

# TWENTY-THIRD ANNUAL SUMMARY OF CHEMICAL LABORATORY REPORTS

## SOUTH AFRICAN SUGAR FACTORIES, SEASON 1947-48

By H. H. DODDS and J. L. DU TOIT.

In the two preceding reports in this series it was pointed out that the prolonged cycle of droughts extending from November, 1944 to December 1946 would have a depressing effect on three successive sugarcane crops, sugarcane being a two-year crop in this country.

The 1947-48 crop now under review is the third and last of the three crops to be adversely affected.

The total crop was 4,543,255 short tons of cane yielding 512,005 tons of sugar, somewhat larger than for the previous season, but smaller than for any year from 1938 onwards, excepting 1941, which was also restricted as the result of a very low rainfall.

Although the rainfall from the beginning of 1947 onwards to date has been for the most part satisfactory, the 1947-48 crop, representing the two growing seasons of September 1945 to April 1946 and September 1946 to April 1947 was for the greater part of its growth subject to very deficient rainfall; and it will not be until the 1948-49 season that we can once more have a crop that for the most part will have had satisfactory rain conditions.

Besides the effect of deficient rains, recent crops have suffered to an extent that cannot be assessed, but must be considerable, from the acute deficiency of commercial fertilizers that has prevailed since the early days of the war. We know that the sugarcane crop cycle requires for maximum profit added phosphorus equivalent to about 500 lbs. of superphosphate, and each crop about 80 lbs. of nitrogen corresponding to 400 lbs. per acre of ammonium sulphate. While it is not possible to arrive at the total quantities of these fertilizers and others of similar or lower grade used in sugarcane production, it is safe to say that in recent years the total fertilizers applied represent much less than these optimum quantities, with consequent depressing effect on the cane crop.

### Quality of Cane.

The 1947-48 crop, besides suffering in its vital early stages from drought and lack of fertilizer, was low in sugar content because of the abundant and prolonged rains of the first half of 1947, delaying the maturity of the cane. Thus June had a rainfall of 3.18 inches, nearly  $2\frac{1}{2}$  times the average for this month and the highest for June since 1940. It is noticeable that those years having abnormally high rainfall in June such as 1935, 1940 and 1947

or in May as in 1936, 1939, and 1943 have had unusually low average sucrose contents.

The sucrose content of the cane crop for 1947 was 13.32 per cent. compared with 14.21 per cent. for 1946 and 14.28 per cent. for 1945 and an average of 13.78 per cent. for the preceding six seasons.

Because of the relative smallness of the crop it was not necessary to begin cutting very early, and the milling season was not very prolonged. Although Maidstone factory with its record crop found it necessary to begin at the end of April, only the moderate amount of 62,000 tons of sugar was made before the end of June, and only 45,000 tons were made after the end of November.

Thus as much as 77 per cent. of the crop was made during the optimum period of July to November.

### Comparison of results from cane harvested during the July-November period, compared with those of earlier and later months of the harvesting season.

	Per cent. total Cane.	Ratio Cane/ Sugar.	Sucrose per cent.	Fibre per cent.	Purity Mixed Juice
<b>Mean 1928/1942—</b>					
Optimum period ...	73.91	9.03	13.77	15.31	85.88
Balance of crop... ..	26.09	10.15	12.56	15.65	84.50
<b>1944</b>					
Optimum period ...	66.57	8.43	14.00	15.78	86.58
Balance of crop... ..	33.43	9.20	13.01	15.93	85.41
<b>1945</b>					
Optimum period ...	73.75	8.06	14.66	16.03	86.93
Balance of crop... ..	26.25	9.01	13.21	15.89	85.95
<b>1946</b>					
Optimum period ...	85.64	8.27	14.33	16.20	85.88
Balance of crop... ..	14.36	8.96	13.49	16.27	85.74
<b>1947</b>					
Optimum period ...	77.07	8.65	13.58	15.78	86.48
Balance of crop... ..	22.93	9.57	12.45	15.87	85.43

The ratio of cane to sugar was 8.84, the highest for some years, as was to be expected with a low sucrose content.

As in nearly all past years the sucrose content of cane reached its peak in September when it was 13.97 per cent. for the month. It was as low as 12.45 per cent. up to the end of June.

The purity of mixed juice was 86.24, not quite so high as might perhaps have been expected with such a low sucrose content, but was only surpassed in the 1943 season during the preceding seven years. It fluctuated unevenly during the season but reached a maximum of 86.73 for the month in October, in which month it is usually the highest.

The reducing sugar ratio of the mixed juice was unusually low throughout the season. The minimum was 2.65 for October and the average for the season 2.95. It was only lower once, in the 1935 season when it was 2.65.

The fibre content of cane for the season, 15.80 per cent., was again high, but lower than during the three preceding seasons of drought. It was lowest during August with 15.68 per cent., and highest for June, 15.94 per cent.

### Cane Varieties.

The older varieties, Uba, Co.290 and Co.281 continued to form a diminishing proportion of the total crop harvested, Co.301 and Co.331 having increased and P.O.J. remaining about the same as in recent years.

The changes over recent years are as follows:—

Variety.	1947-48.	1946-47.	1945-46.	1944-45.	1943-44.	1942-43
Uba... ..	1.53	1.91	2.83	4.25	6.50	11.09
Co.281 ... ..	58.69	63.25	67.77	66.49	64.40	52.41
Co.290 ... ..	1.54	2.65	4.36	7.23	11.23	19.08
Co.301 ... ..	33.11	28.16	21.09	18.07	14.06	10.60
Co.331 ... ..	1.66	0.65	0.60	0.13	0.05	—
P.O.J. ... ..	3.46	3.37	3.34	3.83	3.76	6.82

"P.O.J." implies P.O.J.2725 with a small but variable content of P.O.J.2878.

The next table which gives the percentage varieties crushed by all the factories reporting to the Experiment Station shows that the proportion of Co.281 and Uba diminished as the season progressed but the percentage of Co.301 and Co.331 and to a lesser extent P.O.J. canes increased from the beginning to the end of the season.

Variety.	PERIOD ENDING.						Season 1947/48
	June 28, 1947.	Aug. 2, 1947.	Aug. 30, 1947.	Sept. 27, 1947.	Nov. 1, 1947.	Nov. 29, 1947.	
Uba ... ..	2.42	1.93	1.78	1.67	1.06	0.93	1.53
Co.281 ... ..	67.51	63.54	58.81	57.52	54.83	49.70	58.69
Co.290 ... ..	2.61	1.43	1.22	1.46	1.44	1.65	1.54
Co.301 ... ..	26.64	29.92	33.98	34.42	36.46	42.12	33.11
Co.331 ... ..	0.42	0.63	1.19	1.93	2.42	2.41	1.66
P.O.J. ... ..	0.40	2.55	3.02	3.00	3.79	3.19	3.46

The following is a summary of the arithmetic averages of the sucrose per cent. cane and purity of the different varieties, tested by the Sugar Industry Central Board Service.

Variety.	Per cent. total cane.	Sucrose per cent. cane.	Purity of crusher juice.
Uba ... ..	0.64	13.11	87.5
Co.281 ... ..	63.22	13.55	89.4
Co.290 ... ..	1.89	12.87	86.7
Co.301 ... ..	31.52	13.37	89.5
Co.331 ... ..	1.66	12.67	88.1
P.O.J. ... ..	1.07	13.73	86.5

The weighted average sucrose per cent. cane for all cane tested by the Central Board was 13.38 and the average purity was 89.3. The sucrose peak was in September and the purity peak in October. Uba reached its highest sucrose in August, while there was hardly any difference in sucrose content of Co.331 during August and September, when this variety also reached its peak. All other varieties were highest in sucrose during September. Uba, Co.290, Co.301 and the P.O.J. varieties had their highest purities in October but the peak was reached only during November for Co.281 and Co.331. There was a general tendency to cut Co.331 later in the season, and while it represented only 0.17 per cent. of the total cane in May it increased progressively to reach a peak of 8.63 per cent. in January.

The following table gives the percentage varieties tested by the Central Board during the different periods.

Variety.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan
Uba ... ..	0.06	0.69	0.93	0.70	0.89	0.54	0.33	0.31	0.2
Co.281... ..	68.63	71.35	63.17	65.02	59.91	58.54	57.40	62.83	55.72
Co.290... ..	2.42	2.24	1.88	1.30	2.04	1.83	2.29	1.83	0.74
Co.301... ..	28.25	24.73	27.47	30.21	34.28	35.44	37.08	30.66	32.61
Co.331... ..	0.17	0.35	0.61	1.13	1.84	2.44	2.17	3.14	8.63
P.O.J.... ..	0.47	0.64	0.94	1.64	1.04	1.21	0.73	1.23	2.01

Unfortunately the figures for yield of cane and sucrose per acre, which are, of course, of more importance than sucrose per cent. cane, are not yet available either for the 1947-48 or the previous season, until the agricultural census returns from Pretoria are received. These figures when available will probably show Co.331 in a more favourable light.

The new seedling variety N:Co.310 does not yet appear in the factory records, as all available material has been used for replanting. It is probable, however, that appreciable quantities will be milled during the coming season.

### General Factory Performance.

With the final closing down of Canelands Factory (Central Factory) at the end of 1946 the number of factories in active operation is now 20, of which 18, representing 99.8 per cent. of the total output, are represented in our detailed reports. The remaining two are those of Glendale Sugar Estates, and J. H. Shire, that have not complete factory chemical control.

If the outputs from these two small factories are included for calculating the ratio of cane to sugar for the crop, it is 8.85, instead of 8.84 as calculated from the 18 reporting factories.

This season, for the first time, the Natal Sugar Millers' Association have given their consent to the factories being mentioned by name instead of by code numbers as heretofore.

