

SHORT REPORT ON 1942 SEASON'S WORK AT DOORKOP.

By G. Booth.

General.—The season was a short one of twenty-three weeks. Up to August ending, harvesting conditions were good and some record outputs obtained.

The season began with 12 per cent. sucrose in cane, which figure rose steadily until August, when 15 per cent. and over was obtained—the season's average being 14.5 per cent.

On a fixed Java Ratio Co.281 cane yielded 1 per cent. higher sucrose over all others.

Fibre content was lower than anticipated, considering the preceding two unfavourable years, the average being under 15 per cent. until October, when wet weather produced trashy and badly topped cane—conditions that make any figure for fibre possible.

Although the proportion of Uba cane was high—exceeded only by two other mills—the overall recovery was the highest yet obtained by this mill. Both milling and boiling houses contributed to this end, although long stops for cane naturally adversely affected efficiency in both stations.

The advantages of a six months' harvesting season are demonstrated in this year's figures.

Chemicals.—During the season efforts were made to reduce consumption of sulphur. This could be done only to a limited extent, and only as long as new variety cane in clean, fresh conditions was being crushed. Our opinion generally coincides with a finding published in Hawaiian records, viz., the benefits of sulphur are to be seen not so much in the juice preparation

in the quicker and more complete settling, but rather in the rapidity with which the vacuum pans and centrifugals, especially in low grades, can maintain their output. However, it is doubtful if the elimination of sulphur would conduce to good recovery.

Filtration.—Filtration by the Oliver filter was generally satisfactory, although there were times when Uba cane provided a stiff proposition. With the slimy muds, dilution had to be stopped and boiling-point temperatures maintained.

The off-seasonal maintenance of the filter is a big job, and every year sees some alteration installed to lessen depreciation.

Centrifugals.—For 1942 season a factory-made revolving hot-water coil was placed in the low grade battery mixer, the heating element being evaporator condensate. Roughly speaking, the maintaining of a temperature of 115 degrees of the masse-cuite in the mixer increased the capacity of the battery by about 25 per cent., a better and cleaner purged sugar being obtained. This temperature of 115 degrees is well within the safety zone, and will not be increased until saturascope control can be obtained.

Now that our factory labour, in respect to both numbers and efficiency, is under drastic review, ways and means of tightening things up are being sought.

Any source of information concerning the latest type of high-speed machines equipped with methods of heat conservation of massecuites would be welcomed. It is agreed that the average centrifugal station is capable of much all-round improvement.

Mr. RAULT explained that at Natal Estates too, the sucrose content of cane for the past season had been one of the lowest for a number of years. There was no evidence that in their district the advent of new varieties had produced a rise in the average yearly sucrose content of cane. Fibre also did not seem to have decreased. Last season, with practically 90 per cent. new variety cane, the sucrose and fibre per cent. cane were respectively 13.3 and 15.4, compared with 13.7 and 15.3 representing the average figures over twenty-five years of 100 per cent. Uba canes. The field returns, however, were still improving. Last season, with a better rainfall, the tons of cane per acre was 37.5 compared with 31.0 for the previous year of unprecedented drought, and a still better return might be expected for the coming season. In their programme of planting they were now concentrating on Co.281 and Co.301. Planting this year consisted of over 50 per cent. Co.281 and 40 per cent. Co.301, with only a half per cent. Uba. Co.301 was a quick grower and its performance generally was very satisfactory. Its sucrose content was moderately high, but it had the undesirable feature of poor resistance to wind.

Once again he could find no proof for the assertion that low-fibre canes were an asset for extraction and capacity, or that extraction decreased with an increase in fibre. Their best results both as regards extraction and through-put coincided with periods of high-fibre canes. He thought that sucrose content of cane also had an effect on extraction as the final bagasse was fairly constant in sucrose per cent. and they preferred a combination of high sucrose and high fibre for optimum milling results. For example, during six weeks with 12.2 per cent. sucrose and 14.9 per cent. fibre the extraction was only 94.5, but for four weeks with cane of 14.0 per cent. sucrose, and in spite of a rise in fibre per cent. to 15.6, the extraction rose to 95.23.

Although it was not sound practice to neglect the first units of a crushing plant, it seemed, however, that the work of the first units was not always an indication of final results. They had found at Natal Estates equally good results in total extraction, in spite of the first units having dropped in efficiency.

Attempts were made to run the factory on a continuous carbonatation process for seven weeks in order to economise

labour and plant, and further experimentation on this line is being carried out.

