1942.

QUEENSLAND.

# FORTY-SECOND 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 Acts,* 1900 *to* 1941").

**PRESENTED TO PARLIAMENT BY COMMAND.**

BRISBANE:
BY AUTHORITY: A. H. TUCKER, GOVERNMENT PRINTER.

A. 40—1942-43.

# FORTY-SECOND ANNUAL REPORT OF THE BUREAU OF SUGAR EXPERIMENT STATIONS.

## Director's Report.

### TO THE HONOURABLE THE SECRETARY FOR AGRICULTURE AND STOCK.

SIR,—I have the honour to submit the Forty-second Annual Report of The Bureau of Sugar Experiment Stations, covering the period 1st July, 1941, to 30th June, 1942.

H. W. KERR,
Director.

Brisbane, 1st November, 1942.

## GENERAL.

The seasonal conditions under which the 1942 cane crop was produced were similar in many respects to those of the previous year. A severely dry spring and early summer retarded crops in most districts, so that the wet season rains were not fully effective when they came. The far Northern district experienced an unusually light rainfall for the period, and the crops actually available for harvest are very creditable. A shortage of manpower for farm operations, and a deficiency in available fertilizers have had a marked influence on the yields for 1942, and doubtless will increase in their effect in succeeding years.

Cyclones were virtually absent during the past wet season, and the only serious flood was that of the Burnett River in February. The greatest damage from this cause occurred above the sugar districts, but large areas of river flat canelands were inundated and the crops drowned. In some places serious erosion of banks and cultivated fields ensued.

CROP YIELD, 1941—CROP ESTIMATE, 1942.

| 1941 Crushing. | Mill. | 1942 Estimate. |
|---|---|---|
| 132,305 | Mossman | 92,000 |
| 197,302 | Hambledon | 163,000 |
| 230,933 | Mulgrave | 210,000 |
| 227,441 | Babinda | 212,200 |
| 192,609 | Goondi | 179,000 |
| 241,519 | South Johnstone | 225,000 |
| 166,386 | Mourilyan | 140,000 |
| 253,627 | Tully | 220,000 |
| 229,671 | Victoria | 211,000 |
| 190,725 | Macknade | 170,000 |
| 87,574 | Invicta | 80,150 |
| 162,189 | Pioneer | 185,140 |
| 196,902 | Kalamia | 185,000 |
| 199,346 | Inkerman | 252,960 |
| 152,027 | Proserpine | 135,000 |
| 74,652 | Cattle Creek | 70,000 |
| 154,983 | Racecourse | 156,000 |
| 148,510 | Farleigh | 140,000 |
| 81,797 | North Eton | 80,000 |
| 150,050 | Marian | 170,000 |
| 153,106 | Pleystowe | 140,000 |
| 163,786 | Plane Creek | 145,000 |
| 73,758 | Qunaba | 80,000 |
| 141,223 | Millaquin | 165,000 |
| 168,721 | Bingera | 190,000 |
| 165,154 | Fairymead | 168,000 |
| 43,813 | Gin Gin | 18,000 |
| 186,807 | Isis | 140,000 |
| 55,454 | Maryborough | 50,000 |
| 43,385 | Mount Bauple | 30,000 |
| 107,677 | Moreton | 126,690 |
| 18,334 | Rocky Point | 10,000 |
| 1,823 | Eagleby | 1,000 |
| 4,793,589 | Total | 4,540,140 |

ESTIMATES OF SUGAR YIELD, 1942 CROP.

The preliminary estimate of the cane crop which will be available for harvest in Queensland during 1942 is 4,550,000 tons, which is a-quarter of a million tons below the actual 1941 harvest. Moreover, it is probable that a proportion of the crop in the Southern districts will be backward, and farmers will stand it over until 1943.

However, taking an optimistic viewpoint, a sugar yield of some 640,000 tons may be attained, which will be a very satisfactory performance in the circumstances.

STATISTICS OF THE 1941 CROP.

The yield of raw sugar in Queensland for the 1941 season was 697,345 tons* of 94 n.t. This is 62,000 tons less than that of 1940, and marks a second successive fall from the all-time 1939 record.

The total area harvested for milling purposes in 1941 was 246,939 acres, a reduction of nearly 20,000 on the previous year. The acreages of plant, ratoon, and standover crops were as follows:—

| | Acres. |
|---|---|
| Plant cane | 93,177 |
| Ratoon cane | 142,493 |
| Standover cane | 11,269 |
| Total | 246,939 |

The yield of cane per acre crushed was 19·42 tons, while the average yield of sugar was 2.82 tons. Both figures are almost identical with those for 1940, and are very satisfactory in the circumstances. The average tonnage of cane required to make 1 ton of 94 n.t. sugar was 6.88.

MOLASSES PRODUCED.

The following table shows the manner in which the molasses produced during 1941 was disposed of:—

| | Gallons. |
|---|---|
| Sold to distilleries | 9,996,390 |
| Used as fertilizer | 1,499,250 |
| Used as stock feed | 2,827,350 |
| Used as mill fuel | 1,152,134 |
| Used for other purposes | 106,720 |
| Run to waste | 10,310 |
| Total | 15,592,154 |

1941 SUGAR VALUES.

The proportion of the 1941 sugar crop manufactured in Queensland, which was required for consumption and use in the Commonwealth of Australia, was declared at 59.68 per cent., and that for export at 40.32 per cent. These proportions are exclusive of the "excess" sugar produced by a few mills in excess of their allotments under the 1939 Peak Year quotas. The price payable for the sugar deemed to be required for consumption and use in Australia was £22 13s. per ton of 94 n.t. The net value of 94 n.t. sugar declared as "surplus" sugar was £10 18s. 9d. per ton, while the average value for all sugar was £17 18s. 6d.

* This is slightly in excess of the figure issued by the Sugar Board, as it includes local sales of raw sugars.

## ECONOMIC REVIEW.

The 1941 sugar crop reveals, for the first time, the effects of the impact of war on the industry. Definitely the yields for that year were influenced by a rather unfavourable growing season; but there is distinct evidence of inadequate cultivation, and probably a reduced acreage planted, due to manpower shortage. The supply of fertilizers, though not specially acute during the spring of 1940, did suffer in respect of soluble nitrogenous compounds; and many farmers who anticipated crop marketing difficulties due to the transport deficiency and general uncertainty, deliberately refrained from purchasing what they would normally have used.

With a crop such as sugar-cane, which is not an annual, but which remains in the ground for two or more years after planting, the effects of adverse circumstances are not sudden. They advance insidiously and become apparent only when such influences have been at work for a period of two or more years. In the same manner, the recovery of the industry from a period of adversity must similarly be slow. It may therefore be expected that sugar production is entering upon a phase of low total yields, unless something drastic can be done to break the ring of unfavourable circumstances which beset it.

What will be done is, of course, a matter of national policy. Either sugar is to be produced at the levels of past years, or it is expedient that the volume of production be reduced to normal—or even austerity—home requirements. The recent pronouncement of the Prime Minister, coupled with the necessity for introducing a plan of rationing to consumers, suggests that the desire is for the maintenance of something in excess of scant domestic needs.

The sugar industry is unanimous that nothing must be done which will interfere with the capacity of this country to carry on the war, to the limit of its capacity as a democratic nation. It does not adopt the viewpoint that whatever happens, sugar production must go on as usual. But it does realise that one cannot have a high level of production, when the wherewithal to provide it is lacking.

Its appeal to the authorities to release men for work in the fields and mills was consistent with the desire that the cane which had already been produced should be utilised to best advantage, and that a little essential assistance at the time when it is most required might be afforded to assure a reasonable crop for 1943.

One factor more than any other which would assist in promoting the highest efficiency of manpower utilisation is a better supply of the fertilizers so necessary to maintain crop growth at its maximum possible rate, and assure that crops will be out of hand speedily. It is well recognised that much of the advance in standards of production efficiency in recent years has been due to the better appreciation of the use of the correct fertilizers, applied at the right time. Soils in the high rainfall areas particularly are unable to retain high reserves of plant foods against leaching; and just as soon as there is any slackening in the supply from artificial sources, crop yields diminish at a rapid rate.

The quantity of fertilizer allotted to the sugar industry for the year 1942 is not more than one-third that normally employed. Moreover, the bulk of this consists of meatworks fertilizer, which, though valuable, is not comparable in its effects with quick-acting nitrogenous manures such as sulphate of ammonia and nitrate of soda. The accumulated evidence from farm fertility trials conducted by the Bureau over a long period of years amply demonstrates the absolute necessity for these soluble manures if successful ratoon crops are to be produced. Unless some modification of the present plan can be effected speedily, the Queensland canegrowers will be faced with large areas of unprofitable ratoon crops in 1943; to harvest these can only lead to lack of economy in manpower utilisation, so that by providing even a modest supply of sulphate of ammonia or nitrate of soda at reasonable prices, a dual purpose will be served.

The industry approaches the 1942 harvesting season with some measure of trepidation. The anticipated crop is, from one angle, favourably small. That the crop may be harvested in a reasonable period will need all the ingenuity and co-operative efforts of the farmers; but if the producer must become canecutter, the plantings for 1943 and cultivation of the young crop must inevitably suffer.

## WORK OF THE BUREAU.

*General.*—Events of the past year have, naturally, impressed themselves on the activities of the Bureau. At the present time, more than one-half of the staff is serving with the fighting forces, or has been transferred to direct war activity. The effects of loss of manpower have been felt very severely in the farm extension service, where there are only two senior officers at present, and the mill technology branch, where only one officer remains. Field trial projects have therefore been virtually eliminated with the exception of varietal experimentation. Following the resignation of one assistant mill technologist last year, to engage in munitions production, further two members of this staff have been seconded for duty with the Flax Production Committee, to assist in the development of the manufacture of this important product.

Labour shortage at the regional experiment stations has also restricted the normal programme of work; on two of these stations vegetable production has been taken up to assist increased local demands for these foodstuffs. Seedling propagation will also be restricted, during 1942, to the use of cane seed produced during the previous season, and held in cold storage.

Late in 1941 the Sugar Experiment Stations Advisory Board, on behalf of the sugar industry, conveyed to the Premier a desire that the staff and laboratory facilities of the Bureau be made available to the Commonwealth Government for the duration of the war. This offer was immediately transmitted to the Prime Minister, and has been implemented to a considerable degree. A number of projects from the war departments have been undertaken, and this work continues.

The Bureau has also been called upon to help solve some of the problems of the primary producer which follow in the train of wartime restriction of production and transportation of essential requirements. The subject of fertilizer supplies has provided great difficulties, due to the intensive shortage of supplies, and the necessity for sharing these with the producers of other crops which have been placed in higher priorities. Transportation facilities for even these reduced quantities are not readily obtainable, and it is felt that the sugar growers will this year find difficulty in maintaining economical production on certain of the older, and more highly leached, soils of the cane districts. In order to assure that the fertilizers available for use on sugar-cane might be used to best advantage, and to provide an equitable distribution, a plan of rationing was drawn up by the Director. "Authorities to Purchase" have been prepared for all growers making application, and who purchased fertilizer during the base years 1939 and 1940.

Due to the emergency conditions, no experiment station field days will be held this year, while the Sugar Agriculture and Tractor School arranged for January last, was abandoned at the last moment.

*Advisory Board.*—During the year, two meetings of the Board were held on the 11th December, 1941, and 6th March, 1942. Several matters of importance were dealt with at these meetings—chiefly problems arising from wartime conditions. "*The Sugar Experiment Stations Acts,* 1900 *to* 1938," were amended late in 1941, for the major purpose of facilitating the control of pests and diseases. Provision was made for the substitution of individual boards, where they existed in one area, by a single authority charged with the responsibility of both pest and disease control. Where one board only existed, this was likewise endowed with the dual responsibility. This should make for more economical and efficient administration. The life of the boards was also extended—from two, to three years.

"THE SUGAR EXPERIMENT STATIONS ACTS, 1900-1941."

SUGAR FUND.

STATEMENT OF RECEIPTS AND DISBURSEMENTS FOR THE YEAR ENDED 30TH JUNE, 1942.

| RECEIPTS. | £ s. d. |
|---|---|
| To Balance, 1st July, 1941 | 24,353 12 11 |
| ,, Assessments | 14,980 9 6 |
| ,, Endowment | 7,000 0 0 |
| ,, Bundaberg Station | 1,252 14 11 |
| ,, Mackay Station | 559 8 11 |
| ,, Meringa Station | 492 1 10 |
| ,, Sundries | 68 5 1 |
| | £48,706 13 2 |

| DISBURSEMENTS. | £ s. d. | £ s. d. |
|---|---|---|
| By Salaries | | 10,019 16 1 |
| ,, Contingencies— | | |
| Salaries and Wages | 990 3 3 | |
| Travelling Expenses, Hires, Fares, Freights, Allowances | 1,756 14 11 | |
| Apparatus, Furniture, Books, Installations | 187 15 8 | |
| Printing, Advertising, Stationery, and Postage | 1,217 5 8 | |
| Cars and Maintenance | 329 3 10 | |
| Pay Roll Tax | 304 12 8 | |
| General Expenses | 447 0 8 | |
| | | 5,232 16 8 |
| ,, Bundaberg Contingencies | | 1,489 17 0 |
| ,, Mackay Contingencies | | 1,579 13 9 |
| ,, Meringa Contingencies | | 1,948 10 5 |
| ,, Balance, 30th June, 1942 | | 28,435 19 3 |
| | | £48,706 13 2 |

# DIVISION OF SOILS AND AGRICULTURE.

## WORK OF THE BRISBANE LABORATORY.

MR. C. R. VON STIEGLITZ, Chemist.

*Routine Analyses.*—The following is a summary of the routine analyses performed at the Brisbane Laboratory for the period 1st July, 1941, to 30th June, 1942:—

| | |
|---|---|
| Soils | 523 |
| Waters | 14 |
| Sugar cane leaves | 5 |
| Sugar canes | 3 |
| Limes | 5 |
| Fertilizers | 3 |
| By-products | 4 |
| Miscellaneous | 8 |
| | 565 |

In addition to the above, a certain amount of war work has been undertaken; in all, forty-three samples covering a wide range of materials have been analysed. This work has been done in collaboration with the Technology and Pathology divisions.

The number of routine soil samples, submitted during the year, has decreased appreciably, owing to the fact that the majority of the field officers are on war duties. Approximately 50 per cent. of these samples were from farmers seeking advice as to the correct fertilizer to apply to their fields. Th remaining samples, submitted by field officers or chemists in charge of experiment stations, represented soils from experimental plots, survey samples, or special problems such as possible damage to fields from flood waters.

### INVESTIGATIONAL WORK.

*Soil Fertility Survey, Garradunga Area.*—The fertility survey commenced in 1940 in collaboration with Mr. Knust, Instructor in Cane Culture, was continued last year, and further samples will be taken following this year's harvest. Maps of the area have been compiled, showing, by means of different colours, the variations of the three main plantfoods and soil reaction. The results are consistent with those of the previous year's survey. Approximately 80 per cent. of these soils are deficient in available potash, 50 per cent. in available phosphoric acid, whilst 35 per cent. are exhibiting low pH values as a result of excessive leaching.