The identity of the various factories is as follows:—

Name of Factory.	Owners.	Former code No.	Index reference for tables.
Mount Edgecombe	Natal Estates Ltd. ... ..	1	NE
Umfolozi ... ..	Umfolozi Cooperative Sugar Planters, Ltd. ... ..	2	UF
Entumeni ... ..	Entumeni Sugar Milling Co., Ltd.... ..	3	EN
Gledhow ... ..	Gledhow - Chakas Kraal Sugar Co., Ltd. ... ..	4	GL
Maidstone ... ..	Tongaat Sugar Co., Ltd. ... ..	5	TS
Empangeni ... ..	Zululand Sugar Millers & Planters, Ltd. ... ..	6	ZM
Illovo ... ..	Illovo Sugar Estates, Ltd.	8	IL
Doornkop ... ..	Doornkop Sugar Estates, Ltd.... ..	9	DK
Felixton ... ..	Sir J. L. Hulett & Sons, Ltd.	10	FX
Sezela ... ..	Reynolds Bros., Ltd. ... ..	11	SZ
Darnall ... ..	Sir J. L. Hulett & Sons, Ltd.	12	DL
Amatikulu ... ..	Sir J. L. Hulett & Sons, Ltd.	14	AK
Renishaw ... ..	Crookes Bros., Ltd. ... ..	15	RN
New Guelderland	New Guelderland Sugar Factory ... ..	16	NG
Umzimkulu... ..	Umzimkulu Sugar Co., Ltd.	17	UK
Chaka's Kraal ... ..	Gledhow - Chaka's Kraal Sugar Co., Ltd. ... ..	18	CK
Melville ... ..	Melville Sugar Co., Ltd. ... ..	19	MV
Esperanza ... ..	Reynolds Bros., Ltd. ... ..	21	ES

The missing numbers 7, 13, and 20 formerly represented factories now closed down, Tinley Manor, Ottawa, and Canelands. The numbers were allotted originally to factories reporting for the 1925-26 season, when the first of these annual summaries was compiled. The 11 factories then represented were numbered in order of sucrose content of cane, Natal Estates having the highest that season.

For the 1947-48 season now under review the average extraction reached a new peak of 93.44 for this country, notwithstanding the continued high fibre content of the cane. The reduced extraction based on an assumed fibre content of 12.5 per cent. of cane is 95.01, also the highest for this country.

The latter figure is one that has been surpassed by few countries in recent years.

The average boiling house recovery for the season, 89.61, is not quite as high as it was in 1943 when it was 89.84, but the purity of juice was appreciably higher that year, and the reduced recovery based on an assumed juice purity of 85° was 88.51, which beats all records in this country.

Similarly the overall recovery, 83.73, and the reduced overall recovery, 84.09, are also the best yet recorded in this country, and will bear comparison with the corresponding records from most other cane sugar producing countries of which we have information.

The sucrose in total manufacturing losses per cent. of sucrose in cane is thus brought down to 16.27, also a creditable figure by international standards.

The purity of final molasses diminished to the new low figure of 41.1, but there is still room for improvement in this respect, as in the moisture content of bagasse.

As usual the extraction reached the maximum during the month of September and the overall recovery also, but the boiling house recovery attained its peak a little earlier, in August.

The average imbibition was 34.37 per cent. of cane, ranging from over 40 at three factories to less than 30 at two others.

#### Individual Factory Performances.

Only two factories recorded average sucrose contents of cane for the season of over 14 per cent., Umzimkulu with 14.50 per cent., and Esperanza 14.25. Umfolozi and Felixton each drawing much of their cane supply from alluvial flats had average sucrose contents of less than 12.5 per cent.

Entumeni and Esperanza had the highest purities of mixed juice, 89.07 and 88.98 respectively. Esperanza recorded also the lowest reducing sugar ratio in mixed juice, 1.90 for the season.

Umfolozi had as usual the lowest fibre content of cane and the only one under 15 per cent.

Mount Edgecombe gained considerably the highest average extraction for the season, 95.33, also the lowest sucrose content of bagasse, 1.87 per cent., resulting in the lowest milling loss, 3.97, and extraction ratio 29.69.

The highest boiling house recovery was gained by New Guelderland with 91.77, followed by Esperanza and Amatikulu. New Guelderland gained also the highest Boiling House Performance.

The best overall recovery was gained by Esperanza with 86.43, followed by Mount Edgecombe with 86.25.

The only factory to gain a ratio of cane to sugar of less than 8 was Umzimkulu with 7.98, followed by Esperanza with 8.07.

Umzimkulu gained also the lowest moisture of bagasse 44.72 per cent., while New Guelderland retained the lowest average purity (Clerget) of final molasses, 37.73. Mount Edgecombe had the lowest weight of final molasses, 2.41, calculated to 85° Brix, per cent. of cane.

Illovo had the lowest sucrose per cent. filter cake, 0.31, corresponding to only 0.11 per cent. of the sucrose in the cane.

Every mill but three increased extraction over that of the previous season, Umzimkulu by as much as 2.79, Sezela, Illovo, Felixton and Melville by more than one unit.

13 Factories improved their boiling house recovery over that of the previous season, Empangeni by 1.47, and New Guelderland, Chaka's Kraal and Sezela also by a unit or more.

Every factory but two increased in overall recovery over that of the previous season, Umzimkulu by as much as 2.58, Sezela by 2.06, Chaka's Kraal by 1.85, Melville by 1.75, Empangeni by 1.53, New Guelderland by 1.71, and Illovo by 1.26.

Maidstone factory of Tongaat Sugar Co., Ltd., had the record output for this country of 76,853 tons (2,000 lbs.) of sugar during the season, produced from 665,924 tons of cane.

The average crushing rate, spread over two tandems, was 151.80 tons of cane per hour for the season. This corresponds to the crushing of 23.65 tons of fibre per hour throughout and the manufacture of 17.53 tons of sugar per hour containing 17.27 tons of sucrose.

Natal Estates, Ltd., at Mount Edgecombe made 60,339 tons of sugar from 521,049 tons of cane at an average crushing rate of 141.79 tons of cane per hour on a single train of mills. This corresponds to the crushing of 22.30 tons of fibre per hour and the manufacture of 16.45 tons of sugar per hour containing 16.35 tons of sucrose.

Sir J. L. Hulett & Sons, Ltd., at their factories Darnall, Felixton and Amatikulu crushed 1,087,703 tons of cane to make 118,493 tons of sugar comprising 23.1 per cent. of the total crop.

Reynolds Bros., Ltd., at their two factories Sezela and Esperanza crushed 409,488 tons of cane to make 48,199 tons of sugar.

#### World Production of Sugar.

According to Willett & Gray, the total estimated world production of sugar for 1947-48 is 29,401,700 tons, an increase of 1,255,000 tons over the preceding year. Of this total 19,506,700 tons or 66.3 per cent. consists of cane sugar. The South African crop of 458,268 long tons thus amounts to 2.35 per cent of the cane sugar, or 1.56 per cent. of total world sugar.

The Cuban crop is estimated to be 5,325,000 tons, somewhat less than that of the preceding year, and American production generally is expected to decline; but this will be more than made up by increased production of cane sugar in Asia, Africa, and Australia, and increased beet sugar production in Europe and the U.S.A.

As in other recent years the only countries besides Cuba, and the U.S.A. and India to produce over a million tons of sugar are Russia (3,500,000) tons and Brazil.

Central Jaronu in Cuba made 163,458 short tons of sugar during the season, but the world's record is believed to be held by Central Romana in the Dominican Republic which made 178,653 tons in 1944.

Estimated production in the British Commonwealth for 1947-48 is as follows:—

	Long Tons.	Per cent. of total.
India ... ..	3,700,000*	47.7
	1,300,000†	16.8
Australia ... ..	600,000	7.7
British West Indies ... ..	488,700	6.3
South Africa ... ..	458,268‡	5.9
Britain ... ..	420,000†	5.4
Mauritius ... ..	335,000	4.3
British Guiana ... ..	180,000	2.3
Fiji ... ..	135,000	1.7
Canada ... ..	80,000†	1.0
Ireland ... ..	60,000†	0.8
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	7,756,968	
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\* Gur.

† As refined beet sugar.

‡ White sugar.

§ Actual production, not estimated.

Although the sugar production of Java is still negligible, there have been considerable increases in production in the Philippine Islands and Taiwan (Formosa) now 384,000 and 200,000 tons respectively.

The cane sugar crop has now reached pre-war dimensions, but the beet sugar crop not yet; only in Russia, France, Poland, Spain and Hungary is there any marked increase in beet sugar output.

#### Sugar Production in S. A. in Recent Years.

Production of cane and sugar over the past 19 years is tabulated in tons of 2,000 lbs. At the time of writing this comment the Special Census of Sugarcane Plantations for the year ending April, 1947 has not been received, so that crop data must be postponed.

Season.	Cane crushed.	Inches of rainfall.	Sugar produced.	Ratio Cane/Sugar.
1929/30 ... ..	3,005,663	48.34	298,635	10.06
1930/31 ... ..	3,803,883	37.30	393,205	9.67
1931/32 ... ..	3,130,783	29.33	325,899	9.61
1932/33 ... ..	3,489,960	48.37	358,905	9.72
1933/34 ... ..	3,673,375	31.15	391,173	9.39
1934/35 ... ..	3,874,215	44.74	358,738	10.80
1935/36 ... ..	3,867,536	45.83	417,289	9.27
1936/37 ... ..	4,180,973	50.13	446,409	9.37
1937/38 ... ..	4,489,022	39.57	507,219	8.85
1938/39 ... ..	4,658,962	40.33	522,732	8.91
1939/40 ... ..	5,346,006	47.68	595,556	8.98
1940/41 ... ..	5,309,227	43.48	572,880	9.72
1941/42 ... ..	3,921,436	26.18	452,119	8.67
1942/43 ... ..	4,704,430	49.40	524,975	8.96
1943/44 ... ..	5,278,914	53.31	585,392	9.02
1944/45 ... ..	5,351,945	36.45	614,158	8.71
1945/46 ... ..	4,607,055	31.99	553,074	8.33
1946/47 ... ..	3,990,017	32.02	474,769	8.40
1947/48 ... ..	4,543,255	44.83	512,005	8.87

**Acknowledgements.**

The writers thank the management and staffs of the factories that have supplied the necessary data for this report, and the Natal Sugar Millers' Association for consenting to the publication of factories by name, and the staff of the Sugar Association, including the Central Board and Experiment Station, for their assistance.