The proportion of No. 1 refined sugar made was very high and a good deal of remelting was resorted to. This increased the pan work very considerably. The recording curometer was found to be extremely useful, especially for controlling the boiling of last massecuites. It helped a good pan boiler to visualise graphically his best result and it was an inducement for him to reproduce such results.

It was found that by finishing the last massecuite at a higher temperature it was possible to reach a very high brix and crystallization during cooling was accelerated. This was one method of increasing capacity. As a result of remelting such a large quantity of sugar the syrup purity was high—over 92. The purity of the last massecuite was therefore also high, nearly 69, but there was only a small quantity of it. Similarly, the amount of molasses was small, but its purity fairly high. There was a progressive increase in the molasses purity as the season advanced. The same was true for the average of all our mills, although some chemists maintained that they could keep molasses purity constant, this had not been the speaker's experience.

The speaker wanted to know how the Central Board obtained the different Java Ratios for Co.301 and P.O.J. He was surprised that the Java Ratio for Co.301 was so low.

Mr. MOBERLY, in reply, said that different average Java Ratios were obtained from the various factories crushing varying proportions of the varieties. The reason why the Java Ratio for Co.301 was so low was probably due to the fact that the factories crushing the highest proportion of this variety had low Java Ratios. He did not attach much significance to these comparisons.

He thought the reason for high extractions being obtained with canes of a high fibre content might be partly explained by the fact as illustrated in results of crushing experiments carried out at the Experiment Station by Dr. Hinchy, that increasing amounts of trash increased the fibre content of the cane out of all proportion to the small decrease in extraction. This was to be expected, as trash did not retain as much juice

as pith fibre, for example. He did not suggest that this was a complete explanation of the phenomenon, but thought it would go some way towards explaining it.

Mr. DODDS, in reply to a question by Mr. Wouters, said that it was impossible this year to discriminate between plant and ratoon crops for the different varieties, as the authors were dependent on information from the Agricultural Census Returns, and this had not yet been received. It could be said, however, that nearly all the Uba and Co.290 were old ratoons, since little had been planted of these varieties in recent years.

Mr. DU TIOT pointed out that the effects of fibre on extraction became progressively less as the extraction increased. It therefore followed that the effects of fibre would be more obvious at mills having a lower extraction than was the case at Natal Estates. There was also the seasonal fluctuation in extraction to be taken into consideration.

Mr. DODDS said that Mr. Rault had pointed out that there was no appreciable increase in sucrose content of canes since the introduction of new varieties. This must, however, be due to the general conditions in recent years not favouring a high sucrose. The returns from the Central Board, which drew its cane from a considerable part of the total crop, indicated most clearly, year after year, the superiority of the new varieties over Uba as far as sucrose content was concerned. Co.281 now made up more than half the crop, and the high average fibre content of cane for the year was probably largely due to this high-fibred cane. The Industry, however, seemed well satisfied with the milling properties of Co.281, and it seemed that variety largely determined the nature of fibre and, as such, had more effect on extraction than the content of fibre itself as a whole. Co.281 had proved a very valuable variety to South Africa—much better, in fact, than one could have reasonably expected

from canes selected in other countries. Importation of established varieties offered lesser possibilities compared with seedlings raised here from imported seed and selected under our conditions. He believed the time would come when we would have our own varieties selected from seedlings that would be far superior for our conditions to any imported variety.

The PRESIDENT pointed out that fibre as defined by sugar technologists was not lignified tissue, and he had often wondered whether lignin determinations would not perhaps give a better correlation with milling results.

Mr. DU TOIT, in reply to Mr. Dodds, said that one of the reasons that such a wide discrepancy existed between the purities of final molasses in this country was due to the fact that brix determinations of final molasses were not done in any standard way. Some factories adhered to our recommended method and diluted the final molasses one to two; others, however, used one to five and one to ten, while in a few cases the brix was determined by means of a refractometer. That being the case deductions derived from the S.J.M. formula were also to be accepted with reserve.

Mr. RAULT mentioned the remarkable fact that this year low sucrose content of cane was associated with an extraordinary low reducing sugar ratio.

The PRESIDENT, in concluding the discussion on the paper, pointed out that experiments conducted in Hawaii on transpiration of canes, led to the conclusion that during heavy rains the leaves could absorb water and transport it to the roots. It was therefore possible that rains following a drought might actually have a diluting effect on the juice inside the stem as well as encouraging growth.