*Monthly Variation of Available Plantfoods and pH.*—This study, commenced in 1940, has been continued to date. The samples, representing five different soil types, from three districts, varying greatly in climate, were taken at depths of 0 inch to 10 inches and 10 inches to 20 inches.

Main conclusions to date are:—

(1) *Reaction.*—The Mackay alluvial loam is the only soil to show a tendency to become more acid during the period in which investigations have been carried out. The others either show small fluctuations above and below a constant value or a periodic rise and fall.

(2) *Available Phosphate.*—The values for the red volcanic loam and alluvial loam of the far northern district, despite certain erratic values, show a tendency to become lower, whilst those of the acid alluvial loam have remained practically constant.

The surface soil of the Mackay alluvial loam kept fairly constant for the first fifteen months and then gave erratic figures, the subsoil showing a definite periodic rise and fall of values.

The Bundaberg red volcanic loam gave plus and minus variations from a fairly constant value.

(3) *Replaceable Potash.*—No generalised statement can be made of the potash variations. Several of the soils show a definite increase during the dry season, but this rise appears to be dependent on other factors as well. Evidence of loss of replaceable potash by leaching has only been established for one type, the northern red volcanic loam, and this only after an exceedingly heavy downpour of rain. Sudden demands by the plant, in times of optimum growth, appear to affect this value much more markedly than for phosphate. These experiments will be continued during the coming year.

*Correlation of Field Results with Analytical Methods.*—The usual yearly samples from fertilizer trial plots were received for analysis. The statistical results, showing significance, are not yet available, but indications are that the results confirm previous findings and support the contention that the laboratory figures for available plantfoods can be used confidently as a guide to correct fertilizer application in the field.

## NORTHERN SUGAR EXPERIMENT STATION, MERINGA.

MR. R. W. MUNGOMERY, Officer in Charge.

### METEOROLOGICAL AND NOTES ON CROP GROWTH.

The opening months of the 1941-42 growing season were characterised by prolonged cold weather, and indeed a record low temperature of 35.5 F. was registered on this experiment station on 16th August, when light frosts were recorded from different parts of the surrounding district. It was unfortunate that such adverse weather should have followed in the wake of the substantial plantings that necessarily had to be carried out in June and July as a result of the late termination of the wet season rains. In consequence, plants generally were slow in striking and they suffered a handicap right at the outset.

Day temperatures, however, improved appreciably towards the end of August, and light showers considerably accelerated the strike in the spring planted cane. Throughout the next two months the rainfall was disappointingly low, and it proved to be of practically no benefit to the young crops. Despite this, the plant crops made fair growth wherever the land was well prepared, especially where good crops of legumes had previously been ploughed under. Ratoons, too, came away surprisingly well in most cases considering the adverse weather. Relief came during early November when over 3 inches of rain fell in two good showers, and as a result the plant cane made good headway, whereas the ratoons generally remained fairly backward and poorly stooled. Thunderstorms made their appearance during December when further serviceable rains were recorded, and these helped to maintain the crops in fair growth, but in January very dry conditions with high temperatures prevailed for some weeks and the cane crops showed considerable signs of distress. Light showers subsequently were received and these tended to revive the wilted crops and later to promote vigorous growth. February rainfall more nearly approached a normal figure, but the falls during this period came as a result of thunderstorms and were not due to the usual monsoonal influences. Crops generally grew well during this month and early March as the February falls had provided a small reserve of moisture. Once this was utilized the crops were more or less dependent on light showers, and soon after dry conditions set in the crops suffered a decided growth check. This became increasingly evident towards the end of March when extremely hot weather prevailed, and the position in regard to the backwardness of certain seedling canes was viewed so seriously that irrigation was commenced in order to give them conditions more nearly approaching normal. Such irrigation work, however, had of necessity to be made intermittent as the irrigation well would not stand up to continuous pumping—a position almost without parallel during this period of the year in North Queensland canefields. The dry weather continued until mid-April when some relief came as a result of light showers, and later in the month the heaviest individual day's rainfall for the year was recorded. This fully restored the upper soil moisture, and intermittent showery conditions continued until well into May and June. After the first of this good soaking rain the cane greened considerably, and aided by reasonably warm weather for this period of the year the crops commenced to make fair growth again. Arrowing this year was on a reduced scale, and many of the varieties that normally make a fair amount of winter growth did so on this occasion, and the final crop outlook was much better than was anticipated some three months earlier.

The total rainfall for the year of the crop's growth amounted to 46.05 inches, which is just a little more than half the average annual rainfall, and the district appeared to miss the usual monsoonal rains that are so characteristic of the January-March period. No flooding occurred in the nearby rivers, and consequently no data was secured on the flood resistance or susceptibility of certain new varieties which were planted out on low-lying river banks with the express object of determining their reaction to flooding. The year was characterised by alternate dry and wet periods, and as would be expected the resulting crop is likely to yield below average. This reduced yield, however, should not be debited solely against the reduced rainfall. In many instances the land to be planted was badly prepared owing to the lateness of the previous wet season, and this could not but have been reflected in bad germinations and subsequent mediocre growth.

In addition, fertilizer rationing greatly reduced the quantity of fertilizer that could be applied to all blocks requiring their complement of artificial manures, and this was reflected in reduced yields per acre. Finally, in the case of grub-infested cane, some growers mindful of the serious war situation threatening North Queensland were loath to spend money on grub control during the early months of 1942 when the position was so uncertain. This resulted in many fields being badly damaged by grubs and the stools were so root pruned that no further growth took place in infested fields after March, and very light yields were produced wherever these pests were left uncontrolled.

The following are the rainfall records taken at this Experiment Station during the past twenty years:—

| Year. | Rainfall in Inches. | Year. | Rainfall in Inches. |
|---|---|---|---|
| 1922 | 64·90 | 1933 | 96·06 |
| 1923 | 53·29 | 1934 | 91·44 |
| 1924 | 95·67 | 1935 | 59·91 |
| 1925 | 76·98 | 1936 | 88·81 |
| 1926 | 59·12 | 1937 | 46·33 |
| 1927 | 90·16 | 1938 | 55·86 |
| 1928 | 66·33 | 1939 | 118·08 |
| 1929 | 102·28 | 1940 | 84·58 |
| 1930 | 107·61 | 1941 | 84·65 |
| 1931 | 98·82 | 1942 (6 months) | 35·98 |
| 1932 | 76·31 | Average, 26 years | 81·88 |

ABSTRACT OF METEOROLOGICAL OBSERVATIONS MADE AT THE NORTHERN SUGAR EXPERIMENT STATION, MERINGA, FROM 1ST JULY, 1941, TO 30TH JUNE, 1942.

| Month. | Rainfall in Inches. | Number of Wet Days. | Highest Shade Maximum. | Lowest Shade Maximum. | Mean Shade Maximum. | Highest Shade Minimum. | Lowest Shade Minimum. | Mean Shade Minimum. | Mean Diurnal Range. | Mean Temperature 9 a.m. | Mean Relative Humidity 9 a.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1941. | | | | | | | | | | | |
| July | 0·75 | 5 | 83·5 | 74·5 | 79·5 | 63·8 | 40·0 | 52·5 | 26·3 | 68·0 | 79·0 |
| August | 0·69 | 5 | 84·6 | 76·2 | 80·0 | 65·6 | 35·5 | 50·9 | 29·0 | 68·1 | 71·0 |
| September | 0·25 | 2 | 89·8 | 80·6 | 85·9 | 65·0 | 46·8 | 56·3 | 29·6 | 75·5 | 67·0 |
| October | 0·12 | 2 | 93·2 | 82·5 | 88·9 | 70·5 | 47·2 | 59·8 | 29·1 | 79·7 | 62·0 |
| November | 4·06 | 14 | 95·2 | 83·5 | 89·9 | 73·5 | 63·0 | 69·3 | 20·6 | 82·4 | 70·5 |
| December | 3·30 | 16 | 96·3 | 87·0 | 92·0 | 76·5 | 63·2 | 69·5 | 22·5 | 83·7 | 70·5 |
| 1942. | | | | | | | | | | | |
| January | 3·26 | 11 | 98·0 | 86·0 | 93·1 | 75·5 | 64·8 | 70·3 | 23·1 | 81·0 | 78·0 |
| February | 11·97 | 20 | 100·5 | 86·5 | 92·7 | 76·0 | 68·0 | 73·4 | 19·4 | 80·7 | 84·0 |
| March | 3·76 | 13 | 98·0 | 82·0 | 90·7 | 74·0 | 61·5 | 68·2 | 23·0 | 77·4 | 86·5 |
| April | 8·40 | 19 | 95·3 | 84·0 | 88·6 | 72·7 | 61·5 | 68·6 | 19·8 | 79·9 | 82·0 |
| May | 2·76 | 18 | 89·2 | 81·8 | 85·2 | 70·6 | 45·7 | 65·0 | 19·9 | 77·1 | 81·0 |
| June | 5·83 | 15 | 87·5 | 76·0 | 81·8 | 70·0 | 45·2 | 61·0 | 21·1 | 72·6 | 87·0 |
| Totals | 45·15 | 140 | .. | .. | .. | .. | .. | .. | .. | .. | .. |

## VARIETAL TRIAL (Plant Crop).

*Block.*—A.2
*Harvested.*—August, 1941.
*Age of Crop.*—13 months.
*Plan.*—5 x 5 Latin Square.

SUMMARY OF YIELDS.

| Variety. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| I.118 | 37·3 | 13·8 |
| I.41 | 34·2 | 14·0 |
| J.39 | 41·0 | 13·5 |
| J.37 | 37·7 | 11·4 |
| P.O.J.2878 | 41·2 | 14·0 |

### DISCUSSION.

The land was graded and green-manured with Gambia pea, prior to planting. The strike was slow, and incomplete with some varieties. All canes made good growth during the wet season, and the tonnages are very satisfactory. The standard, P.O.J.2878, outyielded all other varieties in cane and sugar per acre. J.39 has proven too susceptible to gumming disease to warrant further propagation, and therefore no selections were made from the series.

## OBSERVATIONAL VARIETAL TRIAL (Plant Crop).

*Block.*—A.1.
*Harvested.*—August, 1941.
*Age of Crop.*—13 Months.
*Plan.*—Single plots.

SUMMARY OF YIELDS.

| Variety. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| K.1 | 37·0 | 16·0 |
| K.2 | 29·4 | 13·4 |
| K.6 | 34·2 | 10·0 |
| K.9 | 35·4 | 14·1 |
| K.15 | 37·5 | 11·9 |
| K.16 | 39·7 | 13·2 |
| K.19 | 28·7 | 16·1 |
| K.24 | 34·8 | 13·3 |
| K.26 | 39·2 | 12·5 |
| K.55 | 32·0 | 16·9 |
| K.56 | 30·1 | 14·8 |
| K.58 | 38·5 | 12·4 |
| K.74 | 31·2 | 12·9 |
| K.90 | 29·8 | 15·5 |
| K.94 | 26·6 | 12·3 |
| Korpi (5 plots) | 29·8 | 16·5 |

### DISCUSSION.

Trash, followed by a very heavy crop of giant crotalaria, was ploughed into the land during the fallow. All varieties struck well, and during the wet season, the plots made good growth. The new seedlings exhibited favourable vigour, but the majority proved to be of low sugar content, and were discarded for this reason. K.55 gave a high c.c.s. test, but it proved susceptible to major diseases. K.58 alone has been selected for further yield tests.

### NEW VARIETIES.

The following new varieties were received from Quarantine and grew in a healthy condition throughout the year:—Eros, Trojan, 33M.Q.819, 30M.Q.461 Loethers, S.J.2, 28R.154, 28R.155, 32G.1374, and D.166-34. It is premature to make any pronouncement on the probable value of these canes either as commercial or breeding varieties, and further small plantings will be made during the coming year with the object of assessing their merits.

### FODDER CROPS.

A considerable number of sorghum varieties were planted for fodder purposes on the friable red soils of the Meringa area during November, 1941. These included the following:—Imphee, Saccaline, Early Orange, Ambercane, Feterita, Honey, Colman, Atlas, Sugar Drip, Darso, Sumac, Italian, Jones, White African, and Schrock. They were harvested during February-March and allowed to ratoon. Some produced excellent plant crops, but in many cases the ratoons were inferior. A summary of both the plant and ratoon crops places the following as desirable to grow under the conditions then obtaining, and can be recommended to growers who favour this type of fodder crop:—Feterita, Honey, Sugar Drip, White African, and Saccaline.

### LEGUMES.

During the past summer some soaking experiments were undertaken with the seed of Gambia pea, but no particular benefit was found to accrue from this practice. Even when tried out in large scale plantings the germinations in plots of both soaked and unsoaked seed were uniformly good, though weather conditions remained favourable for some time immediately after planting. Later, experiments involving the exposure of seed to the sun were set out, and these appeared to give substantially quicker and better germinations than the untreated seed, but these could not be duplicated with larger field trials.

In the course of the year additional plantings were made of *Crotalaria usaramoensis*, but the summer rainfall which was so erratic did not favour the early growth of this legume, and it was not until continuous wet weather set in that the crops made vigorous growth and overcame their initial backwardness. It will be recalled that this legume performed exceptionally well under the very wet conditions of last year, and it continues to show definite promise for the wetter districts, especially where it is desired to extend growth well into the winter months.

Similarly the performance of *Phaseolus riccardianus* was not equal to that of the previous season, since its normal growth period this year coincided with a considerable amount of dry weather. In addition, on the friable red soils it exhibited a high degree of susceptibility to nematode attack. However, it still shows substantial promise on the heavy clayey soils, where in wet weather other legumes are prone to suffer sudden collapse as a result of wilt. Small plantings were made of *Dolichos lab lab, Dolichos debilis,* and Giru bean, *Phaseolus lunatum,* and in every instance these green manure crops provided a good cover during a period when crowsfoot grass made inroads into other legumes.

Hitherto in our trials *Calapogonium mucunoides* did not make substantial growth, but during the last year volunteer crops made an impressive showing, both in regard to cover and the amount of green matter produced, and its further progress will be watched with interest.

In addition, small plantings were made of *Vigna unguiculata* (two strains), *Vigna sinensis*, *Canavalia ensiformis*, and *Stizolobium pachylobium*, but these species either on account of their unfavourable reaction to wilt or their undesirable growth habits were discarded as being unsuitable for further trials.

### Vegetable Production.

It was decided that this Experiment Station should give a practical lead in vegetable production to the growers who usually come within the ambit of its normal activities. Such every-day necessities as potatoes are usually transported considerable distances from Southern States, and, in addition to lessening the strain on an already over-taxed transport system, the importance of having such crops growing in North Queensland cannot be too highly stressed.