We have pleasure also in expressing our obligation

to the following special sources of information from other countries concerning their sugar industries: The Experiment Station of the Hawaiian Sugar Planters' Association, the Bureau of Sugar Experiment Stations of the Queensland Department of Agriculture, the Sugar Manufacturers' Association of Trinidad, the Joint Chemical Control, British Guiana, and the Sugar Industry Reserve Fund of Mauritius.

Experiment Station,  
South African Sugar Association,  
Mount Edgecombe,  
March, 1948.

**Average Manufacturing Results by periods for Natal Sugar Factories Reporting to the Experiment Station, Season 1947/48.**

	Period ending	...	...	...	...	JUNE 28, 1947.	AUG. 2, 1947.	AUG. 30, 1947.	SEPT. 27, 1947.	NOV. 1, 1947.	NOV. 29, 1947.	SEASON 1947-48.
Tons of 2,000 lbs. Cane crushed	...	...	...	...	This period To date	599,674	784,729 1,384,402	659,635 2,044,037	647,786 2,691,824	798,934 3,490,757	559,822 4,070,408	4,503,198
Tons of 2,000 lbs. Sugar bagged and estimated	...	...	...	...	This period To date	62,575	87,810 150,384	76,596 226,980	77,179 304,169	94,239 398,409	63,334 463,867	509,181
Tons Cane per ton Sugar	...	...	...	...	This period To date	9.58	8.94 9.21	8.61 9.01	8.39 8.85	8.48 8.76	8.84 8.77	8.84
Tons Cane per ton of Sugar, calculated as sugar of 96° Pol.	...	...	...	...	This period To date	9.31	8.69 8.95	8.38 8.76	8.15 8.60	8.25 8.52	8.61 8.53	8.60
Sucrose per cent. Cane	...	...	...	...	This period To date	12.45	13.18 12.86	13.61 13.10	13.97 13.31	13.84 13.43	13.30 13.41	13.32
Fibre per cent. Cane	...	...	...	...	This period To date	15.94	15.72 15.81	15.68 15.77	15.71 15.75	15.80 15.77	15.84 15.80	15.80
Java Ratio	...	...	...	...	This period To date	77.50	77.38 77.43	77.39 77.41	77.12 77.33	76.76 77.20	76.46 77.09	76.99
Sucrose per cent. Bagasse	...	...	...	...	This period To date	2.52	2.61 2.57	2.62 2.59	2.61 2.59	2.56 2.59	2.47 2.57	2.54
Moisture per cent. Bagasse	...	...	...	...	This period To date	50.62	50.46 50.56	50.32 50.49	50.16 50.41	50.30 50.39	50.60 50.41	50.46
Imbibition per cent. Cane	...	...	...	...	This period To date	34.46	34.78 34.63	34.80 34.68	34.76 34.70	34.21 34.59	33.68 34.46	34.37
Extraction	...	...	...	...	This period To date	92.99	93.26 93.14	93.46 93.24	93.67 93.35	93.64 93.42	93.61 93.44	93.44
Recovery on Mixed Juice	...	...	...	...	This period To date	89.03	89.88 89.53	90.09 89.73	89.94 89.78	89.83 89.79	89.56 89.75	89.61
Overall Recovery	...	...	...	...	This period To date	82.79	83.82 83.39	84.20 83.66	84.25 83.81	84.12 83.88	83.84 83.86	83.73
Purity of Mixed Juice	...	...	...	...	This period To date	86.07	86.64 86.40	86.28 86.34	86.70 86.45	86.73 86.52	85.92 86.43	86.24
Reducing Sugar Ratio	...	...	...	...	This period To date	3.21	2.79 2.96	3.03 2.98	2.68 2.90	2.65 2.84	3.20 2.89	2.95
Purity of Syrup	...	...	...	...	This period To date	87.69	88.18 87.98	87.80 87.93	88.30 88.07	88.40 88.19	87.76 88.11	87.98
Sucrose in Filter Cake (A)	...	...	...	...	This period To date	0.96	1.02 1.06	0.96 0.99	1.03 1.00	1.13 1.03	1.21 1.05	1.06
Purity of Final Molasses	...	...	...	...	This period To date	39.45	41.13 40.38	40.46 40.46	41.59 40.73	42.00 40.87	41.68 40.98	41.10
Average Polarization of Sugar	...	...	...	...	This period To date	98.76	98.73 98.75	98.69 98.73	98.78 98.74	98.70 98.73	98.58 98.71	98.83

(A) Arithmetic averages.

