This is of highest importance in all disease work, and upon it rests the control of our major troubles. Moreover, there is a strong tendency to degeneration in all our leading varieties, which is due absolutely to lack of seed selection. This degeneration leads to decrease of resistance to disease, and Badila is especially affected in this way, notably by spindle

5. Investigations into Diseases—*continued.*

top and leaf scald. The neglect of this factor all over the State is deplorable, the losses are tremendous—bad strikes, diseased cane, insects, borer, &c., result from this. Supplies are never the same as original plants, and often die out in the ratoons, so that a bad strike of badly-selected plants means increasing losses in the succeeding crops. To prevent big gaps due to bad plants, &c., the farmer often plants too close, with the result that canes are smothered, and diseases such as spindle top and top rot come into evidence. I mentioned in a monthly report the evils of contract planting, and at the risk of repetition I wish to stress this.

(2) As soon as the cane is well above the ground, the farmer has another chance of cleaning up his fields. With efficient plant selection the diseases should be so reduced that he can, by digging out diseased stools while still cultivating the cane, further reduce the trouble. When the cane gets beyond cultivation, he is usually forced to make a truce with the disease till the young ratoons give him another chance.

(3) However, in the case of vascular diseases, such as gumming and leaf scald, where infection is carried on the cane knife, a necessary precaution is to dip the knives into boiling water or, which is perhaps easier, into a kerosene tin of carbolic solution when changing from one block to another. None of these measures are sufficiently observed, for if they were most of our diseases would be under complete control.

(4) The problem of trash conservation is a ticklish one, but where red rot, spindle top, and leaf stripe are present the farmer should consider whether it will benefit him to burn the trash and thus remove a source of infection, or whether he can cope with the disease by other means. With serious epidemics I urge the destruction of trash till the disease is brought under control.

(5) The problem of soil acidity and fertilisation in connection with disease is one which requires the attention of science and of the farmer.

There are to my mind two innovations necessary to control disease in Queensland:—

(1) The establishment of a field man at each mill to supervise the planting, varieties, &c., and eradication. The men would have to be trained for the work, but the increased field efficiency would far more than repay the cost of such men. Witness the field control practised at their own expense by the C.S.R. Losses due to disease would surprise us all if they were computed, and must cost the industry thousands of pounds annually. These men would have to be independent of the mill, and responsible to some independent body.

(2) Variety plots under strict supervision of such a field man at each centre to grow, compare, and supply the best varieties for each district. This would cut out the scraggy variety plot seen on many farms, which lowers the yield of the farm, takes up space, and often serves as a breeding place for pests and diseases. A few proved varieties should be permitted, and the rest prohibited unless by special permission of the cane inspector. It is the mills with the few good clean varieties which do the best work.

Although diseases are widespread in Queensland, the position is on the whole hopeful, for the farmers are becoming more interested in the control work, and much has been done in some areas. A few indolent men are still holding things back by disregarding our suggestions, but I do think that the position is better than it was last year. In places like the Woongarra, where gum is epidemic, resistance trials must be carried out, and I have made suggestions with regard to this.

Although considerable thought has been expended on spindle top and top rot, I cannot say whether we are any farther advanced, but an endeavour has been made to get the co-operation of the farmers, for they are on the spot, and can save much time in the solution of the problems by carefully recording their observations.

With regard to the distribution of the diseases—

Mosaic.—This disease occurs in all districts south of Townsville in epidemic proportions, but north of this only a few isolated stools are known—one at Mossman, several at Cairns, and a few now ploughed out at Innisfail and Ingham. The complete eradication of these is urged, so that the North may be declared free from this disease. With regard to the Southern areas, the trouble has been discussed at length previously. It was seen in corn and sorghum at Mossman and other places, and the farmers are warned against the growing of these near cane.

Leaf Stripe.—Occurs in Bundaberg, Mackay, Cairns, and Mossman, but mainly on the Burdekin and at Giru. The wind-blown spores make it imperative that the farmers attack the problem by getting rid of the susceptible varieties and by seed selection. It affects D. 1135, B. 147, and Q. 855 at Mossman, and B. 208 on the Burdekin, and these varieties should be abandoned in these areas.

Leaf Scald.—Occurs on two farms at Proserpine (Conway), very slightly at Ingham, and is widespread at Tully, El Arish, Innisfail, Babinda, and Little Mulgrave. Its eradication is merely a matter of plant selection and variety control, with efficient rogueing in ratoons. It causes heavy losses in Goru, H.Q. 426, and in some cases in Badila and Pompey.

Gumming.—Is causing heavy losses on the Woongarra and at Nambour, as was predicted earlier in the year, from the weather conditions. It is also present at Childers, Beenleigh, Maryborough, and Gin Gin. Q. 813, Korpi, and Oramboo are resistant. It was seen in one patch of E.K. 28 at Mackay, and in H. 109 at Aloomba. At Ingham the C.S.R. seem to have it under control. Suspicious streaks were seen at Silkwood.

Red Rot.—Occurs in the Sarina area and in Mackay and Proserpine, and to a less extent in the Southern areas. It requires practical field

5. Investigations into Diseases—*continued.*

experiments in the near future, but suggestions were made for its control in a special report on the Sarina area.

Top Rot.—Diligent inquiries were made of the farmers concerning their observations on the trouble, and most farmers attribute it, as I am inclined to do, to drought followed by excessive moisture. I think, however, that the factors are more complicated than this, and we are only on the threshold of the work. A report was published on it. It occurs at Freshwater, Burdekin, Giru, Ingham, and Tully, and is reported from other parts, but it is far worse on the Burdekin than elsewhere. I suspect that top rot and flood rot are identical in cause as they are in symptoms. Badila is the variety mainly affected.

Spindle Top (needle top or pink sclerotial disease of the leaf sheath).—This disease also affected Badila more than other canes, partly because this is the main variety grown where the disease occurs. It is found in all areas from Giru north, but is not prevalent at Mossman except on the Mowbray. As it is one of the main causes of the deterioration of Badila, it should, in my opinion, be thoroughly investigated and field work done to either bring up the stamina of Badila or to provide other resistant canes if possible. Mossman seems cleaner than any area in the North, and seed could be drawn from the localities where there is no leaf scald. The Badila there is black and true to type.

Minor Diseases.—Leaf sheath fungi of the Marasmius type occur in most localities, but especially in Childers, Bundaberg, Mackay, and at Mossman. M. 1900 Seedling, D. 1135, E.K. 28, and N.G. 16 are the main varieties attacked. In Ingham there is considerable root disease owing to the flood, which has deposited silt in the leaf sheath and given favourable conditions for the fungi. Loss occurred on the Woongarra on two farms and on one at Mackay. Knife cut was seen at Bauple, Childers, Bundaberg, Mossman, and Mackay, but was causing little damage. Peg leg or foot rot affects M. 1900 Seedling and D. 1135 in the South as far as Mackay, and has been observed to a limited extent farther north. Iliau was observed in the Childers district, and at Booyal in M. 1900 Seedling and D. 1135. It needs strict attention to reduce it in the areas in which it does exist.

Lectures were given at the Bundaberg and Mackay field days, and were accompanied by specimens of the various diseases. A set of formalin specimens of the prevailing diseases was prepared at Mackay, and exhibited at Mackay Show; it is now to be seen at the Experiment Station. Another set was made at South Johnstone and given to Mr. Barke at the Station there, where it has been arranged as an exhibit. Photographs and diseased canes were also set out at the Ayr Show, but the heavy rains prevented them from being viewed by as many farmers as had been hoped.

Detailed pathological inspections were made of the three Experiment Stations, and the reports thereon submitted to headquarters. It is suggested that, owing to the gum on the Woongarra, the Bundaberg Station be set apart for variety-resistance trials, and it is with that in view that thirteen carefully selected seedlings were sent there from South Johnstone. I have to thank the Director for permission to make the selection, and Messrs. Barke and Gibson for their help and co-operation in the selection work.

I have summarised my year's work in the following tables, which give some rather interesting information. They are not intended as a guide to the relative resistance of the different varieties, which could well be the reverse of the figures given. They do show, however, roughly, the extent to which the different varieties are affected with disease in the various centres, and so should be consulted if a farmer wishes to know which cane is the cleanest in his district. This is purely a matter of coincidence, as a newly introduced cane should be, on the whole, cleaner than an older cane, which has been widely grown for some time.

In all, over 1,000 farms have been examined since the beginning of this year, and they are placed in the order of date visited:—

BEENLEIGH DISTRICT.

Number of farms visited 81, of which 46 showed Fiji disease, 26 mosaic, and 18 gumming.

Number of Farms growing each Variety.	Varieties.	Fiji Disease.	Mosaic.	Gumming.
59	Q. 813	2*	3*	0*
69	D. 1135	46	15	15
13	M. 1900 Seedling	1	13	3
9	Kikarea	1	2	1
12	H.Q. 285 ..	0*	0	0

H.Q. 285 is newly introduced, and this is probably why it does not show mosaic as much as 1900 Seedling, which it approaches in susceptibility.

MARYBOROUGH DISTRICT

(Excluding Pialba).

Number of farms visited, 144, of which 28 showed Fiji disease and 57 mosaic; gum was not showing up.

Number of Farms growing each Variety.	Varieties.	Fiji Disease.	Mosaic.
71	D. 1135	23	23
41	M. 1900 Seedling	12	11
39	Q. 813	1*	7*
19	H.Q. 285	0*	0
9	Meera	2	0
19	Petite Senneville	1*	6
5	Shahjahanpur		5

* Regarded as resistant to the diseases mentioned.

5. Investigations into Diseases—*continued.*

PIALBA DISTRICT.

Number of farms visited, 38, of which 14 showed mosaic.

Number of Farms growing each Variety.	Varieties.	Mosaic.
33	D. 1135	9
21	Q. 813	3
8	M. 1900 Seedling	0
13	H.Q. 285	4
9	Shahjahanpur 10	9

I have separated Maryborough and Pialba as there is apparently no Fiji disease in the latter area. Yerra, however, is included with Maryborough. It will be noted that out of 14 farms growing Shahjahanpur No. 10, all have mosaic, and this disease is 100 per cent. present.

NAMBOUR DISTRICT.

Number of farms visited 23, of which 12 showed gumming and 12 mosaic.

Number of Farms growing each Variety.	Varieties.	Gumming.	Mosaic.
21	D. 1135	10	12
14	Q. 813	0	0
8	H.Q. 285	1	0

Other varieties make up the balance.

Weather conditions and floods hampered the investigation of this district, and much of the area was not inspected. I have only given the main varieties, but would mention Shahjahanpur 10 as being 100 per cent. infected with mosaic as in all other places where it is grown.

MOUNT BAUPLE DISTRICT.

Number of farms visited, 70.

Varieties.	Mosaic.	Gumming.
D. 1135	*99	1
M. 1900 Seedling	23	..
Q. 822	4	..
E.K. 28	6	1
H.Q. 285	5	..
Q. 813	16	..
E.K. 1	2	..
M. 147	6	1
Shahjahanpur 10	6	..
Mahona	1	..
Striped Singapore	1	..
7 R. 428	1	..
Green Baruma	1	..
Malagache	2	..
Q. 970	2	..
N.G. 48	2	..
H.Q. 77	1	..
Q. 1098	2	..
N.G. 81	3	..
Petite Senneville	1	..
C.S.R. 2	..	..

* Plant and ratoon.

CHILDERS DISTRICT.

Number of farms visited, 73, of which 10 showed gumming, 40 mosaic, 7 Iliau, and 17 X disease.

Number of Farms growing each Variety.	Varieties.	Gumming.	Mosaic.	Iliau.	X Disease.
52	D. 1135 ..	10	23	1	13
51	M. 1900 Seedling	6	18	6	20
11	M. 55	..	3	..	1
17	Q. 813	..	2	..	1
11	M. 189	..	7	..	..
14	H.Q. 285 ..	..	4	..	..

BUNDABERG DISTRICT.

Number of farms visited, 58, of which 14 showed gumming, 55 mosaic, and 1 leaf stripe.

Number of Farms growing each Variety.	Varieties.	Gumming.	Mosaic.	Leaf Stripe.
31	D. 1135	9	20	..
32	Q. 813	2	3	..
37	M. 1900 Seedling	8	22	..
16	M. 189	..	15	1
24	H.Q. 285 ..	..	13	..

I have not given Badila or N.G. 16 in these tables, as the figures would be misleading. Most of the big plantations are growing big areas of these canes, and, with the exception of Bingera, they are all heavily gummed; in fact, in many parts every stool was showing the disease, especially on the Woongarra. The disease situation with regard to these canes is very serious.

MACKAY DISTRICT.

Number of farms visited, 124, of which 24 showed mosaic, 1 leaf stripe, and 1 gumming.

Number of Farms growing each Variety.	Varieties.	Mosaic.	Leaf Stripe.	Gumming.
98	M. 1900 Seedling	7	..	..
97	Q. 813 ..	1	..	..
46	M. 189	7	..	..
66	H.Q. 426 ..	3	..	..
40	Malagache ..	1	..	..
41	E.K. 28 ..	2	..	1
39	D. 1135 ..	2	..	..

Leaf stripe occurs in 7 R. 428 on one farm, where the infection is high. Great interest is being shown by the farmers in mosaic and its control, which probably accounts for the relatively low infection in most areas. Red rot has not been mentioned as it was not showing up to any extent during my visit. There were indications, however, that it would show up later in the season, so a report was submitted on it.

5. Investigations into Disease—*continued.*

PROSERPINE DISTRICT.

Number of farms visited, 24, of which 2 showed mosaic, 4 red rot, and 2 leaf scald.

Varieties.	Mosaic.	Red Rot.	Leaf Scald.
M. 1900 Seedling	2	..	..
Badila	..	..	2
H.Q. 426	..	4	2

BURDEKIN DISTRICT.

Number of farms visited, 68, of which 28 showed top rot, 17 leaf stripe, and 9 mosaic.

Number of Farms growing each Variety.	Varieties.	Top Rot.	Leaf Stripe.	Mosaic.
58	Badila	28	1	2
44	H.Q. 426 ..	1	1	1
43	B. 208	..	17	5
37	E.K. 28 ..	1	..	..
15	M. 1900 Seedling	2	..	1

GIRU DISTRICT.

Number of farms visited, 30, of which 4 showed top rot, 2 spindle top, 2 leaf stripe, and 4 mosaic.

Number of Farms growing each Variety.	Varieties.	Top Rot.	Spindle Top.	Leaf Stripe.	Mosaic.
28	Badila	4	1	..	..
13	B. 208	..	1	2	4
25	H.Q. 426 ..	..	..	..	..

INGHAM DISTRICT.

Number of farms visited, 98, of which 2 showed gumming, 2 top rot, 1 leaf scald, and 1 mosaic.

Varieties.	Gumming.	Top Rot.	Leaf Scald.	Mosaic.
Badila	1	2	1	..
H.Q. 409 ..	1	..	..	..
Oramboo ..	1	..	..	1
Korpi	1	..	..	..
Nanemo	..	..	..	..
H.Q. 426 ..	1	..	..	..

TULLY DISTRICT.

Number of farms visited, 56, of which 8 showed top rot, 20 leaf scald, and 22 spindle top.

Number of Farms growing each Variety.	Varieties.	Top Rot.	Leaf Scald.	Spindle Top.
56	Badila	8	20	22
7	H.Q. 426 ..	..	6 (?)	..

INNISFAIL DISTRICT.

Number of farms visited, 104, of which 56 showed leaf scald and 73 spindle top.

Number of Farms growing each Variety.	Varieties.	Leaf Scald.	Spindle Top.
104	Badila	31	73
12	H.Q. 426	12	1
11	7 R. 428	8	1

BABINDA DISTRICT.

Number of farms visited, 50, of which 50 showed spindle top and 50 leaf scald.

Number of Farms growing each Variety.	Varieties.	Spindle Top.	Leaf Scald.
48	Badila	48	48
15	H.Q. 426	1	15
9	Goru	..	9
3	Q. 813	1	..

Now Badila is only lightly affected on most farms, but Goru and Clark's Seedling are heavily attacked on nearly every farm, so that the growing of Goru should be discontinued, and that of Clark's Seedling either very carefully watched, or, better still, be given up also for the time being.

MOSSMAN DISTRICT.

Number of farms visited, 35, of which 15 showed leaf scald, 4 leaf stripe (just at present), and 2 spindle top.

Owing to the fact that leaf stripe is not showing up to any extent just now, the figure given above is of little value. Leaf scald, however, is probably more prevalent, as much of the cane is cut and has not yet ratooned. These figures are only given for completeness.

CAIRNS DISTRICT.

The diseases in this area include leaf scald and top rot as the major troubles, and mosaic, leaf stripe, and gum as very important but restricted diseases. Farmers are advised to strive their hardest to get rid of these troubles.

In all 97 farms were visited, on 74 of which disease was present.

Number of Farms growing each Variety.	Variety.	Leaf Scald.	Top Rot.	Mosaic.	Gum.	Leaf Stripe.
94	Badila ..	46	27	..	..	..
13	H.Q. 426 ..	5	..	..	..	1
14	D. 1135 ..	..	..	..	..	2
6	Pompey ..	..	..	..	..	4
2	Shahjahanpur No. 10	..	..	2	..	..
3	B. 156 ..	..	..	3	..	..
4	H. 109 ..	..	..	1	2	..
12	B. 147 ..	..	..	..	..	..

5. Investigations into Diseases—*continued.*

The leaf scald problem requires attention, for it is very prevalent, especially in the Hambledon area, notably at Freshwater. It may be stated that on many of the farms on which no disease could be seen the trouble may have been occurring in the latent stages, which are not uncommon in the case of this disease.

Top rot presents a peculiar problem here, which will require much research to solve. It is occurring both on the red soils and on the rivers.

Mosaic is confined to two farms near Hambledon, and four at Mulgrave; gumming to one at Mulgrave as far as can be seen; and leaf stripe to four at Sawmill Pocket, and can be suspected on three others, one in the Mulgrave and two in the Hambledon areas.

Mosaic is still present on one farm in Mossman, and no steps have been taken by the farmer to get rid of the stool which is showing the disease.

I have not mentioned the minor diseases in the tables as they would tend to obscure the main issue. They are, however, not to be regarded too lightly, as they do cause serious losses in a few cases, some of which have come under my notice. The root troubles are complicated, and have a bearing on the tilth and fertilisation of the soil. The research in this connection seems more the work of a soils chemist than of a pathologist.

With regard to the rusts and leaf spots, these may cause losses, and are certainly hard to control owing to their mode of spreading, and to the fact that most of our grasses show leaf spots which are very similar, and possibly identical with some of those affecting cane. Varietal susceptibility and resistance is very pronounced in connection with these diseases.

From my work this year, I realise that a short discussion of the main varieties of cane would not be out of place, as the farmers are continually asking me for this information. Moreover, since I have recommended the elimination of certain canes, it is as well that I should make some suggestions concerning other varieties which could be tried to replace them.

Badila is, on the whole, tolerant to leaf scald, though at times it is very badly affected. It shows this disease in Mossman, Cairns, Babinda, Tully, and Innisfail, and on two farms at Proserpine. Resists mosaic fairly well, but is by no means immune. Though resistant to gumming in the north, it is highly susceptible in the southern districts, and is the biggest source of loss from this disease on the Woongarra. According to C.S.R reports from Fiji, it is rather resistant to Fiji disease. It is very susceptible to top rot and spindle top, from the latter of which it can only be preserved by careful attention to plants. As Badila is the best all-round cane in the North, no trouble should be too great to preserve this variety.

H.Q. 426 is very susceptible to gumming, leaf scald (which appears usually in the acute stages), red rot, and to a lesser extent mosaic. It appears to be resistant to leaf stripe and top rot, for which reason it is a good variety for the Burdekin, and for Giru. It is severely affected with leaf scald in all areas north of Ingham, and in this district has been eliminated owing to gumming. I do not recommend it for any other areas except Mackay, Proserpine, and Giru and the Burdekin. In the former two it will have to be watched for red rot, and due care will have to be taken to preserve it. Owing to its high c.c.s. and its early maturing qualities, it is a hard cane to replace, but attention must be directed to this end.

The Gorus (*N.G. 24, 24A,* and *24B*) are highly susceptible to leaf scald and gumming, and on this account, as well as owing to the fact that the cane is not satisfactory in returns unless cut at exactly the right time of year, it should be prohibited north of Townsville. It gives some good crops on the Burdekin, cut in September and October, and seems tolerably resistant to leaf stripe.

B. 208 should not be grown owing to its high susceptibility to all diseases. On the Burdekin it is badly affected with leaf stripe and mosaic, and when grown on the Herbert was wiped out by gum and mosaic. Moreover, it does not give a ratoon crop, and though it is a heavy plant cropper and has the highest density of any of our commercial canes is not nearly as payable a crop as Badila or Clark's Seedling, when taken over a period.

Q. 813 is a highly resistant variety to mosaic, gumming, and apparently to Fiji disease and leaf scald. Is a good cropper with good c.c.s., but being a shallow rooter does not do well on red soils or sandy soils, and is of little use where grubs are bad. In the North it is an early maturer, but matures later in the South and does not ratoon when cut too early. In North Queensland it should be planted late or it will grow too rank and lodge. It is fast replacing M. 1900 Seedling in Mackay, and does well south of this, but has only recently been tried farther north, and its capabilities are not known. It will not replace Badila on the better lands north of Mackay.

H.Q. 285 (Early maturer, Nerang, Mackay, Sarina, or Hambledon Seedling).—Appears to resist Fiji disease, but is very susceptible to mosaic and fairly so to gumming; is not grown north of Mackay as a commercial cane; it matures early and grows rapidly, giving good c.c.s. and good ratoons; might be useful at Mossman, though its resistance to leaf scald is not known.

7 R 428 (Pompey).—Very susceptible to gumming, Fiji disease, leaf scald, leaf stripe, and mosaic; is a good cropper, with a moderate density on poor soils. Owing to its high susceptibility it is not recommended, as better canes are available for this class of country.

E.K. 28 is susceptible to Fiji disease and mosaic and gum, but with care in planting gives a very heavy crop with a good density cut late in the year. In the North it should be planted late; ratoons strongly but strikes very slowly; is very erect in habit; should not be grown where gum or mosaic are bad; is suited to poor soils, and grows too rank on rich land.

5. Investigations into Diseases—*continued.*

M. 189 (Black Innes) is very highly susceptible to mosaic and gum and red rot; it should on no account be grown where these diseases are prevalent, and though an early maturer is undependable.

D. 1135.—Highly susceptible to gum, mosaic, Fiji disease, and leaf stripe; more resistant to leaf scald; is also susceptible to root troubles; is a deep rooter and resists grubs; gives good results at Mossman, but could be replaced by better canes there as elsewhere, except where grubs are bad.

M. 1900 S.—Highly susceptible to gumming, mosaic, Fiji disease, red rot, leaf scald, and root diseases; gives a heavy crop of high density cut late, but if it lodges the density falls rapidly; is not grown north of the Burdekin, but is one of the main canes farther south, where, except on the red soils, it is giving place to Q. 813.

Oramboo, Korpi, and Nanemo.—These canes are grown on the Herbert, where they seem to show good resistance to gumming. They should be introduced to the southern districts where gum is bad. They are known to be giving high c.c.s. at Mossman, and I suspect that Oramboo is an early maturer. If that is the case, it will solve a big problem in the Bundaberg district.

N.G. 16 is grown on the big plantations around Bundaberg, but is highly susceptible to gumming; gives a good c.c.s. late in the season, and is a two-year cane.

Of the other canes, *B. 147* and *Q. 855* seem rather resistant to gum, but are susceptible to mosaic and leaf stripe; both are good density canes late in the season.

Shajahanpur 10 should be ploughed out on all farms. It is 100 per cent. infected with mosaic, and merely serves to ruin good canes.

Varieties worth keeping in mind with regard to disease resistance as regards seedling raising are—

Gum.—Q. 116 and H.Q. 5, Malabar, and N.G. 14 as last resorts.

Mosaic.—H.Q. 5 and Uba.

Fiji Disease.—Uba.

In conclusion, I wish to thank the Director for his facilitation of my work and his advice, Mr. D. S. North for his kindly help and criticism, and to the Field Assistants for their ready co-operation. With regard to the latter, I wish to point out the value of their suggestions to the farmers in diseases, which have done untold good between the enforcedly infrequent visits of the Pathologist. Thanks are also due to the management of the various mills and to the farmers' executives for their co-operation and for their assistance to me in traversing the district, often at considerable inconvenience to themselves. I also wish to congratulate the C.S.R. on their organisation of disease control work, especially with regard to gumming at Ingham. They set an example to the other mills in the efficacy of plant control.

E. J. FERGUSON WOOD, B.Sc.

6.—Work of the Northern Sugar Experiment Station at South Johnstone.

This Station is situated on the banks of the South Johnstone River, on the opposite side to the South Johnstone Sugar Mill, and is at the foot of the Basilisk Range. The bank of the river is high, and the soil of a stiff clayey nature.

Mr. E. J. Barke is now Chemist in Charge. Mr. Barke was formerly Assistant Chemist at the Sugar Experiment Station at Mackay, and he was appointed to his present position on the 9th June of the present year.

Since taking over the care of the Station Mr. Barke has effected improvements in its working, having brought a knowledge of what is required from his past experience. The Station, office, and fields present a neat and attractive appearance, and Mr. Barke's work to date has been carried out in a highly satisfactory manner. The raising of seedlings at the South Johnstone Station is one of his most important duties, and this year the large number of 15,000 have been propagated—a greater quantity than raised in the whole period since the inception of the work in 1921. In this and laboratory work the Chemist in Charge is assisted by Mr. S. J. Kelly, who also looks after the weather data and the care of the tachinid parasites of the weevil borer. Mr. Kelly has carried out his work in a helpful manner.

The tables of crop and analytical results in the following section have been prepared by the Chemist in Charge, who has also supplied notes on growth and behaviour of the cane for the use of the Director.

METEOROLOGICAL.

The weather conditions during the period from September, 1926, to August, 1927, could be regarded as favourable for the growth of cane. The ratoons, autumn and spring plants, germinated well, and with the September rains in 1926 and humid conditions good growth was made. The rainfall was below the average in October and November, 1926, and the cane received a slight check; but with the good rains in December the cane made a quick recovery and was well advanced in January, 1927. On the 8th and 9th February this district was visited by a cyclonic disturbance, which caused damage to the more advanced canes, a number of which were blown down. Following the cyclone the growing conditions were very favourable till the end of June, and the rainfall was well distributed over this period.

6. Northern Sugar Experiment Station—*continued.*

The following are the rainfall records taken at this Station since 1919:—

Year.	Rainfall in Inches.
1919	97·61
1920	123·92
1921	202·52
1922	107·14
1923	84·78
1924	146·71
1925	118·94
1926	77·50
1927 (9 months) ..	116·24

Abstract of Meteorological Observations made at the Northern Sugar Experiment Station, South Johnstone, from 1st September, 1926, to 31st August, 1927—Covering Period of Growth of Experiment Canes.

Month.	Rainfall in Inches.	Number of Wet Days.	Average Rainfall, 7 Years, 1921-1927.	Highest Shade Maximum.	Lowest Shade Maximum.	Mean Shade Maximum.	Highest Shade Minimum.	Lowest Shade Minimum.	Mean Shade Minimum.	Lowest Terrestrial Minimum.	Mean Terrestrial Minimum.	Mean Diurnal Range.	Mean Temperature, 9 a.m.	Mean Relative Humidity of the Air, 9 a.m.
September, 1926 ..	10·13	21	4·74	88	76	80·9	70	57	64·8	51	59·1	16·1	74·9	81
October, 1926 ..	·33	1	2·79	91	82	86·9	71	52	61·8	46	56	25·1	79·3	66
November, 1926 ..	2·20	10	3·2	96	83	89·4	74	58	66·8	52	61	22·6	81·9	63
December, 1926 ..	7·30	15	9·67	96	86	87·5	74	63	67·5	56	61·9	20	81·9	67
January, 1927 ..	21·02	24	13·8	100	82	85·9	76	69	73	63	67·2	12·9	82·3	83
February, 1927 ..	41·56	21	22·55	95	76	86·5	79	65	71·7	59	66·4	14·8	80·3	82
March, 1927 ..	18·42	21	30·84	91	80	87·9	75	68	71·1	63	66·3	16·8	81·5	83
April, 1927 ..	13·42	16	15·19	87·9	78	83·6	73·5	61	67·4	†	†	16·2	76·2	86
May, 1927 ..	5·60	18	7·4	84·6	74·5	80·6	70·2	51	62·8	†	†	17·8	71·8	85
June, 1927 ..	8·75	18	7·32	84·5	70·9	77·7	69	54·5	63·1	†	†	14·6	70·2	85
July, 1927 ..	4·89	16	3·95	84	69	75·9	69·9	45	57·8	42·5	54·3	18·1	68·0	79
August, 1927 ..	·20	4	3·00	85	72·2	79·9	64·5	45·5	53·5	41	50·2	26·4	68·5	74
	133·82	185	124·45	..	..	..	..	..	..	..	..	..	..	*77·8

* Average. † Thermometer broken.

EXPERIMENTS DEALT WITH IN THIS SECTION OF THE REPORT.

(1) Conclusion of experiments in preparatory treatment of green manure to be followed by cane—Badila, second ratoons.

Plot 1—Land not subsoiled or fertilised, green manured.

Plot 2—Land subsoiled, no fertilisers, green manured.

Plot 3—Land not subsoiled but fertilised with 200 lb. meatworks and 100 lb. sulphate of potash per acre, green manured.

Plot 4—Land not subsoiled or fertilised, green manured.

(2) Conclusion of experiment in distance planting—Badila, third ratoons.

(3) Continuation of experiments with fertilisers—Badila, first ratoons.

(4) Experiments with Badila cane of which top plants, middle plants, and bottom plants were separately planted—Badila, plant cane.

(5) Experiments with fertilisers and methods of applying. Two series. Cane used, Badila, plant crop.

First Series—

Plot 1—No manure.

Plot 2—1,000 lb. superphosphate per acre applied in one dressing.

Plot 3—No manure.

Plot 4—1,000 lb. superphosphate per acre applied in three dressings, with intervals of seven weeks between the dressings.

Second Series—

Plot 1—1,000 lb. basic-superphosphate per acre applied in one dressing.

Plot 2—No manure.

Plot 3—1,000 lb. basic-superphosphate per acre applied in three dressings, with intervals of seven weeks between dressings.

(6) Competitive trials of selected seedlings.

(7) Analytical examination of seedling canes—Plant cane.

(8) Analytical examination of seedling canes—First ratoons.

(9) Analytical examination of Mauritius canes.

(1) Conclusion of Experiments in Preparatory Treatment of Green Manure to be followed by Cane—Badila, Second Ratoons.

Different treatment of land—

Plot 1—Land not subsoiled or fertilised, green manured.

Plot 2—Land subsoiled, no fertilisers, green manured.

Plot 3—Land not subsoiled but fertilised with 200 lb. meatworks and 100 lb. sulphate of potash per acre, green manured.

Plot 4—Land not subsoiled or fertilised, green manured.

The first ratoon crop was harvested on 15th September, 1926, and each plot was ratooned uniformly in the usual manner; the cane came

6. Northern Sugar Experiment Station—*continued.*

away with a strong growth and had a healthy appearance. The growth of the different plots was even in the early stages, and no difference was noticed until December, when plot 3 began to show up to advantage and continued so until the time of cutting. On 9th November, 1926, mixed manure was applied to the four plots at the following rate per acre:—100 lb. sulphate of ammonia, 100 lb. nitrate of soda, 100 lb. sulphate of potash, and 200 lb. meatworks.