To put this programme into effect, it became necessary to omit for this year our normal practice of raising and planting out approximately 10,000 cane seedlings. Instead, the 1941-42 original seedlings, after selection, will be harvested and ratooned, and it is planned to make a further selection from the resulting crop next year. Thus, not only will the ratooning qualities of selected canes be known earlier (and this will allow of certain discards being made on this basis), but also other canes which may have just missed selection in the plant crop and which may excel in their ratooning qualities, will again have a chance of being selected. It has long been felt that the ratooning of all, or a substantial proportion of the original seedlings, would have brought out these important aspects and tested the ideas, but limited acreage hitherto precluded such an undertaking. Now, however, adjustments to wartime conditions render the foregoing plan imperative.

In order further to conserve acreage for this project, any blocks which were growing parent canes for the cane-breeding work and which in the normal course of events were due to be ploughed out this year, were ratooned for another year instead of planting new blocks, and the latter were made available for vegetable production. By this means it was possible to plant over 3 acres to English potatoes, 4½ acres to pumpkins, and ½ acre to sweet potatoes. As far as possible attempts were made to grow different varieties so as to gain some idea of their relative values in these northern districts; but in many cases the choice of varieties ultimately grown was dictated by their availability, rather than by the popularity they enjoyed. For instance, the only seed potatoes available were Brownell, Bismark, and Carman. The firstnamed has the reputation of being a light cropper in these parts, whereas the variety "Up-to-date," which is generally regarded here as a heavy cropper, was quite unprocurable. Apart from an outbreak of bacterial wilt in the English potatoes, and some damping off in the young pumpkin plants, the crops are making good headway and give promise of fulfilling the purpose for which they were originally intended.

### Laboratory Work.

The following is a summary of the analyses carried out during the year:—

| | |
|---|---|
| Canes (Maturity Tests) | 47 |
| Canes (Station samples other than maturity tests) | 269 |
| Canes (Farm Trials) | 164 |
| Canes (Farmers' Samples) | 2 |
| Lime Tests | 20 |
| Total | 502 |

*Crop Summary.*

| | Tons. |
|---|---|
| Cane sent to mill | 359·2 |
| Cane used for plants and samples | 23·2 |
| Totals | 382·4 |
| Total area harvested | 14·1 acres |
| Tons per acre harvested | 27·12 tons |
| Class of Cane— | Per cent. |
| Plant cane | 74·3 |
| Ratoon cane | 25·7 |

## CENTRAL SUGAR EXPERIMENT STATION, MACKAY.

Mr. D. L. McBryde, Chemist in Charge.

### METEOROLOGICAL.

Weather conditions for this period varied very much from the average, and must be considered unfavourable from point of view of the yields of crops grown. Firstly, the period July-October was very dry and yielded only 64 points, whereas expectations for this period are between 5 and 6 inches of rain. Secondly, night temperatures during August were unprecendently low, and frosts caused much damage to a large area of cane. And thirdly, the extremely wet February, with 3,231 points of rain, against 1,230 average for this month during the past forty-one years, caused severe water-logging of much country with consequent damage to root systems, and failure of crops to make continued growth during favourable weather conditions of the next few months.

The combination of dry and cold weather conditions during winter and spring resulted in much poorer germinations in the blocks planted during this period than is usually obtained. As early planting had been restricted by the unusually late wet season, the poor results therefrom must be reflected in yields during the coming harvest.

An unusual happening for many growers of the Mackay district was the fact that standing cane which they had reserved was found to be too badly frosted for use as plants. In a number of instances farmers had to bring in plants from less affected areas because their own material was so seriously damaged.

The total rainfall for the twelve-month period was 5,775 points, which compares with 6,363 average of past years.

Table I.

Abstract of Meteorological Observations made at the Central Sugar Experiment Station, Mackay, from 1st July, 1941, to 30th June, 1942

| Month. | Inches Rainfall. | Wet Days. | Average Rainfall. | Shade Temperatures. Maximum. High. | Maximum. Low. | Maximum. Mean. | Minimum. High. | Minimum. Low. | Minimum. Mean. |
|---|---|---|---|---|---|---|---|---|---|
| 1941. | | | | | | | | | |
| July | 1 | 1 | 133 | 80·0 | 67·5 | 73·6 | 56·5 | 37·5 | 46·4 |
| August | 15 | 2 | 103 | 81·0 | 69·5 | 74·4 | 57·5 | 30·5 | 44·0 |
| September | 35 | 3 | 160 | 87·5 | 69·5 | 80·4 | 64·0 | 43·0 | 53·0 |
| October | 13 | 3 | 160 | 94·5 | 79·5 | 83·9 | 71·5 | 45·0 | 59·6 |
| November | 467 | 11 | 313 | 93·5 | 77·0 | 84·1 | 71·5 | 62·5 | 66·7 |
| December | 144 | 11 | 693 | 93·0 | 84·5 | 87·3 | 74·0 | 61·5 | 67·3 |
| 1942. | | | | | | | | | |
| January | 444 | 13 | 1,371 | 94·0 | 85·0 | 88·9 | 74·5 | 62·5 | 68·5 |
| February | 3,231 | 19 | 1,230 | 92·0 | 80·0 | 85·4 | 76·5 | 67·5 | 71·7 |
| March | 246 | 13 | 1,044 | 94·5 | 82·5 | 87·6 | 72·5 | 63·5 | 68·6 |
| April | 673 | 20 | 562 | 92·0 | 75·0 | 82·9 | 73·5 | 58·0 | 66·4 |
| May | 295 | 15 | 334 | 82·5 | 72·0 | 78·6 | 68·0 | 44·0 | 59·0 |
| June | 211 | 11 | 260 | 83·0 | 72·0 | 75·9 | 66·5 | 41·5 | 57·1 |
| Totals | 5,775 | 122 | 6,363 | .. | .. | .. | .. | .. | .. |

Annual Rainfalls since 1920 at Central Sugar Experiment Station, Mackay.

| Year. | Rainfall in Inches. | Year. | Rainfall in Inches. |
|---|---|---|---|
| 1920 | 57·27 | 1932 | 48·48 |
| 1921 | 95·89 | 1933 | 71·94 |
| 1922 | 34·47 | 1934 | 37·57 |
| 1923 | 25·23 | 1935 | 45·15 |
| 1924 | 53·37 | 1936 | 97·37 |
| 1925 | 54·80 | 1937 | 56·60 |
| 1926 | 34·60 | 1938 | 52·18 |
| 1927 | 83·87 | 1939 | 56·14 |
| 1928 | 72·28 | 1940 | 84·97 |
| 1929 | 64·03 | 1941 | 71·38 |
| 1930 | 55·81 | 1942 (6 months) | 51·00 |
| 1931 | 30·01 | Average, 22 years | 58·38 |

### VARIETAL TRIAL (Plant Crop).

*Block.*—A.5.

*Harvested.*—October, 1941.

*Age of Crop.*—12 months.

*Plan.*—5 × 5 Latin square.

Summary of Yields.

| Variety. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| G.48 | 12·2 | 15·3 |
| H.43 | 22·4 | 14·0 |
| H.45 | 21·9 | 15·3 |
| H.63 | 21·4 | 14·5 |
| Q.813 | 18·6 | 14·6 |

## DISCUSSION.

The strike and early growth of the crop were handicapped by dry weather, but all plots made good progress during the wet season and suffered little from water-logging. Three of the new canes outyielded the standard, while two showed very satisfactory C.C.S. results also.

### OBSERVATIONAL VARIETAL TRIAL (Plant Crop).

*Block.*—A.5.
*Harvested.*—October, 1941.
*Age of Crop.*—12 months.
*Plan.*—Single plots.

SUMMARY OF YIELDS.

| Yields. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| I.2 .. .. .. .. .. | 15·5 | 15·7 |
| I.3 .. .. .. .. .. | 9·3 | 16·9 |
| I.12 .. .. .. .. .. | 8·3 | 16·0 |
| I.15 .. .. .. .. .. | 14·0 | 15·1 |
| I.20 .. .. .. .. .. | 15·0 | 15·5 |
| I.21 .. .. .. .. .. | 12·5 | 15·5 |
| I.22 .. .. .. .. .. | 16·8 | 15·0 |
| I.25 .. .. .. .. .. | 10·8 | 16·7 |
| I.26 .. .. .. .. .. | 21·5 | 15·8 |
| I.31 .. .. .. .. .. | 19·5 | 15·0 |
| I.51 .. .. .. .. .. | 13·5 | 14·0 |
| I.53 .. .. .. .. .. | 11·3 | 14·8 |
| I.62 .. .. .. .. .. | 13·5 | 15·0 |
| I.68 .. .. .. .. .. | 9·8 | 11·1 |
| I.70 .. .. .. .. .. | 8·5 | 14·4 |
| Q.25 .. .. .. .. .. | 18,3 | 15·0 |
| Q.813 (5 plots) .. .. .. .. | 14·3 | 15·2 |

## DISCUSSION.

The strike of this block was affected by dry conditions, while severe water-logging during the heavy wet season caused further damage. Yields were therefore light. Two or three of the new varieties showed promise in this early trial, but the results cannot be regarded as indicative of reliable yields.

### VARIETAL TRIAL (First Ratoon Crop).

*Block.*—A.4.
*Harvested.*—September, 1941.
*Age of Crop.*—10½ months.
*Plan.*—5 × 5 Latin square.

SUMMARY OF YIELDS.

| Variety. | Plant Crop. | | First Ratoon Crop. | |
|---|---|---|---|---|
| | Cane per Acre. | C.C.S. | Cane per Acre. | C.C.S. |
| | Tons. | Per cent. | Tons. | Per cent. |
| G.17 .. .. | 21·8 | 16·9 | 30·7 | 16·3 |
| G.22 .. .. | 22·4 | 15·9 | 30·1 | 13·7 |
| G.39 .. .. | 17·8 | 17·8 | 25·4 | 14·2 |
| G.58 .. .. | 14·8 | 17·1 | 23·3 | 15·7 |
| Q.813 .. .. | 15·7 | 17·4 | 22·7 | 15·4 |

## DISCUSSION.

The varieties ratooned strongly, but growth was slow until the wet season. The plots did not suffer much from water-logging, but the field became very weedy before the wet season closed. All varieties outyielded the standard, while G.17 also showed a better C.C.S. value.

### OBSERVATIONAL VARIETAL TRIAL (First Ratoon Crop).

*Block.*—A.4.
*Harvested.*—October, 1941.
*Age of Crop.*—10½ months.
*Plan.*—Single plots.

SUMMARY OF YIELDS.

| Variety. | Plant Crop. | | Ratoon Crop. | |
|---|---|---|---|---|
| | Cane per Acre. | C.C.S. | Cane per Acre. | C.C.S. |
| | Tons. | Per cent. | Tons. | Per cent. |
| G.43 .. .. | 15·8 | .. | 24·5 | 15·2 |
| G.44 .. .. | 7·0 | .. | 17·8 | 13·2 |
| G.47 .. .. | 9·0 | .. | 11·5 | 13·0 |
| G.48 .. .. | 13·8 | 16·6 | 25·8 | 15·3 |
| G.49 .. .. | 13·8 | .. | 26·8 | 13·4 |
| G.53 .. .. | 13·3 | .. | 30·0 | 14·1 |
| H.18 .. .. | 10·0 | 18·5 | 21·8 | 14·8 |
| H.23 .. .. | 4·0 | .. | 4·5 | 14·5 |
| H.33 .. .. | 4·5 | .. | 20·3 | 13·1 |
| H.41 .. .. | 13·8 | .. | 19·3 | 12·3 |
| H.43 .. .. | 15·8 | 15·6 | 30·5 | 13·4 |
| H.45 .. .. | 20·8 | 17·0 | 29·3 | 14·2 |
| H.59 .. .. | 12·0 | 15·5 | 17·3 | 14·3 |
| H.61 .. .. | 13·0 | .. | 29·8 | 11·9 |
| H.63 .. .. | 18·3 | 15·4 | 25·8 | 13·8 |
| Q.2 .. .. | 8·0 | .. | 6·5 | 14·0 |
| Q.813 (average of 5 plots) .. | 12·1 | 16·9 | 16·8 | 14·0 |

## DISCUSSION.

Following a poor plant crop the ratooning was good. Some damage was caused by water-logging during the wet season, and the plots became very grassy. Yields were generally satisfactory, and several varieties show sufficient promise to warrant selection for further trials. The results for the full-scale trial planted from these plots will be found on page 7.

### VARIETAL TRIAL (First Ratoon Crop).

*Block.*—B.4.
*Harvested.*—October, 1941.
*Age of Crop.*—12 months.
*Plan.*—5 × 5 Latin square.

SUMMARY OF YIELDS.

| Variety. | Plant Crop. | | First Ratoon Crop. | |
|---|---|---|---|---|
| | Cane per Acre. | C.C.S. | Cane per Acre | C.C.S. |
| | Tons. | Per cent. | Tons. | Per cent. |
| Q.20 .. .. | 11·2 | 18·4 | 10·2 | 16·5 |
| Q.28 .. .. | 19·0 | 16·9 | 18·6 | 14·7 |
| Comus .. .. | 23·7 | 17·0 | 21·4 | 14·9 |
| Jason .. .. | 16·7 | 15·4 | 20·3 | 15·1 |
| Q.813 .. .. | 15·8 | 17·5 | 12·4 | 15·7 |

## DISCUSSION.

The plots which had suffered from excessive water in the plant crop did not ratoon well, and the 1941 crop was therefore patchy. The canes on the Q.20, Q.28, and Comus plots were harvested early for plants, so that the yields and C.C.S. values are not strictly comparable. Q.28 on farm trials has shown itself to be a variety of high promise for poorer lands.

### FERTILITY TRIAL (First Ratoon Crop).

*Block.*—B.3.
*Harvested.*—October, 1941.
*Age of Crop.*—12½ months.
*Plan.*—3 × 3 × 3 factorial

SUMMARY OF YIELDS.

| Treatments. | Plant Crop. | | First Ratoon Crop. | |
|---|---|---|---|---|
| | Cane per Acre. | C.C.S. | Cane per Acre. | C.C.S. |
| | Tons. | Per cent. | Tons. | Per cent. |
| No nitrogen .. | 30·2 | 15·4 | 22·2 | 16·1 |
| 200 lb. sulph./amm. | 30·8 | 14·7 | 25·5 | 15·1 |
| 400 lb. sulph./amm. | 31·7 | 16·0 | 26·5 | 14·9 |
| No phosphate .. | 30·5 | 15·8 | 24·6 | 14·6 |
| 200 lb. super. .. | 31·0 | 15·1 | 23·9 | 15·3 |
| 400 lb. super. .. | 31·1 | 16·0 | 25·7 | 15·6 |
| No potash .. .. | 30·9 | 15·6 | 25·3 | 15·6 |
| 125 lb. mur./potash | 30·8 | 16·0 | 23·8 | 14·7 |
| 250 lb. mur./potash | 30·9 | 15·2 | 25·2 | 15·3 |

## DISCUSSION.

The plots ratooned slowly under the dry conditions, but made strong growth during the wet season. At all periods of growth the benefits from sulphate of ammonia were in evidence, and this is reflected in the ratoon yields. Little or no gains followed applications of phosphate or potash with either crop.