# FINAL MANUFACTURING RESULTS, NATAL SUGAR FACTORIES, SEASON 1947/48.

FACTORY NUMBER	...	...	...	NE.	UF.	EN.	GL.	TS.	ZM.	IL.	DK.	FX	SZ.	DL.	AK.	RN.	NG.	UK.	CK.	MV.	ES.	SEASON
Crushing period	{ From	...	...	4.6.47	27.6.47	18.6.47	4.6.47	30.4.47	11.6.47	5.6.47	30.5.47	26.5.47	5.6.47	15.5.47	14.5.4	4.6.47	26.5.47	28.6.47	15.5.47	6.6.47	6.6.4	30.4.47
	{ To	...	...	8.12.47	14.2.48	7.11.47	19.12.47	21.12.47	22.12.47	18.12.47	25.11.47	10.1.47	30.1.48	2.12.47	21.12.47	1.12.47	19.11.47	28.11.47	24.12.47	28.11.47	24.11.47	14.2.48
Tons of 2,000 lbs. Cane crushed	...	...	...	521,049	364,062	38,150	258,517	665,924	345,417	153,916	90,868	331,560	255,667	439,406	316,737	124,726	109,858	76,124	161,010	96,386	153,821	4,503,198
	Cane crushed—metric tons	...	...	472,695	330,277	34,610	234,526	604,126	313,362	139,632	82,435	300,791	231,941	398,629	287,343	113,151	99,663	69,060	146,068	87,441	139,546	4,085,297
Tons of 2,000 lbs. Sugar bagged and estimated	...	...	...	60,339	37,804	4,350	29,193	76,853	39,670	18,246	10,380	34,000	29,138	47,300	37,193	14,361	12,526	9,540	18,221	11,006	19,061	509,181
	Sugar bagged and estimated—metric tons	...	...	54,739	34,296	3,946	26,484	69,721	35,989	16,553	9,417	30,845	26,434	42,911	33,741	13,028	11,364	8,655	16,530	9,985	17,292	461,928
Tons Cane per ton of Sugar	...	...	...	8.62	9.63	8.77	8.86	8.66	8.71	8.44	8.75	9.75	8.77	9.29	8.52	8.68	8.77	7.98	8.84	8.76	8.07	8.84
Tons Cane per ton of Sugar calculated as Sugar of 96° Pol	...	...	...	8.33	9.42	8.47	8.56	8.44	8.51	8.44	8.42	9.44	8.46	9.03	8.32	8.41	8.57	7.79	8.55	8.56	7.79	8.60
Time Crushing per cent. Available Time (no allowance for cane shortage)	...	...	...	97.93	86.60	88.74	95.98	90.62	92.01	79.38	89.17	91.07	87.02	91.83	89.50	90.77	90.66	95.70	93.82	84.48	94.80	91.21
Tons of 2,000 lbs. of Cane per hour Actual Crushing	...	...	...	141.79	88.62	15.37	66.81	151.80	94.96	50:98	28.90	76.57	79.58	116.85	77.51	41.38	33.86	26.13	38.73	32.00	47.57	92.70
Tons of 2,000 lbs. White Sugar made	...	...	...	43,653	52	2,970	20,160	—	—	16,948	7,850	20,000	21,481	—	—	8,774	—	25	8,357	—	13,470	163,740
Tons of 2,000 lbs. No. 2 Grade Sugar made	...	...	...	16,685	12,329	1,380	7,917	9,001	35,171	44	2,522	155	7,594	270	12,530	5,587	9,736	5,992	8,476	11,006	5,591	151,946
Tons of 2,000 lbs. Raw Sugar made	...	...	...	—	25,423	—	1,116	67,852	4,499	—	—	13,873	63	47,030	24,663	—	2,790	3,523	1,388	—	—	192,220
Sucrose per cent. Cane	...	...	...	13.35	12.33	13.98	13.36	13.43	13.58	13.36	13.69	12.49	13.72	13.19	13.51	13.66	13.08	14.50	13.51	13.52	14.25	13.32
Fibre per cent. Cane	...	...	...	15.73	14.62	16.85	15.68	15.58	15.92	16.73	15.91	15.89	16.04	15.94	16.79	16.15	15.33	15.27	15.48	15.79	16.09	15.80
Java Ratio	...	...	...	76.51	76.46	75.19	76.89	77.60	77.00	77.83	77.60	76.92	77.39	76.76	76.30	76.14	77.89	78.69	77.16	77.18	77.07	76.99
*Milling Loss	...	...	...	3.97	5.44	6.98	6.32	5.60	6.01	4.11	5.59	5.22	5.72	7.11	5.28	5.11	5.71	5.39	6.08	6.28	5.01	5.53
*Extraction Ratio	...	...	...	29.69	44.05	49.97	47.32	41.66	44.22	30.72	40.85	41.79	41.65	53.95	39.13	37.46	43.64	36.07	45.03	46.42	35.18	41.54
Imbibition per cent. Cane	...	...	...	37.26	30.73	40.63	34.27	27.12	32.91	40.90	36.30	36.62	40.00	39.35	37.76	29.21	31.74	33.74	32.65	30.46	34.10	34.37
Extraction (Sucrose in Mixed Juice % Sucrose in Cane)	...	...	...	95.33	93.56	91.58	92.58	93.51	92.96	94.86	93.50	93.36	93.32	91.40	93.43	93.95	93.31	94.33	93.03	92.67	94.34	93.44
Sucrose per cent. Bagasse	...	...	...	1.87	2.35	3.37	2.85	2.58	2.72	2.00	2.81	2.39	2.70	3.11	2.44	2.41	2.74	2.78	2.82	2.89	2.45	2.54
Moisture per cent. Bagasse	...	...	...	50.32	53.07	47.60	51.14	50.62	51.30	48.74	46.16	50.82	48.93	52.24	50.72	49.71	48.28	44.72	50.02	50.21	47.80	50.46
Sucrose per cent. Cane lost in manufacture	...	...	...	1.83	2.14	2.65	2.15	2.06	2.29	1.98	2.33	2.33	2.38	2.57	1.97	2.25	1.88	2.17	2.28	2.30	1.94	2.16
Overall Recovery (Sucrose in Sugar % Sucrose in Cane)	...	...	...	86.25	82.64	81.03	83.89	84.64	83.10	85.14	83.01	81.85	82.69	80.54	85.45	83.52	85.63	85.05	83.12	82.93	86.43	83.73
Recovery on Mixed Juice (Sucrose in Sugar % Sucrose in Mixed Juice)	...	...	...	90.48	88.34	88.48	90.61	90.51	89.40	89.75	88.78	87.14	88.61	88.12	91.45	88.89	91.77	90.16	89.35	89.49	91.62	89.61
*Boiling House Recovery (E.S.G.)	...	...	...	90.30	87.92	88.30	90.43	90.15	89.01	—	88.65	86.90	88.49	87.79	91.05	88.64	91.37	89.76	89.14	89.28	91.44	89.31
*Boiling House Performance	...	...	...	96.58	95.51	92.86	96.23	95.99	94.69	—	94.45	93.83	94.25	93.89	96.95	94.44	98.29	95.47	94.32	95.12	96.20	95.39
Sucrose in Bagasse per cent. Sucrose in Cane (A)	...	...	...	4.67	6.44	8.42	7.42	6.49	7.04	5.14	6.50	6.64	6.68	8.60	6.57	6.05	6.69	5.67	6.97	7.33	5.66	6.56
Sucrose in Filter Cake per cent. Sucrose in Cane (B)	...	...	...	0.44	0.22	—	0.13	0.17	0.35	0.11	0.30	0.13	—	0.70	0.24	0.23	0.17	0.92	0.96	0.27	0.14	0.32
Sucrose in Molasses per cent. Sucrose in Cane (C)	...	...	...	6.79	9.84	—	6.97	—	8.27	9.37	8.54	—	—	8.81	6.86	—	6.44	—	8.23	6.85	6.27	—
Undetermined Sucrose per cent. Sucrose in Cane (D)	...	...	...	1.85	0.86	10.55	1.59	8.70	1.24	0.24	1.65	11.88	10.63	1.35	0.88	10.20	1.07	8.36	0.72	2.62	1.50	9.39
Sucrose lost in Boiling House per cent. Sucrose in Cane (B)+(C)+(D)	...	...	...	9.08	10.92	10.55	8.69	8.87	9.86	9.72	10.49	12.01	10.63	10.86	7.98	10.43	7.68	9.28	9.91	9.74	7.91	9.71
Sucrose in total Losses per cent. Sucrose in Cane (A)+(B)+(C)+(D)	...	...	...	13.75	17.36	18.97	16.11	15.36	16.90	14.86	16.99	18.65	17.31	19.46	14.55	16.48	14.37	14.95	16.88	17.07	13.57	16.27
<b>FIRST EXPRESSED JUICE.</b>																						
Brix	...	...	...	19.91	18.52	20.23	19.64	19.62	19.76	19.57	19.66	18.59	19.71	19.49	19.84	20.10	19.15	20.44	19.61	19.72	20.20	19.55
Purity (apparent)	...	...	...	87.60	87.00	91.96	88.20	88.20	89.25	87.73	89.70	87.30	89.97	88.20	89.20	89.30	87.74	90.10	89.25	88.80	91.55	88.48
<b>LAST EXPRESSED JUICE.</b>																						
Brix	...	...	...	2.05	1.50	4.02	4.05	3.16	4.02	2.16	2.40	2.38	1.93	3.40	2.89	3.45	3.99	3.46	3.06	3.27	3.12	2.88
Purity (apparent)	...	...	...	73.91	64.00	81.08	76.20	77.30	78.67	76.36	79.60	69.90	71.94	76.79	78.20	77.90	73.46	75.20	81.28	77.60	74.70	75.03
Purity drop from First Expressed Juice	...	...	...	13.69	23.00	10.88	12.00	10.90	10.58	11.35	10.10	17.40	18.03	11.41	11.00	11.40	14.28	14.90	7.97	11.20	16.85	13.45
<b>MIXED JUICE.</b>																						
Brix	...	...	...	14.24	14.26	13.60	14.30	15.51	14.84	13.92	14.11	13.54	13.92	13.63	14.35	15.58	14.39	15.09	14.39	15.03	14.92	14.44
Purity (Clerget)	...	...	...	86.03	83.42	89.07	86.90	86.80	86.96	85.42	86.70	84.40	86.75	86.03	86.78	86.70	85.04	87.00	87.94	86.70	88.98	86.24
Reducing Sugar Ratio	...	...	...	2.84	2.67	3.67	2.53	—	2.57	3.19	—	3.73	—	3.35	2.95	2.90	—	3.43	3.70	1.90	2.95	2.95
Purity drop from First Expressed Juice	...	...	...	1.57	3.58	2.89	1.30	1.40	2.29	2.31	3.00	2.90	3.22	2.17	2.42	2.60	2.70	3.10	1.31	2.10	2.57	2.24

**CLARIFIED JUICE.**

Brix ...	11.87	13.65	14.87	14.95	14.14	15.64	13.88	15.30	13.27	13.13	13.77	13.97	16.01	14.36	—	14.58	14.12	14.54	<b>13.93</b>
Purity (apparent) ...	91.20	86.01	91.30	87.51	88.90	87.92	86.59	89.39	85.20	87.66	86.83	87.30	87.70	86.47	—	89.11	87.10	89.60	<b>87.97</b>
Reducing Sugar Ratio ...	1.64	2.39	3.29	—	—	2.37	2.56	—	3.63	—	3.16	3.54	2.21	2.41	—	—	3.00	1.57	<b>2.62</b>
pH ...	7.21	7.24	—	7.03	—	7.39	—	—	7.03	7.15	7.40	7.50	—	7.43	7.50	—	—	7.23	<b>7.27</b>

**FILTER CAKE.**

Per cent. Sucrose ...	0.50	0.39	—	0.43	0.46	0.79	0.31	0.82	0.35	0.77	1.64	0.65	0.60	0.45	4.51	4.30	0.72	0.33	<b>0.84</b>
Weight per cent. Cane ...	11.78	6.86	—	3.98	5.01	5.93	5.00	5.06	4.56	—	5.68	5.12	5.41	5.00	2.95	3.02	5.00	5.80	<b>5.90</b>

**SYRUP.**

Brix ...	55.93	52.92	58.76	52.16	49.83	43.46	57.49	53.00	52.65	52.37	54.75	49.67	52.43	49.44	48.50	48.56	50.42	56.46	<b>51.89</b>
Purity (apparent) ...	91.41	85.87	90.89	88.00	83.70	87.50	86.41	89.40	85.20	68.16	87.15	87.40	87.80	86.58	—	88.78	86.80	89.59	<b>87.98</b>
Reducing Sugar Ratio ...	1.63	2.22	2.46	2.45	—	2.51	2.35	—	3.58	—	3.21	—	2.25	2.29	—	—	2.80	1.24	<b>2.45</b>
pH ...	7.19	7.03	—	6.86	—	7.04	—	—	6.74	7.06	7.10	7.20	—	7.24	—	—	—	7.02	<b>7.05</b>
Purity drop from First Expressed Juice ...	-3.81	1.13	1.07	0.20	-0.50	1.75	1.32	0.30	2.10	1.81	1.05	1.80	1.50	1.16	—	0.47	2.00	1.96	<b>0.47</b>
Purity increase from Mixed Juice ...	5.38	2.45	1.82	1.10	1.90	0.54	0.99	2.70	0.80	1.41	1.12	0.62	1.10	1.54	—	0.84	0.10	0.61	<b>1.75</b>

**FISR MASSECUITE.**

Brix ...	91.29	93.37	92.50	93.08	91.00	94.18	90.92	92.00	94.04	93.78	94.30	92.60	93.21	91.90	92.40	92.79	92.08	91.82	<b>92.66</b>
Purity (apparent) ...	90.99	81.84	87.60	87.40	88.20	84.30	86.18	86.70	82.80	84.51	81.41	82.70	86.20	86.37	80.60	83.76	84.20	85.23	<b>85.33</b>
Purity of Run-off ...	75.79	59.39	67.30	66.00	74.30	62.50	68.53	69.40	61.60	64.46	57.58	63.20	66.70	68.67	60.20	65.37	66.00	67.61	<b>66.31</b>
Cubic feet per ton of Sugar (all Masseccuites) ...	57.32	53.73	46.31	48.60	—	47.93	—	61.20	59.20	50.93	44.10	48.29	—	48.75	—	51.06	53.60	49.47	<b>51.56</b>

**SECOND MASSECUITE.**

Brix ...	95.00	96.16	93.15	97.66	95.09	98.05	93.02	94.80	97.15	93.74	98.75	95.20	95.94	96.68	94.80	94.47	95.71	95.93	<b>95.96</b>
Purity (apparent) ...	78.32	71.05	73.60	65.10	75.60	73.10	79.87	75.90	68.80	71.30	65.26	72.20	71.60	70.48	70.40	69.76	68.70	72.08	<b>72.27</b>
Purity of Run-off ...	54.34	47.66	50.20	44.40	52.10	49.70	59.85	51.90	43.20	47.59	41.49	49.70	47.20	44.65	49.40	49.93	46.50	48.99	<b>48.84</b>