The analytical and crop results are set out below—

Analytical Examination of Preparatory Treatment of Land for Green Manure followed by Cane—N.G. 15 (Badila)—2nd Ratoon Crop, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Fibre in Cane.	% Glucose in Juice.	% Sucrose in Cane.	% C.C.S. in Cane.
B2	1	N.G. 15 ..	Green manured. Not subsoiled. No fertiliser was applied to the plant crop. Fertiliser was applied to first and second ratoon crop	12 months	27 Sep.	22·6	21·24	93·9	9·5	0·42	18·16	17·35
B2	2	N.G. 15 ..	Green manured and subsoiled. No fertiliser was applied to the plant crop. Fertiliser was applied to first and second ratoon crop.	12 months	27 Sep.	22·6	21·19	93·8	9·5	0·38	18·12	17·29
B2	3	N.G. 15 ..	Not subsoiled. Fertiliser of following mixture applied to plot previous to sowing of green manure, namely:—200 lb. meatworks and 100 lb. sulphate of potash per acre. First and second ratoon crops were fertilised	12 months	27 Sep.	22·3	20·87	93·6	9·5	0·41	17·84	17·01
B2	4	N.G. 15 ..	Green manured. Not subsoiled. No fertiliser applied to plant crop. First and second ratoon crops were fertilised	12 months	27 Sep.	22·9	21·67	94·6	9·5	0·39	18·53	17·77

Crop Results of Preparatory Treatment of Land for Green Manure followed by Cane—N.G. 15 (Badila)—2nd Ratoon Crop, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Yield of Cane per Acre in English Tons.	Yield of Sugar per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
B2	1	N.G. 15 ..	Green manured. Not subsoiled. No fertiliser was applied to the plant crop. Fertiliser was applied to first and second ratoon crop	12 months	33·24	6·04	5·77
B2	2	N.G. 15 ..	Green manured and subsoiled. No fertiliser was applied to the plant crop. Fertiliser was applied to first and second ratoon crop	12 months	34·35	6·22	5·94
B2	3	N.G. 15 ..	Not subsoiled. Fertiliser of following mixture applied to plot previous to sowing of green manure, namely:—200 lb. meatworks and 100 lb. sulphate of potash per acre. First and second ratoon crops were fertilised	12 months	37·62	6·71	6·40
B2	4	N.G. 15 ..	Green manured. Not subsoiled. No fertiliser applied to plant crop. First and second ratoon crops were fertilised	12 months	31·61	5·86	5·62

6. Northern Sugar Experiment Station—*continued.*

Analytical Results to Date of Preparatory Treatment of Land for Green Manure followed by Cane—N.G. 15 (Badila)—2nd Ratoon Crop—September, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	% C.C.S. Plant Crop.	% C.C.S. First Ratoon Crop.	% C.C.S. Second Ratoon Crop.	Total Tons C.C.S. Three Crops.	Average C.C.S. Three Crops.
B2 ..	1	N.G. 15 ..	Green manured. Not subsoiled. No fertiliser was applied to the plant crop. Fertiliser was applied to first and second ratoon crop	13·31	16·42	17·35	18·74	15·58
B2 ..	2	N.G. 15 ..	Green manured and subsoiled. No fertiliser was applied to the plant crop. Fertiliser was applied to first and second ratoon crop	9·87	15·61	17·29	17·16	14·06
B2 ..	3	N.G. 15 ..	Not subsoiled. Fertiliser of following mixture applied to plot previous to sowing of green manure, namely:—200 lb. meatworks and 100 lb. sulphate of potash per acre. First and second ratoon crops were fertilised	14·30	16·59	17·01	19·74	15·92
B2 ..	4	N.G. 15 ..	Green manured. Not subsoiled. No fertiliser applied to plant crop. First and second ratoon crops were fertilised	15·93	16·89	17·77	19·34	16·79

Crop Results to Date of Preparatory Treatment of Land for Green Manure followed by Cane—N.G. 15 (Badila)—September 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Plant Crop, 1925—Age 14 Months.		First Ratoon Crop, 1926—Age 12 Months.		Second Ratoon Crop, 1927—Age 12 Months.		Total Results for Three Crops.		Average for Three Crops.	
				Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons	Yield of Commercial Cane Sugar per Acre in English Tons
B2	1	N.G. 15 ..	Green manured. Not subsoiled. No fertiliser was applied to the plant crop. Fertiliser was applied to first and second ratoon crop	42·11	5·6	44·88	7·37	33·24	5·77	120·23	18·74	40·08	6·24
B2	2	N.G. 15 ..	Green manured and subsoiled. No fertiliser was applied to the plant crop. Fertiliser was applied to the first and second ratoon crop	43·02	4·25	44·65	6·97	34·35	5·94	122·02	17·16	40·67	5·72
B2	3	N.G. 15 ..	Not subsoiled. Fertiliser of following mixture applied to plot previous to sowing of green manure:—200 lb. meatworks and 100 lb. sulphate of potash per acre. First and second ratoon crops were fertilised	43·52	6·22	42·93	7·12	37·62	6·40	124·07	19·74	41·36	6·58
B2	4	N.G. 15 ..	Green manured. Not subsoiled. No fertiliser was applied to plant crop. First and second ratoon crops were fertilised	40·88	6·51	42·7	7·21	31·61	5·62	115·19	19·34	38·40	6·45

6. Northern Sugar Experiment Station—*continued.*

Plots 2 and 3 have given the best results in the second ratoon crop. The average crop results, however, show very little advantage from the different methods of treatment of the green manure, but are uniformly satisfactory from a tonnage point of view.

This experiment is now concluded.

(2) Distance Experiments—Third Ratoon Crop (Badila)—Conclusion.

Series No. 1—

Rows 5 feet apart and plants spaced 12 inches—
Plants per acre .. 5,090
Eyes per acre .. 18,230

Rows 6 feet apart and plants spaced 12 inches—
Plants per acre .. 4,200
Eyes per acre .. 15,060

Rows 7 feet apart and plants spaced 12 inches—
Plants per acre .. 3,608
Eyes per acre .. 12,938

Series No. 2—

Rows 5 feet apart and plants spaced 6 inches—
Plants per acre .. 6,640
Eyes per acre .. 20,938

Rows 5 feet apart and plants spaced 12 inches—
Plants per acre .. 4,910
Eyes per acre .. 18,410

Rows 5 feet apart and plants spaced 2 feet—
Plants per acre .. 3,177
Eyes per acre .. 9,710

Series No. 3—

Rows 7 feet apart and plants spaced 36 inches—
Plants per acre .. 1,675
Eyes per acre .. 5,386

Confirmation of previous experiments carried out at the Mackay Sugar Experiment Station some years ago was sought on the South Johnstone lands, or whether wider planting would prove of greater advantage.

The results of the plant, first, and second ratoon crops have already been published in the three preceding reports.

After harvesting the second ratoon crop on 24th September, 1926, each plot was ratooned in the usual method, and the cane came away well. On the 10th November, 1926, mixed fertiliser was applied to each plot, at the following rate per acre:—150 lb. sulphate of ammonia, 100 lb. nitrate of soda, 100 lb. sulphate of potash, and 250 lb. meatworks. The ratoons of all the plots came away well and were fairly even in growth until December, 1926, when Plots 1 and 2 of the second series began to show more forward growth. The other plots were even in growth, with the exception of Plot 1 of the third series, which was the most backward of the various plots. The growth of the cane on the different plots continued in this order, as will be seen from the tables of crop results which, with the analytical examinations, are given below:—

Analytical Examination of Experiments in Distance Plantings, using the Variety N.G. 15 (Badila)—3rd Ratoon Crop—September, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Fibre.	% Glucose in Juice.	% Sucrose in Cane.	% C.C.S. in Cane.
First Series, Plants 12 inches apart.												
A2	1	N.G. 15 ..	Rows 5 feet apart and plants spaced 12 inches Plants per acre, 5,090 Eyes per acre, 18,230	12 months	27 Sep.	22·4	21·14	94·4	9·5	0·39	18·07	17·31
A2	2	N.G. 15 ..	Rows 6 feet apart and plants spaced 12 inches Plants per acre, 4,200 Eyes per acre, 15,060	12 months	27 Sep.	22·8	21·65	94·9	9·5	0·39	18·51	17·79
A2	3	N.G. 15 ..	Rows 7 feet apart and plants spaced 12 inches Plants per acre, 3,608 Eyes per acre, 12,938	12 months	27 Sep.	22·1	20·80	94·1	9·5	0·39	17·78	17·01

6. Northern Sugar Experiment Station—*continued.*

Analytical Examination of Experiments in Distance Plantings, using the Variety N.G. 15 (Badila)—3rd Ratoon Crop—September, 1927—*continued.*

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Brix of Juice	% Sucrose in Juice.	Purity of Juice.	%, Fibre.	% Glucose in Juice.	% Sucrose in Cane.	% C.C.S. in Cane.
			Second Series, Rows 5 feet apart.									
A2	1	N.G. 15 ..	Rows 5 feet apart and plants spaced 6 inches Plants per acre, 6,640 Eyes per acre, 20,938	12 months	27 Sep.	22·4	21·22	94·7	9·5	0·34	18·14	17·41
A2	2	N.G. 15 ..	Rows 5 feet apart and plants spaced 12 inches Plants per acre, 4,910 Eyes per acre, 18,410	12 months	27 Sep.	22·1	20·78	94·0	9·5	0·40	17·77	16·98
A2	3	N.G. 15 ..	Rows 5 feet apart and plants spaced 2 feet Plants per acre, 3,177 Eyes per acre, 9,710	12 months	27 Sep.	22·7	21·49	94·7	9·5	0·35	18·37	17·63
			Third Series, Rows 7 feet apart, Plants 3 feet apart.									
A2	1	N.G. 15 ..	Rows 7 feet apart and plants spaced 36 inches Plants per acre, 1,675 Eyes per acre, 5,386	12 months	27 Sep.	21·9	20·61	94·1	9·5	0·39	17·62	16·85

Crop Results of Experiments in Distance Plantings, using the Variety N.G. 15 (Badila)—3rd Ratoon Crop—September, 1927.

Division	Plot Number.	Method of Planting.	Age of Cane.	Yield of Cane per Acre in English Tons.	Total Yield of Sugar per Acre in English Tons.	Total Yield of Commercial Cane Sugar per Acre in English Tons.
		First Series, Plants 12 inches apart.				
A2	1	Rows 5 feet apart and plants spaced 12 inches .. .. Plants per acre, 5,090. Eyes per acre, 18,230.	12 months	36·28	6·55	6·28
A2	2	Rows 6 feet apart and plants spaced 12 inches .. .. Plants per acre, 4,200. Eyes per acre, 15,060.	12 months	35·85	6·63	6·38
A2	3	Rows 7 feet apart and plants spaced 12 inches .. .. Plants per acre, 3,608. Eyes per acre, 12,938.	12 months	32·99	5·86	5·61
		Second Series, Rows 5 feet apart.				
A2	1	Rows 5 feet apart and plants spaced 6 inches .. .. Plants per acre, 6,640. Eyes per acre, 20,938.	12 months	39·12	7·09	6·81
A2	2	Rows 5 feet apart and plants spaced 12 inches .. .. Plants per acre, 4,910. Eyes per acre, 18,410.	12 months	39·48	7·01	6·70
A2	3	Rows 5 feet apart and plants spaced 2 feet .. .. Plants per acre, 3,177. Eyes per acre, 9,710.	12 months	35·42	6·51	6·24
		Third Series, Rows 7 feet apart, Plants 36 inches apart.				
A2	1	Rows 7 feet apart and plants spaced 36 inches .. .. Plants per acre, 1,675. Eyes per acre, 5,386.	12 months	31·28	5·51	5·27

Northern Sugar Experiment Station– *continued.*

The crop results as shown above are remarkably good for a third ratoon crop. Beneath are presented the analytical and crop results to date :—

Analytical Results to Date of Experiments in Distance Plantings, using the Variety N.G. 15 (Badila).

Division.	Plot Number.	Method of Planting.	% C.C.S. Plant Crop.	% C.C.S. First Ratoon Crop.	% C.C.S. Second Ratoon Crop.	% C.C.S. Third Ratoon Crop.	Total Tons C.C.S.— Four Crops.	Average C.C.S.— Four Crops.
		First Series, Plants 12 inches apart.						
A2	1	Rows 5 feet apart and plants spaced 12 inches .. Plants per acre, 5,090. Eyes per acre, 18,230.	14·40	15·03	15·84	17·31	24·74	15·59
A2	2	Rows 6 feet apart and plants spaced 12 inches .. Plants per acre, 4,200. Eyes per acre, 15,060.	14·54	14·26	16·63	17·79	25·54	15·75
A2	3	Rows 7 feet apart and plants spaced 12 inches .. Plants per acre, 3,608. Eyes per acre, 12,938.	14·20	14·10	15·97	17·01	23·65	15·26
		Second Series, Rows 5 feet apart.						
A2	1	Rows 5 feet apart and plants spaced 6 inches .. Plants per acre, 6,640. Eyes per acre, 20,938.	14·52	15·31	16·19	17·41	26·69	15·83
A2	2	Rows 5 feet apart and plants spaced 12 inches .. Plants per acre, 4,910. Eyes per acre, 18,410.	14·52	16·64	16·42	16·98	27·56	16·20
A2	3	Rows 5 feet apart and plants spaced 2 feet .. Plants per acre, 3,177. Eyes per acre, 9,710.	14·60	15·19	16·32	17·63	24·88	15·94
		Third Series, Rows 7 feet apart, Plants 3 feet apart.						
A2	1	Rows 7 feet apart and plants spaced 36 inches .. Plants per acre, 1,675. Eyes per acre, 5,386.	15·19	14·44	15·82	16·85	22·58	15·50

Crop Results to Date of Experiments in Distance Plantings, using the Variety N.G. 15 (Badila).

Division.	Plot Number.	Method of Planting.	Plant Crop, 1924. Age 13 Months.		First Ratoon Crop, 1925. Age 12 Months.		Second Ratoon Crop, 1926. Age 12 Months.		Third Ratoon Crop, 1927. Age 12 Months.		Total Results for Four Crops.		Average for Four Crops.	
			Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per acre in English Tons.	Yield of Commercial Cane Sugar per acre in English Tons.
		First Series, Plants 12 inches apart.												
A2	1	Rows 5 feet apart and plants spaced 12 inches Plants per acre, 5,090. Eyes per acre, 18,230.	41·23	5·94	41·95	6·3	39·3	5·42	36·28	6·28	158·75	24·74	39·69	6·18
A2	2	Rows 6 feet apart and plants spaced 12 inches Plants per acre, 4,200. Eyes per acre, 15,060.	37·31	5·42	44·67	6·37	44·26	7·46	35·85	6·33	162·09	25·54	40·52	6·38
A2	3	Rows 7 feet apart and plants spaced 12 inches Plants per acre, 3,608. Eyes per acre, 12,938.	37·46	5·32	41·62	5·86	42·88	6·85	32·09	5·61	154·05	23·65	38·74	5·91
		Second Series, Rows 5 feet apart.												
A2	1	Rows 5 feet apart and plants spaced 6 inches Plants per acre, 6,640. Eyes per acre, 20,938.	40·15	5·93	46·9	7·18	42·49	6·98	35·12	6·81	168·66	26·69	42·16	6·67
A2	2	Rows 5 feet apart and plants spaced 12 inches Plants per acre, 4,910. Eyes per acre, 18,410.	36·37	5·23	47·7	7·04	46·62	7·65	39·48	6·76	170·17	27·56	42·54	6·89
A2	3	Rows 5 feet apart and plants spaced 2 feet Plants per acre, 3,177. Eyes per acre, 9,710.	32·49	4·74	44·28	6·73	43·93	7·17	35·42	6·24	156·12	24·88	39·03	6·22
		Third Series, 7 feet apart, Plants 36 inches apart.												
A2	1	Rows 7 feet apart and plants spaced 36 inches Plants per acre, 1,675. Eyes per acre, 5,386.	31·22	4·74	42·68	6·56	40·46	6·4	30·28	5·27	145·64	23·58	36·41	5·64

6. Northern Sugar Experiment Station—*continued.*

From the results of previous experiments of this nature at Mackay the close planting was the best, but at the time it was pointed out that these conditions might not apply in more northern latitudes, where, with heavy rainfalls and moist conditions, smaller distances between the plants might not be so advisable, and where thick standing crops which go down might lose some of their tonnage.

From the totals and average crop results shown above it will be seen that this has been borne out to some extent, and that somewhat wider distances than 5 feet between the rows and 6 inches between the plants in the rows would be of advantage. It is obvious, however, from the results that this must not be overdone, and a safe practice would be to place the plants not more or less than 12 inches apart in the rows which could be 5 or 6 feet apart.

This experiment is now concluded.

(3) Fertilising Experiment—Badila, First Ratoons.

The object of this experiment was to test the action of mixed manures as against single fertilisers such as nitrogen, potash, and phosphoric acid.

The plant crop was harvested on the 3rd September, 1926, and each plot uniformly ratooned; the cane came away well and made good growth.

In November, 1926, an application of manure was made at the following rate per acre:—

Plot 1—500 lb. basic superphosphate per acre.

Plot 2—500 lb. meatworks per acre.

Plot 3—500 lb. mixed manure, containing 200 lb. nitrate of soda, 100 lb. sulphate of potash, and 200 lb. basic superphosphate per acre.

Plot 4—No manure.

Plot 5—500 lb. sulphate of potash per acre.

Plot 6—500 lb. mixed manure, containing 250 lb. sulphate of ammonia and 250 lb. nitrate of soda.

On 23rd November, 1926, Plots 3 and 5 were showing an average of 4 inches more growth than Plots 1, 2, and 6, while Plot 4 was the most backward and did not have the healthy appearance of the other plots. On 15th January, 1927, the advanced growth of Plots 3 and 5 was more marked, and had the advantage of 6 inches in height over Plots 1, 2, and 6, which appeared even, while the unmanured plot was backward and had a stunted appearance.

The weighing of Plot 6, however, at time of harvest was somewhat better than Plot 5.

The analytical and crop results of the first ratoons are set out below—

Analytical Examination of Plots in Fertiliser Experiments, N.G. 15 (Badila)—1st Ratoon Crop—September, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Fibre.	% Glucose in Juice.	% Sucrose in Cane	% C.C.S. in Cane.
B4	1	N.G. 15 ..	Fertiliser applied as follows:—500 lb. basic superphosphate per acre	12 months	27 Sep.	22·2	20·93	94·3	9·5	0·38	17·89	17·15
B4	2	N.G. 15 ..	Fertiliser applied as follows:—500 lb. meatworks per acre	12 months	27 Sep.	21·9	20·51	93·6	9·5	0·42	17·54	16·74
B4	3	N.G. 15 ..	Fertiliser applied as follows:—200 lb. nitrate of soda, 100 lb. sulphate of potash, and 200 lb. basic superphosphate per acre	12 months	27 Sep.	23·4	20·99	89·7	9·5	0·66	17·95	16·70
B4	4	N.G. 15 ..	No manure	12 months	27 Sep.	23·0	18·93	82·3	9·5	1·33	16·18	14·23
B4	5	N.G. 15 ..	Fertiliser applied as follows:—500 lb. sulphate of potash per acre	12 months	27 Sep.	22·6	21·09	93·3	9·5	0·32	18·03	17·18
B4	6	N.G. 15 ..	Fertiliser applied as follows:—250 lb. sulphate of ammonia and 250 lb. nitrate of soda per acre	12 months	27 Sep.	20·5	18·49	90·2	9·5	0·79	15·81	14·76

6. Northern Sugar Experiment Station—*continued.*

Crop Results of Plots in Fertiliser Experiments, N.G. 15 (Badila)—1st Ratoon Crop—September, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Yield of Cane per Acre in English Tons.	Yield of Sugar per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
B4	1	N.G. 15 ..	Fertiliser applied as follows :—500 lb. basic superphosphate per acre	12 months	42·42	7·59	7·27
B4	2	N.G. 15 ..	Fertiliser applied as follows :—500 lb. meatworks per acre	12 months	43·77	7·68	7·33
B4	3	N.G. 15 ..	Fertiliser applied as follows :—200 lb. nitrate of soda, 100 lb. sulphate of potash, and 200 lb. basic superphosphate per acre	12 months	46·34	8·32	7·74
B4	4	N.G. 15 ..	No manure	12 months	35·71	5·78	5·08
B4	5	N.G. 15 ..	Fertiliser applied as follows :—500 lb. sulphate of potash per acre	12 months	44·95	8·10	7·72
B4	6	N.G. 15 ..	Fertiliser applied as follows :—250 lb. sulphate of ammonia and 250 lb. nitrate of soda per acre	12 months	45·30	7·16	6·69

The crop results to date are also furnished—

Crop Results to Date of Plots in Fertiliser Experiments, N.G. 15 (Badila)—September, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Plant Crop, 1926—Age 12 Months.		First Ratoon Crop, 1927—Age 12 Months.		Average for Two Crops.	
				Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
B4	1	N.G. 15 ..	Fertiliser applied as follows :—500 lb. basic superphosphate per acre	41·59	7·52	42·42	7·27	42·00	7·40
B4	2	N.G. 15 ..	Fertiliser applied as follows :—500 lb. meatworks per acre	42·94	7·05	43·77	7·33	43·35	7·19
B4	3	N.G. 15 ..	Fertiliser applied as follows :—200 lb. nitrate of soda, 100 lb. sulphate of potash, and 200 lb. basic superphosphate per acre	39·54	6·59	46·34	7·74	42·94	7·17
B4	4	N.G. 15 ..	No manure	42·72	7·02	35·71	5·08	39·21	6·05
B4	5	N.G. 15 ..	Fertiliser applied as follows :—500 lb. sulphate of potash per acre	43·51	7·42	44·95	7·72	44·23	7·57
B4	6	N.G. 15 ..	Fertiliser applied as follows :—250 lb. sulphate of ammonia and 250 lb. nitrate of soda per acre	41·24	7·06	45·30	6·69	43·27	6·87

From the above table of the average of the plant and first ratoon crops the sulphate of potash appears to have given the best results to date, but the results of all the manured plots are fairly close.

(4) Experiments with Badila Cane of which the Top Plants, Middle Plants, and Bottom Plants were separately planted—Badila, Plant Crop.

In preparing the land for this experiment the old stools of the previous crop were ploughed out in November, 1925, and harrowed; the block was sown with cowpea at the rate of one bushel per acre on 17th December. The cowpea germinated well, and a good crop of green manure was ploughed under on the 16th March, 1926. After receiving two cross ploughings and harrowings, the plots were laid out and planted in August. The plants germinated well with the top and bottom plants showing to slight advantage. On 12th November mixed fertiliser was applied to all the plots at the following rate per acre:—150 lb. sulphate of ammonia, 50 lb. nitrate of soda, 100 lb. sulphate of potash, and 300 lb. meatworks. On 20th December the bottom plants were showing the most advanced growth, with the top plants more forward than those of the middles. This order continued up to the time of harvesting.

6. Northern Sugar Experiment Station—*continued.*

The analytical and crop results are given below—

Analytical Examination of Experiments with Badila Cane, of which Top Plants, Middle Plants, and Bottom Plants were separately Planted—Plant Crop—September, 1927.

Division.	Plot Number.	Seed Used.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	Commercial Cane Sugar in Cane.
A1	1	Plants from bottom of sticks ..	13 months	29–9–27	21·6	20·09	0·39	93·0	17·08	16·22
A1	2	Plants from middle of sticks ..	13 months	29–9–27	21·7	20·36	0·33	93·7	17·31	16·52
A1	3	Plants from top of sticks	13 months	29–9–27	21·7	20·26	0·36	93·3	17·18	16·39

Crop Results of Experiments with Badila Cane, of which Top Plants, Middle Plants, and Bottom Plants were separately Planted—Plant Crop—September 1927.

Division.	Plot Number.	Seed Used.	Age of Cane.	Yield of Cane per Acre in English Tons.	Total Yield of Sugar per Acre in English Tons.	Total Yield of Commercial Cane Sugar per Acre in English Tons.
A1 ..	1	Plants from bottom of sticks	13 months	43·56	7·44	7·06
A1 ..	2	Plants from middle of sticks	13 months	38·65	6·69	6·38
A1 ..	3	Plants from top of sticks	13 months	39·21	6·74	6·43

At one time bottom plants were not considered to be at all satisfactory, but experimentation during the last ten years has shown that they frequently germinate as well if not better than top plants. The middle portion of the stick seems to be the weakest as a rule.

(5) Experiments with Fertilisers using heavy dressings of Superphosphate and Basic Superphosphate in one and three dressings —Badila, Plant Crop.

The land for this experiment was prepared by sowing with cowpea at the rate of one bushel per acre on 17th December, 1925, ploughing under on 6th March, 1926, and allowing the green manure to decay. The field then received two cross ploughings and harrowings and was planted in August, 1926. This experiment was divided into two series and the different treatment of the various plots was as follows:—

First Series—

Plot 1—No manure.

Plot 2—1,000 lb. of superphosphate per acre, applied in one dressing.

Plot 3—No manure.

Plot 4—1,000 lb. of superphosphate per acre, applied in three dressings with intervals of seven weeks between dressings.

Second Series—

Plot 1—1,000 lb. of basic superphosphate per acre, applied in one dressing.

Plot 2—No manure.

Plot 3—1,000 lb. of basic superphosphate per acre, applied in three dressings with intervals of seven weeks between dressings.

A good strike was secured from all the plots and little difference was noticed until November, 1926, when Plot 4 of the first series and Plot 1 of the second series showed a slight advantage. Plot 3 of the first series had a slightly stunted appearance and showed to least advantage.

The analytical and crop results are set out hereunder:—

Analytical Examination of Experiments with Different Fertilisers and Methods of Applying—N.G. 15 (Badila)—Plant Crop—September, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Fibre.	% Glucose in Juice.	% Sucrose in Cane.	% C.C.S. in Cane.
					First Series.							
A1	1	N.G. 15 ..	No manure	13 months	30-9-27	22·2	20·94	94·3	9·4	0·33	17·90	17·14
A1	2	N.G. 15 ..	1,000 lb. of superphosphate per acre, applied in one dressing	13 months	30-9-27	22·3	21·21	95·1	9·4	0·31	18·15	17·45
A1	3	N.G. 15 ..	No manure	13 months	30-9-27	22·6	21·23	93·9	9·4	0·34	18·17	17·34
A1	4	N.G. 15 ..	1,000 lb. of superphosphate per acre, applied in three dressings with intervals of seven weeks between dressings	13 months	30-9-27	22·1	20·82	94·2	9·4	0·33	17·82	17·03

6. Northern Sugar Experiment Station—*continued.*

Analytical Examination of Experiments with Different Fertilisers and Methods of Applying—N.G. 15 (Badila)—Plant Crop—September, 1927—*continued.*

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Fibre.	% Glucose in Juice.	% Sucrose in Cane.	% C.C.S. in Cane.
				Second Series.								
A1	1	N.G. 15 ..	1,000 lb. of basic superphosphate per acre, applied in one dressing	13 months	30-9-27	22·4	21·07	94·1	9·4	0·31	18·03	17·22
A1	2	N.G. 15 ..	No manure	13 months	30-9-27	21·4	19·71	92·1	9·4	0·52	16·87	15·92
A1	3	N.G. 15 ..	1,000 lb. of basic superphosphate per acre, applied in three dressings, with intervals of seven weeks between dressings	13 months	30-9-27	21·7	20·26	93·4	9·4	0·48	17·34	16·49

Crop Results of Experiments with Different Fertilisers and Methods of Applying—N.G. 15 (Badila)—Plant Crop—September, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Yield of Cane per Acre in English Tons.	Yield of Sugar per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
			First Series.				
A1	1	N.G. 15 ..	No manure	13 months	28·31	5·07	4·85
A1	2	N.G. 15 ..	1,000 lb. of superphosphate per acre, applied in one dressing	13 months	28·12	5·10	4·91
A1	3	N.G. 15 ..	No manure	13 months	26·58	4·83	4·61
A1	4	N.G. 15 ..	1,000 lb. of superphosphate per acre, applied in three dressings, with intervals of seven weeks between dressings	13 months	30·41	5·42	5·18
			Second Series.				
A1	1	N.G. 15 ..	1,000 lb. of basic superphosphate per acre, applied in one dressing	13 months	32·53	5·86	5·60
A1	2	N.G. 15 ..	No manure	13 months	28·12	4·74	4·48
A1	3	N.G. 15 ..	1,000 lb. of basic superphosphate per acre, applied in three dressings, with intervals of seven weeks between dressings	13 months	28·37	4·92	4·68

The reason for undertaking the above experiment was due to the fact that it was known that certain poor patches of soil existed in this division, and it was thought by the chemists that the application of large dressings of phosphates might assist in overcoming this inferiority. The results are, however, not wholly consistent, as in the first series the application of superphosphate in three dressings gives the best results, while in the second series it is the application of basic superphosphate in one dressing that has done so. Averaging the phosphate plots with those on which no phosphate was applied, we get the following figures:—

Phosphate applied—29·81 tons per acre.

No phosphate—27·61 tons per acre.

The results are scarcely payable, but the ratoon crop may show more marked results.

(6) Competitive Trials with South Johnstone Seedling Canes—Plant Cane.

The land was prepared for these trials by planting with cowpea at the rate of one bushel per acre in November, 1925, and ploughing under on 22nd February, 1926. The cowpea was allowed to rot, and after two cross ploughings and harrowings, forty-four plots were laid out and planted with selected South Johnstone seedling canes on 18th August, 1926. All the

6. Northern Sugar Experiment Station—*continued.*

canes germinated well and came away with a vigorous and healthy appearance. On 17th November, 1926, mixed fertiliser was applied at the following rate per acre:—100 lb. sulphate of ammonia, 100 lb. nitrate of soda, 100 lb. sulphate of potash, and 200 lb. meatworks.

Below are presented the preliminary, first progressive, and final analytical tables of these seedling varieties. From the final table it will be seen that several of these are of promise, while at Mackay several of the selected seedlings have given even better results.

Preliminary Analytical Examination of Competitive Trials with South Johnstone Seedling Canes—Plant Crop—July, 1927.

Seedling Number.	Month of Analysis.	Age of Cane.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane	% C.C.S. in Cane.	Variety from which Seed was taken.
S.J.Q. 2 ..	July	10 months	16·7	12·88	77·1	10·95	9·15	N.G. 15 (Badila)
S.J.Q. 3 ..	July	10 months	16·9	14·44	85·4	12·27	11·10	N.G. 15 (Badila)
S.J.Q. 4 ..	July	10 months	15·2	11·81	77·7	10·04	8·40	N.G. 15 (Badila)
S.J.Q. 5 ..	July	10 months	17·1	13·49	78·9	11·47	9·80	N.G. 15 (Badila)
S.J.Q. 7 ..	July	10 months	17·4	15·76	90·6	13·40	12·50	N.G. 15 (Badila)
S.J.Q. 9 ..	July	10 months	14·0	9·53	68·1	8·10	6·60	N.G. 15 (Badila)
S.J.Q. 12 ..	July	10 months	15·1	10·64	70·5	9·04	7·40	N. G.15 (Badila)
S.J.Q. 15 ..	July	10 months	16·9	14·37	85·0	12·21	11·00	N.G. 15 (Badila)
S.J.Q. 16 ..	July	10 months	16·1	14·35	89·1	12·20	11·30	N.G. 15 (Badila)
S.J.Q. 17 ..	July	10 months	17·9	15·71	87·8	13·35	12·20	N.G. 15 (Badila)
S.J.Q. 19 ..	July	10 months	15·7	11·63	74·1	9·88	8·00	N.G. 15 (Badila)
S.J.Q. 20 ..	July	10 months	14·8	11·05	74·7	9·39	7·65	N.G. 15 (Badila)
S.J.Q. 21 ..	July	10 months	16·4	14·12	86·1	12·00	10·90	N.G. 15 (Badila)
S.J.Q. 25 ..	July	10 months	14·7	10·52	71·6	8·94	7·00	N.G. 15 (Badila)
S.J.Q. 26 ..	July	10 months	14·8	11·73	79·2	9·97	8·50	N.G. 24 (Goru)
S.J.Q. 28 ..	July	10 months	15·1	11·73	77·7	9·97	8·40	N.G. 24 (Goru)
S.J.Q. 31 ..	July	10 months	15·5	12·33	79·5	10·48	9·00	Q. 903
S.J.Q. 41 ..	July	10 months	15·6	12·91	82·7	10·97	9·70	N.G. 16
S.J.Q. 44 ..	July	10 months	14·7	10·13	68·9	8·61	6·50	N.G. 16
S.J.Q. 45 ..	July	10 months	17·6	13·83	78·6	11·75	10·00	H.Q. 77
S.J.Q. 46 ..	July	10 months	14·8	11·81	79·8	10·04	8·60	H.Q. 77
S.J.Q. 48 ..	July	10 months	14·8	10·23	69·1	8·69	6·60	H.Q. 77
S.J.Q. 49 ..	July	10 months	17·2	14·34	83·4	12·19	10·80	H.Q. 77
S.J.Q. 51 ..	July	10 months	14·4	10·42	72·4	8·86	7·00	H.Q. 77
S.J.Q. 53 ..	July	10 months	16·4	13·46	82·1	11·44	10·00	H.Q. 77
S.J.Q. 54 ..	July	10 months	14·4	11·41	79·2	9·70	8·30	E.K. 28
S.J.Q. 55 ..	July	10 months	17·2	14·38	83·6	12·22	10·85	E.K. 28
S.J.Q. 58 ..	July	10 months	15·7	12·93	82·3	10·99	9·60	H. 109
S.J.Q. 60 ..	July	10 months	17·0	14·85	87·3	12·62	11·50	H. 109
S.J.Q. 64 ..	July	10 months	15·4	11·51	74·7	9·78	8·00	N.G. 15 (Badila)
S.J.Q. 70 ..	July	10 months	14·3	11·71	81·9	9·95	8·70	N.G. 15 (Badila)
S.J.Q. 77 ..	July	10 months	15·3	11·10	72·5	9·43	7·50	N.G. 15 (Badila)
S.J.Q. 91 ..	July	10 months	16·6	13·71	82·6	11·65	10·25	Q. 903
S.J.Q. 112 ..	July	10 months	16·8	14·56	86·7	12·38	11·25	N.G. 16
S.J.Q. 137 ..	July	10 months	17·1	14·29	83·6	12·15	10·80	H.Q. 77
S.J.Q. 174 ..	July	10 months	16.2	13·18	81·3	11·20	9·75	E.K. 28
S.J.Q. 301 ..	July	10 months	16·7	13·78	82·5	11·71	10·30	Q. 903
S.J.Q. 312 ..	July	10 months	16·3	13·25	81·3	11·26	9·80	N.G. 102
S.J.Q. 318 ..	July	10 months	15·1	11·17	74·0	9·49	7·70	N.G. 102
S.J.Q. 319 ..	July	10 months	16·2	12·30	75·9	10·45	8·60	N.G. 102
S.J.Q. 329 ..	July	10 months	16·6	12·74	76·7	10·83	9·00	N.G. 102
S.J.Q. 344 ..	July	10 months	17·5	14·89	85·1	12·66	11·40	7R. 428
S.J.Q. 468 ..	July	10 months	14·7	11·05	75·2	9·39	7·70	N.G. 24 (Goru)

First Progressive Analytical Examination of Competitive Trials with South Johnstone Seedling Canes—Plant Crop—August, 1927.