### Rotational Experimental Block, Division C.

*Section* 4 was turned into the grazing area during the year.

*Section* 5, from which a very poor plant crop of E.K.28 had been harvested, was ploughed out and put under a green crop which was later ploughed under.

*Section* 6 was planted with Comus early in September, 1941, and a fair though patchy germination resulted. Bare parts were supplied with soaked setts of H.Q.426 and a reasonably good stand resulted.

*Section* 7 was ploughed and planted to a pea crop, which was then turned under. The surface contour was improved by scooping to give an even fall throughout its length. The block will be planted in the coming September.

*Sheep.*—Sheep were shorn in October, giving a yield of 5 lb. per head, this being somewhat lighter than previously obtained. Trouble was experienced with worm infestation, although all sheep were regularly drenched throughout the year with copper or copper nicotine solutions. The nodule worm, too, has become strongly established in the paddock, and this parasite, in particular, caused poor growth in lambs.

Previously, lambs had reached a dressed weight of 30-35 lb. at twenty weeks, but this year they came to a standstill when 20 lb. at about twelve to fourteen weeks, and thereafter made no growth. Examinations showed that these lambs were very severely infested with nodule worms. An attempt was

made to clean up the paddock by grazing in rotation and burning off that not in use, and by drenching with phenothiazine; but no apparent difference was to be seen either in improved growth or in degree of infestation in lambs.

It is now thought that nothing less than a long spell from sheep-grazing will cause a clean-up of the worm population in the paddock which, being low and naturally subject to annual inundations, lends itself to rapid increase in the parasitic population.

### Experimental Legumes.

*Crotalaria Usaramœnsis.*—This variety has again given a very heavy crop.

The disadvantage of the variety, on experience of the past three years, is that it cannot be established at any but its natural period, which is from February until October.

Efforts to obtain an earlier germination by sowing on irrigated soil and by irrigating during the following few weeks have, on three occasions, failed to start the crop in November, or any time until February, when it comes away naturally.

However, when once established, there can be no doubt that a heavy growth and perfect cover will be obtained from March until late in the year.

*Phaseolus lunatum* has not maintained the reputation it earned in the small preliminary plot. It appears to be very slow to get away, and also needs some other crop which will let it climb well above the ground before it can make a heavy, or useful, cover crop. It will not compete with poona pea, when the two varieties are sown as a mixture.

### Laboratory Work.

There was less than the usual demand for testing canes during this year, as will be seen by the following analysis on work done:—

| | |
|---|---|
| Station samples | 274 |
| Farmers' samples | 63 |
| Farm trial samples | 43 |
| Show canes | .. |
| Total | 380 |

Summary of Cane Yields, 1941.

| Field. | Variety. | Total Cane Harvested.* | Tons per Acre. | C.C.S. |
|---|---|---|---|---|
| A.2 | Seedlings | 26·5 | 22·1 | 14·3 |
| A.3 | Seedlings | 43·5 | 21·7 | 14·3 |
| A.4 | Varieties | 71·8 | 23·2 | 14·4 |
| A.5 | Varieties | 48·4 | 16·7 | 15·3 |
| B.3 | Q.28 | 47·2 | 24·8 | 15·2 |
| B.4 | Varieties | 46·5 | 16·0 | 13·8 |
| C.4 | Q.20 | 38·3 | 20·2 | 16·1 |
| C.5 | E.K.28 | 9·6 | 4·8 | 14·6 |
| D.1 | M.1900-P.O.J.2725 | 72·5 | 14·2 | 15·6 |
| | Totals and Averages | 404·3 | 17·7 | 14·9 |

* Includes cane used as plants, samples, &c.

## SOUTHERN SUGAR EXPERIMENT STATION, BUNDABERG.

Mr. N. J. King, Chemist in Charge.

### METEOROLOGICAL.

The first half of the season—July to December, 1941—was very dry. There were two months without any rain, and the aggregate for the six months was only 3.60 inches. Not since 1919 has the district experienced a similar period with two rainless months. The consequence in the district was that ratoons came away very slowly and erratically, and very little spring planting was done. At the same time severe frosts were experienced as late as September. In January good rains fell, but the crop was slow to respond and growth did not begin in earnest until February, 1942. February rain was normal but was succeeded by a dry March. April and May were fair growing months, but June was again dry.

### 1941 Crop.

The 1941 crops in the Bundaberg area were in some mill districts sufficient to allow of a carryover for the following season. Certain districts, however, were practically cut out in producing mill peak requirements and were unfortunately unable to standover appreciable amounts as an insurance for the following year. Considerable severe frosting during the 1941 harvesting season compelled the harvesting of some areas which would normally have stood over. The principal standover cane of the district—P.O.J.2878—continues to increase in area, while P.O.J. 213 appears to be on the decline. Considerable amounts of the new seedling variety Q.25 have been planted and this cane promises to supplant Co.290 as the best one-year cane of the district.

Meteorological Data.

| Month. | Rainfall. | No. Wet Days. | Highest Shade Max. | Lowest Shade Max. | Mean Shade Max. | Highest Shade Min. | Lowest Shade Min. | Mean Shade Min. | Mean Diurnal Range. | Mean Temperature 8 a.m. | Mean Relative Humidity 8 a.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1941. | | | | | | | | | | | |
| July | Nil | 0 | 77 | 66 | 71·6 | 54 | 34 | 43·2 | 28·4 | 53·2 | 89 |
| August | 0·37 | 1 | 76 | 67 | 69·6 | 56 | 31 | 41·5 | 28·1 | 53·7 | 77 |
| September | Nil | 0 | 82 | 73 | 79·3 | 65 | 38 | 53·6 | 25·7 | 65·7 | 76 |
| October | 1·39 | 4 | 84 | 70 | 81·0 | 71 | 48 | 61·5 | 19·5 | 72·7 | 67 |
| November | 1·51 | 7 | 92 | 75 | 82·4 | 74 | 55 | 66·1 | 16·3 | 76·5 | 67 |
| December | 0·33 | 2 | 91 | 80 | 81·0 | 77 | 56 | 66·5 | 14·5 | 77·9 | 65 |
| 1942. | | | | | | | | | | | |
| January | 10·57 | 8 | 90 | 76 | 86·0 | 80 | 65 | 65·4 | 20·6 | 78·0 | 82 |
| February | 8·53 | 8 | 88 | 76 | 82·6 | 76 | 64 | 69·7 | 12·9 | 74·3 | 90 |
| March | 2·40 | 3 | 91 | 81 | 88·8 | 78 | 59 | 67·3 | 21·5 | 75·5 | 84 |
| April | 5·51 | 8 | 90 | 73 | 79·0 | 74 | 52 | 61·7 | 17·3 | 69·7 | 85 |
| May | 2·17 | 4 | 82 | 68 | 76·4 | 63 | 42 | 54·8 | 21·6 | 64·2 | 86 |
| June | 0·74 | 3 | 77 | 65 | 73·3 | 64 | 40 | 53·5 | 19·8 | 61·1 | 88 |

Total rainfall for the year July, 1941, to June, 1942, was 33.52 inches.

### VARIETAL TRIAL (Plant Crop).

*Block.*—D.2.
*Harvested.*—November, 1941.
*Age of Crop.*—13 months.
*Plan.*—5 x 5 Latin Square.

Summary of Yields.

| Variety. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| G.10 | 32·6 | 16·0 |
| G.16 | 35·0 | 15·8 |
| G.34 | 34·6 | 16·5 |
| H.16 | 31·3 | 15·9 |
| Co.290 | 32·8 | 14·5 |

### DISCUSSION.

The plots were planted during very dry weather, and were spray irrigated to ensure a strike. The germination was good, and all varieties made good progress, with satisfactory cover. The varieties grew taller than the standard, Co.290, but the canes stood erect through the gale which flattened so much cane in the district during May, 1941.

Certain of these varieties show promise, but selections for further trial will be deferred until the ratoon yields are available.

## OBSERVATIONAL VARIETAL TRIAL (Plant Crop).

*Block*—D.1.
*Harvested.*—November, 1941.
*Age of Crop.*—14 months.
*Plan.*—Single plots.

SUMMARY OF YIELDS.

| Variety. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| I.6 .. .. .. .. .. | 49·0 | 15·1 |
| I.9 .. .. .. .. .. | 41·5 | 15·8 |
| I.11 .. .. .. .. .. | 51·2 | 15·1 |
| I.12 .. .. .. .. .. | 37·8 | 15·2 |
| I.15 .. .. .. .. .. | 39·4 | 14·3 |
| I.25 .. .. .. .. .. | 38·2 | 15·7 |
| I.27 .. .. .. .. .. | 35·7 | 15·7 |
| I.31 .. .. .. .. .. | 45·5 | 14·9 |
| I.35 .. .. .. .. .. | 48·3 | 14·8 |
| I.38 .. .. .. .. .. | 49·5 | 14·0 |
| I.41 .. .. .. .. .. | 33·6 | 17·4 |
| I.43 .. .. .. .. .. | 56·3 | 14·5 |
| I.46 .. .. .. .. .. | 46·3 | 12·8 |
| I.49 .. .. .. .. .. | 37·1 | 16·0 |
| I.62 .. .. .. .. .. | 40·4 | 16·2 |
| I.64 .. .. .. .. .. | 40·8 | 14·9 |
| Co.290 (4 plots) .. .. .. .. | 37·0 | 14·4 |

### DISCUSSION.

The trial was planted in very dry soil and was spray irrigated to ensure a strike. The germination was excellent. All varieties covered in early, and the wet season rains produced very vigorous growth. In assessing the relative merits of the new canes, it must be noted that the field has a very distinct fertility gradient, and the yield of each plot must be studied in relationship to the nearest plot of the standard variety.

Unfortunately, many of the heaviest yielders succumbed to downy mildew disease when placed in a resistance trial. Four of the seedlings—I.6, I.9, I.11, and I.12, are from the cross P.O.J.2725 x Co.290, and these have shown good resistance to downy mildew.

## VARIETAL TRIAL (First Ratoon Crop).

*Block.*—A.1.
*Harvested.*—October, 1941.
*Age of Crop.*—12 months.
*Plan.*—5 x 5 Latin square.

SUMMARY OF YIELDS.

| Variety. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| F.20 .. .. .. .. .. | 34·4 | 14·8 |
| Q.20 .. .. .. .. .. | 23·7 | 16·2 |
| Co.290 .. .. .. .. .. | 30·9 | 14·8 |
| Q.42 .. .. .. .. .. | 36·0 | 17·1 |
| C.P.29/116 .. .. .. .. | 53·4 | 14·7 |

### DISCUSSION.

The canes ratooned well, with Q.42 rather slow in comparison with the other varieties. During the wet season growth was excellent, but the autumn produced little further benefit. Both Q.42 and C.P.29/116 are upright canes, which do not cover in well in the early stages of growth; but they exhibited good production qualities in this trial, while Q.42 had a very high c.c.s. C.P.29/116 was imported from Florida, while Q.42 was propagated at Bundaberg. Both are undergoing farm trials in different areas of the State. Unfortunately, the Florida variety is a heavy arrower.

## OBSERVATIONAL VARIETAL TRIAL (1st Ratoon Crop).

*Block.*—F.
*Harvested.*—October, 1941.
*Age of Crop.*—13 months.
*Plan.*—Single plots.

SUMMARY OF YIELDS.

| Variety. | Plant Crop. | | First Ratoon Crop. | |
|---|---|---|---|---|
| | Cane per Acre. | C.C.S. in Cane. | Cane per Acre. | C.C.S. in Cane. |
| | Tons. | Per cent. | Tons. | Per cent. |
| G.10 .. .. | 27·6 | 14·8 | 39·7 | 15·5 |
| G.15 .. .. | 23·2 | 16·0 | 34·6 | 15·4 |
| G.16 .. .. | 31·8 | 15·3 | 45·0 | 16·1 |
| G.28 .. .. | 36·0 | 10·3 | 49·0 | 13·4 |
| G.32 .. .. | 27·4 | 13·7 | 34·2 | 15·8 |
| G.34 .. .. | 30·9 | 16·9 | 49·8 | 16·1 |
| G.35 .. .. | 31·8 | 13·9 | 45·0 | 14·8 |
| H.1 .. .. .. | 24·0 | 15·1 | 35·6 | 17·0 |
| H.3 .. .. .. | 29·1 | 13·8 | 45·5 | 15·6 |
| H.4 .. .. .. | 24·0 | 13·4 | 41·8 | 13·1 |
| H.6 .. .. .. | 44·2 | 8·7 | 54·1 | 12·1 |
| H.9 .. .. .. | 33·6 | 9·3 | 51·0 | 11·5 |
| H.10 .. .. | 21·6 | 13·8 | 35·0 | 15·5 |
| H.15 .. .. | 32·2 | 12·1 | 45·2 | 14·1 |
| H.16 .. .. | 31·2 | 15·4 | 41·8 | 14·7 |
| H.23 .. .. | 29·1 | 13·4 | 32·0 | 16·0 |
| Co.290 (4 plots) .. | 29·0 | 11·0 | 33·7 | 16·2 |

### DISCUSSION.

Following ratooning, the crop made uninterrupted growth for four months. All varieties covered in well, and practically all varieties appeared to outgrow the standard, Co.290. The gale in May flattened the cane on some of the better plots, and this no doubt influenced the C.C.S. values. While several of those varieties have succumbed to downy mildew in the disease resistance trial, others have been selected for further test planting.

## MOLASSES *v.* FERTILIZER TRIAL (First Ratoon Crop).

*Block.*—E3b.
*Harvested.*—October, 1941.
*Age of Crop.*—15 months.
*Plan.*—4 x 4 Latin square.

SUMMARY OF YIELDS.

| Treatments. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| No treatment .. .. .. .. | 23·0 | 15·7 |
| Molasses, 8 tons per acre .. .. | 26·8 | 15·8 |
| Molasses, 4 tons per acre, plus fertilizer | 33·7 | 15·2 |
| Fertilizer only .. .. .. .. | 34·9 | 15·2 |

### DISCUSSION.

The plant crop had not received any fertilizer; after harvesting this crop, four plots were given molasses on the ratoon stubble at the rate of 8 tons per acre; another series was given 4 tons of molasses *plus* fertilizer equivalent to 4 tons of molasses; a third series was fertilized at a rate equivalent to the plantfoods in 8 tons of molasses; finally, one series remained unfertilized.

The ratoons were very slow to begin; many stools failed to ratoon, and the stand was therefore gappy.

The yields show very definitely the value of fertilizer on ratoons, particularly when this has been withheld from the plant crop. The highest yields were recorded for fertilizer alone, while half molasses and half fertilizer was only slightly inferior.

## TRASH TRIAL (Plant Cane).

*Division*—E.3a.
*Harvested.*—September, 1941.
*Age of Crop.*—20 months.
*Plan.*—Duplicate plots.