**THIRD MASSECUITE.**

Brix ...	99.33	98.75	—	97.67	98.73	100.03	93.35	98.60	98.20	96.55	—	97.00	97.70	97.58	96.40	—	98.42	98.68	<b>98.19</b>
Purity (apparent) ...	67.17	60.30	—	56.10	63.30	63.60	70.68	61.70	57.10	62.70	—	61.60	60.30	55.71	60.20	—	56.30	60.59	<b>61.97</b>
Purity of Run-off ...	43.27	42.24	—	38.40	39.50	43.30	49.27	38.77	39.70	40.18	—	41.60	38.50	37.35	39.91	—	39.90	39.88	<b>41.08</b>

**JELLY.**

Brix ...	—	—	—	—	—	95.52	90.60	—	97.08	95.03	95.68	91.70	—	—	—	90.76	—	92.43	<b>94.25</b>
Purity (apparent) ...	—	—	—	—	—	47.20	49.58	—	43.70	46.64	42.00	43.40	—	—	—	50.35	—	42.98	<b>45.08</b>

**FINAL MOLASSES.**

Brix ...	87.72	91.10	82.64	84.19	92.72	92.19	88.73	91.00	91.33	90.65	89.10	85.86	93.38	89.76	88.15	84.92	89.05	85.93	<b>89.45</b>
Purity (Clerget) ...	44.06	42.24	46.70	39.30	39.50	42.70	45.01	38.77†	40.40	40.18	41.09	40.33	39.00†	37.63	39.91†	42.39†	39.70	39.88†	<b>41.10</b>
Weight per cent. Cane at 85.0° Brix ...	2.41	3.37	—	2.79	—	3.09	3.41	3.54	—	—	3.33	2.69	—	2.63	—	3.09	2.87	2.64	<b>2.96</b>

**POLARIZATION OF SUGARS.**

White Sugar ...	99.90	99.65	99.76	99.85	—	—	—	99.82	99.67	99.80	—	—	99.80	—	99.40	99.75	—	99.78	<b>99.81</b>
No 2 Grade Sugar ...	98.11	98.07	98.54	97.98	98.49	98.28	—	98.46	98.78	98.94	98.68	98.37	98.00	98.26	98.42	98.35	99.23	98.34	<b>98.36</b>
Raw Sugar ...	—	98.11	—	97.98	98.49	98.00	—	—	98.26	98.90	98.72	98.35	—	98.30	98.35	98.35	—	—	<b>98.44</b>
Average of all Sugars ...	99.40	98.10	99.38	99.27	98.49	98.25	—	99.48	99.09	99.58	98.72	98.36	99.10	98.27	98.38	99.16	99.23	99.35	<b>98.83</b>
SO <sub>2</sub> in parts per million ...	—	75	—	—	—	70	—	—	—	37	60	81	—	56	—	—	—	28	—

**VARIETIES CRUSHED.**

Uba per cent. ...	3.97	0.21	0.00	0.72	4.19	0.31	0.13	0.07	0.61	1.53	0.45	0.16	1.65	0.95	0.14	0.36	2.30	1.40	<b>1.53</b>
Co.281 per cent. ...	50.51	52.18	97.03	36.98	42.83	87.54	64.13	47.30	71.24	55.00	56.89	70.38	72.49	46.19	98.57	61.21	49.09	75.63	<b>58.69</b>
Co.290 per cent. ...	0.09	1.14	0.21	3.91	0.54	1.23	1.00	0.38	3.60	1.92	2.49	0.54	1.72	1.66	1.02	2.30	0.95	3.90	<b>1.54</b>
Co.301 per cent. ...	43.62	10.05	2.31	55.79	50.62	7.60	34.02	47.20	18.56	38.07	38.85	25.56	23.17	50.63	0.19	35.16	45.35	17.99	<b>33.11</b>
Co.331 per cent. ...	1.72	1.90	0.45	0.70	1.82	0.71	0.36	5.05	2.12	3.46	1.23	3.12	0.75	0.57	0.00	0.97	2.30	0.25	<b>1.66</b>
P.O.J.2725 per cent. ...	0.09	34.52	0.00	1.90	0.00	2.61	0.26	0.00	3.87	0.02	0.04	0.24	0.22	0.00	0.08	0.00	0.00	0.83	<b>3.46</b>

<b>FACTORY NUMBER</b> ...	<b>NE.</b>	<b>UF.</b>	<b>EN.</b>	<b>GL.</b>	<b>TS.</b>	<b>ZM.</b>	<b>IL.</b>	<b>DK.</b>	<b>FX.</b>	<b>SZ.</b>	<b>DL.</b>	<b>AK.</b>	<b>RN.</b>	<b>NG.</b>	<b>UK.</b>	<b>CK.</b>	<b>MV.</b>	<b>ES.</b>	<b>SEASON</b>
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\* Hypothetical formulae recommended by the International Society of Sugarcane Technologists.

† Apparent purity.

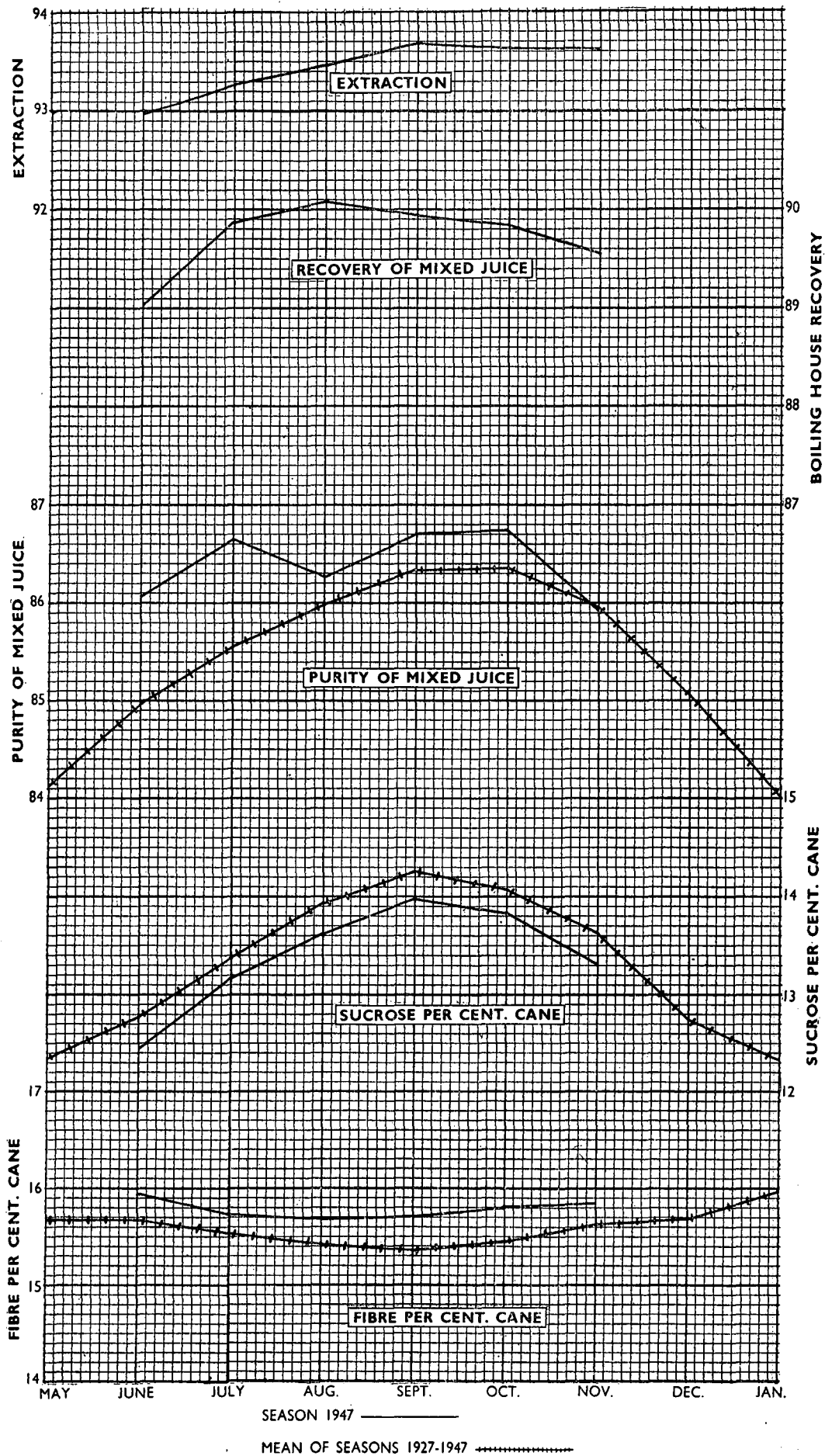
## COMPARATIVE RESULTS FOR RECENT YEARS.