Seedling Number.	Month of Analysis.	Age of Cane.	Brix of Juice	% Sucrose in Juice.	Purity of Juice	% Sucrose in Cane.	% C.C.S. in Cane.	Variety from which Seed was taken.
S.J.Q. 2 ..	August ..	11 months	19·7	18·08	91·8	15·37	14·5	N.G. 15 (Badila)
S.J.Q. 3 ..	August ..	11 months	19·8	18·30	92·4	15·55	14·7	N.G. 15 (Badila)
S.J.Q. 4 ..	August ..	11 months	18·5	16·16	87·3	13·74	12·55	N.G. 15 (Badila)
S.J.Q. 5 ..	August ..	11 months	18·2	15·70	86·3	13·34	12·1	N.G. 15 (Badila)
S.J.Q. 7 ..	August ..	11 months	19·8	17·13	86·5	14·56	13·2	N.G. 15 (Badila)
S.J.Q. 9 ..	August ..	11 months	16·3	13·18	80·9	11·20	9·7	N.G. 15 (Badila)
S.J.Q. 12 ..	August ..	11 months	16·0	12·34	77·1	10·49	8·8	N.G. 15 (Badila)
S.J.Q. 15 ..	August ..	11 months	19·4	17·23	88·8	14·64	13·5	N.G. 15 (Badila)
S.J.Q. 16 ..	August ..	11 months	17·2	15·71	91·3	13·35	12·5	N.G. 15 (Badila)
S.J.Q. 17 ..	August ..	11 months	18·0	15·51	86·2	13·18	11·9	N.G. 15 (Badila)
S.J.Q. 19 ..	August ..	11 months	17·1	13·78	80·6	11·71	10·1	N.G. 15 (Badila)
S.J.Q. 20 ..	August ..	11 months	18·2	15·65	85·9	13·30	12.0	N.G. 15 (Badila)
S.J.Q. 21 ..	August ..	11 months	17·9	15·37	85·9	13·06	11·8	N.G. 15 (Badila)
S.J.Q. 25 ..	August ..	11 months	17·8	14·82	83·2	12·60	11·15	N.G. 15 (Badila)

6. Northern Sugar Experiment Station—*continued.*

First Progressive Analytical Examination of Competitive Trials with South Johnstone Seedling Canes—Plant Crop—August, 1927—*continued.*

Seedling Number.	Month of Analysis.	Age of Cane.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.	Variety from which Seed was taken.
S.J.Q. 26 ..	August ..	11 months	16·3	13·56	83·2	11·53	10·2	N.G. 24 (Goru)
S.J.Q. 28 ..	August ..	11 months	18·1	15·96	88·2	13·57	12·5	N.G. 24 (Goru)
S.J.Q. 31 ..	August ..	11 months	18·0	16·20	90·0	13·77	12·8	Q. 903
S.J.Q. 41 ..	August ..	11 months	18·5	16·72	90·4	14·21	13·3	N.G. 16
S.J.Q. 44 ..	August ..	11 months	17·9	15·79	88·2	13·42	12·3	N.G. 16
S.J.Q. 45 ..	August ..	11 months	18·7	15·25	81·5	12·96	11·3	H.Q. 77
S.J.Q. 46 ..	August ..	11 months	15·7	12·74	81·1	10·83	9·4	H.Q. 77
S.J.Q. 48 ..	August ..	11 months	16·7	12·63	75·6	10·73	8·8	H.Q. 77
S.J.Q. 49 ..	August ..	11 months	18·1	15·53	85·8	13·20	11·9	H.Q. 77
S.J.Q. 51 ..	August ..	11 months	16·6	13·47	81·1	11·45	9·95	H.Q. 77
S.J.Q. 53 ..	August ..	11 months	16·5	12·64	76·6	10·74	8·9	H.Q. 77
S.J.Q. 54 ..	August ..	11 months	16·8	14·71	87·5	12·50	11·4	E.K. 28
S.J.Q. 55 ..	August ..	11 months	17·7	15·29	86·4	13·00	11·8	E.K. 28
S.J.Q. 58 ..	August ..	11 months	18·2	16·68	91·6	14·18	13·35	H. 109
S.J.Q. 60 ..	August ..	11 months	17·5	15·62	89·2	13·28	12·3	H. 109
S.J.Q. 64 ..	August ..	11 months	16·9	13·58	80·3	11·54	10·0	N.G. 15 (Badila)
S.J.Q. 70 ..	August ..	11 months	18·7	17·11	91·5	14·54	13·7	N.G. 15 (Badila)
S.J.Q. 77 ..	August ..	11 months	16·3	12·71	78·0	10·80	9·1	N.G. 15 (Badila)
S.J.Q. 91 ..	August ..	11 months	18·1	16·32	90·2	13·87	12·9	Q. 903
S.J.Q. 112 ..	August ..	11 months	18·1	16·01	88·4	13·61	12·5	N.G. 16
S.J.Q. 137 ..	August ..	11 months	16·3	13·26	81·3	11·27	9·8	H.Q. 77
S.J.Q. 174 ..	August ..	11 months	18·4	16·01	87·0	13·61	12·4	E.K. 28
S.J.Q. 301 ..	August ..	11 months	17·6	15·09	85·7	12·83	11·6	Q. 903
S.J.Q. 312 ..	August ..	11 months	17·9	15·86	88·6	13·48	12·4	N.G. 102
S.J.Q. 318 ..	August ..	11 months	19·7	17·04	86·5	14·48	13·15	N.G. 102
S.J.Q. 319 ..	August ..	11 months	16·6	13·23	79·7	11·24	9·6	N.G. 102
S.J.Q. 329 ..	August ..	11 months	18·0	15·15	84·2	12·88	11·5	N.G. 102
S.J.Q. 344 ..	August ..	11 months	19·6	17·81	90·9	15·14	14·2	TR. 428
S.J.Q. 468 ..	August ..	11 months	17·7	15·29	86·4	13·00	11·8	N.G. 24 (Goru)

Final Analytical Examination of Competitive Trials with South Johnstone Seedling Canes—Plant Crop—September, 1927.

Seedling Number.	Month of Analysis.	Age of Cane.	Brix of Juice.	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Fibre in Cane.	% Sucrose in Cane.	% Commercial Cane Sugar in Cane.	Variety from which Seed was taken.
S.J.Q. 2 ..	September ..	12 months	20·8	19·36	0·69	93·1	9·6	16·53	15·7	N.G. 15 (Badila)
S.J.Q. 3 ..	September ..	12 months	19·8	17·73	0·96	89·5	10·1	15·05	14·0	N.G. 15 (Badila)
S.J.Q. 4 ..	September ..	12 months	18·8	16·65	1·12	88·6	9·9	14·17	13·05	N.G. 15 (Badila)
S.J.Q. 5 ..	September ..	12 months	18·8	16·23	1·10	86·3	9·9	13·81	12·5	N.G. 15 (Badila)
S.J.Q. 7 ..	September ..	12 months	20·8	19·00	0·63	91·3	10·0	16·15	15·2	N.G. 15 (Badila)
S.J.Q. 9 ..	September ..	12 months	16·8	13·70	2·03	81·5	10·2	11·62	10·15	N.G. 15 (Badila)
S.J.Q. 12 ..	September ..	12 months	17·3	14·26	1·78	82·4	9·8	12·15	10·65	N.G. 15 (Badila)
S.J.Q. 15 ..	September ..	12 months	20·5	18·19	0·81	88·7	10·1	15·44	14·3	N.G. 15 (Badila)
S.J.Q. 16 ..	September ..	12 months	19·0	17·74	0·53	93·4	10·6	14·97	14·3	N.G. 15 (Badila)
S.J.Q. 17 ..	September ..	12 months	20·4	18·42	0·58	90·3	10·5	15·56	14·5	N.G. 15 (Badila)
S.J.Q. 19 ..	September ..	12 months	15·0	11·17	2·60	74·5	9·0	9·61	7·8	N.G. 15 (Badila)
S.J.Q. 20 ..	September ..	12 months	17·6	14·85	1·95	84·4	9·8	12·65	11·3	N.G. 15 (Badila)
S.J.Q. 21 ..	September ..	12 months	18·9	16·88	1·42	89·3	10·0	14·35	13·3	N.G. 15 (Badila)
S.J.Q. 25 ..	September ..	12 months	18·0	14·97	2·00	83·2	10·1	12·71	11·25	N.G. 15 (Badila)
S.J.Q. 26 ..	September ..	12 months	15·8	12·70	2·54	80·4	9·9	10·81	9·3	N.G. 24 (Goru)
S.J.Q. 28 ..	September ..	12 months	19·1	17·33	0·52	90·7	9·5	14·82	13·9	N.G. 24 (Goru)
S.J.Q. 31 ..	September ..	12 months	17·8	16·00	0·97	89·9	10·5	13·52	12·6	Q. 903
S.J.Q. 41 ..	September ..	12 months	19·2	17·32	0·79	90·2	10·6	14·63	13·65	N.G. 16
S.J.Q. 44 ..	September ..	12 months	18·1	14·75	2·53	81·5	10·0	12·54	10·9	N.G. 16
S.J.Q. 45 ..	September ..	12 months	18·1	14·94	2·08	82·5	9·6	12·76	11·2	H.Q. 77
S.J.Q. 46 ..	September ..	12 months	16·5	13·37	2·16	81·0	9·9	11·38	9·9	H.Q. 77
S.J.Q. 48 ..	September ..	12 months	17·2	13·59	2·52	79·0	9·5	11·62	9·9	H.Q. 77
S.J.Q. 49 ..	September ..	12 months	19·2	17·25	0·90	89·8	9·6	14·73	13·7	H.Q. 77
S.J.Q. 51 ..	September ..	12 months	16·4	13·44	1·20	81·9	9·6	11·56	10·1	H.Q. 77
S.J.Q. 53 ..	September ..	12 months	19·5	17·19	0·92	88·1	9·5	14·70	13·5	H.Q. 77
S.J.Q. 54 ..	September ..	12 months	19·0	17·69	0·62	93·1	10·9	14·88	14·1	E.K. 28
S.J.Q. 55 ..	September ..	12 months	18·5	16·61	1·00	89·8	11·0	13·95	13·0	E.K. 28
S.J.Q. 58 ..	September ..	12 months	18·5	16·68	0·60	90·2	9·7	14·23	13·3	H. 109
S.J.Q. 60 ..	September ..	12 months	18·1	16·35	1·09	90·3	10·2	13·86	13·0	H. 109
S.J.Q. 64 ..	September ..	12 months	18·5	16·08	1·52	86·9	10·1	13·65	12·45	N.G. 15 (Badila)
S.J.Q. 70 ..	September ..	12 months	18·8	17·22	0·41	91·6	11·0	14·46	13·6	N.G. 15 (Badila)
S.J.Q. 77 ..	September ..	12 months	17·4	14·41	1·32	82·8	10·0	12·25	10·8	N.G. 15 (Badila)
S.J.Q. 91 ..	September ..	12 months	19·4	17·49	0·68	90·1	10·9	14·71	13·7	Q. 903
S.J.Q. 112 ..	September ..	12 months	19·8	18·07	0·66	91·3	10·5	15·27	14·3	N.G. 16
S.J.Q. 137 ..	September ..	12 months	18·2	15·72	1·52	86·4	11·0	13·20	12·0	H.Q. 77
S.J.Q. 174 ..	September ..	12 months	19·7	18·10	1·01	91·9	10·5	15·29	14·4	E.K. 28
S.J.Q. 301 ..	September ..	12 months	18·5	16·56	0·95	89·5	10·2	14·04	13·1	Q. 903
S.J.Q. 312 ..	September ..	12 months	17·0	14·15	1·80	83·2	10·1	12·01	10·65	N.G. 102
S.J.Q. 318 ..	September ..	12 months	18·5	15·58	1·52	84·2	11·9	12·95	11·5	N.G. 102
S.J.Q. 319 ..	September ..	12 months	17·0	13·42	1·95	78·9	10·2	11·38	9·7	N.G. 102
S.J.Q. 329 ..	September ..	12 months	18·3	15·08	1·22	82·4	11·1	12·65	11·1	N.G. 102
S.J.Q. 344 ..	September ..	12 months	19·4	17·70	0·48	91·2	10·0	15·04	14·1	TR. 428
S.J.Q. 468 ..	September ..	12 months	17·4	14·51	1·16	83·4	9·9	12·35	10·9	N.G. 24 (Goru)

6. Northern Sugar Experiment Station—*continued.*

In the following table the crop results of the seedlings are set out:—

Crop Results of Competitive Trials with South Johnstone Seedling Canes—Plant Crop—September, 1927.

Seedling Number.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Variety from which Seed was taken.
S.J.Q. 2	12 months	35·0	5·49	N.G. 15 (Badila)
S.J.Q. 3	12 months	56·0	7·84	N.G. 15 (Badila)
S.J.Q. 4	12 months	59·1	7·71	N.G. 15 (Badila)
S.J.Q. 5	12 months	55·6	6·95	N.G. 15 (Badila)
S.J.Q. 7	12 months	73·1	11·11	N.G. 15 (Badila)
S.J.Q. 9	12 months	76·2	7·73	N.G. 15 (Badila)
S.J.Q. 12	12 months	64·6	6·88	N.G. 15 (Badila)
S.J.Q. 15	12 months	63·8	9·12	N.G. 15 (Badila)
S.J.Q. 16	12 months	49·8	7·12	N.G. 15 (Badila)
S.J.Q. 17	12 months	49·8	7·22	N.G. 15 (Badila)
S.J.Q. 19	12 months	45·1	3·52	N.G. 15 (Badila)
S.J.Q. 20	12 months	39·2	4·43	N.G. 15 (Badila)
S.J.Q. 21	12 months	44·8	5·96	N.G. 15 (Badila)
S.J.Q. 25	12 months	49·8	5·60	N.G. 15 (Badila)
S.J.Q. 26	12 months	52·1	4·84	N.G. 24 (Goru)
S.J.Q. 28	12 months	58·3	8·10	N.G. 24 (Goru)
S.J.Q. 31	12 months	46·3	5·83	Q. 903
S.J.Q. 41	12 months	43·6	5·95	N.G. 16
S.J.Q. 44	12 months	47·1	5·13	N.G. 16
S.J.Q. 45	12 months	43·6	4·88	H.Q. 77
S.J.Q. 46	12 months	33·8	3·34	H.Q. 77
S.J.Q. 48	12 months	38·1	3·77	H.Q. 77
S.J.Q. 49	12 months	36·5	5·00	H.Q. 77
S.J.Q. 51	12 months	45·5	4·59	H.Q. 77
S.J.Q. 53	12 months	46·7	6·30	H.Q. 77
S.J.Q. 54	12 months	45·5	6·41	E.K. 28
S.J.Q. 55	12 months	43·9	5·71	E.K. 28
S.J.Q. 58	12 months	50·1	6·66	H. 109
S.J.Q. 60	12 months	38·9	5·06	H. 109
S.J.Q. 64	12 months	46·3	5·76	N.G. 15 (Badila)
S.J.Q. 70	12 months	29·9	4·07	N.G. 15 (Badila)
S.J.Q. 77	12 months	46·3	5·00	N.G. 15 (Badila)
S.J.Q. 91	12 months	31·1	4·26	Q. 903
S.J.Q. 112	12 months	29·9	4·27	N.G. 16
S.J.Q. 137	12 months	31·9	3·83	H.Q. 77
S.J.Q. 174	12 months	53·7	7·73	E.K. 28
S.J.Q. 301	12 months	57·9	7·58	Q. 903
S.J.Q. 312	12 months	46·3	4·93	N.G. 102
S.J.Q. 318	12 months	38·9	4·47	N.G. 102
S.J.Q. 319	12 months	29·2	2·83	N.G. 102
S.J.Q. 329	12 months	43·6	4·84	N.G. 102
S.J.Q. 344	12 months	33·4	4·71	7R. 428
S.J.Q. 468	12 months	45·1	4·91	N.G. 24 (Goru)

From the above table it will be noted that many of these seedlings have given high tonnages of cane and sugar per acre, the leading variety in this respect being S.J.Q. 9, with 73·1 tons of cane and 11·11 tons of sugar per acre. These represent most of the earlier seedlings, and have now been under observation for about five years. It is hoped that next year a few of the best of these will be available for distribution.

(7) Analytical Examination of South Johnstone Seedling Canes—Plant Cane.

This year's analytical examination of seedling canes shows that quite a number are of good commercial value. All the canes have a clean healthy appearance and erect growth.

The preliminary, progressive, and final examinations of these canes are shown hereunder :—

Preliminary Analytical Examination of South Johnstone Seedling Canes—Plant Crop—July, 1927.

Division.	Seedling Number.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.	Variety from which Seed was taken.
B3	S.J.Q. 356	11 months	8–7–27	17·1	14·17	82·8	12·04	10·6	Q. 903
B3	S.J.Q. 361	11 months	8–7–27	16·8	13·37	79·6	11·36	9·7	Q. 903
B3	S.J.Q. 475	11 months	8–7–27	16·0	13·34	83·4	11·34	10·05	B. 4596
B3	S.J.Q. 487	11 months	8–7–27	17·1	14·86	86·9	12·63	11·5	Badila
B3	S.J.Q. 491	11 months	8–7–27	15·9	13·15	82·7	11·18	9·85	Badila
B3	S.J.Q. 518	11 months	8–7–27	14·6	11·26	77·1	9·57	8·00	Badila
B3	S.J.Q. 524	11 months	8–7–27	16·0	13·11	81·9	11·14	9·75	Badila
B3	S.J.Q. 528	11 months	8–7–27	17·2	14·10	81·9	11·98	10·5	Badila
B3	S.J.Q. 535	11 months	8–7–27	16·1	12·56	78·0	10·68	9·0	Badila
B3	S.J.Q. 537	11 months	8–7–27	16·9	14·37	85·0	12·21	11·0	Badila
B3	S.J.Q. 567	11 months	8–7–27	16·7	13·18	78·9	11·20	9·5	N.G. 24

6. Northern Sugar Experiment Station—*continued.*

Preliminary Analytical Examination of South Johnstone Seedling Canes—Plant Crop—July, 1927—*continued*

Division.	Seedling Number.	Age of Cane.	Date of Analysis.	Brix of Juice.	%Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.	Variety from which Seed was taken.
B3	S.J.Q. 621 ..	11 months	8–7–27	17·6	15·75	89·5	13·39	12·4	Q. 903
B3	S.J.Q. 634 ..	11 months	8–7–27	16·7	13·54	81·1	11·51	10·0	Q. 903
B3	S.J.Q. 638 ..	11 months	8–7–27	17·8	15·31	86·0	13·01	11·8	Q. 903
B3	S.J.Q. 653 ..	11 months	8–7–27	17·9	14·92	83·3	12·68	11·2	Q. 903
B3	S.J.Q. 696 ..	11 months	8–7–27	17·2	15·44	89·8	13·12	12·2	Q. 903
B3	S.J.Q. 751 ..	11 months	8–7–27	15·8	12·19	77·1	10·36	8·7	Q. 903
B3	S.J.Q. 759 ..	11 months	8–7–27	16·2	13·06	80·6	11·10	9·6	Q. 903
B3	S.J.Q. 761 ..	11 months	8–7–27	15·5	11·96	77·1	10·17	8·5	Q. 903
B3	S.J.Q. 770 ..	11 months	8–7–27	17·7	15·66	88·4	13·31	12·3	Q. 903
B3	S.J.Q. 813 ..	11 months	8–7–27	16·8	14·83	88·2	12·60	11·6	N.G. 16
B3	S.J.Q. 837 ..	11 months	8–7–27	16·9	13·83	81·9	11·75	10·3	N.G. 16
B3	S.J.Q. 846 ..	11 months	8–7–27	17·1	13·85	80·9	11·77	10·2	N.G. 16
B3	S.J.Q. 869 ..	11 months	8–7–27	18·0	15·33	85·1	13·03	11·7	N.G. 16
B3	S.J.Q. 879 ..	11 months	8–7–27	16·4	13·52	82·4	11·49	10·1	E.K. 28
B3	S.J.Q. 985 ..	11 months	8–7–27	18·7	16·65	89·0	14·15	13·1	E.K. 28
B3	S.J.Q. 1003 ..	11 months	8–7–27	15·6	12·45	79·8	10·58	9·1	E.K. 28
B3	S.J.Q. 1018 ..	11 months	8–7–27	18·0	15·29	84·9	12·99	11·7	E.K. 28
B3	S.J.Q. 1022 ..	11 months	8–7–27	17·6	14·65	83·2	12·45	11·0	E.K. 28
B3	S.J.Q. 1033 ..	11 months	8–7–27	15·2	11·91	78·3	10·12	8·6	D. 109
B3	S.J.Q. 1039 ..	11 months	8–7–27	16·2	12·90	79·6	10·96	9·4	D. 109
B3	S.J.Q. 1040 ..	11 months	8–7–27	16·6	13·47	81·1	11·45	9·95	D. 109
B3	S.J.Q. 1118 ..	11 months	8–7–27	17·6	13·87	78·8	11·78	10·0	D. 109
B3	S.J.Q. 1134 ..	11 months	8–7–27	15·2	12·43	81·7	10·56	9·2	S.J.Q. 64
B3	S.J.Q. 1135 ..	11 months	8–7–27	18·3	16·30	89·1	13·85	12·8	S.J.Q. 64
B3	S.J.Q. 1136 ..	11 months	8–7–27	15·6	12·50	80·1	10·62	9·15	S.J.Q. 64
B3	S.J.Q. 1138 ..	11 months	8–7–27	15·7	12·40	78·9	10·54	9·0	S.J.Q. 64
B3	S.J.Q. 1139 ..	11 months	8–7–27	16·8	14·22	84·6	12·08	10·8	S.J.Q. 64
B3	S.J.Q. 1140 ..	11 months	8–7–27	15·6	11·19	71·7	9·51	7·5	S.J.Q .64
B3	S.J.Q. 1141 ..	11 months	8–7–27	17·5	15·31	87·5	13·01	11·9	S.J.Q. 64
B3	S.J.Q. 1142 ..	11 months	8–7–27	15·7	12·22	77·8	10·39	8·75	S.J.Q. 64
B3	S.J.Q. 1145 ..	11 months	8–7–27	15·0	11·31	75·4	9·61	7·90	S.J.Q. 64
B3	S.J.Q. 1146 ..	11 months	8–7–27	14·4	10·65	73·9	9·05	7·3	S.J.Q. 64
B3	S.J.Q. 1148 ..	11 months	8–7–27	16·8	13·44	80·0	11·42	9·8	S.J.Q. 64
B3	S.J.Q. 1149 ..	11 months	8–7–27	17·8	14·94	83·9	12·70	11·3	S.J.Q. 64
B3	S.J.Q. 1150 ..	11 months	8–7–27	16·7	12·88	77·1	10·95	9·15	S.J.Q. 64
B3	S.J.Q. 1153 ..	11 months	8–7–27	18·1	15·89	87·8	13·51	12·4	S.J.Q. 64
B3	S.J.Q. 1155 ..	11 months	8–7–27	16·8	13·47	80·2	11·45	9·9	S.J.Q. 64
B3	S.J.Q. 1156 ..	11 months	8–7–27	16·5	13·40	81·2	11·39	9·9	S.J.Q. 64
B3	S.J.Q. 1157 ..	11 months	8–7–27	17·4	15·93	91·5	13·54	12·7	S.J.Q. 64
B3	S.J.Q. 1160 ..	11 months	8–7–27	16·3	12·57	77·1	10·68	8·9	S.J.Q. 64
B3	S.J.Q. 1163 ..	11 months	8–7–27	16·8	13·95	83·0	11·86	10·5	S.J.Q. 64
B3	S.J.Q. 1164 ..	11 months	8–7–27	14·6	11·37	77·8	9·66	8·1	S.J.Q. 64
B3	S.J.Q. 1165 ..	11 months	8–7–27	16·5	13·54	82·1	11·51	10·1	S.J.Q. 64

Second Progressive Analytical Examination of South Johnstone Seedling Canes—Plant Crop—August, 1927.

Division.	Seedling Number.	Age of Cane.	Date of Analysis.	Brix of Juice.	%Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.	Variety from which Seed was taken.
B3	S.J.Q. 356 ..	12 months	16–8–27	19·3	17·17	88·9	14·59	13·5	Q. 903
B3	S.J.Q. 361 ..	12 months	16–8–27	18·1	14·92	82·4	12·68	11·15	Q. 903
B3	S.J.Q. 475 ..	12 months	16–8–27	16·1	13·09	81·3	11·13	9·7	B. 4596
B3	S.J.Q. 487 ..	12 months	16–8–27	17·8	15·77	88·6	13·40	12·4	Badila
B3	S.J.Q. 491 ..	12 months	16–8–27	18·8	16·94	90·1	14·40	13·4	Badila
B3	S.J.Q. 518 ..	12 months	16–8–27	15·9	13·08	82·2	11·12	9·8	Badila
B3	S.J.Q. 524 ..	12 months	16–8–27	18·1	16·49	91·1	14·02	13·15	Badila
B3	S.J.Q. 528 ..	12 months	16–8–27	15·3	11·48	75·0	9·76	8·0	Badila
B3	S.J.Q. 535 ..	12 months	16–8–27	17·8	14·70	82·7	12·49	11·0	Badila
B3	S.J.Q. 537 ..	12 months	16–8–27	17·6	15·26	86·7	12·97	11·8	Badila
B3	S.J.Q. 567 ..	12 months	16–8–27	19·2	16·55	86·2	14·07	12·7	N.G. 24
B3	S.J.Q. 621 ..	12 months	16–8–27	18·7	16·82	89·9	14·30	13·3	Q. 903
B3	S.J.Q. 634 ..	12 months	16–8–27	16·9	14·01	82·9	11·91	10·5	Q. 903
B3	S.J.Q. 638 ..	12 months	16–8–27	19·0	17·20	90·5	14·62	13·7	Q. 903
B3	S.J.Q. 653 ..	12 months	16–8–27	18·3	15·55	84·9	13·22	11·9	Q. 903
B3	S.J.Q. 696 ..	12 months	16–8–27	17·9	16·53	92·3	14·05	13·3	Q. 903
B3	S.J.Q. 751 ..	12 months	16–8–27	18·7	16·92	90·4	14·38	13·4	Q. 903
B3	S.J.Q. 759 ..	12 months	16–8–27	16·3	13·19	80·9	11·21	9·7	Q. 903
B3	S.J.Q. 761 ..	12 months	16–8–27	18·1	15·87	87·6	13·49	12·4	Q. 903
B3	S.J.Q. 770 ..	12 months	16–8–27	18·5	16·40	88·6	13·94	12·9	Q. 903
B3	S.J.Q. 813 ..	12 months	16–8–27	18·9	17·75	93·9	15·09	14·4	N.G. 16
B3	S.J.Q. 837 ..	12 months	16–8–27	18·0	14·41	80·5	12·25	10·5	N.G. 16
B3	S.J.Q. 846 ..	12 months	16–8–27	18·5	15·56	84·1	13·23	11·8	N.G. 16
B3	S.J.Q. 869 ..	12 months	16–8–27	19·5	17·26	88·5	14·67	13·5	N.G. 16
B3	S.J.Q. 879 ..	12 months	16–8–27	18·6	16·11	86·6	13·69	12·4	E.K. 28
B3	S.J.Q. 985 ..	12 months	16–8–27	19·9	18·24	91·6	15·50	14·6	E.K. 28
B3	S.J.Q. 1003 ..	12 months	16–8–27	18·4	16·34	88·8	13·89	12·8	E.K. 28
B3	S.J.Q. 1018 ..	12 months	16–8–27	19·6	17·04	86·9	14·48	13·2	E.K. 28
B3	S.J.Q. 1022 ..	12 months	16–8–27	18·5	15·75	85·1	13·39	12·0	E.K. 28
B3	S.J.Q. 1033 ..	12 months	16–8–27	16·8	13·59	80·9	11·55	10·0	D. 109

6. Northern Sugar Experiment Station—*continued.*

Second Progressive Analytical Examination of South Johnstone Seedling Canes—Plant Crop—August, 1927—*continued.*

Division.	Seedling Number.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.	Variety from which Seed was taken.
B3	S.J.Q. 1039 ..	12 months	16–8–27	18·0	15·35	85·2	13·05	11·7	D. 109
B3	S.J.Q. 1040 ..	12 months	16–8–27	17·3	14·50	83·8	12·32	11·0	D. 109
B3	S.J.Q. 1118 ..	12 months	16–8–27	19·6	16·97	86·5	14·42	13·1	D. 109
B3	S.J.Q. 1134 ..	12 months	16–8–27	16·4	13·31	81·1	11·31	9·8	S.J.Q. 64
B3	S.J.Q. 1135 ..	12 months	16–8–27	18·9	16·91	89·4	14·37	13·3	S.J.Q. 64
B3	S.J.Q. 1136 ..	12 months	16–8–27	18·0	15·77	87·6	13·40	12·3	S.J.Q. 64
B3	S.J.Q. 1138 ..	12 months	16–8–27	17·6	14·30	81·2	12·15	10·6	S.J.Q. 64
B3	S.J.Q. 1139 ..	12 months	16–8–27	18·4	15·65	85·0	13·30	11·95	S.J.Q. 64
B3	S.J.Q. 1140 ..	12 months	16–8–27	17·3	12·68	73·3	10·78	8·6	S.J.Q. 64
B3	S.J.Q. 1141 ..	12 months	16–8–27	17.6	15·33	87·1	13·03	11·9	S.J.Q. 64
B3	S.J.Q. 1142 ..	12 months	16–8–27	15·9	12·47	78·4	10·60	9·0	S.J.Q. 64
B3	S.J.Q. 1145 ..	12 months	16–8–27	17·0	13·66	80·3	11·61	10·0	S.J.Q. 64
B3	S.J.Q. 1146 ..	12 months	16–8–27	16·1	12·94	80·3	11·00	9·5	S.J.Q. 64
B3	S.J.Q. 1148 ..	12 months	16–8–27	17·5	14·65	83·7	12·45	11·1	S.J.Q. 64
B3	S.J.Q. 1149 ..	12 months	16–8–27	19·1	16·77	87·8	14·25	13·1	S.J.Q. 64
B3	S.J.Q. 1150 ..	12 months	16–8–27	18·5	15·99	86·4	13·59	12·3	S.J.Q. 64
B3	S.J.Q. 1153 ..	12 months	16–8–27	16·8	13·20	78·5	11·22	9·5	S.J.Q. 64
B3	S.J.Q. 1155 ..	12 months	16–8–27	17·4	14·40	82·7	12·24	10·8	S.J.Q. 64
B3	S.J.Q. 1156 ..	12 months	16–8–27	16·4	13·88	84·6	11·80	10·6	S.J.Q. 64
B3	S.J.Q. 1157 ..	12 months	16–8–27	18·7	17·08	91·3	14·52	13·6	S.J.Q. 64
B3	S.J.Q. 1160 ..	12 months	16–8–27	17·1	14·54	85·0	12·36	11·1	S.J.Q. 64
B3	S.J.Q. 1163 ..	12 months	16–8–27	18·3	15·97	87·2	13·57	12·4	S.J.Q. 64
B3	S.J.Q. 1164 ..	12 months	16–8–27	16·2	13·72	84·7	11·66	10·4	S.J.Q. 64
B3	S.J.Q. 1165 ..	12 months	16–8–27	17·4	14·75	84·7	12·54	11·2	S.J.Q. 64

Final Analytical Examination of South Johnstone Seedling Canes—Plant Crop—September, 1927.

