ABSTRACT FROM REPORTS SUBMITTED BY FACTORIES ON THE SEASON'S WORK

ZULULAND SUGAR MILLERS & PLANTERS Ltd.

Some Features of the 1945/46 *Season, with Special Reference to Decomposed Cane.*

Report by Wm. Buchanan.

The 1945/46 season was distinguished by a record amount of cane crushed and also a record amount of sugar produced. For the first time in the history of 32 seasons the Z.S.M. & P. Ltd. mill has produced more than 50,000 tons of sugar. Of the 51,400 tons of raws manufactured, 36,100 tons were bagged as Government No. 2 grade.

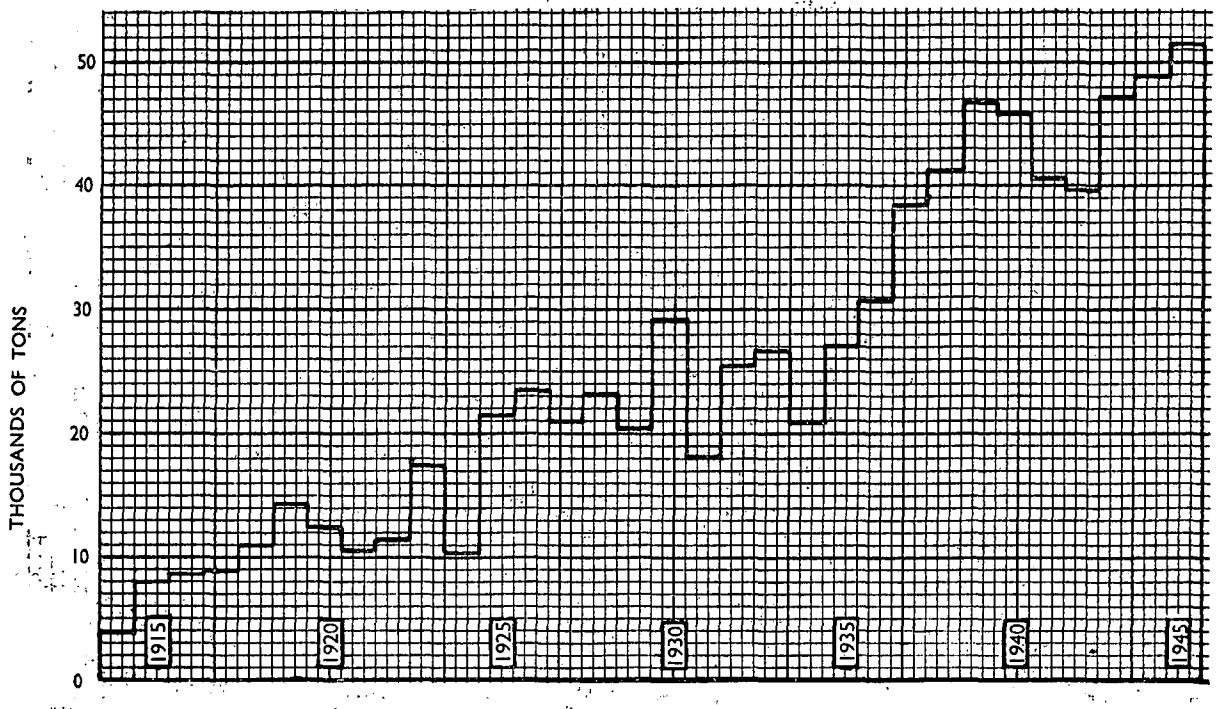
The overall rate of crushing cane and the overall rate of sugar output (each on a basis of total available time) were the highest ever attained by this mill. The factors which contributed towards these record features were the low rainfall and the high average sucrose content of the cane.

To illustrate the development of the Empangeni concession there is interpolated a graph showing the annual production of sugar since the mill first started operating in 1914.

Two notes on the graph.—In the 1936 season supplies of cane arrived in bulk from the Nkwalini settlement. These reached a peak in 1942, when the Nkwalini supply of cane constituted 24.9 per cent. of the total crushed. For the next three seasons supplies from the Nkwalini source have formed 15.6 per cent., 15.3 per cent. and 14.8 per cent. respectively.

About the same time the new Co. and P.O.J. varieties, with their increased yields of cane per acre, were rapidly superseding the old, diseased Uba variety. For example, in 1933, when the new varieties were first crushed, they comprised 0.2 per cent. of the total, but in 1937 the proportion of new varieties had risen above 50 per cent., in 1940 above 90 per cent., and in 1944 more than 99 per cent. of the total cane crushed was comprised of the Co. and P.O.J. varieties.

SUGAR PRODUCED ANNUALLY SINCE COMMENCEMENT OF OPERATIONS IN 1914.



SEASONS 1914 TO 1945.

The Cane Supply.—In the 1945/46 season, six varieties of cane were supplied to the mill, in the following descending proportions :—

Variety.	Proportion.	Average sucrose content.
Co.281	87.78 per cent.	14.23 per cent.
Co.301	4.50 per cent.	14.40 per cent.
P.O.J.'s	3.92 per cent.	14.58 per cent.
Co.290	2.93 per cent.	13.03 per cent.
Uba	0.65 per cent.	13.29 per cent.
Co.331	0.22 per cent.	12.40 per cent.

In the Empangeni district (i.e. excluding Nkwalini) approximately 95 per cent. of the cane grown is the Co.281 variety.