COUNTRY .. .. .	NATAL											
YEAR .. .. .	1937.	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.	1946.	1947	
<b>CANE—</b>												
Per cent. Sucrose .. .. .	13.92	13.64	13.41	13.19	14.00	13.40	13.14	13.67	14.28	14.21	13.32	
Per cent. Fibre .. .. .	15.14	14.51	14.80	15.56	15.66	15.24	15.26	15.83	15.99	16.21	15.80	
<b>JUICES—</b>												
Purity of First Crusher .. .. .	88.15	88.37	88.45	87.44	87.94	88.27	88.70	88.35	88.36	88.22	88.48	
Purity of Mixed Juice .. .. .	85.60	86.36	86.46	85.34	85.67	85.96	86.56	86.19	86.23	85.86	86.24	
Purity of last Roller Juice .. .. .	76.81	76.86	77.07	76.15	77.46	76.86	76.44	75.75	75.94	75.14	75.03	
Purity of Syrup .. .. .	87.70	88.22	88.12	87.11	87.69	87.85	88.12	87.81	87.82	87.44	87.98	
Drop in purity Crusher to Mixed Juice.. .. .	2.55	2.01	1.99	2.10	2.27	2.31	2.14	2.16	2.13	2.36	2.24	
Drop in purity Crusher to last Roller .. .. .	11.34	11.51	11.38	11.29	10.48	11.41	12.26	12.60	12.42	13.08	13.45	
Drop in purity Crusher to Syrup .. .. .	0.45	0.15	0.33	0.33	0.25	0.42	0.57	0.52	0.52	0.75	0.47	
Increase in purity Mixed Juice to Syrup .. .. .	2.10	1.86	1.66	1.77	2.02	1.89	1.57	1.63	1.61	1.60	1.75	
Reducing Sugar Ratio of Mixed Juice .. .. .	3.23	3.08	3.27	3.81	3.35	3.07	3.18	3.49	3.38	3.30	2.95	
JAVA RATIO .. .. .	77.43	78.87	78.70	77.94	77.74	77.67	77.78	77.38	77.36	77.03	76.99	
<b>BAGASSE—</b>												
Per cent. Sucrose .. .. .	3.40	3.30	3.11	3.02	3.03	2.88	2.76	2.73	2.77	2.79	2.54	
Per cent. Moisture .. .. .	52.01	52.17	51.79	51.60	51.50	51.24	50.80	50.23	50.19	50.32	50.46	
<b>EXTRACTION—</b>												
Imbibition % Cane.. .. .	31.84	31.70	31.28	32.59	34.76	32.82	31.62	33.70	34.96	35.25	34.37	
Sucrose in Mixed Juice % Sucrose in Cane .. .. .	91.53	91.90	92.24	91.91	92.37	92.69	92.97	93.13	93.28	93.07	93.44	
Reduced Extraction (based on 12.5% Fibre) .. .. .	93.22	93.18	93.62	93.72	94.13	94.19	94.42	94.78	94.96	94.88	95.01	
<b>FILTER CAKE—</b>												
Per cent. Sucrose .. .. .	3.37	2.63	2.19	2.03	1.71	1.19	1.11	1.17	1.13	0.96	1.06	
Weight % Cane .. .. .	4.75	4.74	4.78	5.12	5.63	5.38	5.11	5.22	5.64	5.91	5.99	
<b>FINAL MOLASSES—</b>												
Purity .. .. .	43.69	43.12	42.67	42.91	43.45	43.24	41.81	42.37	41.98	41.75	41.10	
<b>RECOVERY—</b>												
Sucrose % Cane lost in manufacture .. .. .	2.73	2.55	2.42	2.52	2.57	2.34	2.16	2.30	2.42	2.42	2.16	
Sucrose in Sugar % Sucrose in Cane .. .. .	80.41	81.31	81.98	80.86	81.66	82.48	83.52	83.14	83.30	82.94	83.73	
Reduced Overall Recovery (12.5% Fibre, 85° pur. Mixed Juice)	81.33	81.16	81.89	82.07	82.61	82.98	83.51	83.58	83.72	83.82	84.09	
Sucrose in Sugar % Sucrose in Mixed Juice .. .. .	87.85	88.48	88.88	87.98	88.40	88.98	89.84	89.27	89.29	89.12	89.61	
Reduced Boiling House Recovery (based on 85° pur. Mxd. Juice)	87.25	87.10	87.47	87.57	87.76	88.10	88.45	88.18	88.16	88.34	88.51	
<b>YIELD—</b>												
Tons Cane per ton Sugar .. .. .	8.80	8.89	8.95	9.26	8.62	8.93	8.98	8.67	8.29	8.36	8.84	
Tons Cane per ton Sugar of 96° Pol. .. .. .	8.58	8.66	8.73	9.03	8.39	8.69	8.74	8.44	8.08	8.14	8.60	
<b>LOSSES—</b>												
Sucrose in Bagasse % Sucrose in Cane (A) .. .. .	8.47	8.10	7.76	8.09	7.63	7.31	7.03	6.87	6.72	6.93	6.56	
Sucrose in Filter Cake % Sucrose in Cane (B).. .. .	1.15	0.91	0.78	0.60	0.52	0.41	0.36	0.37	0.35	0.28	0.32	
Sucrose in Molasses % Sucrose in Cane (c) .. .. .	—	—	—	—	—	—	—	—	—	—	—	
Undetermined Sucrose % Sucrose in Cane (d).. .. .	9.97	9.68	9.48	10.43	10.18	9.80	9.09	9.62	9.63	9.85	9.39	
Sucrose lost in Boiling House % Sucrose in Cane (B)+(C)+(D)	11.12	10.59	10.26	11.03	10.70	10.21	9.45	9.99	9.98	10.13	9.71	
Sucrose in Total Losses % Sucrose in Cane (A)+(B)+(C)+(D)	19.59	18.69	18.02	19.12	18.34	17.52	16.48	16.86	16.70	17.06	16.27	
<b>SUGAR—</b>												
Average Polarization of all Sugars .. .. .	98.50	98.60	98.36	98.44	98.58	98.65	98.59	98.62	98.73	98.70	98.83	

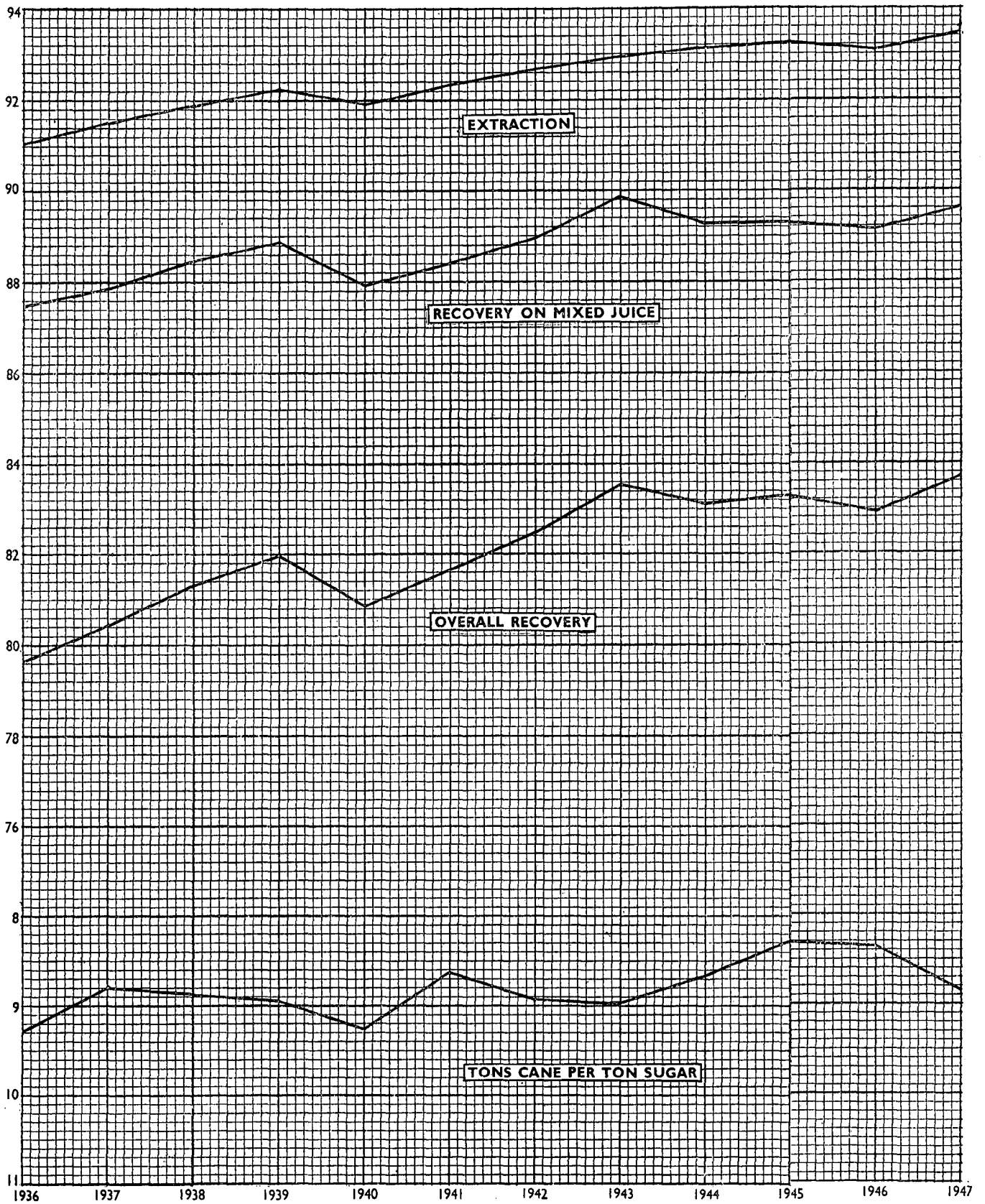
## COMPARATIVE RESULTS FOR RECENT YEARS.