Division.	Seedling Number.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.	Variety from which Seed was taken.
B3	S.J.Q. 356 ..	13 months	14–9–27	21·1	18·85	89·3	16·02	14·85	Q. 903
B3	S.J.Q. 361 ..	13 months	14–9–27	19·2	16·47	85·8	14·00	12·65	Q. 903
B3	S.J.Q. 475 ..	13 months	14–9–27	16·4	13·46	82·1	11·44	10·0	B. 4596
B3	S.J.Q. 487 ..	13 months	14–9–27	19·9	13·49	92·9	15·72	14·9	Badila
B3	S.J.Q. 491 ..	13 months	14–9–27	20·8	19·63	94·4	16·68	16·0	Badila
B3	S.J.Q. 518 ..	13 months	14–9–27	17·9	15·46	86·4	13·14	11·9	Badila
B3	S.J.Q. 524 ..	13 months	14–9–27	19·4	16·84	86·8	14·31	13·0	Badila
B3	S.J.Q. 528 ..	13 months	14–9–27	16·6	13·38	80·6	11·37	9·8	Badila
B3	S.J.Q. 535 ..	13 months	14–9–27	18·6	15·63	84·0	13·28	11·8	Badila
B3	S.J.Q. 537 ..	13 months	14–9–27	19·2	17·70	92·2	15·04	14·2	Badila
B3	S.J.Q. 567 ..	13 months	14–9–27	20·4	18·16	89·0	15·44	14·3	N.G. 24
B3	S.J.Q. 621 ..	13 months	14–9–27	19·6	18·22	92·9	15·49	14·7	Q. 903
B3	S.J.Q. 634 ..	13 months	14–9–27	17·9	15·29	85·4	13·00	11·7	Q. 903
B3	S.J.Q. 638 ..	13 months	14–9–27	19·0	17·12	90·1	14·55	13·6	Q. 903
B3	S.J.Q. 653 ..	13 months	14–9–27	19·4	17·22	88·8	14·64	13·5	Q. 903
B3	S.J.Q. 696 ..	13 months	14–9–27	19·4	18·11	93·3	15·39	14·65	Q. 903
B3	S.J.Q. 751 ..	13 months	14–9–27	18·7	16·55	88·5	14·07	13·0	Q. 903
B3	S.J.Q. 759 ..	13 months	14–9–27	15·4	12·18	79·1	10·35	8·8	Q. 903
B3	S.J.Q. 761 ..	13 months	14–9–27	18·0	15·48	86·0	13·16	11·9	Q. 903
B3	S.J.Q. 770 ..	13 months	14–9–27	19·8	14·60	73·7	12·41	10·0	Q. 903
B3	S.J.Q. 813 ..	13 months	14–9–27	17·9	16·26	90·8	13·82	12·9	N.G. 16
B3	S.J.Q. 837 ..	13 months	14–9–27	19·4	16·74	86·3	14·23	12·9	N.G. 16
B3	S.J.Q. 846 ..	13 months	14–9–27	18·5	16·23	87·7	13·79	12·65	N.G. 16
B3	S.J.Q. 869 ..	13 months	14–9–27	19·0	16·70	87·9	14·19	13·0	N.G. 16
B3	S.J.Q. 879 ..	13 months	14–9–27	19·1	17·17	89·9	14·59	13·6	E.K. 28
B3	S.J.Q. 985 ..	13 months	14–9–27	20·9	19·27	92·2	16·38	15·5	E.K. 28
B3	S.J.Q. 1003 ..	13 months	14–9–27	20·3	18·62	91·7	15·83	14·9	E.K. 28
B3	S.J.Q. 1018 ..	13 months	14–9–27	20·7	18·26	88·2	15·52	14·3	E.K. 28
B3	S.J.Q. 1022 ..	13 months	14–9–27	17·7	14·74	83·3	12·53	11·1	E.K. 28
B3	S.J.Q. 1033 ..	13 months	14–9–27	18·1	15·00	82·8	12·75	11·25	D. 109
B3	S.J.Q. 1039 ..	13 months	14–9–27	18·9	16·33	86·4	13·88	12·6	D. 109
B3	S.J.Q. 1040 ..	13 months	14–9–27	18·1	15·00	82·8	12·75	11·25	D. 109
B3	S.J.Q. 1118 ..	13 months	14–9–27	19·8	16·68	84·2	14·18	12·65	D. 109
B3	S.J.Q. 1134 ..	13 months	14–9–27	18·5	16·98	91·8	14·43	13·6	S.J.Q. 64
B3	S.J.Q. 1135 ..	13 months	14–9–27	19·7	17·98	91·3	15·28	14·35	S.J.Q. 64
B3	S.J.Q. 1136 ..	13 months	14–9–27	17·5	15·51	88·7	13·18	12·2	S.J.Q. 64
B3	S.J.Q. 1138 ..	13 months	14–9–27	17·7	14·92	84·3	12·68	11·3	S.J.Q. 64
B3	S.J.Q. 1139 ..	13 months	14–9–27	18·9	17·36	91·8	14·76	13·9	S.J.Q. 64
B3	S.J.Q. 1140 ..	13 months	14–9–27	19·7	16·53	83·9	14·05	12·5	S.J.Q. 64
B3	S.J.Q. 1141 ..	13 months	14–9–27	18·0	15·71	87·3	13·35	12·2	S.J.Q. 64
B3	S.J.Q. 1142 ..	13 months	14–9–27	17.6	15·48	87·9	13·16	12·1	S.J.Q. 64
B3	S.J.Q. 1145 ..	13 months	14–9–27	17.9	15·35	85·7	13·05	11·8	S.J.Q. 64
B3	S.J.Q. 1146 ..	13 months	14–9–27	17·0	14·30	84·1	12·15	10·8	S.J.Q. 64
B3	S.J.Q. 1148 ..	13 months	14–9–27	16·9	14·04	83·1	11·93	10·55	S.J.Q. 64
B3	S.J.Q. 1149 ..	13 months	14–9–27	19·8	18·00	90·9	15·30	14·3	S.J.Q. 64
B3	S.J.Q. 1150 ..	13 months	14–9–27	19·2	16·61	86·4	14·12	12·8	S.J.Q. 64
B3	S.J.Q. 1153 ..	13 months	14–9–27	19·0	16·80	88·4	14·28	13·15	S.J.Q. 64
B3	S.J.Q. 1155 ..	13 months	14–9–27	19·1	17·03	89·2	14·47	13·40	S.J.Q. 64
B3	S.J.Q. 1156 ..	13 months	14–9–27	18·6	16·42	88·3	13·96	12·8	S.J.Q. 64
B3	S.J.Q. 1157 ..	13 months	14–9–27	19·1	17·56	91·9	14·93	14·1	S.J.Q. 64
B3	S.J.Q. 1160 ..	13 months	14–9–27	17·2	14·62	85·0	12·43	11·15	S.J.Q. 64
B3	S.J.Q. 1163 ..	13 months	14–9–27	20·1	17·75	88·3	15·09	13·9	S.J.Q. 64
B3	S.J.Q. 1164 ..	13 months	14–9–27	18·1	15·65	86·5	13·30	12·1	S.J.Q. 64
B3	S.J.Q. 1165 ..	13 months	14–9–27	15·2	14·54	95·6	12·36	11·9	S.J.Q. 64

6. Northern Sugar Experiment Station—*continued.*

(8) Analytical Examination of South Johnstone Seedling Canes—First Ratoons.

These seedling canes have ratooned well and show an improvement in commercial cane sugar when compared with the above tables of the same varieties in the plant crop. The purity of these canes is high, and this is an important factor in the production of good milling canes.

Preliminary Analytical Examination of South Johnstone Seedling Canes—First Ratoon Crop—July, 1927.

Division.	Seedling Number.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.	Variety from which Seed was taken.
B6	S.J.Q. 2 ..	10 months	21–7–27	20·2	18·59	92·0	15·80	14·7	Badila
B6	S.J.Q. 3 ..	10 months	21–7–27	21·0	19·83	94·4	16·85	15·95	Badila
B6	S.J.Q. 4 ..	10 months	21–7–27	18 1	16·01	88·4	13·61	12·4	Badila
B6	S.J.Q. 5 ..	10 months	21–7–27	18·5	16·40	88·7	13·94	12·7	Badila
B6	S.J.Q. 7 ..	10 months	21–7–27	18·4	16·82	91·4	14·30	13·3	Badila
B6	S.J.Q. 15 ..	10 months	21–7–27	21·7	20·15	92·8	17·13	16·05	Badila
B6	S.J.Q. 16 ..	10 months	21–7–27	19·9	17·85	89·7	15·17	13·9	Badila
B6	S.J.Q. 17 ..	10 months	21–7–27	18·9	16·43	86·9	13·96	12·6	Badila
B6	S.J.Q. 26 ..	10 months	21–7–27	16·4	13·68	83·4	11·63	10·2	N.G. 24
B6	S.J.Q. 28 ..	10 months	21–7–27	17·2	15·22	88·5	12·94	11·8	N.G. 24
B6	S.J.Q. 33 ..	10 months	21–7–27	16·1	13·63	84·7	11·58	10·25	Q. 903
B6	S.J.Q. 45 ..	10 months	21–7–27	17·7	14·74	83·2	12·53	11·0	H.Q. 77
B6	S.J.Q. 49 ..	10 months	21–7–27	19·0	16·86	88·7	14·33	13·1	H.Q. 77
B6	S.J.Q. 55 ..	10 months	21–7–27	18·0	15·65	86·9	13·30	12·0	E.K. 28
B6	S.J.Q. 60 ..	10 months	21–7–27	17·5	15·38	87·9	13·07	11·85	H. 109
B6	S.J.Q. 63 ..	10 months	21–7–27	18·0	14·62	81·2	12·43	10·7	Badila
B6	S.J.Q. 70 ..	10 months	21–7–27	18·1	16·64	91·9	14·14	13·2	Badila
B6	S.J.Q. 137 ..	10 months	21–7–27	18·3	16·13	88·1	13·71	12·45	H.Q. 77
B6	S.J.Q. 301 ..	10 months	21–7–27	17·9	16·01	89·4	13·61	12·5	Q. 903
B6	S.J.Q. 319 ..	10 months	21–7–27	17·3	14·04	81·1	11·93	10·25	N.G. 102
B6	S.J.Q. 329 ..	10 months	21–7–27	17·1	14·73	86·1	12·52	11·2	N.G. 102
B6	S.J.Q. 344 ..	10 months	21–7–27	19·0	17·22	90·6	14·64	13·5	7R. 428
B6	S.J.Q. 356 ..	10 months	21–7–27	18·0	15·26	84·8	12·97	11·5	Q. 903
B6	S.J.Q. 361 ..	10 months	21–7–27	18·1	15·00	82·9	12·75	11·1	Q. 903
B6	S.J.Q. 382 ..	10 months	21–7–27	16·8	13·58	80·8	11·54	9·9	Q. 903
B6	S.J.Q. 406 ..	10 months	21–7–27	17·8	15·17	85·2	12·89	11·5	Q. 903
B6	S.J.Q. 433 ..	10 months	21–7–27	14·3	11·86	82·9	10·08	8·8	E.K. 28
B6	S.J.Q. 468 ..	10 months	21–7–27	17·4	14·84	85·3	12·61	11·2	N.G. 24
B6	S.J.Q. 471 ..	10 months	21–7–27	19·0	16·91	89·0	14·37	13·1	H.Q. 77
B6	S.J.Q. 475 ..	10 months	21–7–27	14·3	11·02	77·1	9·37	7·7	B. 4596
B6	S.J.Q. 481 ..	10 months	21–7–27	17·5	15·09	86·2	12·83	11·5	Badila
B6	S.J.Q. 491 ..	10 months	21–7–27	13·8	10·90	78·9	9·26	7·8	Badila
B6	S.J.Q. 492 ..	10 months	21–7–27	14·3	11·00	76·9	9·35	7·7	Badila
B6	S.J.Q. 524 ..	10 months	21–7–27	16·9	14·07	83·2	11·96	10·5	Badila
B6	S.J.Q. 528 ..	10 months	21–7–27	17·1	14·12	82·5	12·00	10·4	Badila
B6	S.J.Q. 567 ..	10 months	21–7–27	17·0	13·90	81·8	11·81	10·2	N.G. 24
B6	S.J.Q. 621 ..	10 months	21–7–27	18·6	17·11	91·9	14·54	13·6	Q. 903
B6	S.J.Q. 634 ..	10 months	21–7–27	14·5	11·82	81·5	10·05	8·65	Q. 903
B6	S.J.Q. 653 ..	10 months	21–7–27	15·7	12·19	77·6	10·36	8·6	Q. 903
B6	S.J.Q. 657 ..	10 months	21–7–27	18·7	16 58	88·6	14·09	12·85	Q. 903
B6	S.J.Q. 696 ..	10 months	21–7–27	17·2	15·74	91·5	13·38	12·4	Q. 903
B6	S.J.Q. 725 ..	10 months	21–7–27	18·0	15·45	85·8	13·13	11·7	Q. 903
B6	S.J.Q. 879 ..	10 months	21–7–27	18·0	16·20	90·0	13·77	12·7	E.K. 28
B6	S.J.Q. 883 ..	10 months	21–7–27	18·7	16·94	90·6	14·40	13·3	E.K. 28
B6	S.J.Q. 935 ..	10 months	21–7–27	16·1	13·42	83·3	11·41	10·0	E.K. 28
B6	S.J.Q. 986 ..	10 months	21–7–27	18·9	16·62	87·9	14·13	12·8	E.K. 28
B6	S.J.Q. 987 ..	10 months	21–7–27	18·0	15·58	86·6	13·24	11·9	E.K. 28
B6	S.J.Q. 988 ..	10 months	21–7–27	18·8	17·25	91·7	14·66	13·65	E.K. 28
B6	S.J.Q. 1004 ..	10 months	21–7–27	17·9	15·63	87·3	13·28	12·0	E.K. 28
B6	S.J.Q. 1014 ..	10 months	21–7–27	20·0	17·36	86·8	14·76	13·8	E.K. 28
B6	S.J.Q. 1018 ..	10 months	21–7–27	20·0	17·56	87·8	14·93	13·5	E.K. 28
B6	S.J.Q. 1022 ..	10 months	21–7–27	18·1	15·33	84·7	13·03	11·5	E.K. 28
B6	S.J.Q. 1035 ..	10 months	21–7–27	16·0	12·90	80·6	10·96	9·4	D. 109
B6	S.J.Q. 1127 ..	10 months	21–7–27	17·4	14·99	86·1	12·74	11·4	D. 109

Second Progressive Analytical Examination of South Johnstone Seedling Canes—First Ratoon Crop—August, 1927.

Division.	Seedling Number.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.	Variety from which Seed was taken.
B6	S.J.Q. 2 ..	11 months	22–8–27	21·2	19·88	93 7	16·90	16·1	Badila
B6	S.J.Q. 3 ..	11 months	22–8–27	20·6	19·63	95·2	16·68	16·1	Badila
B6	S.J.Q. 4 ..	11 months	22–8–27	19·3	17·85	92·4	15·17	14·4	Badila
B6	S.J.Q. 5 ..	11 months	22–8–27	18·2	16·25	89·1	13·79	12·8	Badila
B6	S.J.Q. 7 ..	11 months	22–8–27	20·9	19·83	94·8	16·85	16·2	Badila
B6	S.J.Q. 15 ..	11 months	22–8–27	21·2	19·52	92·0	16·59	15·7	Badila
B6	S.J.Q. 16 ..	11 months	22–8–27	20 1	19·36	96·3	16·46	15·9	Badila
B6	S.J.Q. 17 ..	11 months	22–8–27	19·5	17·61	90·3	14·97	14·0	Badila
B6	S.J.Q. 26 ..	11 months	22–8–27	16·9	14·63	86·5	12·43	11·3	N.G. 24
B6	S.J.Q. 28 ..	11 months	22–8–27	18·8	17·20	91·4	14·62	13·75	N.G. 24
B6	S.J.Q. 33 ..	11 months	22–8–27	17·4	15·41	88·5	13·10	12·1	Q. 903

6. Northern Sugar Experiment Station—*continued.*

Second Progressive Analytical Examination of South Johnstone Seedling Canes—First Ratoon Crop—August, 1927—*continued.*

Division.	Seedling Number.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.	Variety from which Seed was taken.
B6	S.J.Q. 45 ..	11 months	22–8–27	18·9	15·98	84·5	13·58	12·15	H.Q. 77
B6	S.J.Q. 49 ..	11 months	22–8–27	19·1	17·06	89·3	14·50	13·4	H.Q. 77
B6	S.J.Q. 55 ..	11 months	22–8–27	16·6	13·92	83·8	11·83	10·5	E.K. 28
B6	S.J.Q. 60 ..	11 months	22–8–27	16·7	14·71	88·0	12·50	11·5	H. 109
B6	S.J.Q. 63 ..	11 months	22–8–27	18·6	16·49	88·6	14·02	12·9	Badila
B6	S.J.Q. 70 ..	11 months	22–8–27	19·2	17·82	92·8	15·15	14·4	Badila
B6	S.J.Q. 137 ..	11 months	22–8–27	19·1	17·10	89·5	14·53	13·5	H.Q. 77
B6	S.J.Q. 301 ..	11 months	22–8–27	18·8	17·20	91·4	14·62	13·75	Q. 903
B6	S.J.Q. 319 ..	11 months	22–8–27	18·8	16·70	88·8	14·19	13·1	N.G. 102
B6	S.J.Q. 329 ..	11 months	22–8–27	18·5	16·59	89·6	14·10	13·1	N.G. 102
B6	S.J.Q. 344 ..	11 months	22–8–27	19·1	17·87	93·5	15·19	14·5	7R. 428
B6	S.J.Q. 356 ..	11 months	22–8–27	19·2	16·91	88·0	14·37	13·2	Q. 903
B6	S.J.Q. 361 ..	11 months	22–8–27	17·8	14·89	83·6	12·66	11·2	Q. 903
B6	S.J.Q. 383 ..	11 months	22–8–27	16·1	12·54	77·9	10·66	9·0	Q. 903
B6	S.J.Q. 406 ..	11 months	22–8–27	18·2	15·60	85·7	13·26	12·0	Q. 903
B6	S.J.Q. 433 ..	11 months	22–8–27	15·9	13·75	86·4	11·69	10·6	E.K. 28
B6	S.J.Q. 468 ..	11 months	22–8–27	18·3	16·35	89·3	13·90	12·9	N.G. 24
B6	S.J.Q. 471 ..	11 months	22–8–27	20·1	18·54	92·2	15·76	14·9	H.Q. 77
B6	S.J.Q. 475 ..	11 months	22–8–27	14·5	11·15	76·9	9·48	7·9	B. 4596
B6	S.J.Q. 481 ..	11 months	22–8–27	16·2	12·98	80·1	11·03	9·5	Badila
B6	S.J.Q. 491 ..	11 months	22–8–27	17·3	15·70	90·7	13·34	12·5	Badila
B6	S.J.Q. 492 ..	11 months	22–8–27	17·5	14·65	83·7	12·45	11·1	Badila
B6	S.J.Q. 524 ..	11 months	22–8–27	17·2	14·43	83·9	12·26	10·9	Badila
B6	S.J.Q. 528 ..	11 months	22–8–27	14·4	10·82	75·1	9·20	7·5	Badila
B6	S.J.Q. 567 ..	11 months	22–8–27	16·8	13·20	78·5	11·22	9·5	N.G. 24
B6	S.J.Q. 621 ..	11 months	22–8–27	18·2	15·92	87·4	13·53	12·4	Q. 903
B6	S.J.Q. 634 ..	11 months	22–8–27	15·0	11·88	79·2	10·10	8·6	Q. 903
B6	S.J.Q. 653 ..	11 months	22–8–27	18·2	15·82	86·9	13·45	12·25	Q. 903
B6	S.J.Q. 657 ..	11 months	22–8–27	19·3	17·78	92·1	15·11	14·3	Q. 903
B6	S.J.Q. 696 ..	11 months	22–8–27	18·0	16·49	91·6	14·02	13·2	Q. 903
B6	S.J.Q. 725 ..	11 months	22–8–27	14·7	12·00	81·6	10·20	8·9	Q. 903
B6	S.J.Q. 879 ..	11 months	22–8–27	17·6	15·18	86·2	12·90	11·7	E.K. 28
B6	S.J.Q. 883 ..	11 months	22–7–27	20·1	18·69	92·9	15·89	15·1	E.K. 28
B6	S.J.Q. 935 ..	11 months	22–8–27	18·8	17·40	92·5	14·79	14·0	E.K. 28
B6	S.J.Q. 986 ..	11 months	22–8–27	19·7	17·74	90·0	15·08	14·05	E.K. 28
B6	S.J.Q. 987 ..	11 months	22–8–27	18·1	15·95	88·1	13·56	12·5	E.K. 28
B6	S.J.Q. 988 ..	11 months	22–8–27	20·0	18·73	93·6	15·92	15·2	E.K. 28
B6	S.J.Q. 1004 ..	11 months	22–8–27	19·2	17·54	91·3	14·91	14·0	E.K. 28
B6	S.J.Q. 1014 ..	11 months	22–8–27	19·0	16·42	86·4	13·96	12·7	E.K. 28
B6	S.J.Q. 1018 ..	11 months	22–8–27	18·7	15·88	84·9	13·50	12·1	E.K. 28
B6	S.J.Q. 1022 ..	11 months	22–8–27	18·5	15·99	86·4	13·59	12·3	E.K. 28
B6	S.J.Q. 1033 ..	11 months	22–8–27	18·1	15·24	84·2	12·95	11·55	D. 109
B6	S.J.Q. 1127 ..	11 months	22–8–27	17·8	15·25	85·6	12·96	11·7	D. 109

Final Analytical Examination of South Johnstone Seedling Canes—First Ratoon Crop—September, 1927.

Division.	Seedling Number.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.	Variety from which Seed was taken.
B6	S.J.Q. 2 ..	12 months	15–9–27	22·7	21·46	94·5	18·24	17·5	Badila
B6	S.J.Q. 3 ..	12 months	15–9–27	21·6	20·41	94·5	17·35	16·6	Badila
B6	S.J.Q. 4 ..	12 months	15–9–27	19·7	18·05	91·6	15·34	14·4	Badila
B6	S.J.Q. 5 ..	12 months	15–9–27	17·3	15·17	87·7	12·89	11·8	Badila
B6	S.J.Q. 7 ..	12 months	15–9–27	19·4	17·82	91·8	15·15	14·3	Badila
B6	S.J.Q. 15 ..	12 months	15–9–27	21·7	20·30	93·5	17·25	16·4	Badila
B6	S.J.Q. 16 ..	12 months	15–9–27	21·7	20·77	95·6	17·65	17·0	Badila
B6	S.J.Q. 17 ..	12 months	15–9–27	20·3	18·86	92·9	16·03	15·2	Badila
B6	S.J.Q. 26 ..	12 months	15–9–27	18·3	16·19	88·5	13·76	12·7	N.G. 24
B6	S.J.Q. 28 ..	12 months	15–9–27	20·2	18·97	93·9	16·12	15·4	N.G. 24
B6	S.J.Q. 33 ..	12 months	15–9–27	18·2	16·02	88·0	13·62	12·5	Q. 903
B6	S.J.Q. 45 ..	12 months	15–9–27	18·5	15·65	84·6	13·30	11·9	H.Q. 77
B6	S.J.Q. 49 ..	12 months	15–9–27	19·7	18·08	91·8	15·37	14·5	H.Q. 77
B6	S.J.Q. 55 ..	12 months	15–9–27	19·2	17·56	91·4	14·93	14·0	E.K. 28
B6	S.J.Q. 60 ..	12 months	15–9–27	17·7	15·64	88·3	13·29	12·2	H. 109
B6	S.J.Q. 63 ..	12 months	15–9–27	18·3	15·77	86·2	13·40	12·15	Badila
B6	S.J.Q. 70 ..	12 months	15–9–27	19·8	18·73	94·6	15·92	15·3	Badila
B6	S.J.Q. 137 ..	12 months	15–9–27	20·0	17·90	89·5	15·21	14·1	H.Q. 77
B6	S.J.Q. 301 ..	12 months	15–9–27	19·4	17·78	91·6	15·11	14·2	Q. 903
B6	S.J.Q. 319 ..	12 months	15–9–27	21·4	19·62	91·7	16·68	15·7	N.G. 102
B6	S.J.Q. 329 ..	12 months	15–9–27	19·3	17·61	91·2	14·97	14·05	N.G. 102
B6	S.J.Q. 344 ..	12 months	15–9–27	21·1	19·73	93·5	16·77	16·00	7R. 428
B6	S.J.Q. 356 ..	12 months	15–9–27	18·4	15·79	85·8	13·42	12·10	Q. 903
B6	S.J.Q. 361 ..	12 months	15–9–27	19·2	16·53	86·1	14·05	12·7	Q. 903
B6	S.J.Q. 383 ..	12 months	15–9–27	18·1	15·14	83·6	12·87	11·4	Q. 903
B6	S.J.Q. 406 ..	12 months	15–9–27	18·6	15·58	83·8	13·24	11·8	Q. 903
B6	S.J.Q. 433 ..	12 months	15–9–27	18·1	16·43	90·8	13·96	13·1	E.K. 28
B6	S.J.Q. 468 ..	12 months	15–9–27	20·3	18·45	90·9	15·68	14·7	N.G. 24
B6	S.J.Q. 471 ..	12 months	15–9–27	19·9	18·10	90·9	15·38	14·4	H.Q. 77

6. Northern Sugar Experiment Station—*continued.*

Final Analytical Examination of South Johnstone Seedling Cane—First Ratoon Crop—September, 1927—*continued.*

Division.	Seedling Number.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.	Variety from which Seed was taken.
B6	S.J.Q. 475 ..	12 months	15–9–27	12·1	8·31	68·7	7·06	5·3	B. 4596
B6	S.J.Q. 481 ..	12 months	15–9–27	20·6	18.81	91·3	15·99	15·0	Badila
B6	S.J.Q. 491 ..	12 months	15–9–27	18·7	17·01	90·9	14·46	13·55	Badila
B6	S.J.Q. 492 ..	12 months	15–9–27	18·1	14·91	82·4	12·67	11·1	Badila
B6	S.J.Q. 524 ..	12 months	15–9–27	19·6	17·35	88·5	14·75	13·6	Badila
B6	S.J.Q. 528 ..	12 months	15–9–27	14·2	10·12	71·3	8·60	6·7	Badila
B6	S.J.Q. 567 ..	12 months	15–9–27	19·9	17·66	88·7	15·01	13·9	N.G. 24
B6	S.J.Q. 621 ..	12 months	15–9–27	20·4	18·98	93·0	16·13	15·3	Q. 903
B6	S.J.Q. 634 ..	12 months	15–9–27	18·0	15·50	86·1	13·17	11·9	Q. 903
B6	S.J.Q. 653 ..	12 months	15–9–27	18·2	15·21	83·6	12·93	11·5	Q. 903
B6	S.J.Q. 657 ..	12 months	15–9–27	20·2	18·62	92·2	15·83	14·95	Q. 903
B6	S.J.Q. 696 ..	12 months	15–9–27	19·5	18·34	94·1	15·59	14·9	Q. 903
B6	S.J.Q. 725 ..	12 months	15–9–27	19·0	17·01	89·5	14·46	13·4	Q. 903
B6	S.J.Q. 879 ..	12 months	15–9–27	19·9	18·30	91·9	15·55	14·7	E.K. 28
B6	S.J.Q. 883 ..	12 months	15–9–27	20·9	19·56	93·6	16·63	15·85	E.K. 28
B6	S.J.Q. 935 ..	12 months	15–9–27	20·3	18·40	90·6	15·64	14·6	E.K. 28
B6	S.J.Q. 986 ..	12 months	15–9–27	20·6	18·88	91·6	16·05	15·1	E.K. 28
B6	S.J.Q. 987 ..	12 months	15–9–27	20·9	19·25	92·1	16·36	15·45	E.K. 28
B6	S.J.Q. 988 ..	12 months	15–9–27	21·2	19·90	93·9	16·91	16·15	E.K. 28
B6	S.J.Q. 1004 ..	12 months	15–9–27	18·6	16·01	86·1	13·61	12·3	E.K. 28
B6	S.J.Q. 1014 ..	12 months	15–9–27	20·8	18·57	89·3	15·78	14·6	E.K. 28
B6	S.J.Q. 1018 ..	12 months	15–9–27	21·3	18·97	89·1	16·12	14·9	E.K. 28
B6	S.J.Q. 1022 ..	12 months	15–9–27	18·9	16·26	86·0	13·82	12·5	E.K. 28
B6	S.J.Q. 1033 ..	12 months	15–9–27	19·0	16·41	86·4	13·95	12·65	D. 109
B6	S.J.Q. 1127 ..	12 months	15–9–27	19·8	18·68	94·3	15·88	15·2	D. 109

(9) Analytical Results of Mauritius Canes.

A description of these varieties was given in the report for 1922 (page 43), also notes on their general habits, and further notes were given in the report for 1924 (pages 47 and 48).

Some of these canes show good promise and should do well on poor soil. The preliminary, progressive, and final analytical examinations are embraced in the tables which appear hereunder :—

Preliminary Analytical Examination of Mauritius Canes—Plant Cane—July, 1927.

Division.	Name or Number of Variety.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.
B3 ..	R.P. 6	11 months	15–7–27	16·2	13·66	84·3	11·47	10·25
B3 ..	R.P. 8	11 months	15–7–27	15·7	12·25	78·0	10·29	8·7
B3 ..	M. 33/95	11 months	15–7–27	16·3	13·74	84·3	11·54	10·3
B3 ..	M. 55/453	11 months	15–7–27	17·3	13·76	79·5	11·56	9·9
B3 ..	M. 55/1182	11 months	15–7–27	18·5	16·64	89·9	13·98	13·0
B3 ..	M. 64/14	11 months	15–7–27	18·8	16·89	89·8	14·19	13·2
B3 ..	M. 131/126	11 months	15–7–27	16·3	13·18	80·8	11·07	9·6
B3 ..	M. 291/08	11 months	15–7–27	18·0	15·28	84·9	12·83	11·5

First Progressive Analytical Examination of Mauritius Canes—Plant Cane—August, 1927.

Division.	Name or Number of Variety.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.
B3 ..	R.P. 6	12 months	19–8–27	17·8	15·95	89·7	13·40	12·4
B3 ..	R.P. 8	12 months	19–8–27	16·2	12·88	79·5	10·82	9·3
B3 ..	M. 33/95	12 months	19–8–27	17·6	15·79	89·7	13·26	12·3
B3 ..	M. 55/453	12 months	19–8–27	18·5	15·63	84·5	13·13	11·7
B3 ..	M. 55/1182	12 months	19–8–27	20·1	18·45	91·8	15·50	14·6
B3 ..	M. 64/14	12 months	19–8–27	19·9	18·51	93·0	15·55	14·8
B3 ..	M. 131/126	12 months	19–8–27	17·3	14·63	84·6	12·29	11·0
B3 ..	M. 291/08	12 months	19–8–27	19·3	17·13	88·7	14·39	13·3

Final Analytical Examination of Mauritius Canes—Plant Cane—September, 1927.

Division.	Name or Number of Variety.	Age of Cane.	Date of Analysis.	Brix of Juice.	% Sucrose in Juice.	Purity of Juice.	% Fibre in Cane.	% Sucrose in Cane	% C.C.S. in Cane.
B3 ..	R.P. 6	13 months	13–9–27	19·5	17·63	90·4	11·8	14·67	13·7
B3 ..	R.P. 8	13 months	13–9–27	17·7	15·39	86·9	13·5	12·54	11·4
B3 ..	M. 33/95	13 months	13–9–27	19·2	17·53	91·3	10·7	14·78	13·9
B3 ..	M. 55/453	13 months	13–9–27	16·8	13·05	77·7	11·0	10·98	9·2
B3 ..	M. 55/1182	13 months	13–9–27	19·8	16·66	84·2	11·5	15·58	14·9
B3 ..	M. 64/14	13 months	13–9–27	19·9	17·85	89·7	12·0	14·81	13·8
B3 ..	M. 131/126	13 months	13–9–27	17·6	14·77	83·9	11·0	12·41	11·0
B3 ..	M. 291/08	13 months	13–9–27	19·8	17·81	89·9	12·6	14·67	13·7

6. Northern Sugar Experiment Station—*continued.*

DATES OF ARROWING.

Varieties.	1927.
Uba	12th May
Q. 116 Sport	15th May
E.K. 28	23rd May
Q. 903	25th May
M. 64/14	2nd June
N.G. 24	8th June
N.G. 16	10th June
Badila	11th June
R.P. 6	12th June
N.G. 24B	14th June
Striped Singapore	18th June
H.Q. 458	20th June
M. 291/08	20th June
Malabar	21st June
M. 55/453	15th July

DISTRIBUTION OF VARIETIES, SEASON 1927.

A free distribution of varieties was made during the planting season, and quite a large number of farmers availed themselves of the opportunity of improving their plant stocks. The varieties most in demand were E.K. 28, Q. 813, Tableland Badila, Oba Badila, and Badila Seedling.

ANNUAL FIELD DAY.

Due to the prolonged wet weather and the industrial dispute at the South Johnstone Sugar Mill, it was found impossible to hold the Annual Field Day. In the first place all roads to the station were absolutely impassable for traffic, and in the second, the farmers were too much occupied with trying to run the mill to enable them to attend. It was unfortunate, as all arrangements had been completed.

NEW EXPERIMENTS INITIATED, 1927-1928.

(1) Subsoiling Experiment—

Plot 1.—Ordinary cultivation.

Plot 2.—Subsoiled to depth of 18 inches.

Plot 3.—Ordinary cultivation.

Plot 4.—Subsoiled to depth of 18 inches.

(2) Experiment to test the value of different quantities of lime—

Plot 1.—Lime at the rate of 1 ton per acre.

Plot 2.—Lime at the rate of 2 tons per acre.

Plot 3.—No lime.

Plot 4.—Lime at the rate of 1 ton per acre.

Plot 5.—Lime at the rate of 2 tons per acre.

Plot 6.—No lime.

(3) Competitive trials of 20 selected South Johnstone Queensland Seedlings.

Experiment in Soaking Plants before Planting.

Plot 1.—Plants soaked in limewater containing lime to saturation for forty-eight hours.

Plot 2.—Plants soaked in limewater containing lime to saturation and one pound of magnesium sulphate to 50 gallons, for forty-eight hours.

Plot 3.—Plants soaked in water for forty-eight hours.

Plot 4.—Ordinary planting.

Plot 5.—Plants soaked in water for twenty-four hours.

NEW VARIETIES INTRODUCED TO THE SOUTH JOHNSTONE EXPERIMENT STATION.

From Cuba.—S.C. 12 (4).

From India (through the Bundaberg Sugar Experiment Station).—Coimbatore 210, 213, 227.

GENERAL.

During the past year farmers have been making inquiries as to the symptoms of the various cane diseases. A collection of diseased canes has been made and is open for inspection.

The Public Works Department have completed reconditioning and painting the buildings of this station, and they now present a very fine appearance.

LIST OF VARIETIES AT THE SOUTH JOHNSTONE SUGAR EXPERIMENT STATION FOR 1927, EXCLUDING S.J.Q. SEEDLINGS.

Badila	E.K. 1
Tableland Badila	E.K. 2
Oba Badila	E.K. 28
Badila Seedling	R.P. 6
N.G. 24	R.P. 8
N.G. 24 A	M. 33/95
N.G. 24 B	M. 291/08
N.G. 16	M. 55/453
H.Q. 426	M. 55/1182
H.Q. 458	M. 64/14
Q. 813	M. 131/126
Q. 903	Uba
D. 1135	Improved Forage Cane
Q. 116 Sport	S.C. 12 (4)
Striped Singapore	Co. 210
Rose Bamboo	Co. 213
Malabar	Co. 227.