SUMMARY OF YIELDS.

| Treatment. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| All trash conserved .. .. .. | 44·0 | 14·6 |
| All trash burned .. .. .. | 43·9 | 14·4 |

### DISCUSSION.

This trial has now been in progress since 1933. The stubble from the previous rotation was ploughed out in 1939, the block seeded uniformly with poona pea, which was turned into the land late in the year. Cane was planted in January, 1940, with P.O.J.2878. A good germination resulted, and there was no apparent growth difference throughout the season. At times the cane on the trash plot appeared to have a deeper green colour, particularly during dry spells.

The plant crop yields show no apparent yield differences due to treatment.

## FORMS OF NITROGEN AND INTERSPACE TRIAL (First Ratoon Crop).

*Division.*—B.6.
*Harvested.*—September, 1941.
*Age of Crop.*—14 months.
*Plan.*—Randomised blocks.

SUMMARY OF YIELDS.

| Treatment. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| No nitrogen .. .. .. .. | 29·1 | 13·7 |
| N as sulphate of ammonia .. .. | 32·0 | 13·2 |
| N as nitrate of soda .. .. .. | 31·0 | 13·4 |
| N as dried blood .. .. .. | 31·5 | 13·3 |
| N as cyanamide .. .. .. .. | 29·9 | 13·5 |
| Interspace 4 ft. 0 in. .. .. .. | 31·5 | 13·3 |
| Interspace 4 ft. 9 in. .. .. .. | 29·8 | 13·5 |

### DISCUSSION.

The plots ratooned slowly due to dry, cool weather, but made good growth during the wet season. The different forms of nitrogenous fertilizer were applied at appropriate times, and in such proportions as to supply equal weight of nitrogen per acre.

The ratoons show small benefits from this fertilizer, and the sulphate of ammonia appears slightly more favourable than

nitrate or dried blood; cyanamide would appear to be definitely inferior. The results thus parallel those recorded for the plant crop.

The narrower interspace has given a crop gain of 3.3 tons per acre for plant and first ratoon crops, with a C.C.S. value about 0.1 unit lower.

### VARIETAL TRIAL (Plant Crop).

*Division.*—B.3.
*Harvested.*—August, 1941.
*Age of Crop.*—18 months.
*Plan.*—Duplicate 3 x 3 Latin square.

SUMMARY OF YIELDS.

| Variety. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| Co.290 | 28·5 | 14·6 |
| P.O.J.2878 | 33·9 | 14·0 |
| Q.25 | 36·8 | 13·9 |

### DISCUSSION.

Following green manure crops, the land was in excellent condition when planted. During the first winter all plots of P.O.J.2878 and Q.25 were cut to ground level by frost. The Co.290 shoots were damaged but not destroyed. All varieties grew away in the spring, and made good growth during the wet season. The lower plots of P.O.J.2878 and Q.25 were again frosted during the second winter.

Q.25 has exhibited its excellent qualities as a one-year cane, and thus appears to be a good substitute for Co.290 on the red soil. Doubtless P.O.J.2878 is the best variety for stand-over crops.

### ROTATIONAL AND FERTILITY TRIAL (1st and 2nd Ratoon Crops).

*Division.*—B.4.
*Harvested.*—August, 1941.
*Age of Crop.*—11 months.
*Plan.*—Randomised blocks.

SUMMARY OF YIELDS.

| Treatment. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| First Ratoon—18 months fallow | 31·9 | 12·7 |
| Second Ratoons—6 months fallow | 29·9 | 12·8 |
| No potash | 26·4 | 12·0 |
| 150 lb. muriate of potash | 30·5 | 13·1 |
| 300 lb. muriate of potash | 34·9 | 13·1 |

### DISCUSSION.

On this block one rotation has now been completed. The three crops following a short fallow have yielded a total of 97 tons of cane, while in two crops the long fallow area has given 78 tons. The entire area has now been ploughed out and the treatments will be repeated.

The fertility trial combined with this experiment has given interesting results, and they show clearly how the potash supplies of the red volcanic soil are rapidly depleted when the plantfood is withheld. The plant cane showed that the soil had ample supplies; with the first ratoons 150 lb. of potash gave a gain of nearly 4 tons of cane, while the double dressing was not responsible for any further increase. The results recorded above show that gains of 4.1 and 4.4 tons of cane were recorded for successive increases of muriate of potash with the older ratoons.

### FERTILIZER AND PLANT RESIDUE TRIALS (Second Ratoon Crop).

*Division.*—E.4.
*Harvested.*—July, 1941.
*Age of Crop.*—10 months.
*Plan.*—Six randomised blocks.

SUMMARY OF YIELDS.

| Treatment. | Cane per Acre. | C.C.S. in Cane. |
|---|---|---|
| | Tons. | Per cent. |
| Check | 17·9 | 12·9 |
| N.K. | 31·2 | 13·1 |
| P.K. | 20·6 | 12·9 |
| N P K | 29·6 | 12·9 |
| Trash Burned | 24·7 | 13·0 |
| Trash conserved | 25·1 | 12·8 |

### DISCUSSION.

All plots had the benefit of a green manure crop prior to planting for this rotation; but in future only two-thirds of the area will be so treated. On these sections trash will be conserved on one-half, while on the balance the trash will be burned.

The influence of fertilizer treatment dominates the results to date. Nitrogen deficiency is most marked with the second ratoons, while benefits from potash are also evident. With the plant cane the "check" plots yielded as heavily as those which were fertilized; the first ratoon crop showed slight gains from potash and large increases from sulphate of ammonia.

### LABORATORY WORK PERFORMED DURING THE YEAR 1941-1942.

| | |
|---|---|
| Cane samples— | |
| Station | 384 |
| Farmers | 337 |
| Irrigation Waters | 42 |
| Total | 763 |

### SURVEY OF 1941 CANE CROP.

| | Tons. |
|---|---|
| Cane sent to mill | 757·6 |
| Cane used for plants | 12·0 |
| Cane used for samples | 4·0 |
| Total | 773·6 |
| Acreage harvested | 22·5 acres |
| Average yield cane per acre | 34·4 tons |

## REPORT OF THE COMMITTEE ON SEEDLING PROPAGATION.

By ARTHUR F. BELL, Chairman.

Owing to loss of staff to the various Defence Services, no cross-pollination was carried out this year, nor are any seedlings being germinated at the Meringa and Bundaberg Stations; it is proposed, however, to carry out the normal seedling raising programme at Mackay, using fuzz collected in 1941 and since stored at low temperatures.

For the purposes of continuity, the following tabulation of rainfall and arrowing data for the six-year period, 1937-42, is included:—

TABLE I.
RELATION OF ARROWING TO WET SEASON CONDITIONS.

| Year. | Rainfall. | January. | February. | March. | April. | Totals. | Arrowing. |
|---|---|---|---|---|---|---|---|
| 1937 | Rain in Inches | 8·4 | 4·7 | 16·4 | 4·9 | 32·4 | Poor |
| | Wet Days | 18 | 15 | 20 | 6 | 59 | |
| 1938 | Rain in Inches | 18·8 | 18·9 | 2·7 | 0·5 | 40·9 | Poor |
| | Wet Days | 14 | 18 | 9 | 6 | 47 | |
| 1939 | Rain in Inches | 26·1 | 36·9 | 34·7 | 9·3 | 107·0 | Excellent |
| | Wet Days | 19 | 14 | 19 | 22 | 74 | |
| 1940 | Rain in Inches | 12·7 | 18·9 | 34·4 | 7·3 | 73·3 | Excellent |
| | Wet Days | 14 | 21 | 25 | 17 | 77 | |
| 1941 | Rain in Inches | 12·2 | 24·2 | 15·4 | 18·7 | 70·5 | Excellent |
| | Wet Days | 25 | 19 | 23 | 26 | 93 | |
| 1942 | Rain in Inches | 3·2 | 12·0 | 3·8 | 8·4 | 27·4 | Mediocre |
| | Wet Days | 11 | 20 | 13 | 19 | 63 | |

The arrowing season was late and rather poor, and was certainly inferior to the three seasons immediately preceding. Arrowing was much superior at Freshwater and a fair selection of arrows would have been obtainable if required; actually some varieties, including N.G.16, N.G.24, and S.W.499, produced more arrows than in the good arrowing years of 1940 and 1941, while Badila showed little or no tendency to arrow this year.

The seedings of the 1941 ("C") series seedlings were made entirely from stored fuzz. At Meringa, germination was carried out in March and again in June-July: The former, a small batch of eight crosses, comprised progeny from commercial parent canes which are normally planted in the autumn and so have a growth period of somewhat more than a year. Owing to a prolonged wet season these early germinated seedlings, some 3,360 in number, were not planted in the field until July; lack of weed growth in the winter allowed the drills to be kept open and stooling was accordingly good; they were not irrigated at any time. The second batch encountered very cold weather after potting, and suffered some mortality; 8,720, representing fifty crosses, were ultimately planted in the field. At Mackay and Bundaberg phenomenally late frosts

very adversely affected potted seedlings, and in some cases crosses suffered 100 per cent. loss; some 13,000 seedlings were eventually planted in the field at these two stations.

Since no new seedlings will be raised at Meringa or Bundaberg this year, it is proposed to make a selection of the original seedlings, ratoon them instead of the normal ploughing out, and make a second selection from the ratoons in 1943. It will be of considerable interest to see how these two selections compare.

Selections of the 1940 "B" series seedlings were made as follows:—Meringa 114, Mackay 77, and Bundaberg 88; in addition, a further twenty-four more were retained at Meringa from mass plantings, &c., and will be propagated further. The Meringa selections were divided into two general types, according to height, and planted with plots of a tall or short standard,-as the case may be, instead of using a single standard as formerly. At present, it appears that the innovation will permit much better comparisons of growth when selection time comes.

Selections of 40-sett plots of the "A" series were as follows:—Meringa, 16 seedlings from 12 families, no family being represented by more than two selections; Mackay, 14 seedlings from 10 families, plus Q.29 and 30S.N.874; Bundaberg, 15 seedlings from 7 families; these Bundaberg seedlings constituted 75 per cent. of those planted in the 40-sett plots, but constituted 100 per cent. of the selections; however, a supplementary selection of Q.13, Q.27, Juno, 30R.115, 30S.N.225, 30S.N.362, 30S.N.451, and 30G.1250 was made, and these have been planted in two standover yield-observation trials.

Owing to the decision to make selections only from ratoon crops in the case of yield-observation and Latin Square trials, no selections were forthcoming for the planting of the routine Latin Square trials. The opportunity was therefore taken to plant "check-up" Latin Square trials with various varieties at Meringa (K.58, Q.44, Comus, and Cato), Mackay (G.22, Q.20, Q.25, and Q.28), and Bundaberg (H.6, I.6, I.9, and I.11).

Of the selected seedlings which have gone to farm trial, the following are worthy of mention:—

*Northern Districts.*

Q.13. Yields very well as plant cane and has a high sugar content, but ratooning inclines to be shy; it is being further tested in drier areas.

Q.20. Yielded well and had uniformly high sugar content, but its pronounced habit of lodging in the wet tropics has caused it to be discarded.

Q.44. A number of the plantings, made from an over-succulent plant crop, germinated poorly in the cold, dry weather of last year, the variety obviously being somewhat susceptible to pineapple disease. Otherwise, growth has been very satisfactory and a considerable area is now being planted.

Cato and Comus. Have both been approved for planting in the Mulgrave and Hambledon areas and are being tried out on a considerable scale. At the moment neither appear particularly suited to the wetter areas due to lodging and low sugar, respectively, under these conditions.

*Central Districts.*

Q.28. Has performed very well in trials and will be extensively planted this year as an approved variety; it promises to be a valuable replacement variety for Co.290.

Q.45. (P.O.J.2878 × S.C.12/4), which was adjudged too susceptible to downy mildew disease for release when ready for farm trial a few years ago, is now being propagated in view of the greatly improved disease situation. This cane is a very promising yielder. (See Ann. Rpt. 1939, p. 19.)

Comus. Is an excellent striker and has yielded some very good plant crops, but its ratooning requires further observation.

*Southern Districts.*

Q.25. Is now being planted fairly extensively where the Fiji disease position permits. It should not be stood over and should not be harvested early.

Q.42. Appears to stand dry weather well, and this, coupled with its high sugar content, makes extended trial desirable; it also appears to stand over well.

C.P.29/116. Should be a valuable stand-over cane where it does not arrow too freely; its excellent germination and high general disease resistance are attractive qualities which justify full consideration.

## VARIETAL STATISTICS.

In Table II. is set out the varietal constitution of the 1941 cane crop, all varieties contributing more than 1,000 tons being listed. In comparing these statistics with those of the 1940 crop, it must be remembered that the areas of Mackay and south contributed 43.5 per cent. of the cane harvested in 1941, as against 48 per cent. in 1940; consequently, certain variations in relative tonnages crushed may not have been due to a corresponding increase or decrease in area cropped. For example, although the percentage of Badila crushed in 1941 increased by 2.2 per cent. to 34.8, the tonnage crushed—1,689,870 (1940) and 1,671,200 (1941)—remained virtually unchanged.

P.O.J.2878 has consolidated its position as second variety, having increased from 13.7 per cent. to 15.2 per cent., in spite of reduced tonnages crushed in the Mackay district, where downy mildew has necessitated restrictions in the planting of this variety. However, this decrease was more than compensated by increased plantings in Bundaberg and south, where P.O.J.2878 advanced from 47.6 per cent. of the crop to 55.6 per cent.; with the partial removal of planting restrictions in Maryborough and Beenleigh, due to improvement in the Fiji disease position, an even greater percentage of P.O.J.2878 may now be expected.

M.1900 Seedling, for many years the variety second in importance, has now been relegated to fourth place by the advance of Co.290; Co.290 and P.O.J.2878 together constituted 86 per cent. of the crop in Bundaberg and south, as compared with 79 per cent. last year.

The varieties S.J.2 and Juno have increased in popularity (the latter at the expense of H.Q.409), while Q.25 and Cato appear in the list for the first time with 10,000 and 8,400 tons respectively. On the other hand, Black Innes, Hector, and S.J.7 have fallen below the 1,000-ton mark.

No very marked changes have taken place in respect of the distribution of varieties according to the country of origin (Table III.). Both the New Guinea and Queensland produced varieties have increased slightly to an aggregate of 57 per cent. compared with 54 per cent. in 1940.

TABLE II.

QUEENSLAND CANE VARIETY CENSUS—1941 CROP.