COUNTRY .. .. .	MAURITIUS.		BRITISH GUIANA.		HAWAII.		QUEENSLAND.		TRINIDAD.			
	YEAR .. .. .	1945.	1946.	1945.	1946.	1945.	1946.	1945.	1946.	1945.	1946.	1947.
<b>CANE—</b>												
Per cent. Sucrose .. .. .	13.42	13.56	11.64	11.43	12.54	12.59	15.41	14.91	12.31	12.44	12.11	
Per cent. Fibre .. .. .	13.86	12.58	13.72	14.39	14.61	14.76	12.66	11.83	14.90	14.80	15.20	
<b>JUICES—</b>												
Purity of First Crusher .. .. .	87.20	88.00	82.76	82.53	86.10	86.50	89.53	84.71	83.70	84.37	83.07	
Purity of Mixed Juice .. .. .	84.50	85.20	—	80.53	83.17	83.67	—	—	81.31	82.29	81.01	
Purity of last Roller Juice .. .. .	73.70	73.60	—	75.62	71.19	71.67	76.35	74.15	71.65	73.03	72.36	
Purity of Syrup .. .. .	84.70	85.50	81.48	81.33	84.11	84.57	88.60	83.58	83.31	84.56	83.98	
Drop in purity Crusher to Mixed Juice.. .. .	2.70	2.80	—	2.00	9.93	2.83	—	—	2.39	2.08	2.06	
Drop in purity Crusher to last Roller .. .. .	13.50	14.40	—	6.91	14.91	14.83	13.18	10.56	12.05	11.34	10.71	
Drop in purity Crusher to Syrup .. .. .	2.50	2.50	1.28	1.20	1.99	1.93	0.93	1.13	0.39	-0.19	-0.91	
Increase in purity Mixed Juice to Syrup .. .. .	0.20	0.30	—	0.80	0.94	0.90	—	—	2.00	2.27	2.97	
Reducing Sugar Ratio of Mixed Juice .. .. .	4.00	4.10	—	8.73	—	—	—	—	8.60	8.24	9.03	
<b>JAVA RATIO .. .. .</b>	78.92	79.72	79.03	78.83	—	—	82.35	83.53	76.24	77.40	76.79	
<b>BAGASSE—</b>												
Per cent. Sucrose .. .. .	2.93	2.82	3.52	3.27	2.13	2.03	2.61	2.78	2.47	2.49	2.52	
Per cent. Moisture .. .. .	45.60	44.80	46.53	46.37	43.50	42.80	48.84	50.15	47.92	48.15	48.12	
<b>EXTRACTION—</b>												
Imbibition % Cane.. .. .	22.40	21.60	20.28	22.52	34.62	35.37	—	—	23.55	23.97	21.96	
Sucrose in Mixed Juice % Sucrose in Cane .. .. .	94.00	94.90	91.49	91.63	95.80	96.38	95.51	95.31	93.84	93.87	93.47	
Reduced Extraction (based on 12.5% Fibre) .. .. .	94.60	94.90	92.35	92.89	96.49	97.01	95.56	94.93	94.97	94.96	94.80	
<b>FILTER CAKE—</b>												
Per cent. Sucrose .. .. .	8.00	8.10	5.53	5.61	1.18	1.48	3.49	3.38	1.95	1.99	1.98	
Weight % Cane .. .. .	1.80	1.61	1.89	2.05	5.87	5.98	3.56	3.55	2.71	2.63	2.65	
<b>FINAL MOLASSES—</b>												
Purity .. .. .	39.70	39.20	—	33.09	38.90†	39.83†	47.88	46.42	33.23	31.59	31.38	
<b>RECOVERY—</b>												
Sucrose % Cane lost in manufacture .. .. .	2.45	2.21	2.57	2.42	1.80	1.83	2.36	2.60	2.05	1.78	1.98	
Sucrose in Sugar % Sucrose in Cane .. .. .	81.70	83.70	77.90	78.86	85.61	85.49	84.69	82.57	83.33	85.67	83.68	
Reduced Overall Recovery (12.5% Fibre, 85° pur. Mixed Juice)	82.59	83.51	—	83.42	87.55	87.09	—	—	86.80	88.15	87.33	
Sucrose in Sugar % Sucrose in Mixed Juice .. .. .	86.80	88.20	85.15	86.04	89.37	88.69	88.67	86.67	88.80	91.26	89.53	
Reduced Boiling House Recovery (based on 85° pur. Mxd. Juice)	87.30	88.00	—	89.81	90.73	89.77	—	—	91.40	92.83	92.12	
<b>YIELD—</b>												
Tons Cane per ton Sugar .. .. .	8.98	8.67	10.59	10.75	9.08	9.06	7.58	8.02	9.46	9.09	9.56	
Tons Cane per ton Sugar of 96° Pol. .. .. .	8.75	8.46	10.54	10.71	8.94	8.92	7.36	7.80	9.36	9.01	9.47	
<b>LOSSES—</b>												
Sucrose in Bagasse % Sucrose in Cane (A) .. .. .	6.00	5.10	8.51	8.37	4.20	3.62	4.49	4.69	6.16	6.13	6.53	
Sucrose in Filter Cake % Sucrose in Cane (B).. .. .	1.07	0.96	0.90	1.00	0.55	0.70	0.65	0.68	0.43	0.42	0.43	
Sucrose in Molasses % Sucrose in Cane (C) .. .. .	—	—	—	—	9.19	9.44	6.59	8.93	—	—	—	
Undetermined Sucrose % Sucrose in Cane (D).. .. .	11.23	10.24	12.69	11.77	0.45	0.75	3.58	3.13	10.08	7.78	9.36	
Sucrose lost in Boiling House % Sucrose in Cane (B)+(C)+(D)	12.30	11.20	13.59	12.77	10.19	10.89	10.82	12.74	10.51	8.20	9.79	
Sucrose in Total Losses % Sucrose in Cane (A)+(B)+(C)+(D)	18.30	16.30	22.10	21.14	14.39	14.51	15.31	17.43	16.67	14.33	16.32	
<b>SUGAR—</b>												
Average Polarization of all Sugars .. .. .	98.50	98.40	96.44	96.40	97.49	97.53	98.87	98.72	97.02	96.81	96.88	

† Refractometer sucrose Purity



EXTRACTION AND RECOVERY FIGURES 1936-47



# REPORT ON WEATHER CONDITIONS FOR THE YEAR 1947

## General.

In contrast to the previous three years, which marked one of the driest periods on record, 1947 had a rainfall somewhat above the average and on the whole it was very favourably distributed with abundant rains in February and November. The mean temperature during February was also well above normal which further facilitated good cane growth. The average mean temperature for the whole year was about normal but July was one of the coldest months on record and in many districts, particularly so along the North Coast and Zululand, fairly severe frosts occurred necessitating the cutting of rather immature cane.

## Rainfalls by Districts.

Annual rainfall returns are again given for 44 recording stations, but certain minor adjustments have been found necessary in the averages of some of the earlier years, and the return from the Umzumbi district for 1947 is now supplied by Mr. A. H. G. Blamey whose rainfall appears somewhat higher than that recorded by the late Mrs. M. G. Lomas, although this will not affect any of the averages appreciably.

The average rainfall for all the recording stations for 1947 is 44.83 inches compared with the 1929 to 1947 average of 41.08 inches, or 109.1 per cent. of the mean. Ten stations, 4 on the North Coast and 6 in the Zululand area, however, had rainfalls below their own 19-year averages.

It has been remarked in last year's report, that the drought conditions in 1944 and 1945 were progressively worse from North to South. In 1946 however, the position was reversed Zululand being most affected by the drought and the South Coast least, although even here every centre had a rainfall below the average. This year the South Coast was again most favoured. All the stations in this area now had rainfalls well above their averages, and the average fall for this area, 51.40 inches was 23.3 per cent. above normal. Illovo had a rainfall of 53.42 inches or 15.02 inches, i.e., 39.1 per cent above normal. Umbogintwini with 56.69 inches had the highest rainfall for the year of all recording stations. Particularly heavy rains were experienced in this area during November and the storm of the 12th and 13th of this month resulted in precipitations between 4 and 6 inches in a single day at many stations. Thus at Park Rynie 5.91 inches of rain were recorded on the 13th and of a total rainfall of 10.82 inches for the month, 10.42 inches fell between the 13th and 26th.

The mean of the 21 stations between the Umgeni and the Tugela rivers was 42.19 inches or 106.0 per cent of the 1929 to 1947 average. There were 4

recording stations Mount Edgecombe (Experiment Station), Blackburn, La Mercy and Umhlali with rainfalls below their averages. It will be noticed that the two first named stations are in the Mount Edgecombe area which is normally a dry one. Blackburn had the lowest rainfall on the North Coast, 35.50 inches, and La Mercy showed the greatest relative deficiency, 95.4 per cent. of normal with 39.50 inches. The highest rainfall, 47.95 inches, was recorded at Kearsney.

As shown in the following table Zululand had an average rainfall of 44.55 inches which is less than 5 per cent. above normal.

	Average rainfall for 1947 in inches.	Average for years 1929-1947 inclusive in inches.	1947 rainfall as per cent. of average.
South Coast : mean of 9 stations south of the Umgeni River ... ..	51.40	41.68	123.3
North Coast : mean of 21 stations between the Umgeni and the Tugela ... ..	42.19	39.80	106.0
Zululand : mean of 14 stations north of the Tugela River.	44.55	42.60	104.6
Total averages ... ..	44.83	41.08	109.1

Out of 14 recording stations, 6 had rainfalls below their respective averages and at Riverview, the most northerly station only 28.06 inches or 80.3 per cent. of its average rainfall was recorded. This was the only station of the 44 in the sugar belt with a total rainfall of less than 35 inches. The year before its rainfall was only 22.83 inches. There were six stations in the Zululand area with rainfalls over 50 inches. Felixton with 56.43 inches had the highest fall, followed by Eshowe, two Empangeni stations, Kulu Halt and Mtunzini.

## Experiment Station Rainfall.

The rainfall for the Experiment Station, 36.74 inches is below the 1929/1947 average as referred to above, but it is higher than our average since 1926 which is now 36.42 inches.

The distribution was on the whole very favourable. The rainfall during November and December 1946, was slightly below the average, but January 1947, with a fall of 4.13 inches was above normal and the excellent rains of February measured 7.85 inches or 167 per cent. of the normal for this month. The total rain up to the end of February was 41.8 per cent. above the average and with temperatures particularly for the last named month above normal, very good growing conditions prevailed for sugarcane. March had a rainfall below normal, but it was not until the end of May that the aggregate for the year fell below normal. May had only 0.13 inches of rain which was the second lowest total ever to be recorded

for this month at the Experiment Station. During June the high total of 3.18 inches of rain was recorded at this station and 2.19 inches fell on the 2nd which was the highest fall for a single day during the year. The rainfalls for the next four months were below the averages and although October had 14 rainy days no good soaking rains fell until November when a total of 6.50 inches was recorded and conditions for sugarcane growth became very favourable. These conditions continued during December although the rainfall for this month was somewhat below the average.