6. Northern Sugar Experiment Station—*continued.*

YIELD OF CANE HARVESTED FROM THE SUGAR EXPERIMENT STATION AT SOUTH JOHNSTONE, SEASON 1927.

	Tons.
Cane sent to mill	414·3
Used for plants	13·8
Distributed to farmers	3·0
Total	431·1

Nature of Crop—

	Per cent.
Plant cane	32·0
First ratoon	31·5
Second ratoon	18·5
Third ratoon	18·0

Tonnages—

	Tons.	Tons per acre.
Badila plant	70·7	32·87
Badila first ratoon ..	96·725	43·76
Badila second ratoon	79·05	35·93
Badila third ratoon ..	78·625	35·41
Variety plant ..	29·3375	26·40
S.J.Q. Seedling plant	37·6375	35·81
S.J.Q. Seedling first ratoon	39·025	41·78
Acreage under cane		11·877
Tons of cane per acre		36·3

These results from the poor land at the South Johnstone Experiment Station can be considered as highly satisfactory.

7.—Work of the Central Sugar Experiment Station at Mackay.

Mr. F. Keogh is the Chemist in Charge of the Sugar Experiment Station at Mackay, and his work is largely of a chemical nature, combined with carrying out the instructions of the Director as to field work. Mr. Keogh has performed his duties ably and well. The tables in connection with this part of the report have been prepared by the Chemist in Charge, who has also supplied notes for use by the Director. Mr. W. Allan, cadet student, assists Mr. Keogh, who speaks of his work as being very satisfactory.

The field staff—viz., Messrs. Andersen (foreman), Winton, Bailey, Benson, and Pearce—have continued to carry out their duties creditably.

Weather Notes covering period from March, 1926, to end of September, 1927.

The weather for the early part of 1926 was not too favourable for planting; the rainfall was deficient in January and February, and opposite conditions prevailed in March, when there was good rain on twenty wet days. The following months were much below the average rainfall, and planting was started a little later than usual and carried on right through the winter. The falls in these months were March 9·36, April 1·12, May 0·53, June 1·51, July 0·07, and August 0·28 inches. The strikes were mostly good and the young cane made moderate growth. The month of September, usually dry, gave 5·39 inches on fifteen wet days. This was of considerable benefit to growing crops. The next two months gave useful showers, keeping a moderate to good growth in the cane. December was up to the average, with 7·04 inches, the cane now making good progress.

January, 1927, received 8·32 inches, and February, 7·68 inches. Although below the average fall, both were good months, as the rain was spread over a large number of wet days; the largest fall in twenty-four hours was 2·80 points, the wet days numbering seventeen and fourteen respectively. The even distribution of the rain minimised any loss in growth due to lower rainfall. March was a wet month—14·53 inches on seventeen wet days; April and May were showery, the precipitation being a little below the average. The crops continued to make good growth during these months and also during June, which month was a little better than usual for rain, and the weather continued fairly mild. July, usually fairly dry, was a good growing month, the registration was 3·07 inches on eight wet days. The early part of the month was mild, with a cold snap towards the end of the month. Frost was recorded on four days, but no serious damage was reported from outside centres, which usually show a much heavier frost than near the coast. The rainfall for the first seven months of this year was 40 inches, compared with only 20 inches for a similar period in 1926. The rainfall for a similar period in 1925 was also 40 inches, when the record production of sugar for Queensland was made. The monthly registrations of rain for the two years 1925 and 1927 were similar, the number of wet days being sixty-six and seventy-seven respectively, and the total falls for twelve months commencing September 53 and 54 inches respectively.

The month of August was cool throughout, although no frosts were recorded. September was mild with useful showers.

The present harvesting season in Mackay is expected to be a record. This is mainly attributable to a moderately good rainfall evenly distributed over a large number of wet days—112—compared with 102 in 1925. Crops this year, both plant and ratoon, are cutting splendid tonnages, and the c.c.s. is maintaining a high average. The following are the records of rainfall taken at this station since 1900:—

Year.	Rainfall in Inches.	Year.	Rainfall in Inches.
1900	45·26	1914	71·71
1901	63·45	1915	36·27
1902	33·93	1916	82·93
1903	64·93	1917	67·92
1904	60·48	1918	115·97
1905	69·50	1919	38·03
1906	99·84	1920	57·27
1907	51·78	1921	95·89
1908	78·86	1922	34·47
1909	63·98	1923	25·23
1910	101·87	1924	58·37
1911	65·35	1925	54·89
1912	42·67	1926	34·69
1913	85·16	1927 (10 months)	44·13

It will be seen from the above table that there is a considerable variation in the annual rainfall at Mackay, and that there has been a big decline in the rainfall since 1921.

7. Central Sugar Experiment Station—*continued.*

Abstract of Meteorological Observations, made at Sugar Experiment Station, Mackay, from 1st September, 1926, to 31st August, 1927—Covering Growth of Experimental Canes.

Month.	Rainfall in Inches.	Number of Wet Days.	Average Rainfall, 26 Years, 1901–1926.	Highest Shade Maximum.	Lowest Shade Maximum.	Mean Shade Maximum.	Highest Shade Minimum.	Lowest Shade Minimum.	Mean Shade Minimum.	Lowest Terrestrial Min.	Mean Terrestrial Min.	Mean Diurnal Range.	Mean Temperature, 9 a.m.	Mean Relative Humidity of the Air, Saturation equalling 100 at 9 a.m.	Mean Daily Evaporation in Inches.
Sept., 1926 ..	5·39	15	2·07	90·9	72·2	87·4	66·8	53·6	61·1	52·1	60·1	26·3	73·0	74·0	0·18
Oct., 1926 ..	0·75	1	1·89	91·7	82·2	88·1	77·9	51·8	60·7	50·4	59·8	27·4	80·6	64·0	0·21
Nov., 1926 ..	1·13	6	2·84	95·9	85·6	90·8	77·4	58·9	66·5	58·1	65·8	24·3	84·2	61·0	0·31
Dec., 1926 ..	7·04	9	7·28	96·2	86·9	90·8	77·0	62·5	70·5	61·9	69·6	20·3	84·7	69·0	0 20
Jan., 1927 ..	8 32	17	15·89	96·8	84·0	89·0	77·2	67·8	72·7	67·1	72·0	16·3	81·5	81 0	0·11
Feb., 1927 ..	7·68	14	8·99	93·3	78·0	87·1	77·4	62·8	70·7	62·2	70·1	12·9	79·4	82·0	0·11
Mar., 1927 ..	14·53	17	9·98	93·0	76·8	86·7	75·9	66·3	71·0	65·4	70·3	15·7	79·4	84·0	0·12
Apr., 1927 ..	2·11	9	5·75	91·6	73·8	83·3	73·5	58·8	64·8	57·9	64·3	18·5	74·8	78·0	0·17
May, 1927 ..	1·13	5	3·33	84·6	71·0	80·3	67·0	40·2	56·5	38·1	54·4	23·8	70·2	72·5	0·22
June, 1927 ..	3·08	7	2·61	84·8	71·3	77·1	65·0	48·5	55·7	47·1	54·1	21·4	66·4	84·0	0·15
July, 1927 ..	3·07	8	1·40	82·7	57·3	74·4	67·0	37·1	49·8	31·9	47·7	24·6	62·0	77·0	0·16
Aug., 1927 ..	0·18	4	1·13	85·8	71·2	78·1	64·8	38·9	49·1	37·7	46·7	29·0	65·9	70·0	0·23
	54·41	112	63·16	..	..	..	..	..	..	..	..	..	..	*74·7	..

* Average.

EXPERIMENTS DEALT WITH IN THE FOLLOWING SECTION.

(1.) Conclusion of experiments in comparative tests with early and late maturing varieties. Second ratoon crop.

Early maturing canes selected—
- D. 109;
- H.Q. 285;
- H.Q. 426;
- Java E.K. 28;
- Q. 813.

Late maturing canes selected—
- N.G. 24 (Goru);
- M. 1900 (Seedling);
- 7 R. 428 (Pompey);
- N.G. 15 (Badila);
- Cheribon.

(2) Conclusion of experiment in green manure trials, followed by cane. Second ratoon crop.

Plot 1—Ordinary ploughing; cowpea sown broadcast previous to plant crop; first and second ratoon crops fertilised.

Plot 2—Ploughed and subsoiled previous to planting green crop; cowpea sown broadcast; first and second ratoon crops fertilised.

Plot 3—Ordinary ploughing fertilised previous to planting green crop with sulphate of potash (100 lb. per acre), and superphosphate (200 lb. per acre); first and second ratoon crops fertilised.

Plot 4—Ordinary ploughing; cowpea sown broadcast; first and second ratoon crops fertilised.

(3) Experiments with fertilisers—two series.

First Series—

Plot 1—300 lb. sulphate of potash per acre.

Plot 2—500 lb. meatworks fertiliser per acre.

Plot 3—No fertiliser.

Plot 4—500 lb. superphosphate per acre.

Plot 5—500 lb. basic superphosphate per acre.

Plot 6—400 lb. nitrate of soda, 300 lb. sulphate of ammonia, 100 lb. sulphate of potash, and 400 lb. meatworks manure per acre.

Second Series—

Plot 1—400 lb. nitrate of soda per acre.

Plot 2—300 lb. sulphate of ammonia per acre.

Plot 3—No fertiliser.

Plot 4—400 lb. nitrate of soda and 200 lb. basic superphosphate per acre.

Plot 5—200 lb. nitrate of soda, 150 lb. sulphate of ammonia, 50 lb. sulphate of potash, and 200 lb. meatworks fertiliser per acre.

(4) Analyses of miscellaneous canes.

(5) Analyses of new varieties from Java, Hawaii, Mauritius, and Philippine Islands.

(6) Analyses of South Johnstone seedlings.

(7) Preliminary experiments in soaking cane plants in different solutions for twenty-four hours to test time in germination.

7. Central Sugar Experiment Station—*continued.*

(1) Conclusion of Experiments with Early and Late Maturing Varieties.

Early maturing canes selected—

D. 109;
H.Q. 285;
H.Q. 426 (Clark's Seedling);
Java E.K. 28;
Q. 813.

Late maturing varieties—

Goru (N.G. 24);
1900 (Seedling);
7 R. 428 (Pompey);
N.G. 15 (Badila);
Cheribon.

Second Ratoon Crop.

The first ratoon crop of the early varieties was cut late in August, and the late varieties at the end of October last year. The soil was stirred to a depth of 15 inches with plough and subsoiler, and fertilised with the same mixture as applied to first ratoons, viz.—

Sulphate of ammonia—200 lb. per acre.
Nitrate of soda—100 lb. per acre.
Sulphate of potash—75 lb. per acre.
Meatworks—300 lb. per acre.

In December, 1926, a top dressing of 50 lb. sulphate of ammonia and 50 lb. nitrate of soda was applied.

In the second ratoons the canes grew similarly in rate to the first ratoons. In the early varieties E.K. 28 was the slowest in coming away, and slow in growth for the first few months; D. 109 was a little slower than the other three. Of the late-maturing varieties Goru and 1900 Seedling were a little slower than Pompey, Cheribon, and Badila, but the two former made better growth comparatively than last year.

The following tables furnish the analytical data, comprising preliminary, progressive, and final results of the second ratoon crop:—

First Preliminary Examination in Comparative Experiments with Early and Late Maturing Varieties—Second Ratoon Crop.

Division.	Variety.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	Purity of Juice.	% C.C.S. in Cane.
	Early Maturing Varieties—June.						
C2 ..	D. 109	30–6–27	10 months	18·1	15·92	88·0	12·13
C2 ..	H.Q. 285	30–6–27	10 months	19·1	18·16	95·1	14·49
C2 ..	H.Q. 426	30–6–27	10 months	20·5	19·45	94·9	15·50
C2 ..	E.K. 28	30–6–27	10 months	18·6	17·01	91·4	13·27
C2 ..	Q. 813	30–6–27	10 months	20·8	19·74	94·9	15·73
	Late Maturing Varieties.						
C2 ..	N.G. 24 (Goru)	30–6–27	8 months	18·5	16·76	90·6	13·0
C2 ..	1900 S.	30–6–27	8 months	18·2	16·86	92·6	13·25
C2 ..	7R. 428 (Pompey)	30–6–27	8 months	16·6	14·03	84·5	10·41
C2 ..	Badila	30–6–27	8 months	20·0	18·75	93·7	14·84
C2 ..	Cheribon	30–6–27	8 months	17·5	14·62	83·5	10·76

Second Progressive Examination in Comparative Experiments with Early and Late Maturing Varieties—Second Ratoon Crop.

Division.	Variety.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	Purity of Juice.	% C.C.S. in Cane.
	Early Maturing Varieties—July.						
C2 ..	D. 109	31–7–27	11 months	19·1	17·4	91·1	13·54
C2 ..	H.Q. 285	31–7–27	11 months	20·9	20·46	97·9	16·54
C2 ..	H.Q. 426	31–7–27	11 months	21·4	20·66	96·5	16·62
C2 ..	E.K. 28	31–7–27	11 months	20·4	19·45	95·3	15·54
C2 ..	Q. 813	31–7–27	11 months	20·5	19·64	95·8	15·74
	Late Maturing Varieties.						
C2 ..	N.G. 24 (Goru)	31–7–27	9 months	19·4	18·0	92·7	14·16
C2 ..	1900 S.	31–7–27	9 months	20·6	19·74	95·8	15·82
C2 ..	7R. 428 (Pompey)	31–7–27	9 months	18·0	15·95	88·6	12·21
C2 ..	Badila	31–7–27	9 months	20·7	19·72	95·2	15·75
C2 ..	Cheribon	31–7–27	9 months	18·2	15·84	87·0	11·98

7. Central Sugar Experiment Station—*continued.*

Third Progressive Examination in Comparative Experiments with Early and Late Maturing Varieties—Second Ratoon Crop.

Division.	Variety.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	Purity of Juice.	% C.C.S. in Cane.
	Late Maturing Varieties.						
C2 ..	N.G. 24 (Goru)	31–8–27	10 months	20·8	19·59	94·1	15·64
C2 ..	1900 S.	31–8–27	10 months	22·4	21·55	96·2	17·52
C2 ..	7R. 428 (Pompey)	31–8–27	10 months	18·6	17·67	95·0	14·35
C2 ..	Badila	31–8–27	10 months	21·5	20·71	96·3	16·85
C2 ..	Cheribon	31–8–27	10 months	19·6	18·16	92·6	14·01

Final Examination in Comparative Experiments with Early and Late Maturing Varieties—Second Ratoon Crop.

Division.	Variety.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Fibre.	% Sucrose in Cane.	% C.C.S. in Cane.
	Early Maturing Varieties—August.									
C2	D. 109	31–8–27	12 months	19·0	17·37	0·30	91·4	13·0	14·24	13·38
C2	H.Q. 285	31–8–27	12 months	21·1	20·43	0·22	96·8	9·5	17·47	16·97
C2	H.Q. 426	31–8–27	12 months	22·2	21·40	0·15	96·4	9·5	18·30	17·73
C2	E.K. 28	31–8–27	12 months	20·7	19·48	0·20	94·1	11·0	16·36	15·64
C2	Q. 813	31–8–27	12 months	21·9	21·08	0·19	96·2	13·5	17·18	16·62
	Late Maturing Varieties—October.									
C2	N.G. 24 (Goru)	24–10–27	12 months	20·8	19·51	0·29	93·8	11·5	16·29	15·54
C2	1900 S.	24–10–27	12 months	22·3	20·98	0·21	94·1	11·0	17·62	16·84
C2	7R. 428 (Pompey) ..	24–10–27	12 months	21·6	20·04	0·30	92·8	10·5	16·93	16·06
C2	Badila	24–10–27	12 months	22·8	21·71	0·19	95·2	11·0	18·23	17·55
C2	Cheribon	24–10–27	12 months	20·9	19·0	0·31	90·9	13·5	15·48	14·50

It will be noticed that, with the exception of D. 109, the commercial cane sugar figures in the final table are good.

The table given below shows the crop results, which are particularly good for second ratoons :—

Crop Results in Comparative Experiments with Early and Late Maturing Varieties—Second Ratoon Crop—1927.

Division.	Variety.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.
	Early Maturing Varieties—August.			
C2	D. 109	12 months	37·3	4·99
C2	H.Q. 285	12 months	29·3	4·97
C2	H.Q. 426	12 months	34·6	6·13
C2	E.K. 28	12 months	39·2	6·13
C2	Q. 813	12 months	35·3	5·86
	Late Maturing Varieties—October.			
C2	N.G. 24 (Goru)	12 months	31·9	4·95
C2	1900 Seedling	12 months	31·5	5·30
C2	7R. 428 (Pompey)	12 months	45·1	7·24
C2	Badila	12 months	34·2	6·0
C2	Cheribon	12 months	38·7	5·61

7. Central Sugar Experiment Station—*continued.*

Below are presented the analytical and crop results to date:—

Analytical Results to Date in Comparative Experiments with Early and Late Maturing Varieties.

Division.	Variety.	Plant Crop, 1925, 13 Months.	First Ratoon Crop, 1926, 10½ Months.	Second Ratoon Crop, 1927, 12 Months.	Average for Three Crops.
		% Commercial Cane Sugar.	% Commercial Cane Sugar.	% Commercial Cane Sugar.	% Commercial Cane Sugar.
	Early Maturing Varieties.				
C2	D. 109	12·92	14·07	13·38	13·46
C2	H.Q. 285	15·48	15·42	16·97	15·96
C2	H.Q. 426	16·33	18·65	17·73	17·57
C2	E.K. 28	17·02	17·79	15·64	16·82
C2	Q. 813	16·58	17·12	16·62	16·77
	Late Maturing Varieties—Plant Crop, 14½ months. First Ratoon, 11 months. Second Ratoon, 12 months.				
C2	N.G. 24 (Goru)	14·28	15·17	15·54	15·0
C2	1900 Seedling	16·60	16·45	16·84	16·63
C2	7R. 428 (Pompey)	14·84	14·23	16·06	15·04
C2	Badila	16·99	17·13	17·55	17·22
C2	Cheribon	14·33	13·87	14·50	14·23

Crop Results to Date in Comparative Experiments with Early and Late Maturing Varieties.

Division.	Variety.	Plant Crop, 1925. 13 Months.		First Ratoon Crop, 1926—10½ Months.		Second Ratoon Crop, 1927—12 Months.		Total Results for Three Crops.		Average Results for Three Crops.	
		Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
	Early Maturing Varieties.										
C2	D. 109	45·1	5·82	26·7	3·75	37·3	4·99	109·1	14·56	36·4	4·85
C2	H.Q. 285	32·6	5·04	23·9	3·68	29·3	4·97	85·8	13·69	28·6	4·56
C2	H.Q. 426	46·5	7·59	26·8	5·0	34·6	6·13	107·9	18·72	36·0	6·24
C2	E.K. 28	47·7	8·12	28·5	5·07	39·2	6·13	115·4	19·32	38·5	6·44
C2	Q. 813	48·4	8·02	31·5	5·39	35·3	5·86	115·2	19·27	38·4	6·42
	Late Maturing Varieties—Plant Crop, 14½ months; First Ratoon, 11 months; Second Ratoon, 12 months.										
C2	N.G. 24 (Goru)	42·2	6·02	23·1	3·50	31·9	4·95	97·2	14·47	32·4	4·82
C2	1900 Seedling	41·9	6·95	22·8	3·75	31·5	5·30	96·2	16·00	32·1	5·33
C2	7R. 428 (Pompey)	47·3	7·01	36·1	5·13	45·1	7·24	128·5	19·38	42·8	6·46
C2	Badila	41·8	7·10	30·1	5·15	34·2	6·0	106·1	18·25	35·4	6·08
C2	Cheribon	49·3	7·06	31·6	4·38	38·7	5·61	119·6	17·05	39·9	5·68

Reviewing the whole of the results, the three best canes in the early varieties are H.Q. 426, Q. 813, and E.K. 28. There is very little difference between them, the total tonnages of sugar per acre being very close; H.Q. 426 a little behind the others, but the latter maintained the highest average c.c.s., which would lower the harvesting costs a little. H.Q. 285 gave fair returns, but is far behind; D. 109 gave good tonnages, but the c.c.s. is only moderate. This cane is more a late than an early variety.

Of the late varieties, Badila is the best, giving good tonnages with high sugar content. The results in Badila were somewhat lowered through damage by rats or mice, both in first and second ratoons. The other canes alongside were not touched, although Pompey is a soft cane and was grown next to the Badila. 1900 Seedling yielded a good plant crop, but was a little disappointing in the first ratoons; the second ratoons were more favourable. The tonnages throughout were moderately good, and with a high c.c.s. showed better results than Goru or Cheribon; the latter cane is unreliable and showed marked susceptibility to mosaic disease. It was rogued continually during plant and first ratoon crops, and still the second ratoon crop was badly infected. Badila grown alongside was unaffected, and is evidently more resistant to this disease. Pompey gave splendid crops every year; the c.c.s. is moderate, and it cannot be considered to give as payable results as Badila. The second ratoons of Pompey gave rather a good c.c.s. Pompey should not be grown in places where Badila will be successful. This experiment is now concluded.

7. Central Sugar Experiment Station– *continued.*

(2) Conclusion of Experiments in Green Manure Trials followed by Cane.

Treatment of land before planting—

Plot 1—Ordinary ploughing; cowpea sown broadcast.

Plot 2—Ploughed and subsoiled; cowpea sown broadcast.

Plot 3—Ordinary ploughing, fertilised; cowpea sown broadcast.

Plot 4—Ordinary ploughing; cowpea sown broadcast.

In the above experiment the piece of ground selected for this trial first received two ploughings. Plot 2 was subsoiled; and manure consisting of 200 lb. superphosphate and 100 lb. sulphate of potash per acre was applied to Plot 3. Green manure in the shape of cowpea was then sown, and the resulting crop ploughed under. The land received two further ploughings, and was planted in August, the strike being excellent. The cane in all plots made good growth throughout the season. No fertilisers were applied to the plant crop, except the superphosphate and potash to Plot 3 prior to sowing green manure.

The plant crop was harvested in 1925, the first ratoons in 1926, and the second ratoon crop this year. The first ratoon crop was fertilised, and the same mixture was applied to the second ratoon crop, viz.:—

Sulphate of ammonia—200 lb. per acre.

Nitrate of soda—100 lb. per acre.

Sulphate of potash—75 lb. per acre.

Meatworks—300 lb. per acre.

This was followed later by a top-dressing of 50 lb. sulphate of ammonia and 50 lb. nitrate of soda.

In ratooning for the second ratoon crop it was treated similarly to the first ratoon, *i.e.*, soil ploughed and subsoiled to a depth of 15 inches. The second ratoon crop made good growth throughout as the season was favourable, cutting a much higher tonnage than the previous year's crop, averaging 34 tons per acre for second ratoons.

The analytical and crop results will be found in the tables below:—

Analytical Results in Green Manuring Experiments with Different Treatment of Land—Second Ratoon Crop, 1927—Q. 813.

Division.	Plot.	Variety.	Treatment.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Fibre.	% Sucrose in Cane.	% C.C.S. in Cane.
A1	1	Q. 813	Ordinary ploughing; cowpea sown broadcast for plant crop. Ratooned to 15 in. deep with plough and subsoiler	12–9–27	11 months	22·6	21·59	0·23	95·5	13·5	17·59	16·96
A1	2	Q. 813	Ploughed and subsoiled; cowpea sown broadcast for plant crop. Ratooned to 15 in. deep with plough and subsoiler	12–9–27	11 months	22·3	21·37	0·22	95·8	13·5	17·41	16·81
A1	3	Q. 813	Ordinary ploughing; fertilised with superphosphate and potash; cowpea sown broadcast. Ratooned to 15 in. deep with plough and subsoiler	12–9–27	11 months	21·7	20·71	0·24	95·4	13·5	16·88	16·26
A1	4	Q. 813	Ordinary ploughing; cowpea sown broadcast for plant crop. Ratooned to 15 in. deep with plough and subsoiler	12–9–27	11 months	21·5	20·74	0·21	96·5	13·5	16·90	16·38

7. Central Sugar Experiment Station—*continued.*

Crop Results in Green Manuring Experiments with Different Treatment of Land—Second Ratoon Crop—1927.—Q. 813.

Division.	Plot.	Variety.	Treatment.	Age of Cane.	Weight of Cane per Acre in English Tons.	Weight of Commercial Cane Sugar per Acre in English Tons.
A1 ..	1	Q. 813 ..	Ordinary ploughing; cowpea sown broadcast for plant crop. Ratooned to 15 in. deep with plough and subsoiler	11 months	31·35	5·31
A1 ..	2	Q. 813 ..	Ploughed and subsoiled; cowpea sown broadcast for plant crop. Ratooned to 15 in. deep with plough and subsoiler	11 months	32·77	5·51
A1 ..	3	Q. 813 ..	Ordinary ploughing; fertilised with superphosphate and potash; cowpea sown broadcast. Ratooned to 15 in. with plough and subsoiler	11 months	34·14	5·55
A1 ..	4	Q. 813 ..	Ordinary ploughing; cowpea sown broadcast for plant crop. Ratooned to 15 in. deep with plough and subsoiler	11 months	34·0	5·57

In the tables set out hereunder are the analytical and crop results to date:—

Analytical Results to Date in Green Manuring Experiments with Different Treatment of Land.—Q. 813.

Division.	Plot.	Variety.	Treatment.	Plant Crop, 1925—14 Months.	First Ratoon, 1926—11 Months.	Second Ratoon 1927—11 Months.	Average for Three Crops.
				% Commercial Cane Sugar in Cane.	% Commercial Cane Sugar in Cane.	% Commercial Cane Sugar in Cane.	% Commercial Cane Sugar in Cane.
A1 ..	1	Q. 813	Ordinary ploughing; cowpea sown broadcast for plant crop. Ratooned to 15 in. deep with plough and subsoiler	16·76	17·85	16·96	17·19
A1 ..	2	Q. 813	Ploughed and subsoiled; cowpea sown broadcast for plant crop. Ratooned to 15 in. deep with plough and subsoiler	16·78	18·58	16·81	17·39
A1 ..	3	Q. 813	Ordinary ploughing; fertilised with superphosphate and potash; cowpea sown broadcast. Ratooned to 15 in. deep with plough and subsoiler	17·58	18·25	16·26	17·36
A1 ..	4	Q. 813	Ordinary ploughing; cowpea sown broadcast for plant crop. Ratooned to 15 in. deep with plough and subsoiler	17·59	18·19	16·38	17·39

Crop Results to Date in Green Manuring Experiments with Different Treatment of Land—Q. 813.

Division.	Plot.	Treatment.	Plant Crop, 1925. 14 Months.		First Ratoon Crop, 1926. 11 Months.		Second Ratoon Crop, 1927. 11 Months.		Total Results for Three Crops.		Average Results for Three Crops.	
			Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.
A1	1	Ordinary ploughing; cowpea sown broadcast for plant crop. Ratooned to 15 in. deep with plough and subsoiler	42·8	7·17	23·5	4·05	31·35	5·32	97·65	16·54	32·55	5·51
A1	2	Ploughed and subsoiled; cowpea sown broadcast for plant crop. Ratooned to 15 in. deep with plough and subsoiler	44·4	7·45	27·1	4·88	32·77	5·51	104.27	17·84	34·76	5·95
A1	3	Ordinary ploughing; fertilised with superphosphate and potash; cowpea sown broadcast. Ratooned to 15 in. deep with plough and subsoiler	45·3	7·96	27·3	4·79	34·14	5·55	106·74	18·30	35·58	61
A1	4	Ordinary ploughing; cowpea sown broadcast for plant crop. Ratooned to 15 in. deep with plough and subsoiler	44·9	7·89	25·7	4·54	34·0	5·56	104·6	17·99	34·87	5·99

7. Central Sugar Experiment Station—*continued.*

No apparent results are shown from the averages above beyond the fact that the plot originally fertilised before sowing the green manure has given a slightly higher result all through.

(3) Experiments with Fertilisers—Two series—First ratoon crop.

First Series—

Plot 1—300 lb. sulphate of potash per acre.
Plot 2—500 lb. meatworks fertiliser per acre.
Plot 3—No manure.
Plot 4—500 lb. superphosphate per acre.
Plot 5—500 lb. basic superphosphate per acre.
Plot 6—400 lb. nitrate of soda, 300 lb. sulphate of ammonia, 100 lb. sulphate of potash, and 400 lb. meatworks manure per acre.

Second Series—

Plot 1—400 lb. nitrate of soda per acre.
Plot 2—300 lb. sulphate of ammonia per acre.
Plot 3—No manure.
Plot 4—400 lb. nitrate of soda and 200 lb. basic superphosphate per acre.
Plot 5—200 lb. nitrate of soda, 150 lb. sulphate of ammonia, 50 lb. sulphate of potash, and 200 lb. meatworks fertiliser per acre.

The above experiment was initiated for the purpose of testing certain fertilisers independently, including heavy dressings of nitrogenous fertilisers against complete mixtures containing nitrogen, potash, and phosphoric acid.

The land was well prepared for the plant crop, which was harvested in the middle of October. It was then ratooned to 15 inches deep with plough and subsoiler, and fertilised, and harrowed to level off. The cane ratooned well in all the plots and made unchecked growth all the season. The cane fertilised with nitrogen and complete mixture always showed a much better colour in foliage, and superior growth.

The following tables represent the analytical and crop results of the first ratoon crop:—

Analytical Results in Fertilising Trials—First Ratoon Crop—7R. 428 (Pompey)—October, 1927.

Division.	Plot.	Treatment—Fertiliser per Acre.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	Fibre.	% Sucrose in Cane.	% C.C.S. in Cane.
				First Series.							
Z1	1	300 lb. sulphate of potash ..	10–10–27	11½ months	21·8	20·50	0·28	94·0	10·5	17·32	16·55
Z1	2	500 lb. meatworks fertiliser ..	10–10–27	11½ months	21·9	20·56	0·28	93·9	10·5	17·37	16·59
Z1	3	No fertiliser	10–10–27	11½ months	21·5	20·35	0·27	94·6	10·5	17·19	16·49
Z1	4	500 lb. superphosphate ..	10–10–27	11½ months	21·9	20·64	0·27	94·2	10·5	17·44	16·69
Z1	5	500 lb. basic superphosphate	10–10–27	11½ months	21·6	20·49	0·27	94·8	10·5	17·31	16·63
Z1	6	400 lb. nitrate soda, 300 lb. sulphate ammonia, 100 lb. sulphate of potash, 400 lb. meatworks fertiliser	10–10–27	11½ months	20·0	18·42	0·30	92·1	10·5	15·56	14·69
				Second Series.							
Z1	1	400 lb. nitrate of soda ..	11–10–27	11½ months	20·7	19·56	0·27	94·5	10·5	16·52	15·84
Z1	2	300 lb. sulphate of ammonia	11–10–27	11½ months	20·6	19·37	0·28	94·0	10·5	16·36	15·64
Z1	3	No fertiliser	11–10–27	11½ months	21·1	19·94	0·28	94·5	10·5	16·84	16·15
Z1	4	400 lb. nitrate of soda, 200 lb. basic superphosphate	11–10–27	11½ months	21·5	20·21	0·27	94·0	10·5	17·06	16·31
Z1	5	200 lb. nitrate of soda, 150 lb. sulphate of ammonia, 50 lb. sulphate of potash, 200 lb. meatworks	11–10–27	11½ months	18·9	17·64	0·29	93·3	10·5	14·90	14·18

Crop Results in Fertilising Trials—First Ratoon Crop, 7R. 428 (Pompey)—October, 1927.

Division.	Plot.	Treatment—Fertiliser per Acre.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
		First Series.			
Z1	1	300 lb. sulphate of potash	11½ months	36·3	6·0
Z1	2	500 lb. meatworks fertiliser	11½ months	41·4	6·86
Z1	3	No fertiliser	11½ months	34·6	5·70
Z1	4	500 lb. superphosphate	11½ months	35·7	5·96
Z1	5	500 lb. basic superphosphate	11½ months	31·7	5·27
Z1	6	400 lb. nitrate of soda, 300 lb. sulphate of ammonia, 100 lb. sulphate of potash, 400 lb. meatworks	11½ months	50·5	7·42
		Second Series.			
Z2	1	400 lb. nitrate of soda	11½ months	47·3	7·49
Z2	2	300 lb. sulphate of ammonia	11½ months	41·7	6·52
Z2	3	No fertiliser	11½ months	36·3	5·86
Z2	4	400 lb. nitrate of soda, 200 lb. basic superphosphate	11½ months	38·1	6·21
Z2	5	200 lb. nitrate of soda, 150 lb. sulphate of ammonia, 50 lb. sulphate of potash, 200 lb. meatworks	11½ months	38·8	5·50

7. Central Sugar Experiment Station—*continued.*

In last year's report it was pointed out that the results of the plant crop of this experiment did not disclose any very marked differences between the several plots, but that such differences were never very great in a plant crop when the soil had been well prepared, and where green manure had been used. It was expected that the ratoon crops would give a much better account of themselves, and this has been borne out this year, for the plot with the heavy nitrogenous dressing has given a large yield, viz., 50·5 tons of cane per acre, or practically 16 tons of cane per acre more than the unfertilised plot. The next best result in the first series was where meatworks was applied. This manure contained 5·7 per cent. of nitrogen and 17 per cent. phosphoric acid, and the yield was 6·8 tons of cane per acre higher than the no-manure plot. Potash alone and superphosphate alone gave negligible results, while basic superphosphate gave a lower yield than the no-manure plot, which is difficult to understand.

In the second series, Plot 1 with 400 lb nitrate of soda per acre gave the highest yield, being 11 tons in excess of the tonnage of cane per acre on the no-manure plot, while Plot 2, sulphate of ammonia only, gave an increase of 5·4 tons per acre. In Plots 4 and 5 the yields were lower than expected.