VARIETAL COMPOSITION OF THE 1941 CANE CROP IN THE FOUR MAIN DISTRICTS AND THE STATE AS A WHOLE. TONNAGES COMPUTED FROM MILL RETURNS TO THE NEAREST 100 TONS.

| Variety. | North of Townsville. | | Giru and Burdekin. | | Proserpine and Mackay | | Bundaberg and South. | | Whole State. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Tons. | Per Cent. Crop. | Tons. | Per Cent. Crop. | Tons. | Per Cent. Crop. | Tons. | Per Cent. Crop. | Tons. | Per Cent. Crop. |
| 1. Badila | 1,199,500 | 57·0 | 380,300 | 63·1 | 91,500 | 8·4 | .. | .. | 1,671,200 | 34·8 |
| 2. P.O.J.2878 | 139,200 | 6·6 | .. | .. | 31,400 | 2·9 | 559,200 | 55·6 | 729,800 | 15·2 |
| 3. Co.290 | .. | .. | .. | .. | 100,300 | 9·2 | 303,500 | 30·2 | 403,900 | 8·4 |
| 4. M.1900 Sdg. | .. | .. | .. | .. | 382,100 | 35·1 | 5,000 | 0·5 | 387,000 | 8·1 |
| 5. H.Q.426 | 172,800 | 8·2 | 35,500 | 5·9 | 105,900 | 9·7 | .. | .. | 314,100 | 6·5 |
| 6. E.K.28 | .. | .. | 94,400 | 15·7 | 200,800 | 18·5 | .. | .. | 295,200 | 6·1 |
| 7. H.Q.409 | 169,600 | 8·0 | .. | .. | .. | .. | .. | .. | 169,600 | 3·5 |
| 8. S.J.2 | 12,500 | 0·6 | 66,600 | 11·1 | 85,300 | 7·8 | .. | .. | 164,400 | 3·4 |
| 9. S.J.4 | 115,500 | 5·5 | 7,300 | 1·2 | .. | .. | .. | .. | 122,800 | 2·6 |
| 10. Q.813 | 23,100 | 1·1 | .. | .. | 43,900 | 4·0 | 23,200 | 2·3 | 90,200 | 1·9 |
| 11. Pompey | 85,400 | 4·1 | .. | .. | .. | .. | .. | .. | 85,400 | 1·8 |
| 12. Juno | 57,100 | 2·7 | .. | .. | .. | .. | .. | .. | 57,100 | 1·2 |
| 13. P.O.J.213 | .. | .. | .. | .. | 500 | ·05 | 53,600 | 5·3 | 54,100 | 1·1 |
| 14. Oramboo | 17,100 | 0·8 | .. | .. | 6,600 | 0·7 | 11,900 | 1·2 | 35,600 | 0·7 |
| 15. D.1135 | 28,000 | 1·3 | .. | .. | 200 | < ·05 | 5,200 | 0·5 | 33,400 | 0·7 |
| 16. Korpi | 15,800 | 0·8 | 8,700 | 1·4 | 1,500 | 0·15 | 4,500 | 0·45 | 30,600 | 0·6 |
| 17. P.O.J.2725 | 1,200 | 0·05 | 1,500 | 0·25 | 12,400 | 1·1 | 13,100 | 1·3 | 28,200 | 0·6 |
| 18. Q.2 | 21,700 | 1·0 | .. | .. | .. | .. | .. | .. | 21,700 | 0·5 |
| 19. P.O.J.2714 | .. | .. | 2,600 | 0·4 | 16,700 | 1·5 | 700 | 0·05 | 20,000 | 0·4 |
| 20. B.147 | 14,200 | 0·7 | .. | .. | .. | .. | .. | .. | 14,200 | 0·3 |
| 21. Brutus | 10,700 | 0·4 | .. | .. | .. | .. | .. | .. | 10,700 | 0·2 |
| 22. Q.25 | .. | .. | .. | .. | .. | .. | 10,000 | 1·0 | 10,000 | 0·2 |
| 23. Cato | 8,400 | 0·4 | .. | .. | .. | .. | .. | .. | 8,400 | 0·15 |
| 24. Q.20 | .. | .. | 900 | 0·15 | 7,500 | 0·7 | .. | .. | 8,400 | 0·15 |
| 25. H.Q.285 | .. | .. | .. | .. | 200 | < ·05 | 6,300 | 0·6 | 6,500 | 0·15 |
| 26. P.O.J.234 | .. | .. | .. | .. | .. | .. | 4,600 | 0·5 | 4,600 | 0·1 |
| 27. Q.10 | 4,200 | 0·2 | .. | .. | .. | .. | .. | .. | 4,200 | 0·1 |
| 28. B.208 | .. | .. | 3,600 | 0·6 | .. | .. | .. | .. | 3,600 | 0·1 |
| 29. Vulcan | 3,600 | 0·2 | .. | .. | .. | .. | .. | .. | 3,600 | 0·1 |
| 30. Mahona | .. | .. | .. | .. | .. | .. | 2,200 | 0·2 | 2,200 | 0·05 |
| 31. Nanemo | 1,800 | 0·1 | .. | .. | .. | .. | .. | .. | 1,800 | 0·05 |
| 32. Saturn | 1,300 | 0·05 | .. | .. | .. | .. | .. | .. | 1,300 | 0·05 |
| Others | 3,300 | 0·2 | 1,100 | 0·2 | 500 | 0·05 | 3,300 | 0·3 | 8,200 | 0·2 |
| Actual Tons Harvested | 2,106,001 | .. | 602,529 | .. | 1,087,246 | .. | 1,006,156 | .. | 4,801,932 | .. |

TABLE III.

COMPOSITION OF 1941 CROP ON THE BASIS OF COUNTRY OF ORIGIN OF VARITIES.

| Country of Origin. | Tonnage Harvested. | Per Cent. of Crop. |
|---|---|---|
| New Guinea .. .. .. .. .. .. .. .. | 1,741,400 | 36·3 |
| Java .. .. .. .. .. .. .. .. .. | 1,131,900 | 23·6 |
| Queensland ... .. .. .. .. .. .. .. | 993,000 | 20·7 |
| India .. .. .. .. .. .. .. .. .. | 403,900 | 8·4 |
| Mauritius .. .. .. .. .. .. .. .. .. | 387,000 | 8·1 |
| Fiji .. .. .. .. .. .. .. .. .. | 85,400 | 1·8 |
| British West Indies .. .. .. .. .. .. .. .. | 51,200 | 1·0 |
| Unclassified .. .. .. .. .. .. .. .. | 8,200 | 0·2 |

## REPORT OF THE DIVISION OF ENTOMOLOGY AND PATHOLOGY.

By ARTHUR F. BELL.

The activities of the Division have proceeded on a much reduced scale during the past year, due to military exigencies; other demands on manpower have also greatly depleted the personnel available for carrying on the complementary services rendered by Cane Pest and Disease Control Boards. Investigational work has been virtually eliminated, but every effort has been made to maintain adequate advisory services; in such circumstances, it is very gratifying to be able to record that the incidence of sugar-cane diseases has been so greatly reduced that it should be possible to maintain a satisfactory position, with but a skeleton inspectional staff, for a considerable period. As recorded in detail below, downy mildew and gumming diseases are fast becoming difficult to find, while the next most serious disease, Fiji, is well under control.

During the last session of Parliament, the Sugar Experiment Stations Act was amended in certain particulars, the principal being the amalgamation of the functions of Cane Pests Boards, and Cane Disease Control Boards and the constitution of Cane Pest and Disease Control Boards, thus making for considerable economies in administration. Sixteen such Boards are now functioning within the provisions of the Act; they have co-operated fully with the Bureau staff, and in some districts it would have been impossible to carry out essential work of the Bureau without their willing aid. In accordance with the policy of the sugar industry, the 1942 conference of Pest Boards was cancelled.

We have been advised by the Director of the Imperial Institute of Entomology that, owing to prior usage of this generic term in zoological nomenclature, the use of *Lepidoderma* should be discontinued and Mr. G. J. Arrow had substituted the term *Dermolepida*; the greyback beetle will therefore now be known as *Dermolepida* (*Lepidoderma*) *albohirtum* Waterh.

As forecast in last year's report, the occurrence of adequate rainfalls during November and December, 1941, was followed by heavy beetle flights in North Queensland, with consequent widespread grub infestation of canefields. An immediate shortage of manpower, the feeling of uncertainty and apprehension engendered by Japan's southward drive in the Pacific, and doubts as to the ultimate availability of labour to harvest the whole of the 1942 crop, all operated against a normal fumigation campaign—with the result that many growers suffered substantial losses from badly damaged cane. An area of approximately 870 acres was fumigated north of Townsville (as compared with 1,570 acres in 1941, and 1,900 in 1940), but it is estimated that a further 4,500 acres were grub infested. Fortunately, late rains in April, May, and June kept the less heavily infested fields in good condition, and it is expected that destruction of stools in non-fumigated fields will be on a scale below that normally experienced.

In the Lower Burdekin district, infestation of this pest, and damage to crops, was both heavy and widespread in the Kalamia mill area, with some scattered and at times severe damage in the Pioneer area. Fumigation was carried out in very adverse natural circumstances and was further seriously hampered by the unsettled national outlook and an acute shortage of suitable labour; in consequence, in spite of every effort by the local Board, much of the work was of poor quality. Some 2,213 acres were surveyed on 56 farms, and 278 acres were fumigated on 25 farms.

Infestations were lighter throughout the Mackay district than in 1941; 906 acres were surveyed on 55 farms, and eventually 304 acres were fumigated on 24 farms, the prevailing national stress limiting a more extensive campaign. Although fumigant costs were higher, the then backward state of the cane reduced labour costs, with the result that average costs were lower. Results of the campaign were generally excellent, and winter rains revived cane damaged by light infestations; noteworthy grub damage was ultimately visible on only two farms in the district. The variety S.J.2 was again a source of trouble and damage to this variety was reported from the usually grub-free Koumala district.

Again it must be stated that the outlook in respect of the grub pest problem in the 1943 season is not at all promising. Pest populations have been built up with but little check during the past season; the man-power position must be expected to become even more acute, and the diversion of coastal shipping facilities to war service will still further accentuate the difficulties of supplying fumigant; in these circumstances, favourable November and December weather conditions will portend trouble.

The search for new substitute fumigants to ease the supply and transport problems associated with carbon disulphide, was continued but no available substitute was found. However, under the limited conditions of small late-season trials, some promising results were obtained with methallyl chloride; this fumigant is active at lower temperatures, and hence may well prove useful when commercial supplies become available. Plantings of the new variety Q.44 indicate that it possesses considerably more resistance to moderate grub attack than does Badila, and growers have been advised to try out this variety in fields where grub infestation is likely.

Damage by the Frenchi grub (*Lepidiota frenchi* Blackh.) was somewhat less extensive than in previous years, and beetle flights were also on a restricted scale in North Queensland. The pest has been favoured in many places by the unsound practice of ploughing out and immediate replanting, instead of fallowing and ploughing during the late spring-summer period. The current labour shortage may also incline growers to ratoon for unusually long periods, but such a practice can only end in disaster in areas subject to Frenchi grub infestation. In the Central district infestation was rather more widespread than usual, but not generally intense.

Very few wireworm infestations were reported last spring, and it is anticipated that this condition will continue into the current season. The rat pest also continued at a low level, and little significant economic damage was reported from any part of the State.

Gumming disease (*Bacterium vasculorum* (Cobb) Greig Smith) is fast disappearing from the known areas of infection in the Mulgrave and Hambledon districts, and after the remaining fields of S.J.4 are ploughed out at the end of this season, the incidence of the disease should be extremely light. Current variety trials also demonstrate improved performance of some of the newer gumming-resistant canes.

The absence of the normal monsoonal wet season in 1942 reduced natural transmission of downy mildow, and enabled Cane Pest and Disease Control Boards to clean up numerous centres of infection. At Mossman there remain only eight known diseased fields and most of these will be ploughed out by the end of the year; a very few diseased stools were found on one farm in each of the Mulgrave and Hambledon areas. After four years of systematic inspections, and the cessation of plantings of P.O.J.2878, there has been a very marked improvement in the downy mildew position in the Mackay district. Seasonal inspections up to mid-summer revealed small numbers of diseased stools on 84 farms, but by 30th June, disease was known to exist on only 7 farms, with infestation ranging from 1—7 stools per farm. A small infestation at Mount Jukes—the first in the North Coast quarantine section—was promptly dealt with, and has not since reappeared; small new outbreaks were also found and dealt with at Netherdale and the Gorge. However, the ultimate downy mildew position is intimately bound up with the scattered stools of non-approved susceptible varieties still found on a number of farms; until these are cleaned up, it will not be safe to reintroduce P.O.J.2878.

The extent of the improvement in the Bundaberg district may be gauged from the fact that during the peak period of January-February only 142 stools of downy mildew were found in 6,222 acres of susceptible varieties inspected. Comparing this with the same period for the previous three years we find that in 1939 the inspectors found 1.24 diseased stools per acre inspected, 0.39 in 1940, 0.15 in 1941, and 0.023 in 1942.

The climatic conditions which assisted in the control of downy mildew naturally did not favour transmission in the resistance trials, which have yielded mainly negative results.

A marked improvement was again apparent in the Fiji disease position in the Maryborough district, and the reintroduction of susceptible varieties has already begun in selected parts of the area; P.O.J.2878 has also been approved for planting in the Logan district. In the Isis, where P.O.J.2878 constituted no less than 79 per cent. of the 1941 crop, an inspection of 7,178 acres during the year ended 31st March, 1942, revealed the presence of only 63 diseased stools on 10 farms. Due to a greater carry-over of leaf hoppers there was an increase in the amount of Fiji disease found in certain river-flat and irrigated farms in the Bundaberg district; the position here was also affected by the carrying over of a greater proportion of stand-over cane into the 1942 season. A total of 4,777 diseased stools were found and removed from the 35,179 acres inspected—in effect, this represents a loss of perhaps .0025 per cent. of the district crop!

Control of Fiji disease is a distinctly more difficult problem in the Moreton district due to an absence of autumn planting, a greater proportion of stand-over cane, and better growing conditions. Although actual loss of crop is so far negligible, the position demands continuous care, and consequently, with the aid of the Cane Pest and Disease Control Board, attention is being concentrated on the testing and propagating of new resistant varieties.

It is of interest to note that in the Fiji disease resistance trial now nearing completion, it is evident that the four Hawaiian canes under test, 28-4291, 31-2484, 31-2806, and 32-8560, all possess a high degree of susceptibility. On the other hand, it is pleasing to note that Q.28 is apparently highly resistant. *Saccharum robustum* Tank and *S. robustum* Burma were included in this trial, but no sign of infection has been seen in either.

The minor disease Leaf-scald (*B. albilineans* Ashby) was rather more in evidence in North Queensland—probably due to greater planting of the susceptible variety Oramboo. It is of importance only in the wet areas, as where dry soil conditions are experienced in the spring, there is a strong tendency for diseased stools to die out.

Recovery from chlorotic streak was again demonstrated by planting setts from diseased stools which had arisen from single buds; plantings from symptomless stalks in these stools gave rise to a considerable proportion of healthy plants. Neither curative nor preventive effects were obtained by the addition of the elements lithium, sodium, mercury, copper, boron, zinc, manganese, cobalt, barium, arsenic, bismuth, lead, or iron to the soil.

Due to the failure of the usual monsoonal late-summer rains, red stripe and top rot were very little in evidence. On the other hand, the dry spring of 1941 was responsible for the development of a certain amount of stem rot in overmature canes. This was particularly the case in standover Co.290 in the Moreton district, where some farmers persist in risking the standing over of this definitely one-year type variety; generally speaking, they would be better advised to stand over some P.O.J.2878 to a third year rather than carry over Co.290 to the second year. Some red rot was also reported on shallow soil in the Mackay area.