A feature of the Co.281 variety, which appears to call for an investigation, is the tendency of three-years-old, or older, cane to decompose in the fields. When a consignment was found on inspection to contain a proportion of dead stalks, it was invariably discovered to be a consignment of old "left-over" Co.281 variety. While it may be the case that other varieties decompose similarly, we found the condition only in the Co.281 variety, possibly because no other variety has been left so long in the fields before harvesting.

It has not been possible at this mill to separate and weigh the amount of decomposed cane supplied, nor to make continuous inspection day and night for its presence in consignments, but decomposed cane has been supplied in sufficient quantity to affect adversely the process of manufacture.

A sample of decomposed cane taken at random from a consignment of Co.281 variety gave the following results :—

From 2,740 grams, double-crushed in a hand mill, 75 mls. of juice were obtained which, in normal solution, gave a direct saccharimeter reading of +0.2°V.

A portion of the cane, suitably cut into small pieces, was digested in water in $\frac{1}{2}$N solution at boiling point for one hour :

pH of extract = 5.0.

Direct reading of extract (400 mm. tube)—1.2°V.

Copper reducing substances per cent. cane (using Eynon and Lane invert table) were approximately equivalent to 9 per cent. reducing sugars.

Dry substance in the cane = 55.5 per cent.

Fibre by lixiviation = 47 per cent.

The presence of this decomposed cane causes a serious defect in the distribution of sucrose amongst the aggregate of planters for the following reasons. The decomposed (i.e. juiceless or nearly so) cane in consignments is invariably supplied mixed with cane still containing a normal amount of juice. At the first crushers almost all the juice comes from the more virile cane stalks, while an insignificant amount is extracted from the decomposed stalks. Thus the whole consignment is credited with the analysis of the juice which is extracted from the virile cane in the consignment. And the net result is a fictitiously high evaluation for the consignments containing decomposed stalks, and a wrongful distribution of sucrose.

Manufacturing.—The salient feature of the process of manufacture throughout the season under review was the sudden fall in recovery in the August period, which coincided with the supply in quantity of the decomposed cane noted above.

The following table demonstrates the condition :—

	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Purity mixed juice .	85.5	86.5	86.5	85.9	85.8	85.1	85.8	85.8
Recovery percent...	87.64	89.20	89.04	86.28	86.34	86.62	87.14	87.77

* May period 19 full working days.

The effect in the boiling house of juices extracted in the milling process from old Co.281 variety is most marked in the pans. The syrup forms grain only with extreme difficulty, and in some instances, during the season under review, graining was completely inhibited. Massecuites were highly viscous, and second molasses, and occasionally even first molasses, had to be boiled string-proof and passed to jelly tanks. The net result was a fall in recovery.

Conditions in the boiling house varied with the times and the quantity of juice supplied from old cane, but by dint of selection of molasses for reboiling, the balancing of the process within the boiling house and the high overall rate of crushing, the sugar output was maintained, and the records, previously noted, gained.

DOORNKOP SUGAR FACTORY.

Report by G. Booth.

The output for the year was the largest yet produced by this factory, the daily throughput being also a record.

The dry season allowed the harvesting to proceed without much interruption, the rainfall being only 8 inches over the crop period. The total rainfall for the year is only approximately 34 inches.

Some individual high sucrose figures were recorded, and also, surprisingly, some very low crusher juice purities from freshly burnt cane, especially Co.301 variety.

The season started in May with a sucrose of 13.5 per cent.; the peak was reached in September at 15.5 per cent.; the crop average was 14.58 per cent. The fibre was not appreciably higher than that recorded for the past five years, but this may be attributed to the large quantity of plant cane counterbalancing the effects of the dried-up three-year-old cane.

The proportions of cane varieties did not differ much from the previous year's cuttings.

The problem of efficient crushing of mixed variety canes is still of high priority in this mill, as also apparently it is in others with which notes have been compared during the season.

It is of much interest to see in the 1945 monthly laboratory reports that the majority of the mills have

recorded decreased extractions compared to last year. Informative opinions as to why this is so would be welcomed.

Last year's report from Empangeni factory gave weight to the assertion that fibre in cane *per se* is not the controlling factor in milling control.

A milling test on Co.331 raises hopes that, provided this cane is grown in suitable conditions, its milling characteristics may approach those of Co.281.

Recovery on mixed juice was 1 per cent. less than last year; a drop was anticipated. It is observed that a lower recovery is common to all those factories that showed very high figures for 1944, and we shared the experience of others who handled three-year-old cane in seeing the weekly recovery moving in a most erratic curve.

It is to be hoped that the drought has compelled one most desirable thing, viz. the wiping out or severe limitation of stand-over crops.

The economic loss to the whole industry in handling three-year-old cane calls for more than passing comment; it justifies an official investigation. Purities ranging from 70° downwards (crusher juice samples) to 42° (hand mill samples) have been obtained. (It should be noted that 42° purity is the industrial average purity for exhaust molasses !)

Obviously comparisons in industrial efficiencies is a futile thing in these circumstances.

The effects of the drought were upsetting to the process work. On occasions juices were muddy and smelly and our low grade pan seeding outfit did valuable work.

In the low grade, the usual ebb and flow of molasses exhaustion was more pronounced than usual.

Referring to last year's notes on the heating of raw juice as effecting scale formation in the evaporator, our further experiments did not produce any marked diminution of scale as claimed by other factories. The results obtained at Central Factory by varying the temperature of the last pot are most interesting, and it is to be hoped they will be followed up by others whose condensing layout permits them to do so.