On referring to the analytical table above, it will be noticed that the commercial cane sugar in Plot 6, with the double dressing of nitrogen, is notably lower than in the other plots in the first series, as it is in Plot 5 of the second series, where a heavy dressing of nitrogen was also applied. This bears out previous trials at this Station.

The experiments are being continued to second ratoons, when greater differences are expected if a favourable season eventuates. The soil on this Station is in a good condition of fertility, which is shown by high tonnage on the unfertilised plots, but in ratoon crops the benefit of fertilisers has invariably been shown by marked differences between fertilised and unfertilised plots.

The crop results to date are now given:—

Crop Results to Date in Fertilising Trials—7R. 428 (Pompey).

Division.	Plot.	Treatment—Fertiliser per Acre.	Plant Crop, 1926. 18½ Months.		First Ratoon Crop, 1927. 11½ Months.		Average for Two Crops.	
			Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.
		First Series.						
Z1 ..	1	300 lb. sulphate of potash	43·1	6·86	36·3	6·0	39·4	6·43
Z1 ..	2	500 lb. meatworks fertiliser	45·5	6·93	41·4	6·86	43·4	6·90
Z1 ..	3	No fertiliser	44·2	6·76	34·6	5·70	39·4	6·23
Z1 ..	4	500 lb. superphosphate	45·9	7·12	35·7	5·96	40·8	6·54
Z1 ..	5	500 lb. basic superphosphate	37·6	5·71	31·7	5·27	34·5	5·49
Z1 ..	6	400 lb. nitrate of soda, 300 lb. sulphate of ammonia, 100 lb. sulphate of potash, 400 lb. meatworks fertiliser	45·1	6·59	50·5	7·42	47·8	7·0
		Second Series.						
Z2 ..	1	400 lb. nitrate of soda	42·8	6·09	47·3	7·49	45·0	6·79
Z2 ..	2	300 lb. sulphate of ammonia	43·4	6·03	41·7	6·52	42·6	6·27
Z2 ..	3	No fertiliser	40·8	6·02	36·3	5·86	38·5	5·94
Z2 ..	4	400 lb. nitrate of soda, 200 lb. basic superphosphate	38·3	5·87	38·1	6·21	38·2	6·04
Z2 ..	5	200 lb. nitrate of soda, 150 lb. sulphate of ammonia, 50 lb. sulphate of potash, 200 lb. meatworks fertiliser	38·3	5·82	38·8	5·50	38·5	5·66

(4) Analyses of Miscellaneous Canes.

Of these miscellaneous canes most of them are well known, but new ones are P.O.J. 2714 and 90 F. The most promising cane of these is P.O.J. 2714. This cane made exceptional growth, being far ahead of other good varieties grown alongside; it grows very erect like E.K. 28 with joints 6 to 8 inches long, and is a self-trasher. The sticks are also fairly stout. This year it was grown with the other canes on a medium sandy soil, not retentive to moisture, and the sticks were 9 to 10 feet long; it arrowed, and a few sticks shot at the eyes. The c.c.s. this year showed a slight improvement over last year, 11·9 in June, 13·6 in July, and 16·8 at end of August. Oba Badila is a good cane, with the same characteristics as Badila. 90 F analysed well, but it does not crop sufficiently heavily; sticks are also thin. B. 156 is not promising. Of the older varieties the Striped Sport Q. 813 A tested well.

7. Central Sugar Experiment Station—*continued.*

Below are set out the preliminary, progressive, and final tests of these varieties:—

First Preliminary Examination of Miscellaneous Canes—Plant Crop—June, 1927.

Division.	Variety.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	Purity of Juice.	% C.C.S. in Cane.
H	Oba Badila	30–6–27	10 months	19·1	17·79	93·1	14·03
H	Tableland Badila	30–6–27	10 months	18·4	16·67	90·6	12·93
H	H.Q. 426	30–6–27	10 months	20·3	18·75	92·3	14·71
H	N.G. 24	30–6–27	10 months	19·6	17·86	91·1	13·90
H	N.G. 24A	30–6–27	10 months	19·4	17·98	92·7	14·14
H	N.G. 24B	30–6–27	10 months	19·2	17·10	89·1	13·13
H	Q. 813B (Sport)	30–6–27	10 months	21·8	20·48	93·9	16·23
H	Q. 813A (Sport)	30–6–27	10 months	21·8	20·53	94·2	16·29
H	Q. 855A (Sport)	30–6–27	10 months	19·9	17·86	89·7	13·78
H	P.O.J. 2714	30–6–27	10 months	18·9	16·05	84·9	11·95
H	90 F.	30–6–27	10 months	18·4	16·40	89·1	12·60
H	7R. 428 (Pompey)	30–6–27	10 months	18·2	15·23	83·7	11·22
H	1900 Seedling	30–6–27	10 months	19·0	16·74	88·0	12·76
H	B. 156	30–6–27	10 months	18·0	15·50	86·1	11·65
H	D. 109	30–6–27	10 months	19·4	17·15	88·2	13·10

Second Progressive Examination of Miscellaneous Canes—Plant Crop—July, 1927.

Division.	Variety.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	Purity of Juice.	% C.C.S. in Cane.
H	Oba Badila	31–7–27	11 months	20·0	18·94	94·7	15·17
H	Tableland Badila	31–7–27	11 months	19·5	18·47	94·7	14·79
H	H.Q. 426	31–7–27	11 months	21·2	20·11	94·9	16·12
H	N.G. 24	31–7–27	11 months	19·6	18·73	95·5	15·05
H	N.G. 24A	31–7–27	11 months	18·8	17·67	93·9	14·03
H	N.G. 24B	31–7–27	11 months	20·3	19·22	94·6	15·37
H	Q. 813B (Sport)	31–7–27	11 months	20·8	20·05	96·4	16·22
H	Q. 813A (Sport)	31–7–27	11 months	21·6	20·94	96·9	16·99
H	Q. 855A (Sport)	31–7–27	11 months	19·2	17·50	91·1	13·62
H	P.O.J. 2714	31–7–27	11 months	19·7	17·65	89·6	13·60
H	90 F.	31–7–27	11 months	19·9	18·65	93·7	14·76
H	7R. 428 (Pompey)	31–7–27	11 months	19·0	17·24	90·7	13·39
H	1900 Seedling	31–7–27	11 months	19·0	17·44	91·8	13·64
H	B. 156	31–7–27	11 months	18·6	17·29	92·9	13·62
H	D. 109	31–7–27	11 months	19·1	17·42	91·2	13·57

Final Examination of Miscellaneous Canes—Plant Crop—August, 1927.

Division.	Variety.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	Purity of Juice.	% C.C.S. in Cane.
H	Oba Badila	23–8–27	12 months	21·7	20·51	94·5	16·51
H	Tableland Badila	23–8–27	12 months	20·6	19·21	93·2	15·34
H	N.G. 24	23–8–27	12 months	20·6	19·85	96·3	16·15
H	N.G. 24A	23–8–27	12 months	20·6	19·69	95·5	15·95
H	N.G. 24B	23–8–27	12 months	20·5	19·42	94·7	15·65
H	Q. 813B (Sport)	23–8–27	12 months	21·0	20·07	95·6	16·26
H	Q. 813A (Sport)	23–8–27	12 months	21·2	20·52	96·8	16·74
H	Q. 855A (Sport)	23–8–27	12 months	20·1	18·91	94·1	15·18
H	P.O.J. 2714	23–8–27	12 months	22·2	20·93	94·3	16·82
H	90 F.	23–8–27	12 months	21·4	20·71	96·8	16·90
H	7R. 428 (Pompey)	23–8–27	12 months	20·3	18·68	92·0	14·81
H	1900 Seedling	23–8–27	12 months	20·5	19·37	94·5	15·59
H	B. 156	23–8–27	12 months	19·8	18·57	93·8	14·88
H	D. 109	23–8–27	12 months	20·1	18·59	92·4	14·78

7. Central Sugar Experiment Station—*continued.*

(5) Analyses of Varieties introduced from Java, Hawaii, Mauritius, and Philippine Islands.

The most promising of these varieties are Striped Tip, M. 291/08, Luzon 2, and Luzon 4. The first is a thin cane, a very good stooler, and prolific in ratoons; the c.c.s. is moderate. M. 291/08 tested well, but is much inclined to lodge. Luzon 2 and 4 are very clean, healthy canes, standing erect, and should be good canes when more acclimatised.

The tables of preliminary and final tests are included below:—

Preliminary Examination of New Varieties Introduced from Java, Hawaii, Mauritius, and Philippine Islands—Plant Crop—August, 1927.

Variety.	Introduced from.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	Purity of Juice.	% C.C.S. in Cane.
P.O.J. 100	Java	31–8–27	13 months	19·3	17·98	93·2	14·18
P.O.J. 213	Java	31–8–27	13 months	19·7	18·66	94·7	14·86
H. 456	Hawaii	31–8–27	13 months	18·9	17·34	91·7	13·55
H. 5803	Hawaii	31–8–27	13 months	17·6	15·45	87·7	11·75
Striped Tip	Hawaii	31–8–27	13 months	19·3	17·37	90·0	13·42
M. 291/08	Mauritius	31–8–27	13 months	19·7	17·89	90·8	13·90
M. 64/14	Mauritius	31–8–27	13 months	17·0	14·57	88·7	10·91
M. 55/453	Mauritius	31–8–27	13 months	20·6	18·53	90·0	14·31
Luzon 2	Philippine Islands ..	31–8–27	13 months	19·7	17·86	90·7	13·86
Luzon 4	Philippine Islands ..	31–8–27	13 months	20·3	19·36	95·3	15·47

Final Examination of New Varieties Introduced from Java, Hawaii, Mauritius, and Philippine Islands—Plant Crop—September, 1927.

Variety.	Introduced from.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	Purity of Juice.	% C.C.S. in Cane.
P.O.J. 100	Java	30–9–27	14 months	19·1	17·71	92·7	14·10
P.O.J. 213	Java	30–9–27	14 months	17·5	15·37	87·9	11·84
H. 456	Hawaii	30–9–27	14 months	18·3	16·94	92·6	13·47
H. 5803	Hawaii	30–9–27	14 months	18·4	16·26	88·4	12·57
Striped Tip	Hawaii	30–9–27	14 months	20·8	18·84	90·6	14·79
M. 291/08	Mauritius	30–9–27	14 months	21·2	20·01	94·4	16·10
M. 55/453	Mauritius	30–9–27	14 months	19·6	17·65	90·1	13·81
Luzon 2	Philippine Islands ..	30–9–27	14 months	19·0	17·01	89·5	13·26
Luzon 4	Philippine Islands ..	30–9–27	14 months	20·8	19·33	92·9	15·66

(6) Analyses of Eight South Johnstone Queensland Seedlings.

The above canes continue to show promising results. S.J.Q. 2 again leads the list in c.c.s. results; it has only a medium growth so far; the sticks are of medium thickness and the cane very soft; probably will be liable to damage from pests.

S.J.Q. 3 is a stout cane and crops well; it tested better this year than last. S.J.Q. 4 promises to be a good cropper, the c.c.s. is fairly good. The same applies to S.J.Q. 5. The next two, S.J.Q. 15 and 16, are thin canes with good sugar content. S.J.Q. 28 did not test as well as last year, but it promises to be a good grower; the germination is a little slow. S.J.Q. 468 is comparably to S.J.Q. 28 in growth, but so far the c.c.s. is lower. These canes are all very healthy, showing no sign of any disease.

Below are given the preliminary, progressive, and final examinations of these varieties:—

First Preliminary Examination of South Johnstone Queensland Seedlings—First Ratoons—June, 1927.

Variety.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	Purity of Juice.	% C.C.S. in Cane.	Variety from which Seed was taken.
S.J.Q. 2..	30–6–27	10 months	20·8	19·08	91·7	14·91	Badila
S.J.Q. 3..	30–6–27	10 months	20·4	18·59	91·7	14·61	Badila
S.J.Q. 4..	30–6–27	10 months	18·7	16·18	86·5	12·59	Badila
S.J.Q. 5..	30–6–27	10 months	20·3	18·04	88·8	13·83	Badila
S.J.Q. 15	30–6–27	10 months	21·1	19·12	90·6	14·83	Badila
S.J.Q. 16	30–6–27	10 months	20·5	19·41	92·7	15·25	Badila
S.J.Q. 28	30–6–27	10 months	19·2	17·28	89·5	13·23	N.G. 24 (Goru)
S.J.Q. 468	30–6–27	10 months	19·9	17·57	88·2	13·41	N.G. 24 (Goru)

7. Central Sugar Experiment Station—*continued.*

Second Progressive Examination of South Johnstone Queensland Seedlings—First Ratoons—July, 1927.

Variety.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	Purity of Juice.	% C.C.S. in Cane.	Variety from which Seed was taken.
S.J.Q. 2..	31–7–27	11 months	21·1	19·83	94·0	15·79	Badila
S.J.Q. 3..	31–7–27	11 months	20·6	19·50	94·6	15·72	Badila
S.J.Q. 4..	31–7–27	11 months	19·6	17·70	90·3	13·79	Badila
S.J.Q. 5..	31–7–27	11 months	19·8	18·15	91·7	14·22	Badila
S.J.Q. 15	31–7–27	11 months	21·6	20·37	94·2	16·22	Badila
S.J.Q. 16	31–7–27	11 months	20·2	19·65	97·2	15·93	Badila
S.J.Q. 28	31–7–27	11 months	19·4	18·58	95·8	14·91	N.G. 24 (Goru)
S.J.Q. 468	31–7–27	11 months	20·5	19·32	94·2	15·41	N.G. 24 (Goru)

Third Progressive Examination of South Johnstone Queensland Seedlings—First Ratoons—August, 1927.

Variety.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	Purity of Juice.	% C.C.S. in Cane.	Variety from which Seed was taken.
S.J.Q. 2	23–8–27	12 months	22·3	21·19	95·0	17·11	Badila
S.J.Q. 3..	23–8–27	12 months	22·0	21·14	96·1	17·17	Badila
S.J.Q. 4..	23–8–27	12 months	20·1	18·51	92·1	14·68	Badila
S.J.Q. 5..	23–8–27	12 months	19·7	18·04	91·6	14·26	Badila
S.J.Q. 15	23–8–27	12 months	21·7	20·40	94·0	16·37	Badila
S.J.Q. 16	23–8–27	12 months	21·2	20·50	96·7	16·71	Badila
S.J.Q. 28	23–8–27	12 months	20·4	19·29	94·6	15·53	N.G. 24 (Goru)
S.J.Q. 468	23–8–27	12 months	20·7	19·12	92·3	15·19	N.G. 24 (Goru)

Final Examination of South Johnstone Queensland Seedlings—First Ratoons—September, 1927.

Variety.	Date of Analysis.	Age of Cane.	% Total Solids (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% C.C.S. in Cane.	Variety from which Seed was taken.
S.J.Q. 2 ..	30–9–27	13 months	24·3	23·02	0·25	94·7	18·55	Badila
S.J.Q. 3 ..	30–9–27	13 months	23·6	22·50	0·24	95·3	18·25	Badila
S.J.Q. 4 ..	30–9–27	13 months	21·1	19·70	0·27	93·3	15·75	Badila
S.J.Q. 5 ..	30–9–27	13 months	20·8	19·37	0·25	93·1	15·46	Badila
S.J.Q. 15 ..	30–9–27	13 months	22·2	20·56	0·27	92·6	16·36	Badila
S.J.Q. 16 ..	30–9–27	13 months	21·8	21·16	0·19	97·1	17·28	Badila
S.J.Q. 28 ..	30–9–27	13 months	21·5	20·56	0·22	95·6	16·66	N.G. 24 (Goru)
S.J.Q. 468 ..	30–9–27	13 months	18·1	17·41	0·26	96·2	12·80	N.G. 24 (Goru)

Below is given a brief description of the new seedling canes:—

Description of South Johnstone Queensland Seedlings.

S.J.Q. 2.—Blackish cane, medium thickness, joints 3 to 4 in., parallel sided, very soft, eyes medium round and flat, foliage narrow, small top.

S.J.Q. 3.—Blackish cane, waxed, thick, joints 4 to 5 in., eyes medium, full, slightly pointed, foliage broad, large top.

S.J.Q. 4.—Blackish cane, heavily waxed, thick, internodes 4 to 5 in., slightly parallel sided, eyes medium full and round, foliage broad, large top, hispidity plentiful.

S.J.Q. 5.—Blackish cane, medium thickness, internodes 5 to 6 in., slightly zig-zag, slight hump at nodes, eyes prominent and pointed, foliage and top medium, arrows freely.

S.J.Q. 15.—Blackish cane, medium thickness, joints 4 to 5 in., zig-zag, constricted below nodes, eyes prominent and pointed, foliage narrow, small top.

S.J.Q. 16.—Blackish cane, medium thickness, internodes 4 to 5 in., zig-zag, constricted below nodes, eyes small and flat, foliage medium, hispidity fairly plentiful.

S.J.Q. 28.—Brownish cane, thick, internodes 4 to 5 in., cylindrical, dark-yellow flesh, eyes large flat and pointed, foliage medium.

S.J.Q. 468.—Brownish cane, thick, internodes 3 to 4 in., barrel-shaped, zig-zag, flesh light-yellow, eyes large full and pointed, foliage large.

7. Central Sugar Experiment Station—*continued.*

(7) Preliminary Experiment in Soaking Cane Plants in different Solutions for 24 hours, to test time in germination.

Experiments carried out in Porto Rico with the soaking of plants in various solutions gave appreciable results, both in rapidity of germination and increased crop. The most favourable results were obtained by soaking in water alone, saturated lime solution, and saturated lime solution with magnesium sulphate (Epsom salts) at rate of 1 lb. to 50 gallons of water.

As no large area of experimental land was available this year on this station, a small area of three lines for each trial was selected, where some Clark's Seedling was being planted. The soil on the piece selected was uniform in character. As no proper appliances were available, there was a period of twenty-four hours between each planting; also, soaking in water alone was not tried.

It is intended next year to try out this experiment on a larger scale, and the land is now under green crop.

The results of this small experiment as far as germination is concerned bear out the claim made in the Porto Rico experiments. The number of shoots through were counted each week, and are set out in tabular form below. It will be noted that the germination of soaked plants is far superior, with the advantage in lime and magnesia solution.

The amount of land planted this year will enable a small comparison to be made in tonnage results when harvested next year, as there will be about 5 tons of cane to each three lines of cane.

Preliminary Experiment in Soaking of Cane Plants in Different Solutions for Twenty-four Hours to Test Time in Germination.

Number of days after planting.	Plants not soaked.	Plants soaked in saturated lime solution.	Plants soaked in saturated Lime solution with 1 lb. Magnesium Sulphate to 50 gallons of water.
	Number germinated.	Number germinated.	Number germinated.
27	6	..	..
26	..	136	..
25	..	..	174
34	106	..	..
33	..	275	..
32	..	..	360
41	281	..	..
40	..	386	..
39	..	..	456
48	530	..	..
47	..	*518	..
46	..	..	556

* Unfortunately some of the eyes were attacked by a pest of some kind.

VARIETIES GROWING ON MACKAY EXPERIMENT STATION FOR 1928 SEASON.

D. 1135	S.J.Q. 49
D. 109	S.J.Q. 301
H.Q. 426	S.J.Q. 468
E.K. 28	S.C. 12 (4)
Q. 813	B.H. 10/12
Q. 813A, Striped Sport	P.O.J. 100
Q. 813B, Green Sport	P.O.J. 213
N.G. 24	P.O.J. 2714
N.G. 24A	H. 456
N.G. 24B	H. 5803
1900 Seedling	Striped Tip
7 R. 423 (Pompey)	Luzon 2
Badila	Luzon 4
Oba Badila	M. 291/08
Q. 855	M. 64/14
Q. 855A, Striped Sport	M. 55/453
R. 156	H. 146
E.K. 1	H. 227
S.J.Q. 2	Q. 1092
S.J.Q. 3	Q. 1098
S.J.Q. 4	Co. 210
S.J.Q. 5	Co. 213
S.J.Q. 7	Co. 227
S.J.Q. 10	N.G. 14
S.J.Q. 15	R.P. 6
S.J.Q. 16	H. 109
S.J.Q. 28	90 F.

ANNUAL FIELD DAY.

The Annual Field Day of the Sugar Experiment Station at Mackay was held this year on Friday, 11th June, when, as usual, a large gathering of cane growers, sugar mill representatives, and commercial men attended. Professor Goddard, Dean of the Faculty of Agriculture, was present, and gave an exceedingly interesting address on the measures at present being adopted by the Commonwealth and State Governments and by the Queensland University to promote the interests of agriculture generally, and particularly those of the sugar industry.

In the course of his address, Professor Goddard said that he had remarked, during the few years of his association with the biological problems in relation to agriculture in Queensland, the desire of the Bureau of Sugar Experiment Stations to co-operate with every scientific effort to solve the problems connected with the industry. These efforts to secure the efficient training of cadets in plant pathology and entomology had counted for much in the fight to

7. Central Sugar Experiment Station—*continued.*

secure a Faculty of Agriculture. Now that this had been brought about, there was a great desire on the part of the University to afford thorough training to young men and cadets for every type of specialisation required in dealing with the problems of tropical agriculture.

Professor Goddard then dealt in an illuminating manner with science in its relation to agriculture; an address that was warmly appreciated by all those present.

Practical addresses on cane diseases and insect pests were delivered by Messrs. E. J. Ferguson Wood, B.Sc., and Mr. R. W. Mungomery, and were illustrated by exhibitions of material.

A fine display of modern cane-farming machinery concluded the day, and the Bureau is much indebted to Messrs. J. Croker and Sons, the International Harvester Company, Limited, and the Australian Co-operative Fertilisers Company for their assistance in this respect.

PESTS AND DISEASES.

Very little weevil borer has been seen of late years at the Mackay Experiment Station. Rats, however, have done some damage this year.

DATES OF ARROWING OF VARIETIES.

7R. 428 (Pompey) (ratoons)—20th May (few).
P.O.J. 2714 (plant)—29th May (few).
S.J.Q. 5 (plant)—15th June (freely).
S.J.Q. 15 (plant)—20th June (few).
N.G. 24 Goru (plant)—1st July (very sparse).
Q. 855A (plant)—1st July (few).
Q. 813 (second ratoons)—15th July (very few).
D. 109 (second ratoons)—31st July (few).
E.K. 28 (second ratoons)—31st July (few).

NEW EXPERIMENTS UNDERTAKEN.

1. Comparative trials of Q. 813 and two Sports of Q. 813A (striped) and Q. 813B (green).
2. Comparative trials with five South Johnstone Queensland Seedlings—S.J.Q. 2, S.J.Q. 4, S.J.Q. 5, S.J.Q. 15, and S.J.Q. 16.
3. Competitive trial with two South Johnstone Queensland Seedlings—S.J.Q. 28 and S.J.Q. 468.
4. Trials with trash ploughed under and green crops versus trash burnt off, and green crops.

NEW VARIETIES INTRODUCED.

B.H. 10/12 from Barbados.
S.C. 12/4 from Cuba and Barbados.
Co. 210, Co. 213, and Co. 227 from India, through the Bundaberg Experiment Station.

YIELD OF CANE HARVESTED FROM THE SUGAR EXPERIMENT STATION AT MACKAY, SEASON 1927.

	Tons.
Cane sent to mill up to 8th November ..	162·3
Estimated tonnage to harvest	64
Distributed to farmers and used for analyses ..	6
Used for plants	14
	246·3

Nature of Crop—

Plant cane, 0·74 acres	10·4 per cent.
First ratoons, 3·73 acres ..	52·4 per cent.
Second ratoons, 2·65 acres ..	37·2 per cent.

Tonnages—

Plant cane ..	32 tons 1 cwt.	= 43·3 tons per acre
First ratoons	125 tons 18 cwt.	= 33·8 tons per acre
Second ratoons	88 tons 7 cwt.	= 33·3 tons per acre
	246 tons 6 cwt.	

Acreage under cane	7·12 acres
Tons cane per acre	34·6 tons

8.—Work of the Southern Sugar Experiment Station at Bundaberg.

The Chemist in Charge of the Sugar Experiment Station at Bundaberg is Mr. J. Pringle, whose work during the past twelve months has been executed with attention and care. The foreman, Mr. A. E. Evans, and the teamster, Mr. C. V. E. Olsen, have also carried out their duties with much credit.

The tables in the following section have been prepared by Mr. Pringle, who has also supplied notes on weather conditions, and on crops resulting from the experiments laid down.

METEOROLOGICAL.

The climatic conditions during the period from August, 1926, to March, 1927, though better than the previous year, could not be regarded as wholly favourable for canegrowing. The winter of 1926 was somewhat severe and dry, with frosts extending into the early part of September, one of which was so acute as to cause considerable damage to the cane, especially the autumn plant and young ratoons. The rainfalls from August to the middle of December, 1926, were of a light nature, only 2.27 inches being recorded during that period, and on no occasion did the fall reach 1 inch. Owing to adverse conditions in August and September, 1926, a poor strike was obtained in the spring plantings in the Bundaberg district, the extent of which is reflected in many of the light plant crops being harvested this year. After a good soaking rain of 9 inches towards the middle of December, the cane made a quick recovery and grew rapidly during the following three months, though, owing to excessive rainfalls and rough weather in January, 1927, the growth was not quite so vigorous, but as the cyclonic conditions ceased towards the end of that month rapid progress was made during the next two months till checked by cold weather in April, 1927.

8. Southern Sugar Experiment Station—*continued.*

The winter was cold, and the cane in many places was severely damaged by frosts. The spring months of this year were cold, and, though there was sufficient moisture in the soil, the germination of the spring plantings was prolonged, but as warmer conditions prevailed and good rains fell at the end of September and the beginning of October, the crops should be good for next year, if favourable conditions continue.

RAINFALL AT THE SOUTHERN SUGAR EXPERIMENT STATION, BUNDABERG, DURING THE GROWING PERIOD.

Month.	Rainfall. In.	No. of Wet Days.
August, 1926	0·03	1
September, 1926	1·37	11
October, 1926	0·85	2
November, 1926	0·31	5
December, 1926	18·86	15
January, 1927	24·00	17
February, 1927	4·55	6
March, 1927	9·80	16
April, 1927	3·75	6
May, 1927	0·30	3
June, 1927	4·23	4
July, 1927	1·74	5
August, 1927	1·13	4
September, 1927	2·58	8
October, 1927	4·09	10
Total	77·59	113

RAINFALL RECORDS TAKEN AT THIS STATION SINCE 1914.

Year.	Rainfall in Inches.
1914	36·430
1915	19·658
1916	47·307
1917	51·054
1918	37·156
1919	22·120
1920	39·270
1921	49·180
1922	38·775
1923	32·905
1924	38·755
1925	47·672
1926	48·520
1927 (10 months)	56·160

EXPERIMENTS DEALT WITH IN THIS SECTION OF THE REPORT.

(1) Conclusion of fertilising experiment with N.G. 15 (Badila)—Second ratoons (standover).

(2) Conclusion of experiments with sulphate of lime (gypsum) in place of carbonate of lime. D. 1135—Second ratoons.

(3) Conclusion of experiments with green manure followed by cane. D. 1135—Second ratoons.

(4) Continuation of fertilising experiment No. 1. Q. 813—First ratoons.

(5) Continuation of fertilising experiment No. 2 (potash trials). Q. 813—First ratoons.

(6) Analytical examination of three canes from Coimbatore, South India, and one from Java.

(1) Conclusion of Fertilising Experiment with N.G. 15 (Badila)—Second ratoons (standover).

Plot 1—600 lb. mixed manure per acre, containing 150 lb. sulphate of ammonia, 100 lb. nitrate of soda, 150 lb. sulphate of potash, and 200 lb. meatworks manure; also, in December, 1926, as a top dressing, 100 lb. sulphate of ammonia and 50 lb. nitrate of soda per acre.

Plot 2—No manure applied.

On the removal of the first ratoon crop in November, 1925, each plot was ratooned uniformly, and the cane came away well. On the 24th November, mixed manure as above was applied to Plot 1, but, as the following four weeks were dry, little progress was made. After a fall of 5 inches towards the end of December the cane commenced to grow rapidly, especially Plot 1, and made good headway until retarded by adverse conditions from the middle of January to the end of April. Though 10·28 inches of rain were recorded during that period, the falls were of a light nature, and the growth of the cane was slow until completely checked by cold weather in May. As the cane was not sufficiently forward to cut, and had suffered no damage from frost, it was allowed to stand over. In the middle of December, 1926, nitrogen was applied as a top dressing to Plot 1 as follows:—100 lb. sulphate of ammonia and 50 lb. nitrate of soda per acre. The cane in both plots grew vigorously well into April before being retarded by cold conditions.

The tables now following comprise the analytical and crop results of the second ratoons:—

Analytical Examination of Manurial Experiments,—N.G. 15 or Badila—Standover—Second Ratoon Crop—August, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.
C1	1	Badila	600 lb. mixed manure per acre, containing 150 lb. sulphate of ammonia, 100 lb. nitrate of soda, 150 lb. sulphate of potash, and 200 lb. meatworks manure, also in December, 1926, as a top dressing 100 lb. sulphate of ammonia and 50 lb. nitrate of soda per acre	21 months	8-8-27	21·0	19·94	0·13	94·9	16·73	16·09
C1	2	Badila	No manure	21 months	8-8-27	20·1	18·77	0·14	93·3	15·76	15·60

8. Southern Sugar Experiment Station—*continued.*

Crop Result of Manurial Experiments—N.G. 15 or Badila—Second Ratoon Crop—August, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Weight of Cane per Acre in English Tons.	Weight of Commercial Cane Sugar per Acre in English Tons.
C1 ..	1	Badila	600 lb. mixed manure per acre, containing 150 lb. sulphate of ammonia, 100 lb. nitrate of soda, 150 lb. sulphate of potash, and 200 lb. meatworks; also in December, 1926, as a top-dressing 100 lb. sulphate of ammonia and 50 lb. nitrate of soda per acre	21 months	25·78	4·15
C1 ..	2	Badila	No manure	21 months	12·84	1·93

The analytical tables and crop results to date are comprised hereunder:—

Analytical Results to Date of Manurial Experiments—N.G. 15 or Badila.

Division.	Plot Number.	Variety of Cane.	Treatment.	Plant Crop, 1924—Age 24 Months.	First Ratoon Crop, 1925—Age 15 Months.	Second Ratoon Crop, 1927—Age 21 Months.	Average for Three Crops.
				% Commercial Cane Sugar in Cane.	% Commercial Cane Sugar in Cane.	% Commercial Cane Sugar in Cane.	% Commercial Cane Sugar in Cane.
C1	1	Badila	Mixed manures	16·98	17·12	16·09	16·73
C1	2	Badila	No manure	17·46	17·33	15·00	16·59

Total Crop Results of Manurial Experiments—N.G. 15 or Badila.

Division	Plot Number.	Variety of Cane.	Treatment.	Plant Crop, 1924—Age 24 Months.		First Ratoon Crop, 1925—Age 15 Months.		Second Ratoon Crop, 1927—Age 21 Months.		Total Results for Three Crops.		Average for Three Crops.	
				Yield of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Yield of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.
C1	1	Badila	Mixed manures	26·41	4·48	30·11	5·15	25·78	4·15	80·30	13·78	26·76	4·59
C1	2	Badila	No manure	21·24	3·71	15·54	2·69	12·84	1·93	49·34	8·33	16·44	2·77

From the above table of crop results it will be gathered that the growing of Badila as a two-year crop in the Bundaberg district, well fertilised, is payable.

(2) Conclusion of Experiments with Sulphate of Lime (Gypsum) in place of Carbonate of Lime. D. 1135—Second ratoons.

Plot 1—One ton sulphate of lime per acre.

Plot 2—Two tons sulphate of lime per acre.

Plot 3—No lime applied.

After harvesting the first ratoons crop in September, 1926, each plot was ratooned in the usual manner, but owing to dry conditions the ratoons, though strong and healthy, were slow in coming away. Late in November, mixed manure was applied to each plot as follows:—100 lb. sulphate of ammonia, 50 lb. nitrate of soda, 150 lb. sulphate of potash, and 200 lb. meatworks manure per acre, but the cane did not make much headway until the middle of December, when the soil received a good soaking, and vigorous growth was made during the following three months. Progress was again checked by cold, dry conditions in April. During the growing period the plots appeared to be quite uniform both in growth and colour.

Previous annual reports have shown that no benefit whatever was derived from the application of lime oxide or lime carbonate on the red soils at the Bundaberg Sugar Experiment Station. It was suggested that gypsum, or sulphate of lime, might make a difference. However, after trials of this form of lime from 1924 to 1927, negative results have to be reported, and it must now be concluded that the application of lime to the red scrub soils of Bundaberg is not required.

8. Southern Sugar Experiment Station—*continued.*

Analytical Examination of Experiments with Sulphate of Lime (Gypsum) in Place of Carbonate of Lime.—D. 1135. Second Ratoon Crop – September, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.
B2	1	D. 1135	One ton sulphate of lime per	12 months	5–9–27	19·8	18·44	0·67	93·1	15·49	14·74
B2	2	D. 1135	Two tons sulphate of lime per acre	12 months	5–9–27	18·4	17·63	0·64	95·7	14·81	14·31
B2	3	D. 1135	No lime	12 months	5–9–27	19·0	18·14	0·55	95·5	15·23	14·70

Crop Results of Experiments with Sulphate of Lime (Gypsum) in place of Carbonate of Lime—D. 1135. Second Ratoon Crop—September, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
B2	1	D. 1135	One ton sulphate of lime per acre	12 months	25·13	3·70
B2	2	D. 1135	Two tons sulphate of lime per acre	12 months	25·20	3·61
B2	3	D. 1135	No lime	12 months	27·75	4·08

Analytical Results to Date of Experiments with Sulphate of Lime (Gypsum) in place of Carbonate of Lime.