In one of our Meringa fields, where top rot was bad in patches, it was found that the moisture equivalent was lower in these patches. Heavy dressings of filter press mud were made on these places and the amount of top rot has been greatly reduced; while three years later the differences in moisture equivalents are still greatly reduced.

The elimination of odd stools of non-approved varieties has proceeded and this clean-up is just about complete except in parts of the Mackay and Cairns areas. In the latter the chief difficulty has been with odd volunteer stools of the now non-approved S.J.4, mainly as a result of ploughing out and replanting. More trouble has been experienced in Mackay than in the rest of the State, mainly due to the scattered nature of the cane areas, and the large proportion of broken hilly country with abandoned fields. In all, some 600 Mackay farms were investigated, and of these, 350 received attention from our field staff. As most of the odd stools found are of varieties susceptible to downy mildew, the nett effect is to postpone the time when P.O.J.2878 and other desirable susceptible varieties can be reintroduced.

Some field germination studies were carried out on lines suggested in last year's report. As the temperature and moisture of the soil layer surrounding the planted sett are to some degree regulated by the amount and texture of the soil cover placed over the sett, the effects of varying this cover were investigated. It was found that during early spring the temperature 2 inches below the soil surface of red soils may, during daylight, reach temperatures as much as 15 degrees F. higher than 4 inches below; generally the temperature under the 2 inches of cover ranged from 2 degrees to 8 degrees F. higher during the hours 9 a.m. to 7 p.m., and 1 degree to 3 degrees F. lower at night. Reduced differences of the same type were obtained with rolled and unrolled soil cover of the same thickness. Conversely, moisture is lost more rapidly with shallow or rolled cover. Where moisture is the limiting factor it appears desirable to put on 4 inches of unrolled cover, and where temperature is limiting, to put on 2 inches and compact by rolling or, alternatively, put on 4 inches and rake off to 2 inches. Field trials had shown that germination could take place at temperatures considerably below the often-stated minimum of 70 degrees F.; multiple temperature incubator tests showed no movement taking place below 60 degrees F., with the varieties Co.290 and Q.813, but germination occurred above that temperature with maximum root development at 80 to 85 degrees F. and maximum shoot development at 95 degrees F., with the all-round optimum at about 90 degrees F.

Preliminary tests with a number of substances under ordinary and relatively aseptic conditions indicated that none of these had any appreciable stimulation value *per se*, but that steeping in certain disinfectants greatly delayed internal rotting of the seed piece. Summarising further work it may be stated that the best mercurials were quite effective in increasing both speed and percentage of germination under conditions when germination is normally delayed, viz., low temperature and low soil moisture. Both steeps and dusts were tried but, as the commercial dusts were actually more effective when used as steeps, and as steeps are much more readily applied in the field, all later tests were made with steeps. Agrosan, Ceresan (used in only two trials), Hortosan, Hortosan Potato Dip, and mercuric chloride all gave improvement after setts had been steeped overnight in solutions containing .003 per cent.Hg; actually steeps of Agrosan and Ceresan were better, and mercuric chloride poorer, than the average of tested setts. A marked protective action was observed when treated and untreated setts were planted in soil pre-inoculated with spores of the pineapple disease fungus *Thelaviopsis paradoxa*.

Considerable difficulty has been experienced in obtaining satisfactory germination of the otherwise suitable legumes *Crotalaria goreensis* and *C. usaramoensis*. Samples of the former normally carry a moderate, and the latter a high, proportion of hard seed. It was found that hard seed could be rendered permeable by hot water treatment, but the limits were such that over-treatment readily took place. The effect of exposure of seed to sunlight was next investigated and it was found that 3 to 4 days exposure reduced hard seed in *C. usaramoensis* to a minimum and greatly improved germination; this improvement persisted for at least several weeks after treatment. On the other hand, the amount of hard seed in *C. goreensis* was markedly increased by exposure to sun. The results suggest that when planting *C. usaramoensis* the seed should be broadcast and exposed to the sun for 2 to 3 days before harrowing in.

The service of supplying bacterial cultures for the pre-planting inoculation of seed of green manure crops was continued and during the year cultures were supplied for the inoculation of seed sufficient to plant nearly 3,000 acres.

Only two varieties of cane were introduced from overseas during the year, viz., the Barbados seedlings, B.3439 and B.34104. These were no less than seven months en route, but a single bud of each had remained viable.

A certain amount of work has also been carried out on behalf of the military authorities.

# DIVISION OF MILL TECHNOLOGY.

Mr. E. R. Behne, Mill Technologist.

### Staff.

In March, 1942, Messrs. A. H. Praeger and J. L. Clayton, Assistant Mill Technologists, were seconded to the Commonwealth Government to investigate the technology of flax production in the Southern States.

### Mutual Control.

The Tenth Annual Synopsis of Mill Data for Mills in the Mutual Control, giving figures for the same twenty-four mills as previously, has been published and issued. This synopsis covers the work of the 1941 season.

Due to reductions in the clerical staff, it has been found necessary to discontinue the calculation and distribution of the fortnightly returns of the Mutual Control for the 1942 season, but it is hoped that it will be possible to compile and issue the Eleventh Synopsis covering the work of the season.

### Standardisation of Apparatus.

With the reduction of the Technology staff, standardisation of apparatus was confined to essential units, and the following is a record of the pieces tested:—

| | | |
|---|---|---|
| Brix Spindles | .. | 231 spindles were tested, and five of these had errors beyond the legal tolerance. |
| Polariscope Tubes | .. | 30 tubes were tested; all were satisfactory. |
| Weights | .. .. | One box of weights was tested and adjusted. |

### Technical Papers.

Papers published in the Thirteenth Proceedings of the Queensland Society of Sugar Cane Technologists, were as follows:—

E. R. Behne, "Progress in Milling in Queensland Factories."

A. H. Praeger, "The Function of the Laboratory."

J. L. Clayton, "The Selection of Materials of Construction."

### Technical Communications.

Due to wartime economies, it has been found necessary to discontinue the publication of Technical Communications. Prior to the enforcement of this measure, two communications were issued since the last Annual Report was published. These were:—

1941 No. 3 "Crystallisation of Raw Sugar in Factory Practice," by G. H. Jenkins.

No. 4 "The Clarification Process," by E. R. Behne.

### News Letter.

Two News Letters were issued during the current year, whilst a third is now completed for the press.

### Mill Research Programme Committee.

With the cancellation of the Thirteenth Annual Conference of the Queensland Society of Sugar Cane Technologists, which was to have been held in Brisbane this year, it was not possible to convene a meeting of the Mill Research Programme Committee this year. A report covering the work conducted during the 1941 season has therefore been prepared for the News Letter. No pure mill research programme was contemplated for the 1942 season, as, firstly, the Technology staff was fully occupied with matters connected with the war effort, and secondly, conditions at the mills this year would not have been favourable for conducting researches.

### Present Activities of the Staff.

*Flax Industry.*

As mentioned above, the services of Messrs. Praeger and Clayton were taken over by the Commonwealth Government to investigate technological problems associated with the flax industry, which has been recently established in the south.

*Egg Drying.*

In past years it has been the custom to export to Britain a considerable proportion of the excess eggs produced in Queensland. Present wartime conditions prevent the shipping of large quantities of eggs in shell, on account of their bulk and refrigeration requirements. It was therefore decided to establish an egg drying plant in Queensland, and export the dried product, and so greatly reduce the shipping requirements. This plant is now in course of erection and one of the duties of the Bureau will be to supervise the installation of the equipment and to operate the plant, prior to handing over to the Egg Board.

In this connection, visits have been paid to two existing plants in New South Wales, one at Hexham near Newcastle, and the other at Riverstone near Paramatta.

*Rubber Investigation.*

The fact that well over ninety per cent. of the source of the world's rubber is now in the hands of the Japanese, has placed the Allies in a very serious position regarding supplies of this essential commodity, and has necessitated that other avenues be explored. In Queensland, there are numerous plants which are known to contain rubber and an investigation has been started to determine the possibility of utilising these plants on a commercial scale. Not the smallest problem associated with this investigation is the development of a satisfactory process for recovering the rubber from the plant and this aspect of the work has been relegated to the Bureau.

*Bagasse Plastics.*

The prominence given in recent Overseas journals to the use of bagasse as a raw material in the production of plastics led to the conducting of a series of tests on a sample of bagasse from one of the Queensland factories. The results obtained were in complete accord with those obtained overseas and it is felt that, in this regard, bagasse has definite possibilities.

### Mill Work, 1941 Season.

The total tonnage of cane crushed this season was the smallest since the 1935 season, and was the net result of restricted planting, adverse weather conditions, and the limiting of the crushing to the peak quota in those areas where excess cane was available.

As a natural consequence there was a marked reduction in the number of crop days, the total, 4,034, being the lowest recorded with the exception of the 1932 season, when a number of mills did not crush.

The quality of the cane was slightly inferior to that of the past few seasons, due mainly to lower quality cane in the central and southern districts, where an extremely cold winter accompanied by frost, doubtless had a deleterious effect.

The crushing rates increased in the Central and Southern districts, but decreased in the Northern district. The net result over all districts was an increase in the hourly rate of 1.65 tons of cane per hour.

The percentage of time lost (3.73) must be considered as satisfactory, in view of the fact that most mills had to cope with inexperienced labour both in the field and in the factory.

The average work of the factories was good; there was a definite improvement in milling performance—the lost cane juice per cent. fibre being the lowest yet recorded, although the dilution was slightly lower than that of the previous year.

The true purity of the final molasses was essentially the same as that of the previous year, although the apparent purity was slightly lower. The increase in the quantity of molasses produced resulted, however, in a slightly greater pol loss in molasses per cent. pol in cane.

The pol recovery remained much the same as that in previous years, as also did the undetermined loss.

The coefficient of work, though not the highest recorded, compared favourably with those of past years. In this regard, it should be noted that the values for coefficient of work given in previous reports were slightly in error. These have been corrected in this issue, and are shown in the table giving the comparative figures for the various seasons for all Queensland districts.

| — | Season. | Pol in Cane. | Fibre in Cane. | Purity, 1st Expd. Juice. |
|---|---|---|---|---|
| | | Per cent. | Per cent. | Per cent. |
| Southern District | 1932 | 13·32 | 15·16 | 84·95 |
| | 1933 | 13·55 | 15·21 | 87·65 |
| | 1934 | 14·67 | 14·59 | 89·74 |
| | 1935 | 14·56 | 14·47 | 88·60 |
| | 1936 | 15·31 | 14·32 | 88·83 |
| | 1937 | 15·05 | 14·04 | 88·14 |
| | 1938 | 14·62 | 13·66 | 88·87 |
| | 1939 | 14·88 | 13·70 | 88·46 |
| | 1940 | 15·42 | 13·40 | 87·69 |
| | 1941 | 14·76 | 12·93 | 87·94 |
| Central District .. | 1932 | 16·22 | 11·99 | 90·02 |
| | 1933 | 15·40 | 12·25 | 90·84 |
| | 1934 | 16·45 | 12·20 | 90·82 |
| | 1935 | 16·54 | 12·36 | 90·78 |
| | 1936 | 16·43 | 11·84 | 90·91 |
| | 1937 | 16·62 | 10·96 | 90·06 |
| | 1938 | 16·70 | 11·55 | 91·58 |
| | 1939 | 16·33 | 11·39 | 90·43 |
| | 1940 | 16·34 | 11·52 | 90·54 |
| | 1941 | 15·86 | 11·54 | 90·11 |
| Northern District | 1932 | 16·01 | 10·51 | 90·11 |
| | 1933 | 14·92 | 10·27 | 88·84 |
| | 1934 | 15·16 | 10·30 | 89·08 |
| | 1935 | 15·91 | 11·35 | 89·63 |
| | 1936 | 15·01 | 9·92 | 87·92 |
| | 1937 | 16·14 | 10·12 | 89·79 |
| | 1938 | 15·74 | 10·17 | 89·95 |
| | 1939 | 16·18 | 9·84 | 90·30 |
| | 1940 | 16·26 | 9·89 | 90·45 |
| | 1941 | 16·27 | 9·71 | 90·01 |
| All Districts .. | 1932 | 15·90 | 11·51 | 89·64 |
| | 1933 | 14·85 | 12·00 | 89·40 |
| | 1934 | 15·57 | 12·23 | 89·95 |
| | 1935 | 15·84 | 12·39 | 89·83 |
| | 1936 | 15·66 | 11·63 | 89·36 |
| | 1937 | 16·15 | 11·17 | 89·61 |
| | 1938 | 15·84 | 11·63 | 90·32 |
| | 1939 | 15·88 | 11·56 | 89·85 |
| | 1940 | 16·04 | 11·58 | 89·65 |
| | 1941 | 15·70 | 11·29 | 89·47 |

TONS OF CANE PER TON OF 94 N.T. SUGAR.

| 1929. | 1930. | 1931. | 1932. | 1933. | 1934. | 1935. | 1936. | 1937. | 1938. | 1939. | 1940. | 1941. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6·91 | 6·83 | 6·94 | 6·90 | 7·31 | 6·97 | 6·92 | 6·94 | 6·73 | 6·87 | 6·77 | 6·82 | 6·87 |

AVERAGE CRUSHING RATES (TONS CANE PER HOUR).

| 1934. | 1935. | 1936. | 1937. | 1938. | 1939. | 1940. | 1941. |
|---|---|---|---|---|---|---|---|
| 48·92 | 50·80 | 54·83 | 55·73 | 60·80 | 61·53 | 61·67 | 63·32 |

SOUTHERN DISTRICT.

| —— | 1935. | 1936. | 1937. | 1938. | 1939. | 1940. | 1941. |
|---|---|---|---|---|---|---|---|
| Tons of cane | 909,223 | 794,390 | 647,220 | 1,035,992 | 1,262,554 | 1,217,278 | 1,006,149 |
| Tons of 94 n.t. sugar | 117,467 | 109,142 | 85,131 | 135,261 | 168,896 | 169,232 | 134,603 |
| Tons of cane per ton 94 n.t. sugar | 7·74 | 7·28 | 7·60 | 7·66 | 7·48 | 7·19 | 7·48 |
| Pol in cane | 14·56 | 15·31 | 15·05 | 14·62 | 14·88 | 15·42 | 14·76 |
| Fibre in cane | 14·47 | 14·32 | 14·04 | 13·66 | 13·70 | 13·40 | 12·93 |
| Purity— | | | | | | | |
| First expressed juice | 88·6 | 88·83 | 88·14 | 88·87 | 88·46 | 87·69 | 87·94 |
| Clarified juice | 87·78 | 87·57 | 87·23 | 88·07 | 87·80 | 86·91 | 87·05 |
| Syrup | 88·1 | 87·97 | 87·42 | 88·33 | 88·22 | 87·28 | 87·30 |
| Gallons molasses per ton cane | 4·11 | 4·36 | 4·91 | 4·13 | 4·13 | 4·56 | 4·54 |
| Apparent purity final molasses | 39·72 | 40·07 | 41·23 | 39·05 | 38·79 | 37·42 | 36·77 |
| Overall recovery | 86·08 | 85·98 | 83·83 | 85·46 | 86·17 | 86·44 | 86·86 |
| Recovery on mixed juice | 91·995 | 90·64 | 87·81 | 89·82 | 90·08 | 90·27 | 90·31 |
| Boiling-house efficiency | 96·94 | 95·41 | 92·82 | 94·55 | 95·02 | 95·63 | 95·57 |