Division.	Plot Number.	Variety of Cane.	Treatment.	Plant Crop, 1925—Age 12 Months.	First Ratoon Crop, 1926—Age 12 Months.	Second Ratoon Crop, 1927—Age 12 Months.	Average for Three Crops.
				% Commercial Cane Sugar in Cane.	% Commercial Cane Sugar in Cane.	% Commercial Cane Sugar in Cane.	% Commercial Cane Sugar in Cane.
B2	1	D. 1135	One ton sulphate of lime per acre ..	14·35	15·11	14·74	14·73
B2	2	D. 1135	Two tons sulphate of lime per acre ..	13·79	14·95	14·31	14·35
B2	3	D. 1135	No lime	14·73	14·15	14·70	14·52

Total Crop Results to Date of Experiments with Sulphate of Lime (Gypsum) in place of Carbonate of Lime.

Division.	Plot Number.	Variety of Cane.	Treatment.	Plant Crop, 1925—Age 12 Months.		First Ratoon Crop, 1926—Age 12 Months.		Second Ratoon Crop, 1927—Age 12 Months.		Total for Three Crops.		Average for Three Crops.	
				Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Weight of Cane per Acre in English Cane.	Yield of C.C.S. per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Weight of Cane per Acre in Englich Tons.	Yield of C.C.S. per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.
B2	1	D. 1135	One ton sulphate of lime per acre	22·81	3·31	14·25	2·15	25·13	3·70	62·19	9·14	20·73	3·04
B2	2	D. 1135	Two tons sulphate of lime per acre	23·81	2·28	14·85	2·12	25·20	3·61	63·86	8·01	21·29	2·67
B2	3	D. 1135	No lime	25·21	3·71	15·37	2·17	27·75	4·08	68·33	9·96	22·78	3·32

8. Southern Sugar Experiment Station—*continued.*

(3) Conclusion of Experiments with Green Manure followed by Cane. D. 1135—Second ratoons.

In the preparation of this land before planting cowpea, Plots 1 and 4 received ordinary ploughings only, Plot 2 was subsoiled in addition, and to Plot 3 100 lb. of sulphate of potash and 200 lb. of meatworks manure were applied.

Shortly after taking off the first ratoon crop, at the beginning of September, 1926, each plot was ratooned by running three furrows between the rows and levelling with the cultivator. On account of adverse weather the ratoons were delayed, but ultimately came away well. On the 23rd November mixed manure containing 100 lb. sulphate of ammonia, 50 lb. nitrate of soda, 150 lb. sulphate of potash, and 200 lb. meatworks per acre was applied to each plot, but, owing to unfavourable conditions, the cane made no real progress until heavy rain fell about the middle of December, when it made a quick recovery and grew vigorously until checked by winter conditions late in autumn.

In the tables appearing hereunder the analytical and crop results of the second ratoons are given. It will be noted that the purity of the juice is very high in the analytical table:—

Analytical Examination of Experiments with Green Manure followed by Cane—D. 1135—Second Ratoon Crop—August, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.
E3	1	D. 1135	Ordinary ploughing; cowpea planted	12 months	27–8–27	19·0	17·70	0·71	93·1	14·87	14·14
E3	2	D. 1135	Ploughed and subsoiled; cowpea planted	12 months	27–8–27	19·5	18·21	0·66	93·3	15·29	14·59
E3	3	D. 1135	Ordinary ploughing, but fertilised with 100 lb. sulphate of potash and 200 lb. meatworks manure per acre applied broadcast previous to planting cowpea	12 months	27–8–27	19·8	18·63	0·43	94·1	15·65	14·97
E3	4	D. 1135	Ordinary ploughing; cowpea planted	12 months	27–8–27	19·4	18·40	0·52	94·8	15·45	14·87

Crop Results of Experiments with Green Manure followed by Cane—D. 1135—Second Ratoon Crop—August, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Weight of Cane per Acre in English Tons.	Weight of Commercial Cane Sugar per Acre in English Tons.
E3	1	D. 1135..	Ordinary ploughing; cowpea planted	12 months	21·53	3·04
E3	2	D. 1135..	Ploughed and subsoiled; cowpea planted	12 months	22·86	3·34
	3	D. 1135..	Ordinary ploughing but fertilised with 100 lb. sulphate of potash and 200 lb. meatworks manure per acre applied broadcast previous to planting cowpea	12 months	20·46	3·05
E3	4	D. 1135..	Ordinary ploughing; cowpea planted	12 months	18·36	2·73

The analytical results to date are given below:—

Analytical Results to Date of Experiments with Green Manure followed by Cane.

Division.	Plot Number.	Variety of Cane.	Treatment.	Plant Crop, 1925—Age 12 Months	First Ratoon Crop, 1926—Age 12 Months	Second Ratoon Crop, 1927—Age 12 Months	Average for Three Crops.
				% Commercial Cane Sugar in Cane.	% Commercial Cane Sugar in Cane.	% Commercial Cane Sugar in Cane.	% Commercial Cane Sugar in Cane.
E3	1	D. 1135	Ordinary ploughing; cowpea planted ..	14·21	14·10	14·14	14·15
E3	2	D. 1135	Ploughed and subsoiled; cowpea planted	14·28	14·78	14·59	14·55
E3	3	D. 1135	Ordinary ploughing, but fertilised with 100 lb. sulphate of potash and 200 lb. meatworks manure per acre applied broadcast previous to planting cowpea	14·03	15·46	14·97	14·82
E3	4	D. 1135	Ordinary ploughing; cowpea planted ..	14·01	14·57	14·87	14·48

8. Southern Sugar Experiment Station—*continued.*

The results of the three crops are summarised hereunder. It will be seen from the averages that the plot subsoiled before planting green manure and that which received potash and phosphoric acid have given slightly higher yields, but not sufficient to be very payable.

Total Crop Results of Experiments with Green Manure followed by Cane.

Division.	Plot Number.	Variety of Cane.	Treatment.	Plant Crop, 1925—Age 12 Months.		First Ratoon Crop, 1926—Age 12 Months.		Second Ratoon Crop, 1927—Age 12 Months.		Total Results of Three Crops.		Average for Three Crops.	
				Weight of Cane per acre in English Tons.	Yield of C.C.S. per acre in English Tons.	Weight of Cane per acre in English Tons.	Yield of C.C.S. per acre in English Tons.	Weight of Cane per acre in English Tons.	Yield of C.C.S. per acre in English Tons.	Weight of Cane per acre in English Tons.	Yield of C.C.S. per acre in English Tons.	Weight of Cane per acre in English Tons.	Yield of C.C.S. per acre in English Tons.
E3	1	D. 1135	Ordinary ploughing; cowpea planted	20·44	2·90	9·37	1·32	21·53	3·04	51·34	7·26	17·11	2·42
E3	2	D. 1135	Ploughed and subsoiled; cowpea planted	24·91	3·56	11·03	1·63	22·86	3·34	58·80	8·53	19·60	2·84
E3	3	D. 1135	Ordinary ploughing, but fertilised with 100 lb. sulphate of potash and 200 lb. meatworks manure per acre applied broadcast previous to planting cowpea	24·60	3·45	12·32	1·90	20·46	3·05	57·38	8·40	19·13	2·80
E3	4	D. 1135	Ordinary ploughing; cowpea planted	21·73	3·04	9·55	1·39	18·36	2·73	49·64	7·15	16·55	2·38

(4) Continuation of Fertilising Experiment No. 1. Q. 813—First ratoons.

Plot 1—No manure applied.

Plot 2—600 lb. mixed manure per acre, containing 150 lb. sulphate of ammonia, 200 lb. sulphate of potash, and 250 lb. meatworks manure.

Plot 3—Manure as in Plot 2.

Plot 4—No manure applied.

Plot 5—Manure as in Plot 2.

Plot 6—Manure as in Plot 2.

After cutting the plant crop at the beginning of October, 1926, each plot was ratooned in the usual way and the cane, though slow in coming through in all plots owing to adverse weather, ultimately came away well, exceeding expectations, but the growth was slow during the next two months, and though the fertilisers as set out above were applied in November, it was not till after the heavy rain on the 14th December that any real progress was made. The recovery was rapid in the manured plots, and somewhat slow in the unmanured, but vigorous growth was made during the following three months, extending well into April, though somewhat retarded by cool conditions after the beginning of that month. These plots suffered no damage from frost, and no trace of gum was found in any, the variety upholding its reputation as being a highly resistant cane to gumming.

The following are the analytical and crop results of the first ratoon crop:—

Analytical Examination of Fertilising Experiment No. 1 Q. 813—First Ratoon Crop—October, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	% C.C.S. in Cane.
B3	1	Q. 813	No manure	12 months	1–10–27	21·8	20·97	0·21	96·1	17·61	17·06
B3	2	Q. 813	600 lb. mixed manure per acre, containing 150 lb. sulphate of ammonia, 200 lb. sulphate of potash, and 250 lb. meatworks manure	12 months	1–10–27	21·0	20·27	0·17	96·5	17·02	16·50
B3	3	Q. 813	Mixed manure as in Plot 2	12 months	1–10–27	21·5	20·75	0·18	96·5	17·43	16·90
B3	4	Q. 813	No manure	12 months	1–10–27	22·0	21·16	0·21	96·2	17·77	17·20
B3	5	Q. 813	Mixed manure as in Plot 2	12 months	1–10–27	22·0	21·09	0·22	95·8	17·72	17·09
B3	6	Q. 813	Mixed manure as in Plot 2	12 months	1–10–27	21·0	20·21	0·22	96·2	16·97	16·45

8. Southern Sugar Experiment Station—*continued.*

Crop Results of Fertilising Experiment No. 1, Q. 813—First Ratoon Crop—October, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
B3	1	Q. 813 ..	No manure	12 months	21·11	3·60
B3	2	Q. 813 ..	600 lb. mixed manure per acre, containing 150 lb. sulphate of ammonia, 200 lb. sulphate of potash, and 250 lb. meatworks manure	12 months	34·03	5·46
B3	3	Q. 813 ..	Mixed manure as in Plot 2	12 months	34·03	5·75
B3	4	Q. 813 ..	No manure	12 months	23·08	4·05
B3	5	Q. 813 ..	Mixed manure as in Plot 2	12 months	32·16	5·45
B3	6	Q. 813 ..	Mixed manure as in Plot 2	12 months	36·62	6·34

Taking the figures as given in the crop results, the use of manure has given a most profitable return. The average increase of the fertilised plots over the unfertilised represents 12·12 tons of cane, and 1·93 tons of sugar per acre. The average tonnage of the fertilised plots, viz., 34·21 tons per acre, is remarkably good for a twelve-month crop on old land in the Bundaberg district.

(5) Continuation of Fertilising Experiment No. 2 (Potash Trials) Q. 813—First ratoons.

Plot 1—700 lb. mixed manure per acre, containing 100 lb. sulphate of ammonia, 500 lb. sulphate of potash, and 100 lb. meatworks manure.

Plot 2—500 lb. sulphate of potash per acre.

Plot 3—No manure.

Plot 4—No manure.

Plot 5—500 lb. sulphate of potash per acre.

Plot 6—700 lb. mixed manure per acre, containing 100 lb. sulphate of ammonia, 500 lb. sulphate of potash, and 100 lb. meatworks manure.

Following the removal of the plant crop, towards the middle of October, 1926, each plot was uniformly ratooned by the customary method of running three furrows between the rows and levelling with the cultivator twice in each row. Owing to the dry weather, the cane was slow in coming away, but finally a splendid ratoon was obtained. As adverse conditions prevailed during the two months following the ratooning, the growth was checked. The manures as outlined above were carefully applied to the respective plots towards the middle of November, and taking advantage of these (after a fall of over 9 inches of rain on the 14th and 15th December), the cane commenced to grow vigorously, which was continued during the following three months, and, though slightly retarded by cold atmosphere, well in to April. The cane was not damaged by frost, and no traces of gummosis were found in any of the plots; even the unmanured plots, which were stunted and yellow, towards the end resisted the disease. Three factors were noted that contributed to the increased tonnage in the manured plots. These were—

(1) Greater length;
(2) Greater thickness;
(3) Better stooling.

With regard to the latter, a careful count was made of the number of sticks in 100 stools of the manured and unmanured plots, and these averaged out at 6·65 sticks per stool in the former and 4·75 in the latter.

This experiment was initiated to make further tests of the action of potash on the Bundaberg red soils. They were purposely laid down in duplicate so as to obtain more accurate results from averaging.

The analytical and crop results are set out in the following tables. The purities in the analytical table are again very high:—

Analytical Examination of Fertilising Experiment No. 2 (Potash Trials), Q. 813—First Ratoon Crop—September, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Date of Analysis.	Density of Juice (Brix).	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Sucrose in Cane.	% of C.S. in Cane
E1	1	Q. 813	700 lb. mixed manure per acre, containing 100 lb. sulphate of ammonia, 500 lb. sulphate of potash, and 100 lb. meatworks manure	11 months	13–9–27	22·5	21·64	0·21	96·1	18·18	17·60
E1	2	Q. 813	500 lb. sulphate of potash per acre	11 months	13–9–27	22·5	21·69	0·20	96·4	18·22	17·65
E1	3	Q. 813	No manure	11 months	13–9–27	22·5	21·58	0·22	95·9	18·13	17·59
E2	4	Q. 813	No manure	11 months	13–9–27	22·4	21·57	0·21	96·2	18·12	17·53
E2	5	Q. 813	500 lb. sulphate of potash per acre	11 months	13–9–27	21·7	20·84	0·24	96·0	17·51	16·94
E2	6	Q. 813	700 lb. mixed manure per acre, containing 100 lb. sulphate of ammonia, 500 lb. sulphate of potash, and 100 lb. meatworks manure	11 months	13–9–27	22·2	21·33	0·24	96·1	17·92	17·33

8. Southern Sugar Experiment Station—*continued.*

Crop Results of Fertilising Experiment (Potash Trials), Q. 813—First Ratoon Crop—September, 1927.

Division.	Plot Number.	Variety of Cane.	Treatment.	Age of Cane.	Weight of Cane per Acre in English Tons.	Yield of Commercial Cane Sugar per Acre in English Tons.
E1	1	Q. 813 ..	700 lb. mixed manure per acre, containing 100 lb. sulphate of ammonia, 500 lb. sulphate of potash, and 100 lb. meatworks manure	11 months	31·12	5·48
E1	2	Q. 813 ..	500 lb. sulphate of potash per acre	11 months	25·66	4·53
E1	3	Q. 813 ..	No manure	11 months	12·71	2·22
E2	4	Q. 813 ..	No manure	11 months	10·84	1·90
E2	5	Q. 813 ..	500 lb. sulphate of potash per acre	11 months	20·65	3·50
E2	6	Q. 813 ..	700 lb. mixed manure per acre, containing 100 lb. sulphate of ammonia, 500 lb. sulphate of potash, and 100 lb. meatworks manure	11 months	23·49	4·07

In averaging out the results from the above crop table, it will be seen that the average results are as under:—

700 lb. mixed manure = 27·30 tons of cane per acre and 4·77 tons of sugar per acre.

500 lb. sulphate of potash = 23·15 tons of cane per acre and 4·01 tons of sugar per acre.

No manure = 11·77 tons of cane per acre and 2·06 tons of sugar per acre.

There is then an increase of 15·53 tons of cane per acre in favour of the 700 lb. of mixed manure, and an increase of 11·38 tons of cane per acre in favour of the 500 lb. of sulphate of potash per acre. Both show most payable yields.

Owing to the poor returns in the drought of last year, the crop results to date are not so good as those of this year:—

Crop Results to Date of Fertilising Experiment (Potash Trials).

Division.	Plot Number.	Variety of Cane.	Treatment.	Plant Crop, 1926—Age 13 Months.		First Ratoon Crop, 1927—Age 11 Months.		Average for Two Crops.	
				Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.	Weight of Cane per Acre in English Tons.	Yield of C.C.S. per Acre in English Tons.
E1..	1	Q. 813 ..	700 lb. mixed manure per acre, containing 100 lb. sulphate of ammonia, 500 lb. sulphate of potash, and 100 lb. meatworks manure	7·58	1·23	31·12	5·48	19·35	3·35
E1..	2	Q. 813 ..	500 lb. sulphate of potash per acre	8·73	1·49	25·66	4·53	17·18	3·01
E1..	3	Q. 813 ..	No manure	5·23	0·81	12·71	2·22	8·97	1·51
E2..	4	Q. 813 ..	No manure	6·71	1·04	10·84	1·90	8·77	1·47
E2..	5	Q. 813 ..	500 lb. sulphate of potash per acre	10·24	1·54	20·65	3·50	15·44	2·02
E2..	6	Q. 813 ..	700 lb. mixed manure per acre, containing 100 lb. sulphate of ammonia, 500 lb. sulphate of potash, and 100 lb. meatworks manure	8·47	1·28	23·49	4·07	15·98	2·67

8. Southern Sugar Experiment Station—*continued.*

(6) Analytical Examination of Three Canes from Coimbatore, South India, and one from Java.

Brief descriptions of the Coimbatore varieties including Co. 239, together with a preliminary and progressive analyses, were given in the reports for 1925, page 65, and 1926, pages 64 and 65.

With regard to the variety Co. 239, which is omitted from this report, it was stated in last report that it did not appear to be a suitable cane for this district, which was further proved by its behaviour during the dry weather from August to November last, when it practically died out and was discarded.

The other canes Co. 210, Co. 213, and Co. 227 (which is the standover of the plant crop from which samples were taken last year) continued to make good progress, especially Co. 210, and all appear to be very promising varieties of this class. They have now been planted out with a view to obtaining cropping qualities.

Since Uba has been disapproved, these canes are being closely watched by a large number of growers, and many are anxious to obtain plants as soon as available.

The variety E.K. Madoe was received in good condition, on the 8th December, 1925, and was carefully planted and tended; the germination was good, the cane grew vigorously during the growing period of 1926 and gave promise of a valuable variety, but, unfortunately, in August of that year indications of gum were found in the cane, which developed to such an extent that in July of this year it was found to be almost all infected. After being cut in September the cane failed to ratoon, but a few of the apparently healthy sticks were selected and further planted out in an isolated position for the purpose of obtaining clean cane if possible.

Analytical Examination of Three New Canes from Coimbatore, South India, and one from Java—Plant Cane—October, 1927.

Division.	Country.	Name or Number of Variety.	Age of Cane.	Date of Analysis.	Density of Juice.	% Sucrose in Juice.	% Glucose in Juice.	Purity of Juice.	% Fibre in Cane.	% Sucrose in Cane.	% C.C.S. in Cane.
D ..	Coimbatore ..	Co. 210 ..	24 months	12–10–27	19·6	17·90	0·55	91·3	15·9	14·16	13·29
D ..	Coimbatore ..	Co. 213 ..	24 months	12–10–27	19·8	18·55	0·43	93·6	15·3	14·77	14·07
D ..	Coimbatore ..	Co. 227 ..	24 months	12–10–27	19·7	18·57	0·40	94·2	16·2	14·63	13·99
Garden..	Java ..	E. K. Madoe	22 months	5–10–27	21·8	20·75	0·16	95·1	11·8	17·26	16·61

BRIEF DESCRIPTION OF E.K. MADOE.

Stout yellowish-green cane with slight black wax, eyes small and pointed, reposing in slight groove; internode 2 to 6 inches long with occasional longitudinal skin cracks; straight stick; foliage broad and plentiful. Good striker, rapid grower, and big stooler; fairly brittle cane, with strong root system. Very subject to gum in the Bundaberg district.

GREEN MANURE AND POTASH.

An interesting feature in the growth of green manure was noticed last year on the portion of land previously used for a potash experiment. In October, 1925, the stools from the third ratoon crop of the "Sulphate of potash *versus* muriate of potash" experiment were ploughed out, and cowpea sown with the seed planter; a good germination was obtained, and it was noticed that the growth of the pea was much more vigorous on the portions where sulphate and muriate of potash had been applied to the cane than on the untreated portions.

Portions from the plots where potash had been previously applied and from those where no potash had been used were weighed and calculated out with the following results:—

Treatment.	Tons of Green Manure per acre.
Potash previously applied	24·31
No potash previously applied ..	9·72

ANNUAL FIELD DAY.

The tenth Annual Field Day of the Sugar Experiment Station was held on Saturday, 28th May, and was an unqualified success, the attendance of canegrowers being between 500 and 600.

Proceedings opened with an address of welcome by the Director, and an abstract of the experimental work carried out during the past year. This was then followed by an inspection of the fields of cane and cultivation and variety experiments. After luncheon, an exceedingly interesting address was delivered by Mr. J. F.

8. Southern Sugar Experiment Station—*continued.*

Reid, Editor of the "Agricultural Journal," on "Agricultural journalism and its assistance to the man on the land." This was followed by addresses on "Cane diseases" by Mr. E. J. F. Wood, B.Sc., and on "Insects affecting sugar-cane," by Mr. R. W. Mungomery. Exhibits of cane diseases and cane insects attracted considerable attention.

On the motion of Mr. T. Dexter, of the Bundaberg Cane Growers' Executive, a hearty vote of thanks was accorded to the speakers, to the Chemist in Charge of the Station (Mr. Pringle), and to Mrs. Pringle and the staff for the excellent laying out of the luncheon and the care taken of the comfort of those attending, also to the Director for the organisation of the Field Day.

During the afternoon a very fine demonstration of farm implements was made by the various machinery agents, which aroused the keenest interest. These included tractors, trash burying ploughs, cane planters, rotary cultivators, disc ploughs, and fertiliser distributors.

The thanks of the Bureau are due to Messrs. W. Marles and Sons, Wyper Brothers, F. A. Brand, George Davies, and the Australian Co-operative Fertilisers Company for the display of the above machinery.

NEW EXPERIMENTS INITIATED.

Cultivation Experiment—

Plot 1—Six ploughings in all, one harrowing, one rolling.

Plot 2—Five ploughings in all, one harrowing, one rolling.

Plot 3—Four ploughings in all, one harrowing, one rolling.

Plot 4—Four ploughings in all, one subsoiling to 18 inches, one harrowing, and one rolling.

Plot 5—Four ploughings in all, two harrowings, one rolling.

Plot 6—Four ploughings in all, three harrowings, one rolling.

Second Series.

Duplicate of above.

Potash Experiment—

First Series.

Plot 1—300 lb. sulphate of potash per acre.

Plot 2—300 lb. muriate of potash per acre.

Plot 3—500 lb. sulphate of potash per acre.

Plot 4—500 lb. muriate of potash per acre.

Plot 5—No manure.

Second Series.

Plot 1—300 lb. sulphate of potash per acre.

Plot 2—300 lb. muriate of potash per acre.

Plot 3—500 lb. sulphate of potash per acre.

Plot 4—500 lb. muriate of potash per acre.

Plot 5—No manure.

NEW VARIETIES INTRODUCED.

From Cuba—Santa Cruz 12 (4).

From C.S.R. Company, Childers—Nanemo, Korpi, Oramboo.

From Mackay Sugar Experiment Station—S.J.Q. 2, S.J.Q. 3, S.J.Q. 4, S.J.Q. 5, S.J.Q. 15, S.J.Q. 16, S.J.Q. 28, S.J.Q. 468, P.O.J. 2714.

From South Johnstone Sugar Experiment Station—S.J.Q. 2, S.J.Q. 3, S.J.Q. 4, S.J.Q. 5, S.J.Q. 7, S.J.Q. 16, S.J.Q. 344, S.J.Q. 15, S.J.Q. 28, S.J.Q. 45, S.J.Q. 49, S.J.Q. 60, S.J.Q. 301.

LIST OF VARIETIES GROWING ON THIS STATION, 1927-1928.

D. 1135	Korpi
Q. 813	Oramboo
Q. 1098	S.J.Q. 2
H. 227	S.J.Q. 3
M. 55/11	S.J.Q. 4
M. 28/10	S.J.Q. 5
Co. 210	S.J.Q. 7
Co. 213	S.J.Q. 15
Co. 227	S.J.Q. 16
S.C. 12 (4)	S.J.Q. 28
P.O.J. 2714	S.J.Q. 45
E.K. Madoe	S.J.Q. 49
E.K. 28	S.J.Q. 60
D.I. 52	S.J.Q. 301
Assam Red Seedling	S.J.Q. 344
Yellow Caledonia	S.J.Q. 468
Nanemo	

TOTAL TONNAGE OF CANE HARVESTED FROM THE SOUTHERN SUGAR EXPERIMENT STATION, BUNDABERG, DURING 1927.

	Tons.
Cane sent to mill	300·85
Cane cut for plants	9·50
Total	310·35

Nature of Crop—	Tons.
Plant cane (standover)	47·65
First ratoon (standover)	31·90
First ratoon	107·15
Second ratoon (standover) ..	10·35
Second ratoon	113·30

Tonnages—	Per cent.
Q. 813	37·14
D. 1135	32·12
Badila	13·63
M. 1900 Seedling	10·35
Mixed varieties	5·35
Acres harvested	16
Average tons of cane per acre ..	19·39

9.—Work of the Laboratories.

Only a part of the chemical work carried out by the Sugar Experiment Stations is represented in the foregoing tables. In addition, soils, waters, fertilisers, limestones, and agricultural products are analysed for canegrowers, and large numbers of sugar-canes for determining maturity, &c. Chemical laboratories are attached to the various Sugar Experiment Stations, but most of the soil analyses are carried out in the Agricultural Laboratory in Brisbane, which is under the charge of Mr. J. C. Brünnich, to whom the thanks of the Bureau are due for assistance rendered in various directions. The Bureau's analyst at Brisbane is Mr. C. R. Von Stieglitz, who carries out most of the Sugar Bureau work in Brisbane.

The tables appearing hereunder give the analytical work done:—

DETAILED REPORT OF THE ANALYTICAL WORK PERFORMED AT THE LABORATORY OF THE SUGAR EXPERIMENT STATION AT SOUTH JOHNSTONE, NOVEMBER, 1926, TO NOVEMBER, 1927.

Materials.	No. of Analyses.
Sugar-cane juices for Experiment Station	552
Cane fibres	46
Limestones	2
Soil moisture	25
Total	625

DETAILED REPORT OF ANALYTICAL WORK PERFORMED AT THE LABORATORY OF THE SUGAR EXPERIMENT STATION, MACKAY, FROM NOVEMBER, 1926, TO NOVEMBER, 1927.

Materials.	No. of Analyses.
Sugar-canes for growers	150
Sugar-canes for Mackay Show	61
Sugar-cane juices for Experiment Station	147
Sugar-cane fibres	21
Fertilisers	1
Waters	4
Total	384

DETAILED REPORT OF ANALYTICAL WORK PERFORMED AT THE LABORATORY OF THE SOUTHERN SUGAR EXPERIMENT STATION, BUNDABERG, FOR THE SEASON 1926–1927.

Materials.	No. of Analyses.
Sugar-canes and juices for growers	372
Sugar-canes and juices for Agricultural Show, Bundaberg	175
Sugar-canes and juices for Agricultural Show, Gin Gin	350
Sugar-canes and juices for Agricultural Show, Maryborough	37
Sugar-canes and juices for Experiment Station	26
Cane fibres for Experiment Station	2
Total	962

ANALYSES CARRIED OUT FOR THE BUREAU OF SUGAR EXPERIMENT STATIONS AT THE AGRICULTURAL LABORATORY IN BRISBANE, FROM NOVEMBER, 1926, TO NOVEMBER, 1927.

Materials.	No. of Analyses.
Soils	63
Waters	1
Coral lime	1
Lime deposit	1
Soil and shell deposit	1
Cassava	6
Spent wash from distillery (dried)	1
Filter press cake	1
Total	75

Aluminium as affecting Soil Fertility.

EXTRACT FROM PAPER PREPARED BY THE ANALYST, MR. C. R. VON STIEGLITZ.

The following extract from a paper to be published shortly by the analyst to the Bureau, dealing with the part played by aluminium in soil infertility, should prove of interest to sugar-growers:—

Toxic quantities of aluminium are believed by many writers to be present in certain acid soils, and that this factor is responsible for the deleterious effect observed on crops grown in such soils.

Root rot in maize is often believed to be caused by similar conditions, and the presence of such toxic quantities of aluminium to predispose the plant to fungus invasion.

Plants affected in this way have been shown to have accumulations of iron and aluminium in the vascular bundles at the nodes.

These accumulations prevent the normal functioning of the plant nutritive processes, and a stunted crop results. McGeorge, in Hawaii, has noticed similar phenomena in connection with sugar-cane. The symptoms are brownish discolourations, and a certain amount of disintegration at the nodes.

The application of lime and superphosphate to the soil overcomes the tendency for plants to become thus affected.

In cases of this description, plants fail in isolated patches, which patches have been shown to be of greater acidity than surrounding healthy ones.

Present data associates this variety of root trouble with acid soils, rich in organic matter, and deficient in available calcium and phosphate, and occasionally potash.

Fortunately, certain varieties appear to be fairly resistant. Where cases of root rot are noticed by farmers, the analyst to the Bureau would be pleased to receive samples of soil from both the affected and healthy parts.

So far but one such sample has come to hand, and this from the Bundaberg area. The rot in question, however, is definitely not caused by acid soil conditions.

It is interesting, however, to note that the supply of available potash is much less in the soil from the diseased cane, and an application of potash might materially help the crop to resist further inroads.

Last year experiments on sugar-cane were carried out in water cultures, with a view to comparing the toxic effect of added aluminium on two different varieties. The varieties selected were D. 1135 and Badila. Under the conditions of the experiment (which, owing to their preliminary nature, cannot yet be taken as final), it would appear that both varieties are fairly resistant, but Badila more so than the former.

It is probable then that, given a good rainfall, good crops of this cane should be grown on fairly acid lands, provided the essential plant foods are supplied.

9. Work of the Laboratories—*continued.*

Pot experiments conducted in Hawaii on acid soils (in which root rot with Lahaina variety was evident) showed marked improvement with applications of superphosphate far greater than would be economical and far greater than would be needed as a plant food. It was assumed that the phosphate was precipitating the soluble aluminium to a relatively insoluble form.

After harvesting the crop from these pots there would still remain a large excess of phosphate, yet when fresh cane was grown in this same soil, it gave but a poor yield, but by a further addition of phosphate a good yield was obtained.

Experiments are being conducted on a very acid patch at South Johnstone Experiment Station growing Badila.

The effect of adding a large quantity of superphosphate shortly after the cane had struck is being compared with that produced by the same quantity added in three equal parts but extended over a portion of the growing period.

A further similar trial is being conducted with basic superphosphate. The results may be seen compiled in this report.

10.—Irrigation Experiments on the Home Hill State Farm, Inkerman District, Lower Burdekin.

Irrigation in the Row versus the Ordinary Methods Practised at Home Hill.

Plot Number.	Inches Rainfall.	Inches Irrigation Water applied.	Treatment.	Yield per acre.	Cost per ton.	Realisation per ton.	Return per ton.
					£ s. d.	£ s. d.	£ s. d.
1	43·31	30·50	Watered in furrows and manured	22·65	1 10 8	2 8 9	0 18 1
2	43·31	30·50	Watered in furrows, not manured	18·16	1 8 11	2 11 9	1 2 10
3	43·31	30·50	Watered in ordinary way in interspaces ; manured	24·70	1 7 3	2 9 8	1 2 5
4	43·31	30·50	Watered in ordinary way in interspaces, but not manured	14·73	1 11 11	2 7 5	0 15 6

In the manured plots the irrigation in the rows is not so good this year as the ordinary method, although it is better on the unmanured plots.

Watering in the furrows, however, gave a better result in another experiment, when 47·3 tons of cane were harvested, compared with 42·3 tons from watering in the interspaces.

The manager of the State Farm at Home Hill, speaking of subsoiling, states that land which was only ploughed to a depth of 10 inches gave a yield of 15 tons per acre, whereas on being subsequently subsoiled to 16 inches the yield was 40·5 tons. Both irrigated.

The Bureau is indebted to the manager, Mr. Munro, for above statements.

11.—Seedling Propagation at the South Johnstone Sugar Experiment Station.

The raising of seedling canes was commenced at the Sugar Experiment Station in 1921. The object in view was to produce new varieties. Since disease has taken a strong hold in every sugar-cane producing country in the world, one factor towards the success of this industry lies in the production of canes that are resistant to these diseases. With this aim in view, seedling propagation has been taken up on a large scale by the Bureau of Sugar Experiment Stations. The crossing of our best canes with canes of known disease resisting properties is now being made, and results are hoped for. The raising of seedlings this season has proved satisfactory, and 15,000 germinations have been obtained. A careful selection of these seedlings has been made and transplanted out in readiness for transferring to the field. Preparation for crossing on a larger scale has also been carried out, and by planting the canes desired for crossing, at calculated periods, it is hoped to restrict their arrowing to the time most suitable for this work.

The following are particulars of the number of seedlings raised each year, from 1921 to 1927:—

Year.	Number.
1921	736
1922	345
1923	344
1924	3,005
1925	460
1926	3,000
1927	15,000
	22,791

Seedlings transplanted to nursery, first stage:—

Year.	Number.
1921	390
1922	55
1923	123
1924	656
1925	460
1926	600
	2,284

11. South Johnstone Sugar Experiment Station—*continued.*

SEEDLING WORK, 1927.

This year most of the varieties arrowed freely, and their tassels contained a good supply of pollen. The large rainfall during June interfered with the seedling work during that month, and it was not until the latter part of July that the collection of tassels was commenced. The Hawaiian sulphurous acid method and dusting were the two methods adopted in crossing.