CENTRAL DISTRICT.

| —— | 1935. | 1936. | 1937. | 1938. | 1939. | 1940. | 1941. |
|---|---|---|---|---|---|---|---|
| Tons of cane | 1,530,240 | 1,966,183 | 1,961,413 | 2,030,166 | 2,397,268 | 1,891,399 | 1,724,922 |
| Tons of 94 n.t. sugar | 233,901 | 301,893 | 304,502 | 314,574 | 371,259 | 280,777 | 256,923 |
| Tons of cane per ton 94 n.t. sugar | 6·542 | 6·51 | 6·44 | 6·45 | 6·46 | 6·74 | 6·71 |
| Pol in cane | 16·54 | 16·43 | 16·62 | 16·70 | 16·33 | 16·34 | 15·86 |
| Fibre in cane | 12·36 | 11·84 | 10·96 | 11·55 | 11·39 | 11·52 | 11·54 |
| Purity— | | | | | | | |
| First expressed juice | 90·78 | 90·91 | 90·06 | 91·58 | 90·43 | 90·54 | 90·11 |
| Clarified juice | 90·01 | 90·25 | 89·55 | 90·77 | 89·97 | 90·04 | 89·54 |
| Syrup | 90·06 | 90·54 | 89·84 | 91·04 | 90·33 | 90·14 | 88·87 |
| Gallons molasses per ton cane | 3·91 | 3·71 | 4·13 | 3·72 | 3·96 | 4·03 | 4·12 |
| Apparent purity final molasses | 39·52 | 37·22 | 35·93 | 37·85 | 35·33 | 35·40 | 35·53 |
| Overall recovery | 88·79 | 88·62 | 89·00 | 88·72 | 86·98 | 87·80 | 88·25 |
| Recovery on mixed juice | 93·79 | 93·20 | 93·25 | 92·70 | 91·20 | 92·19 | 92·23 |
| Boiling-house efficiency | 97·8 | 97·08 | 97·54 | 96·26 | 95·20 | 96·23 | 96·47 |

NORTHERN DISTRICT.

| —— | 1935. | 1936. | 1937. | 1938. | 1939. | 1940. | 1941. |
|---|---|---|---|---|---|---|---|
| Tons of cane | 1,780,804 | 2,410,638 | 2,524,301 | 2,275,927 | 2,378,999 | 2,072,079 | 2,062,518 |
| Tons of 94 n.t. sugar | 258,958 | 333,613 | 373,692 | 328,301 | 351,267 | 309,437 | 305,819 |
| Tons of cane per ton 94 n.t. sugar | 6·877 | 7·23 | 6·76 | 6·93 | 6·77 | 6·70 | 6·74 |
| Pol in cane | 15·91 | 15·01 | 16·14 | 15·74 | 16·18 | 16·26 | 16·27 |
| Fibre in cane | 11·35 | 9·92 | 10·12 | 10·17 | 9·84 | 9·89 | 9·71 |
| Purity— | | | | | | | |
| First expressed juice | 89·63 | 87·92 | 89·79 | 89·95 | 90·30 | 90·45 | 90·01 |
| Clarified juice | 89·96 | 88·59 | 90·29 | 90·07 | 90·34 | 90·63 | 90·18 |
| Syrup | 89·89 | 88·58 | 89·85 | 90·89 | 90·40 | 90·73 | 89·90 |
| Gallons molasses per ton cane | 3·86 | 3·94 | 3·51 | 3·39 | 3·56 | 3·62 | 3·89 |
| Apparent purity final molasses | 36·53 | 31·66 | 34·62 | 34·38 | 35·81 | 36·20 | 35·32 |
| Overall recovery | 87·93 | 88·10 | 88·01 | 87·50 | 86·88 | 87·67 | 87·40 |
| Recovery on mixed juice | 92·86 | 92·58 | 92·44 | 92·53 | 91·15 | 91·69 | 91·28 |
| Boiling-house efficiency | 97·34 | 97·97 | 96·80 | 96·89 | 95·25 | 95·71 | 95·48 |

ALL QUEENSLAND DISTRICTS.

| —— | 1935. | 1936. | 1937. | 1938. | 1939. | 1940. | 1941. |
|---|---|---|---|---|---|---|---|
| Tons of cane | 4,220,267 | 5,171,211 | 5,132,934 | 5,342,085 | 6,038,821 | 5,180,756 | 4,793,589 |
| Tons of 94 n.t. sugar | 610,326 | 744,648 | 763,325 | 778,136 | 891,422 | 759,446 | 697,345 |
| Tons of cane per ton 94 n.t. sugar | 6·915 | 6·94 | 6·73 | 6·87 | 6·77 | 6·82 | 6·87 |
| Pol in cane | 15·84 | 15·66 | 16·15 | 15·84 | 15·88 | 16·04 | 15·70 |
| Fibre in cane | 12·39 | 11·63 | 11·17 | 11·63 | 11·56 | 11·58 | 11·29 |
| Purity— | | | | | | | |
| First expressed juice | 89·83 | 89·36 | 89·61 | 90·32 | 89·85 | 89·65 | 89·47 |
| Clarified juice | 89·51 | 89·07 | 89·44 | 89·83 | 89·48 | 89·28 | 89·08 |
| Syrup | 89·57 | 89·27 | 89·41 | 90·29 | 89·77 | 89·46 | 88·80 |
| Gallons molasses per ton cane | 3·93 | 3·96 | 4·02 | 3·54 | 3·88 | 4·06 | 4·16 |
| Apparent purity final molasses | 38·33 | 35·54 | 36·62 | 37·08 | 36·51 | 36·39 | 35·83 |
| Overall recovery | 87·8 | 87·90 | 87·79 | 87·52 | 86·70 | 87·34 | 87·66 |
| Recovery on mixed juice | 92·98 | 92·52 | 92·20 | 92·01 | 90·94 | 91·49 | 91·54 |
| Boiling-house efficiency | 97·36 | 97·18 | 96·65 | 96·14 | 95·23 | 95·90 | 96·06 |
| Pol extraction | 94·43 | 95·01 | 95·22 | 95·12 | 95·34 | 95·46 | 95·76 |
| C.C.S. in cane | 14·79 | 14·52 | 15·00 | 14·79 | 14·77 | 14·90 | 14·58 |
| Coefficient of work | 96·77 | 99·37 | 98·98 | 98·17 | 99·16 | 98·24 | 98·60 |

| —— | 1933. | 1934. | 1935. | 1936. | 1937. | 1938. | 1939. | 1940. | 1941. |
|---|---|---|---|---|---|---|---|---|---|
| Crop days | 5,130 | 4,382 | 4,296 | 4,809 | 4,497 | 4,822 | 5,163 | 4,558 | 4,034 |

FIGURES FOR 1941 SEASON.

| —— | Northern. | Central. | Southern. | Totals and Averages. |
|---|---|---|---|---|
| Tons cane crushed | 2,062,518* | 1,724,922* | 1,006,149* | 4,793,589* |
| Tons sugar made (94 n.t.) | 305,819* | 256,923* | 134,603* | 697,845* |
| Net titre | 96·91 | 97·21 | 97·16 | 97·09 |
| Tons of cane per ton 94 n.t. sugar | 6·74* | 6·71* | 7·48* | 6·87* |
| C.C.S. in cane | 15·16 | 14·79 | 13·57 | 14·58 |
| Coefficient of work | 98·00 | 99·16 | 98·53 | 98·60 |
| Crushing rate | 81·43 | 68·02 | 47·76 | 63·32 |
| Lost time per cent | 2·06 | 3·83 | 4·54 | 3·73 |
| Fibre, per cent. cane | 9·71 | 11·54 | 12·93 | 11·29 |
| Pol, per cent. cane | 16·27 | 15·86 | 14·76 | 15·70 |
| First expressed juice— | | | | |
| Brix | 21·19 | 21·07 | 20·39 | 20·92 |
| Purity | 90·01 | 90·11 | 87·94 | 89·47 |
| Clarified juice— | | | | |
| Brix | 16·93 | 15·26 | 15·37 | 15·87 |
| Purity | 90·18 | 89·54 | 87·05 | 89·08 |
| Syrup— | | | | |
| Brix | 68·60 | 69·40 | 67·08 | 68·49 |
| Purity | 89·90 | 88·87 | 87·30 | 88·80 |
| Last expressed juice— | | | | |
| Purity | 78·74 | 80·11 | 75·03 | 78·24 |
| Clarified juice per 100 cane | 101·21 | 110·67 | 105·27 | 105·62 |
| Dilution, per cent. first expressed juice | 25·16 | 38·07 | 32·66 | 31·82 |
| Final bagasse— | | | | |
| Pol | 3·30 | 2·76 | 2·14 | 2·78 |
| Dry substance | 50·51 | 49·92 | 52·00 | 50·69 |
| Pol extraction | 95·75 | 95·68 | 96·18 | 95·76 |
| Lost cane juice per cent. fibre | 42·69 | 35·23 | 28·44 | 36·00 |
| Final molasses— | | | | |
| Gallons per ton cane | 3·89 | 4·12 | 4·54 | 4·16 |
| Brix | 85·40 | 88·86 | 87·82 | 87·35 |
| Apparent purity | 35·32 | 35·53 | 36·77 | 35·83 |
| True purity | 48·74 | 45·91 | 45·96 | 47·04 |
| Reducing sugars | 15·69 | 15·75 | 12·70 | 14·18 |
| Final mud— | | | | |
| Tons per 100 tons cane | 3·23 | 3·45 | 3·18 | 3·29 |
| Pol | 3·67 | 1·95 | 2·90 | 2·82 |
| Sugar— | | | | |
| Pol | 98·464 | 98·700 | 98·802 | 98·639 |
| Reducing sugars | ·406 | ·331 | ·210 | ·329 |
| Ash | ·229 | ·232 | ·286 | ·244 |
| Moisture | ·395 | ·327 | ·234 | ·329 |
| Dilution indicator | 34·62 | 33·61 | 24·27 | 31·88 |
| Pol balance— | | | | |
| Sugar (recovery) | 87·40 | 88·25 | 86·86 | 87·66 |
| Bagasse | 4·25 | 4·32 | 3·82 | 4·24 |
| Molasses | 4·67 | 4·47 | 6·52 | 5·40 |
| Mud | ·73 | ·38 | ·63 | ·59 |
| Undetermined | 2·95 | 1·58 | 2·17 | 2·11 |
| Boiling house efficiency | 95·48 | 96·47 | 95·57 | 96·06 |
| Fuel— | | | | |
| B.T.U.'s 1,000s. per ton cane— | | | | |
| Wood | 94·04 | 61·65 | 127·14 | 90·48 |
| Coal | .. | 5·25 | 4·21 | 3·15 |
| Molasses | 62·11 | 10·49 | .. | 25·42 |
| Bagasse | 1,944·60 | 2,276·74 | 2,512·96 | 2,229·92 |
| Total | 2,000·75 | 2,354·13 | 2,644·31 | 2,348·97 |
| Crop days | 1,437* | 1,403* | 1,194* | 4,034* |

* All Mills. Remainder except C.S.R., Pioneer, Inkerman, and Eagleby Mills.

CANE MILLED AND SUGAR YIELDS, SEASON 1941.

| Mill. | Tons Cane Crushed. | Tons 94 n.t. Sugar Made. | Tons Cane per Ton 94 n.t. Sugar. 1941. | 1940. |
|---|---|---|---|---|
| Mossman | 132,305 | 20,380 | 6·492 | 6·490 |
| Hambledon | 197,302 | 29,657 | 6·653 | 6·605 |
| Mulgrave | 230,933 | 34,559 | 6·682 | 6·654 |
| Babinda | 227,441 | 32,948 | 6·903 | 7·098 |
| Goondi | 192,609 | 28,245 | 6·819 | 6·954 |
| South Johnstone | 241,519 | 35,740 | 6·758 | 6·742 |
| Mourilyan | 166,386 | 24,286 | 6·851 | 6·746 |
| Tully | 253,627 | 38,102 | 6·657 | 6·528 |
| Victoria | 229,671 | 33,430 | 6·870 | 6·530 |
| Macknade | 190,725 | 28,392 | 6·718 | 6·664 |
| Sugar—Local Sales | .. | 80 | .. | .. |
| Total for Northern District | 2,062,518 | 305,819 | 6·744 | 6·696 |
| Invicta | 87,574 | 13,607 | 6·436 | 6·247 |
| Pioneer | 162,189 | 25,999 | 6·238 | 6·790 |
| Kalamia | 196,902 | 30,969 | 6·358 | 6·848 |
| Inkerman | 199,346 | 30,966 | 6·438 | 7·303 |
| Proserpine | 152,027 | 22,178 | 6·855 | 6·523 |
| Cattle Creek | 74,652 | 10,369 | 7·200 | 6·892 |
| Racecourse | 154,983 | 21,797 | 7·110 | 6·674 |
| Farleigh | 148,510 | 21,403 | 6·939 | 6·808 |
| North Eton | 81,797 | 11,059 | 7·396 | 7·023 |
| Marian | 150,050 | 22,085 | 6·794 | 6·460 |
| Pleystowe | 153,106 | 22,681 | 6·750 | 6·533 |
| Plane Creek | 163,786 | 23,502 | 6·969 | 6·766 |
| Sugar—Local Sales | .. | 308 | .. | .. |
| Total for Central District | 1,724,922 | 256,923 | 6·714 | 6·736 |
| Qunaba | 73,758 | 9,969 | 7·399 | 7·284 |
| Millaquin | 141,223 | 19,058 | 7·410 | 6·909 |
| Bingera | 168,721 | 23,039 | 7·323 | 7·048 |
| Fairymead | 165,154 | 20,872 | 7·913 | 7·721 |
| Gin Gin | 43,813 | 5,307 | 8·256 | 7·859 |
| Isis | 186,807 | 26,876 | 6·951 | 6·615 |
| Maryborough | 55,454 | 7,472 | 7·422 | 7·351 |
| Mount Bauple | 43,385 | 5,566 | 7·795 | 7·506 |
| Moreton | 107,677 | 14,026 | 7·677 | 7·456 |
| Rocky Point | 18,334 | 2,096 | 8·747 | 8·033 |
| Eagleby | 1,823 | 180 | 10·128 | 9·749 |
| Sugar—Local Sales | .. | 142 | .. | .. |
| Total for Southern District | 1,006,149 | 134,603 | 7·475 | 7·193 |

*Price: 6d.*] By Authority: A. H. TUCKER, Government Printer, Brisbane.