PROGRESS REPORT.

In 1926, forty-four of the 1921 and 1922 seedlings were planted out to undergo competitive trials, and some good results were obtained. A noticeable feature of a large number of these canes was their high purity and heavy yield per acre. From the results of the above, twenty canes were selected and again placed in competitive trials. The following is a list of the twenty selected canes:—S.J.Q. 2, 3, 4, 7, 15, 17, 21, 25, 26, 28, 49, 53, 55, 60, 77, 102, 137, 301, 344.

1923 *Seedlings.*—Only three canes remain from this year's raisings, and they have again been planted out to undergo further analytical examinations.

1924 *Seedlings.*—A selection of twenty-nine canes from this year's seedlings has been made, and these will be subjected to further analytical trials.

1925 *Seedlings.*—From the seedlings raised during this year, eight have been selected and planted out in order to stand their second year's examination.

1926 *Seedlings.*—Forty canes have been planted out from these seedlings to undergo their first analytical trials.

12.—Abstracts from Reports of Sugar Research Scholars now Abroad.

The three research scholars—Messrs. N. Bennett, A. F. Bell, and H. W. Kerr—now abroad—are expected to return and take up duty during next year, 1928. They will be most valuable additions to the Experiment Station staff. During the course of their studies and travels reports are sent in, and abstracts from these are now presented.

The first given is from the report of Mr. N. Bennett, B.Sc., the Sugar Technology Scholar:—

Since submitting my previous annual report I continued studies on general sugar work under the direction of Dr. E. Coates, of the Audubon Sugar School, and Dr. William Owen, Research Bacteriologist of the Louisiana Sugar Experiment Station. Combining general studies on sugar manufacture with special work under Dr. Owen, I qualified for the Degree of Master of Science of the Louisiana State University. I then went to Cuba and made a tour of many of the better class factories. This tour was so arranged that visits were made during the meetings of the International Sugar-cane Technologists' Conference. In arranging these visits I wish to record the assistance furnished me by the Cuban Club, the Cuban-American Sugar Company, and the Cuban Cane Corporation. It is my intention to visit some of the best sugar factories in the West during the latter part of the year, and to leave America on the homeward journey about the end of November, when I propose to visit Hawaii, the Philippines, and Java, prior to returning to Queensland.

Cuba.

For many years past the total production of sugar in the island has been gradually increasing, and with the potential production of some 6,000,000 tons of sugar for the 1926 and 1927 crop, the Cuban Government decided to take drastic measures, and limited the crop to 4,500,000 tons, allotting the quota in bags to each mill on the basis of the past annual production. In some instances, particularly in the eastern provinces, this crop limitation resulted in 40 to 50 per cent. of the available cane being left over until the next season.

The island closely approximates in size and shape that of the island of Java. The cane is grown in all of the provinces of the island, but during the past ten years a gradual tendency has been for the bulk of the cane to be grown in the eastern provinces of Camaguey and Oriente. In these provinces the soil and climatic conditions are more favourable for a thick growth and for long ratooning of the first planted crop. Some fields have had only one planting in the past ten years. To this peculiarity of cane growth in Cuba is due the backward condition of agriculture as applied to cane cultivation, but the time is now at hand when the production of cane has to be based on better yields and lower cost of production. Under good agricultural conditions and with the same acreage under cultivation, the island of Cuba should be capable of producing at least 10,000,000 tons of sugar per year.

The Cuban grinding season in normal years extends from the beginning of December until the beginning of July.

Most Cuban factories commence the season with cane taking 11 tons to the ton of sugar in early December. At the end of the season the cane harvested is of sufficient quality to make a ton of sugar from 7 to 7½ tons.

The cutting of the cane is accomplished by native labour, paid upon a contract tonnage basis. Labour, however, is scarce and of a very unreliable type, and some of the bigger companies controlled by American capital adopted a policy of importing outside labour, which comes from Hayti and Jamaica, and means have to be provided for the deportation of such labour at the close of the grinding season.

12. Reports of Sugar Research Scholars—*continued.*

All the cane is cut into short lengths of about 3 feet and is then loaded on to mule-drawn wagons in the field, and from the field it is drawn to a central loading station, where it is loaded into cane cars of large capacity. Cuban conditions have resulted in the development of quick dumping devices for the cars at the unloading stations.

The large capacity demanded by Cuban crop conditions has therefore resulted in the development of sugar plants capable of treating very large tonnages of cane both in the milling station and in the manufacturing department.

The ownership of Cuban houses has been gradually changing from that of Cuban-owned to American-owned, and all the larger estates and factories on the island are now held directly or indirectly by American interests.

Direct comparison in terms of our c.c.s. system cannot be made, because a full analysis is seldom run on the first expressed juice. The first expressed juice is analysed for brix only and a factor used on this figure to obtain the normal juice brix.

Sugar Conference.—On receipt of cabled advice from the department, I made arrangements to attend the meeting of the International Sugar-cane Technologists' Association in Havana in March, 1927. This meeting was attended by representatives of practically every important cane-producing country, but, unfortunately, the programme of the meeting was so arranged that it was impossible to be present at all of the more important meetings. Under mutual arrangement between Mr. W. F. Seymour Howe and myself, I attended those meetings having more to do with the actual manufacture, whilst Mr. Howe attended meetings of those sections dealing with cane cultivation, varieties, cane diseases, &c.

Actual printed reports of the various meetings were to have been prepared by the Cuban Cane Technology Association and to be ready for distribution in June, but up to the present time I have not received any copies of these proceedings. Considering the large scope of the various sections, it will be impossible in a report like this to attempt any detailed accounts. When I receive the copies of the proceedings from Havana I will forward them to the department.

After completion of the meetings held in Havana the foreign delegates were invited to accept the offer of the Cuban Government to make a thorough inspection of the industry on the island. For this purpose a special train was furnished to the delegation, and a five-day tour of various plantations was undertaken by the foreign delegates accompanied by representatives of the Cuban Government and the Cuban sugar industry. This trip was exceedingly interesting, but, unfortunately, did not allow very much time for thorough inspection of the various new processes, &c., at the mills, consequently I decided to supplement this trip by further visits to other factories at a later date.

Extract from Reports of Mr. A. F. Bell, B.Sc., Pathological Scholar.

The outstanding feature of the disease situation in North America and the West Indies is the fact that the diseases found are so few in number. Especially is this so in view of the haphazard methods of introduction of varieties which have prevailed in the past, and to a great extent prevail at the present time. The outlook for the growers is not particularly bright in any of these countries, and the immediate future calls for the closest scientific control of all phases of sugar production. Porto Rico, by virtue of participating in the United States preferential tariff of 1·78 cents per lb. on raw sugar, is in a much more favourable position than its neighbours.

By far the most widespread and the most important disease is the ubiquitous mosaic, which is causing extreme damage in certain localities. In spite of the ravages, however, the disease has not been without value in demonstrating the effectiveness of commonsense agriculture as a means of control for this type of disease. There is abundant evidence to show that mosaic can be completely controlled, even under what appear to be the most unfavourable conditions.

Louisiana.

The highest degree of infection, and the greatest difficulties in the way of eradication, were found in Louisiana. Here it was extremely difficult to find a healthy stool, and doubtless this complete infection is largely responsible for the hazardous condition of the Louisiana sugar industry.

Practically the entire crop is composed of two varieties, D. 74 and Louisiana Purple, both of which are approximately 100 per cent. infected, and thus it is impossible to carry out any comparative tests to determine the losses due to mosaic. Although it has been shown in Porto Rico that it is feasible to take seed from a field carrying as high as 90 per cent. infection, providing that the seed is rigidly selected and strict attention paid to the roguing of the young cane arising therefrom, it is obvious that this method of control is impossible under the conditions existing in Louisiana. Therefore it follows that any supplies of healthy or disease-resistant cane must be imported or raised from seedlings.

The reason for the rapid and complete spread of the disease in Louisiana does not appear to be far to seek. It is an established practice of the farmers to grow about half cane and half corn, and, moreover, to interplant the corn and the cane in comparatively small fields. An examination of the corn disclosed the presence of mosaic in practically every field, and on tearing away the leaves one could find large numbers of corn aphids, and experiments have shown conclusively that the corn aphid is capable of transmitting the disease. It is inevitable that these aphids should transfer to the cane, even though it be but a temporary transfer owing to the insect preferring the corn leaves as a source of food. In addition, the corn plants wither and die before the cane is harvested and it is natural to assume that any aphids which might be present at that time would of necessity transfer to the

12. Reports of Sugar Research Scholars—*continued.*

cane. Owing to the comparatively low current values for sugar, it is unlikely that the farmers will be persuaded to give up the growing of corn, and this will be an ever present force militating against complete control. Recent experiments are demonstrating the suitability of Louisiana for the cultivation of the sugar beet, and thus it is within the bounds of possibility that Louisiana will cease to produce cane sugar.

Cuba.

Cuba has hitherto enjoyed the position of being remarkably free from a great number of the most destructive diseases of sugar-cane; this is no doubt due to the fact that it has been largely a one variety country, Crystallina constituting practically the entire crop.

As far as mosaic is concerned, this country presents a remarkable contrast between the entirely successful control by the more progressive estates and the ravages occasioned in the absence of control on the part of the native farmers and the badly administered estates. So far there has been no very serious attempt to organise a campaign against this disease. The Government maintains an experimental station, where a pathologist is employed, but the purposes of this station are for general agriculture, and it has not the facilities for the carrying out of an educational programme which will reach the small farmers. The Cuba Sugar Club has been formed in recent years and is co-operating with the Tropical Research Foundation in the maintenance of a field experimental station at Baragua, in Central Cuba. This organisation has obtained the services of some very able men, but its dealings will probably be with the larger estates rather than with the small farmers, or "colonos," as they are called in Cuba.

Most of the estates have an agricultural staff who tender advice to anyone forwarding cane to their particular mill; these men find it most difficult to convince the farmers that mosaic is a disease, and their advice on this matter appears to be largely disregarded. The tendency is for the colono to take the thinnest and poorest quality cane for planting, with the result that actually he is selecting for mosaic and not against it.

As the lands are becoming older and more compacted, together with the generally poor cultivation, there is an increasing amount of root rots, although in the well-tilled areas there were no complaints. The effect of the root troubles, together with the spread of mosaic, will inevitably exercise an adverse effect on the ratooning properties of the cane. The Cuban sugar industry has grown up largely on the wonderful ratooning capacity of the cane, and once this is removed it is hard to see how the small farmer can carry on.

Just now a good deal of attention is being paid to the introduction of new varieties, particularly from Porto Rico, and of these the Barbados seedlings B.H. 10 (12) and S.C. 12 (4) promise to do well. Nevertheless, the introduction of varieties from Porto Rico without adequate quarantine would appear to be very dangerous since gummosis exists in Porto Rico and inasmuch as Crystallina has been shown to be very susceptible to the disease.

Porto Rico.

Sugar is responsible for about one-half the income of Porto Rico, an island having an area of about 3,500 square miles and a population approaching 1,500,000. It it thus among the more thickly populated portions of the earth, and with most of the best land being used for cane culture the people are dependent on the outside world for most of their food supplies. Within this small area Porto Rico is fortunate in having two experimental stations; the Insular Government maintains one at Rio Piedras and the Federal Government one at Mayaguez. Both of these house pathology laboratories, and Dr. Cook is the Pathologist at the former and Mr. Tucker at the latter. By virtue of the presence of these two centres the aetiology of most of the cane diseases of Porto Rico has been studied and comprehensive data gained on the question of varietal resistance and suitability in the various districts. The stations are open to the criticism that they appear to have no adequate means by which the knowledge gained by the scientific staffs can be imparted to the small farmers. The major portion of the sugar is grown on comparatively large estates, which are operated by men who have the training necessary for them to be able to read and apply the information contained in the scientific periodicals; in addition, some of them have a pathologist employed in an advisory capacity. As far as the larger plantations are concerned, the standard of the field control of disease is high; a few have their own experimental stations and carry on breeding and resistance trials, and rigidly supervise the seed selection and field sanitation.

Sugar culture in Porto Rico has been watched closely by the rest of the sugar world during the last decade, owing to the rapid spread and consequent losses due to the mosaic disease, culminating in the establishment of its true nature and the complete ascendency of the methods devised for its control. The presence of the disease was reported in the Journal of the Department of Agriculture in 1917 by Stevenson and Johnston. Their attention had been drawn two years previously to an outbreak in a somewhat restricted area, but in the two years it had spread over one-fourth of the island. They state that a small infection in the first year would give a general infection in the second, with a falling off in yield, while in the third year the crop might be a total loss. For 100 per cent. infection it was considered that the losses ranged from 50 to 70 per cent. No definite cause was found and no methods of control could be suggested. Two years later Stevenson published the results of his further work; he found that infection was aerial and not through the soil, and also that bacteria and fungi were not associated. He abandoned the degeneration theory and expressed his belief that the disease was an infectious chlorosis, due to a virus or an ultramicroscopic organism. The careful selection of healthy seed and the rogueing out of diseased canes were recommended as a means of control. In order to save the industry from its threatened extinction the Government had, in 1918, appointed Prof. F. S. Earle as a special commissioner to investigate the disease and devise

12. Reports of Sugar Research Scholars *continued.*

means for its control. Prof. Earle gathered a staff and divided the work up into a number of projects as follows:—

(1) The distribution.
(2) An inquiry into eradication as an efficient means of control.
(3) Methods of culture best adapted to badly-diseased fields.
(4) Statistics of sugar production as affected by the disease.
(5) Methods of natural or artificial infection.
(6) Resistance and immunity.
(7) Ecological survey of the insect inhabitants of canefields.
(8) Cage experiments with insects suspected as carriers.
(9) Morphological, histological, and cytological studies.
(10) Studies on the nature of the disease and the search for a causal organism.
(11) Chemical studies of diseased as compared with healthy cane.
(12) Soil studies.

The results of these and other studies served to show that the disease was an infectious chlorosis which could be transmitted artificially, and in the field was transmitted through the air by insects. No definite causal agent was found, although Plasmodia-like bodies were found in association with the disease, and in the discoloured areas there was found to be a lack of chlorophyll and chloroplasts. As a result of these investigations the present methods of clean seed beds, seed selection, and eradication of diseased stools were advised and have been used with conspicuous success. By adopting these methods, Guanica, the biggest central on the island, has practically eliminated the disease although starting with an initial infection of 90 per cent. In spite of the success of these methods, vigilance is never relaxed, and at the present time all cane is inspected and rogued twice a month for as long as is practicable. On going into a heavily-infected field the practice would be to rogue twice in the first day and then about five days later. After a field has been cleaned and an inspection shows one cane of a stool to be infected, this cane is cut off but the stool is not rogued out. It has been demonstrated by several tests that this is secondary infection, and the rest of the stool does not show the disease later after treatment in this manner.

In common with Australia and other sugar-producing countries, Porto Rico is unfortunate in having present the disease known as bacterial gummosis or gumming *(B. vasculorum)*. It is not known whence this disease was imported, but its presence was first reported early in 1920 by Mr. Julius Matz, then pathologist to the Insular Experiment Station. Mr. Matz made a detailed study of the disease and published his results in vol. 6, No. 3, of the Porto Rico Journal. The disease was evident in the fields in the eastern end of the island in the summer of 1926, these fields having been planted with gummed sets. There is no doubt that the leaf symptoms exhibited by these particular diseased canes are identical with those used for diagnostic purposes in Australia. However, these leaf markings do not agree at all with those described and illustrated by Matz as being typical, nor were markings corresponding to the latter found on the leaves of the canes in question. The other symptoms, such as the exudation of gum, discolouration and decay of the tissues, and failure to transmit through the soil agree with those found under Australian conditions. It is the opinion of the agriculturists of the plantations —and this opinion is shared by Dr. M. T. Cook —that any spread of the disease is due to the organism being carried on the cane knives; there is no evidence pointing to the presence of an insect carrier such as is suspected in Australia. As far as can be ascertained, there is no connection between rainfall and drainage and the severity of the disease. Although found in most parts of the island, gummosis cannot be said to be doing much damage, and the growers assert that its control is quite easy—due to the large numbers of resistant varieties of cane available. When the presence of gummosis became known the heavily infested fields were ploughed out and replanted with resistant varieties. The Otaheite, or Cana Blanca, cane proved extremely susceptible, and has been eliminated by the disease, while Rayada and Crystallina are following rapidly. With the eradication of these, there are now no susceptible canes which are widely grown, and it is unlikely that this condition of affairs will be altered. Matz lists the following canes as highly resistant or immune:—

Uba	P.R. 209
D. 109	P.R. 262
P.R. 233	D. 433
P.R. 370	D. 448
P.R. 272	Yel. Cal.
B. 6202	P.R. 292
B.H. 10 (12)	B. 1809
P.R. 234	P.R. 309
B. 3412	B. 109
P.R. 219	P.R. 229
P.R. 230	D. 117
P.R. 417	P.R. 318
P.R. 308	B. 347

In addition to these, S.C. 12 (4) has been introduced in recent years and has been found to be practically immune. B.H. 10 (12), which is highly resistant, forms half the crop on the basis of its general excellence apart from this property of resistance. The S.C. 12 (4) also gives high yields, and with two such canes as these Porto Rico is in a very favourable position as far as combating gummosis is concerned.*

British West Indies.

The British West Indies are fortunate in that, being very small in general, they usually have but one port of entry; thus it is comparatively easy to erect an efficient quarantine barrier against uncontrolled importation of foreign varieties and diseases. In addition, nearly all their cane is grown under the plantation system, which is a great help towards control when once a disease has been introduced. As in the case of Porto Rico, B.H. 10 (12) is rapidly becoming the standard cane on account of the outstanding

* The Bureau of Sugar Experiment Stations has imported these two varieties.

12. Reports of Sugar Research Scholars—*continued.*

yields obtained. Gummosis was found on the island of St. Kitts, where it was very severe on B. 6032; Otaheite (Cana Blanca) and Crystallina (White Transparent) are also found to be very susceptible. However, with the growing of B.H. 10 (12) and S.C. 12 (4) and the elimination of those susceptible varieties, the disease has not become a serious economic factor. Mosaic appears to have been introduced into practically all the islands at some time or other during the past few years; it is still prevalent in Jamaica, but the other islands appear to have eradicated it entirely by the prompt enforcement of laws compelling the eradication of all diseased stools. Contrary to the state of affairs in most of the British West Indies, Jamaica has a large proportion of its cane grown by the small farmers, and consequently control of the disease has proved much more difficult here than in other centres. The situation was very grave a few years ago, but was relieved by the introduction of Uba, which has constituted most of the crop since then. Although this cane gave a very low sugar content, the tonnages were good and there is no doubt that it saved the industry from extinction. B.H. 10 (12) is now being grown, and the Agricultural Department is raising some seedlings from crosses with Uba. The small size of most of the islands and also the small amount of disease present make it impracticable to maintain pathology laboratories. Just now the only pathological investigations are those carried on in Trinidad at the Imperial College of Tropical Agriculture. This institution is, as yet, only in its infancy, but is undoubtedly destined to become a great force for the good of agriculture in the West Indies.

Mr. Bell has lately visited Hawaii, and, by the courtesy of the Hawaiian Sugar Experiment Station, was allowed to work at the station with the pathological staff under Dr. Atherton Lee, where, amongst other duties, he assisted in preparing a list of the world's cane diseases and their distribution. He has also assisted in certain field methods for control of diseases. Mr. Bell expects to visit the Philippine Islands and Java before returning to Queensland.

Extracts from Report made by Dr. H. W. Kerr, Soils Scholar, 1927.

Dr. Kerr attended the First International Congress of Soil Science in Washington, and has submitted a report thereon, from which the following abstract has been made:—

Report of the First International Congress of Soil Science. June-July, 1927.

The First International Congress of Soil Science met in Washington, D.C., on 13th June, 1927. There were present about 400 delegates, the representatives of more than thirty countries; the group included many of the leading soil scientists of the present time—chemists, physicists, and biologists. It was found necessary to have six commissions, each embracing one particular phase of soil science, in order that the large volume of material presented could be dealt with expeditiously and efficiently. These meetings were punctuated by joint sessions of two or more commissions, at which were presented data of wider interest. The meetings proceeded in this way until 22nd June.

As it was not possible to take in all the interesting matters which were being discussed, I attended such meetings as I thought would prove most profitable to me; these were concerned chiefly with the work in plant nutrition and soils chemistry. I had the opportunity of hearing many and varied problems discussed by the leading European and American workers, and of gaining the viewpoints of these men on some of the most important subjects under consideration by the present day agriculturist. Unfortunately, some of the foreign papers were delivered in German, which was rather a difficulty; but abstracts in English were provided, so that one was able to appreciate the general tenor of the discourse.

On the suggestion of Professor Truog, I presented a paper embodying the results of my researches on base exchange and soil acidity; I was gratified to receive a number of favourable comments on my conclusions at the termination of the session. This important phase of soil chemistry continues to receive much attention, and it is to be hoped that the valuable data which are being accumulated now, along fundamental lines, will lead to a better appreciation of this soil condition, its function, and correction.

I attended the most important meetings of the bacteriological, land drainage, and soil physics sections as opportunity presented itself; the soil survey work I deferred until the field tour, which followed the Washington meetings. An interesting feature of the Congress was the display of special apparatus, brought together by the investigators from research institutions in Europe and America. In addition, vertical sections or "profiles" of many of the typical and important soils of Europe were displayed, and these served to illustrate the nature of the particular problem involved, and a comparison could be made with the soil types encountered in other parts of the world.

The American Organising Committee arranged an extensive tour of the United States and Canada, to follow the meetings in Washington. A thirty-day tour through a representative area of the country enabled the foreign delegates to study the soil and climatic conditions, as well as the agricultural methods pursued in the North American continent. A special train was provided, and the excursion was complimentary to the foreign delegates. Under the able guidance of the Director of Soil Surveys in the United States, Dr. Marbut, the tour was an unqualified success. Every attention was given to the matter of personal comfort, and splendid facilities were provided for the covering of the maximum of territory in the minimum of time.

Of greatest interest from the point of view of Queensland agriculture were the regions of Kansas and Colorado. The former State is the centre of the winter wheat area of America, and many conditions obtaining there simulate those of Queensland. It was interesting to note the recent introduction of combine harvesters into the wheat industry in these parts; under certain conditions they are found to be quite successful, and this method of harvesting will effect considerable saving in production costs. In Western Kansas and Eastern Colorado, where the light rainfall is inadequate for successful crop growth,

12. Reports of Sugar Research Scholars—*continued.*

irrigation is resorted to. This introduced the necessity of a careful control on the methods of water application to prevent damage to the soil through alkali accumulation. Under well-regulated conditions, these soils of Colorado are highly productive, and yield excellent crops of sugar beets and lucerne.

Out in the middle of the Nevada Desert we saw what can be achieved under highly alkaline conditions, when irrigation water is available and is applied judiciously. Some thriving orchards and vineyards are maintained at Las Vegas, and a dairy farmer was producing adequate supplies of lucerne for the feeding of his herd.

In California we visited the experimental stations affiliated with the University, and studied the work which is being carried on. An interesting piece of field work at Fresno showed a successful method of combating alkali in the soil by the use of sulphur. The greatly improved conditions were reflected in the fine stands of lucerne observed in the treated plots.

The Minnesota station is carrying out a very interesting series of experiments on the utilisation of peat and sandy soils. The results show how a carefully planned system of farming may be devised, so that the two types of soil are mutually benefited. In Iowa we visited Ames Experimental Station. The productive prairie soils in this State constitute some of the richest cornlands of America, and an intensive agricultural policy is followed. Much breeding work is in operation in an attempt to evolve still more successful varieties of corn and grains. Extensive fertiliser trials were also very much in evidence.

Dr. Kerr represented Queensland at the Imperial Agricultural Research Conference.

In a recent letter to the Department of Agriculture the Professor of Soils at the Wisconsin University, U.S.A., had paid a very high tribute to the Queensland Travelling Scholar, Dr. H. W. Kerr. Professor Truog stated that Dr. Kerr had worked out an exceptionally fine thesis for his Doctor's degree regarding soil fertilisation and cultivation, and added that Dr. Kerr had been one of the best students they have ever had in soils work, and they have been very glad indeed to have had him with them. Dr. Kerr has now attained the Degree of Doctor of Philosophy.

At Professor Truog's request an extension of four months' time has been granted to Dr. Kerr to enable him to finish the very important work on which he is at present engaged at Wisconsin, it being considered that this work will be of far-reaching practical value to Queensland in clearing up many ideas concerning soil acidity and its correction.

13.—Economics of the Industry.

The severe drought experienced in 1926 adversely affected the yield of sugar. This was principally the case in those districts below Townsville, the crops from Bundaberg to Beenleigh being light in character. The Lower Burdekin and Mackay crops also showed a falling off.

The yield of cane in 1926 was 2,925,623 tons, as against 3,668,252 tons in 1925, the record year. The production of raw sugar of 94 net titre in 1926 was 389,272 tons or 96,313 tons less than was produced in 1925. The production of sugar for Australia was some 418,000 tons, of which 74,777 tons were exported.

The total area under cane in 1926 amounted to 266,519 acres. This was about 3,000 acres less than in 1925, and the first reduction in acreage that had occurred for several years. In 1920 the total acreage under cane was only 162,619 acres. The area from which cane was crushed in 1926 was 189,312 acres, practically the same as in the previous year.

Due to the dry weather the yield of cane and sugar per acre were not so high as in 1925, being 15·45 tons of cane per acre, and 2·06 tons of sugar per acre compared with 19·36 tons of cane per acre and 2·56 tons of sugar per acre in 1925. The yields of cane and sugar per acre in 1926 in the different parts of Queensland were as under:—

Districts.	Tons of Cane per Acre.	Tons of Sugar per Acre.
Mossman to Ingham	19·05	2·62
Ayr to Mackay	13·34	1·76
Bundaberg to Gympie	10·35	1·24
Maroochy to Logan	16·30	1·87

In 1925 the highest yields were in the Lower Burdekin district.

The tonnage of cane required to make 1 ton of sugar was 7·52, a slightly better figure than in 1925. This figure is to a large extent the index of the efficiency of the sugar mills, and has much improved in recent years. The lowest tonnage of cane per ton of sugar was from Mossman to Ingham—7·27, and the highest from Logan to Nerang—10·16.

The estimated consumption of sugar in 1926 was stated to be 327,000 tons.

The average acreage to each planter is given by the Registrar-General as being 36. The number of plantations of 5 acres and over are 6,608, and of under 5 acres 736, making a total of 7,344 canegrowers in Queensland. The average acreage to each planter in the different districts is as under—

Cairns to Townsville	48
Townsville to Mackay ..	43
Bundaberg, Childers, Maryborough, &c.	27
Maroochy to Logan	9

This is practically the same as in 1925.

The number of sugar mills operating in 1926 was thirty-six, and two refineries, employing 7,146 hands. The value of the output of Australian sugar is given as £11,289,627.

The return of the molasses manufactured in 1926 is stated to be 14,686,433 gallons, made up as under—

	Gallons.
Sold to distilleries	3,178,467
Burnt	2,547,140
Used or sold for feed	2,828,118
Sold other purposes	123,090
In stock	1,172,003
Manure	89,600
Run to waste	4,748,015
Total	14,686,433

13. Economics of the Industry—*continued.*

EXPORTS OF SUGAR IN MANUFACTURED ARTICLES.

	Tons.
1924-1925	5,500
1925-1926	4,800
1926-1927 (estimate) ..	*5,000

*This depends on the condensed milk export.

The table given below gives the amount crushed at the end of the 1926 season, supplied by the mills for the purpose of assessment—

TONNAGE OF CANE CRUSHED AT THE VARIOUS MILLS, 1926 SEASON.

Name of Mill.	Tonnage Crushed, 1926.
Mossman	84,579
Hambledon	193,116
Mulgrave	189,349
Babinda	195,125
Goondi	170,006
South Johnstone	181,733
Mourilyan	135,473
Tully	131,714
Victoria	155,951
Macknade	169,566
Invicta	31,773
Pioneer	72,212
Kalamia	78,781
Inkerman	98,111
Proserpine	72,209
Cattle Creek	44,533
Racecourse	80,331
Farleigh	71,444
North Eton	37,747

TONNAGE OF CANE CRUSHED AT THE VARIOUS MILLS, 1926 SEASON—*continued.*

Name of Mill.	Tonnage Crushed, 1926.
Marian	102,833
Pleystowe	103,057
Plane Creek	103,707
Qunaba	28,034
Millaquin	63,680
Bingera	67,807
Fairymead	71,561
Gin Gin	17,391
Childers	22,670
Isis Central	26,915
Maryborough	23,868
Mount Bauple	33,000
Moreton	57,701
Eagleby	1,305
Carbrook	613
Alberton	1,108
Rocky Point	6,629
	2,925,623

The total nearly agrees with that furnished by the Registrar-General.

14.—General.

The Falkiner cane harvester has been again in the field this year, but further work is necessary in construction. It is understood that a machine is going to Cuba.

A cane harvester of a lighter character has been invented in Mackay and manufactured, being known as the Miller-Owen cane harvester. This had a trial at Mackay. It is believed this machine has great possibilities, and further trials will be awaited with interest.

A third cane harvester manufactured in New South Wales was also tried in Bundaberg, but not much information about this has yet been made available.

The Carbrook sugar mill at Beenleigh has discontinued operations.

A movement is on foot at the present time in favour of carrying preference for Empire sugar to the length of complete removal of the duty levied on sugar imports from the Empire into Great Britain, with the view of encouraging the production of all the sugar Great Britain needs within the Empire.

COMMERCIAL CANE SUGAR IN CANE.

The expression "commercial cane sugar" is one that has been adopted by the Queensland Cane Prices Board, and is calculated as follows:—

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

$$\text{Sucrose in juice} \times \frac{100 - (3 + \text{Fibre})}{100} = \text{sucrose in cane.}$$

Total soluble solids in cane — sucrose in cane = impurities in cane.

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

PUBLICATIONS, 1927.

Bulletin No. 3 (revised new edition).—"Notes on Insects Damaging Cane in Queensland," by Edmund Jarvis.

Several leaflets and articles on cane diseases.

ACKNOWLEDGMENTS.

The Director desires to thank the secretaries of the various district executives and mill suppliers' committees, farmers' associations, and cane growers' associations, also the managers and officers of the Queensland sugar mills, for their help and courtesy to the officers of this Bureau.

The thanks of the Bureau are due to the Registrar-General and his staff for information supplied from time to time.

The Director also wishes to acknowledge the kindness of Mr. E. W. Bick, the Curator of the Botanic Gardens, in taking charge of and growing imported canes for the Bureau in quarantine.

The indebtedness of the Bureau is also expressed to the metropolitan and country press for the publishing of useful information, especially to the "Australian Sugar Journal" and the "Agricultural Journal," which specially illustrate many articles. Thanks are also due to the "Queensland Producer" and the "Producers' Review," as well as to the Government Printer for the excellent printing of the Technical Reports and Bulletins.

To Miss Wyllie, the typiste to the Bureau, special thanks are rendered for her great assistance during the year in the arranging of sugar data, general work, and typing of this report for the printer.

H. T. EASTERBY, Director.

Brisbane, 1st December, 1927.

Price, 2s]

By Authority: A. J. CUMMING, Government Printer, Brisbane.

"THE SUGAR EXPERIMENT STATIONS ACTS, 1900 TO 1923."

Statement of Receipts and Payments for the Financial Year 1926-1927.

THE SUGAR FUND.

Receipts.	£	s.	d.	Payments.	£	s.	d.
To Balance, 1st July, 1926	19,818	2	9	By Salaries	6,397	10	11
„ Assessments	3,391	3	8	„ Wages, Travelling Expenses, Chemicals, &c.	2,283	3	7
„ Endowment	3,391	3	8				
„ Bundaberg S.E.S.	425	11	10	„ Subsidy—Destruction Cane Grubs, &c.	1,902	19	9
„ Mackay S.E.S.	862	0	3	„ Contingencies—			
„ Johnstone S.E.S.	981	5	10	Bundaberg S.E.S.	1,802	15	2
„ Sundries	9	4	6	Mackay S.E.S.	1,760	1	11
				Gordonvale S.E.S.	1,309	5	8
(Total Receipts 1926-27—£9,000 9s. 9d.)				Johnstone S.E.S.	3,172	14	8
				„ Balance, 30th June, 1927	10,190	9	10
	£28,818	12	6		£28,818	12	6

"THE REGULATION OF SUGAR CANE PRICES ACTS, 1915 TO 1922."

Statement of Receipts and Payments for the Financial Year 1926-1927.

SUGAR CANE PRICES FUND.

Receipts.	£	s.	d.	Payments.	£	s.	d.
To Balance, 1st July, 1926	31,296	7	10	By Salaries—Central Board, Cane Testers, and others	1,530	14	1
„ Assessments	13,559	11	5	„ Personal Travelling Expenses Central Board and Staff	360	19	3
„ Sundries	9	8	1	„ Local Boards' Expenses	639	6	7
				„ Printing and Stationery	266	0	2
				„ Rail and Steamer Fares, Advertising, and Hires	670	10	7
				„ Cane Testers and Assistants' Expenses (excluding Salaries)	1,073	6	3
				„ Legal Costs and Fees	64	0	0
				„ Collections of Cost of Production Returns	217	0	0
				„ Sugar Research Scholarships	1,159	19	5
				„ Postage and Sundries	180	11	5
				„ Delegates and Witnesses' Expenses (attending Central Board)	355	0	8
				„ Balance, 30th June, 1927	24,848	4	11
	£44,865	7	4		£44,865	7	4