The year 1947 is remarkable for the high number of raindays, 131. This total has only been exceeded in 1939 when it was 134 and the average from 1926 to 1947 is only 116. The average rainfall was, however, very little above normal so that the rainfall per rainday 0.280 inches is very low. We had, however, two days with rainfalls higher than 2 inches and 9 days with falls between 1-2 inches. November had three days with falls higher than one inch, the highest being on November 13th with 2.03 inches. January, February and December each had two days with rainfalls of an inch or better and April one.

Following is the Experiment Station rainfall by months compared with the average of the past 22 years.

	1947.					Mean 1926-1947 inclusive.					
	Total for month inches.	Aggregate from 1st January	Per cent. of average aggregate.	No. of rain days.	Average rainfall per rain day in ins.	Total for month in ins.	Aggregate for 1st January.	No. of rain days.	Average rainfall per day.	Per cent. of wet days.	Average rainfall per rain day.
January ...	4.13	4.13	109.8	13	0.318	3.76	3.76	14	0.121	45	0.261
February ...	7.85	11.98	141.8	17	0.462	4.69	8.45	12	0.166	42	0.39
March ...	3.54	15.52	114.2	15	0.236	5.14	13.59	12	0.166	39	0.42
April... ..	2.71	18.23	113.4	13	0.208	2.48	16.07	8	0.083	27	0.31
May ... ..	0.13	18.36	99.7	4	0.033	2.34	18.41	5	0.075	16	0.46
June ... ..	3.18	21.54	105.6	8	0.398	1.98	20.39	5	0.066	17	0.39
July ... ..	0.47	22.01	101.1	5	0.094	1.37	21.76	5	0.044	16	0.274
August ...	1.11	23.12	100.6	5	0.222	1.23	22.99	5	0.040	16	0.246
September .	1.49	24.61	98.5	9	0.166	2.00	24.99	8	0.067	27	0.250
October ...	1.96	26.57	94.7	14	0.140	3.08	28.07	14	0.099	45	0.220
November .	6.50	33.07	102.5	15	0.433	4.20	32.27	14	0.140	47	0.300
December...	3.67	36.74	100.9	13	0.282	4.15	36.42	15	0.134	48	0.277
Total... ..		36.74	100.9	131	0.280		36.42	116	0.997	32	0.314

Table of Rainfall and Mean Temperature.

Year.	Rainfall in inches.	Per cent. of present mean.	Number of rain days.	Average fall per rain day.	Mean shade temperature.	Year.	Rainfall in inches.	Per cent. of present mean.	Number of rain days.	Average fall per rain day.	Mean shade temperature.
1926 ...	25.42	69.80	116	0.219	—	1938 ...	37.97	104.26	117	0.325	68.7
1927 ...	42.46	116.58	128	0.332	—	1939 ...	42.87	117.71	134	0.320	68.1
1928 ...	27.56	75.67	114	0.242	67.8	1940 ...	37.31	102.44	108	0.345	69.9
1929 ...	43.83	120.35	129	0.340	67.5	1941 ...	24.35	66.86	107	0.227	69.9
1930 ...	30.03	82.45	123	0.244	67.8	1942 ...	45.41	124.68	116	0.391	69.4
1931 ...	28.01	76.91	112	0.250	68.8	1943 ...	51.32	140.91	124	0.414	68.2
1932 ...	41.36	113.56	126	0.328	69.2	1944 ...	30.32	83.25	105	0.289	69.5
1933 ...	27.14	74.52	109	0.249	68.9	1945 ...	28.50	78.25	105	0.271	68.9
1934 ...	39.42	108.24	127	0.310	68.9	1946 ...	29.55	81.14	110	0.269	69.4
1935 ...	53.25	146.21	111	0.480	66.8	1947 ...	36.74	100.88	131	0.280	68.9
1936 ...	45.36	124.55	110	0.412	67.9						
1937 ...	33.21	91.19	101	0.329	68.8	Means	36.42	100.00	116	0.314	68.7

#### Temperatures.

The mean temperature for 1947 was 68.9°F which is 0.2° above the 20-year average of 68.7° for the Experiment Station.

February was as usual the warmest month and the mean temperature of 75.8° was 1.2° above the

February normal. July was the coldest month, also as usual, and the mean temperature of 59.7° was 2.1° below the average of 61.8° for this month. In fact it was the lowest mean monthly temperature since August, 1935 when the mean was 59.4°. These were the only two mean monthly tempera-

tures below 60.0° recorded at the Experiment Station since 1928 when our records started.

The mean minimum screen temperature was 49.1° which is an absolute record for any month. The previous lowest was 50.8° on three occasions. There were two unusually cold mornings during the year on the 11th and 17th of July, when the screen minimum temperatures were respectively 41.5° and 41°. Only slight frosts were experienced at the Experiment Station but reports from other centres indicated considerable damage due to frost. Thus from Eteza very heavy frost was reported on six mornings and slighter but visible frost on many others.

There was the usual monthly sequence of mean temperatures, except that August, following the very cold July, was surprisingly hot. Its mean temperature 66.1° was 2.5° above the average and was slightly higher than that for September. November although following the normal sequence was also well above normal and only 0.1° lower than December.

The highest shade temperature was 100° on August 31st and the lowest 41° on July 17th. The latter temperature was only reached once before on 9th July, 1934. The lowest grass minimum 33° on July 17th is also equal to the lowest ever recorded here also on 9th July, 1934.

The mean daily range of temperature was below the average probably as a result of the large number of rainy days.

The screen temperatures by months in degrees Fahrenheit are as follows:—

	1947.				1928-1947 inclusive.			
	Maxi- mum.	Mini- mum.	Mean.	Daily range.	Maxi- mum.	Mini- mum.	Mean.	Daily range.
Jan. ...	81.5	67.4	74.4	14.1	81.2	67.0	74.2	14.2
Feb. ...	82.9	68.6	75.8	14.3	81.8	67.4	74.6	14.4
Mar. ...	79.5	65.5	72.5	14.0	80.3	65.7	73.0	14.6
April ...	77.7	63.4	70.6	14.3	78.3	62.1	70.2	16.2
May ...	76.4	56.8	66.6	19.6	75.8	56.8	66.4	19.0
June ...	72.2	53.6	62.9	18.6	72.6	52.6	62.6	20.0
July ...	70.3	49.1	59.7	21.2	71.8	51.7	61.8	20.1
Aug. ...	77.1	55.2	66.1	21.9	73.1	53.9	63.5	19.2
Sept. ...	74.1	57.9	66.0	16.2	74.4	57.1	65.8	17.3
Oct. ...	75.6	60.9	68.2	14.7	76.1	60.7	68.4	15.4
Nov. ...	79.2	65.1	72.2	14.1	78.2	63.4	70.8	14.8
Dec. ...	79.8	64.8	72.3	15.0	80.3	65.6	73.0	14.7
Means	77.2	60.7	68.9	16.5	77.0	60.3	68.7	16.7

A grass thermometer was not available for the last two months of the year. The grass minimum temperature for July, 42.4°, is the lowest ever recorded here.

The average earth thermometer readings for the year, 71.8°, 72.8° and 73.1° for 1, 2 and 4 feet are

just below the 13-year averages of 71.9°, 73.0° and 73.7°. The lowest monthly averages were recorded in July with 61.1°, 63.9° and 66.7° for the various depths.

The first mentioned temperature is an absolute minimum for the Experiment Station for any month. Cane measurements carried out at the Experiment Station showed that cane growth came to a standstill during this period.

#### Atmospheric Conditions.

The mean true atmospheric pressure for the year was 29.75 inches or practically the same as the year before, 29.76 inches. June had the highest monthly average 29.88 inches and January the lowest 29.62 inches. The highest reading for the year was 30.31 inches on September 27th and the lowest on the afternoon of December 15th when it was 29.21 inches.

The mean relative atmospheric humidity per cent. of saturation was 74.2 at 8.30 a.m. and 63.0 per cent. at 1 p.m. which are above normal, the average over the past twenty and nineteen years being 72.9 and 62.8 respectively at 8.30 a.m. and 1 p.m.

The total evaporation from a free water surface was not taken during September and October when the tank was removed for repairs, but the estimated total for the year is 46.02 inches which is just under normal. As usual January with 5.73 inches and December with 5.31 inches had the highest monthly evaporations, and June with 1.85 inches the lowest.

The total hours of sunshine during the year were 2,309.8 hours or 52.7 per cent. of the total hours of daylight which is not much below the 20-year average of 2,377.6 considering the abnormally high number of rain days we had. July and August were the two sunniest months with 230.3 and 240.1 hours of sunshine, or 71.4 and 70.1 per cent. of total daylight respectively. November had only 166.8 hours of sunshine or 41.0 sunshine per cent. total daylight.

A feature of this year's weather conditions was the almost complete absence of hot north-west berg winds. On November the 13th a strong south-west gale was blowing at the Experiment Station. This was the strongest wind experienced here for many years and on the South Coast appreciable structural damage was done.

#### Conclusions.

Unlike the preceding three years 1947 had a rainfall above the average and it was favourably distributed. The average temperature was also slightly above normal. Hot weather and excellent

rains in February did much to improve the 1947 sugarcane crop and the prospects for 1948 are even better due largely to the very good rains that fell in November.

A frost in July affected the North Coast and Zululand most and the South Coast suffered most damage from a gale in November. In other respects the year was quite normal.

Experiment Station,  
South African Sugar Association,  
Mount Edgecombe,  
March, 1948.

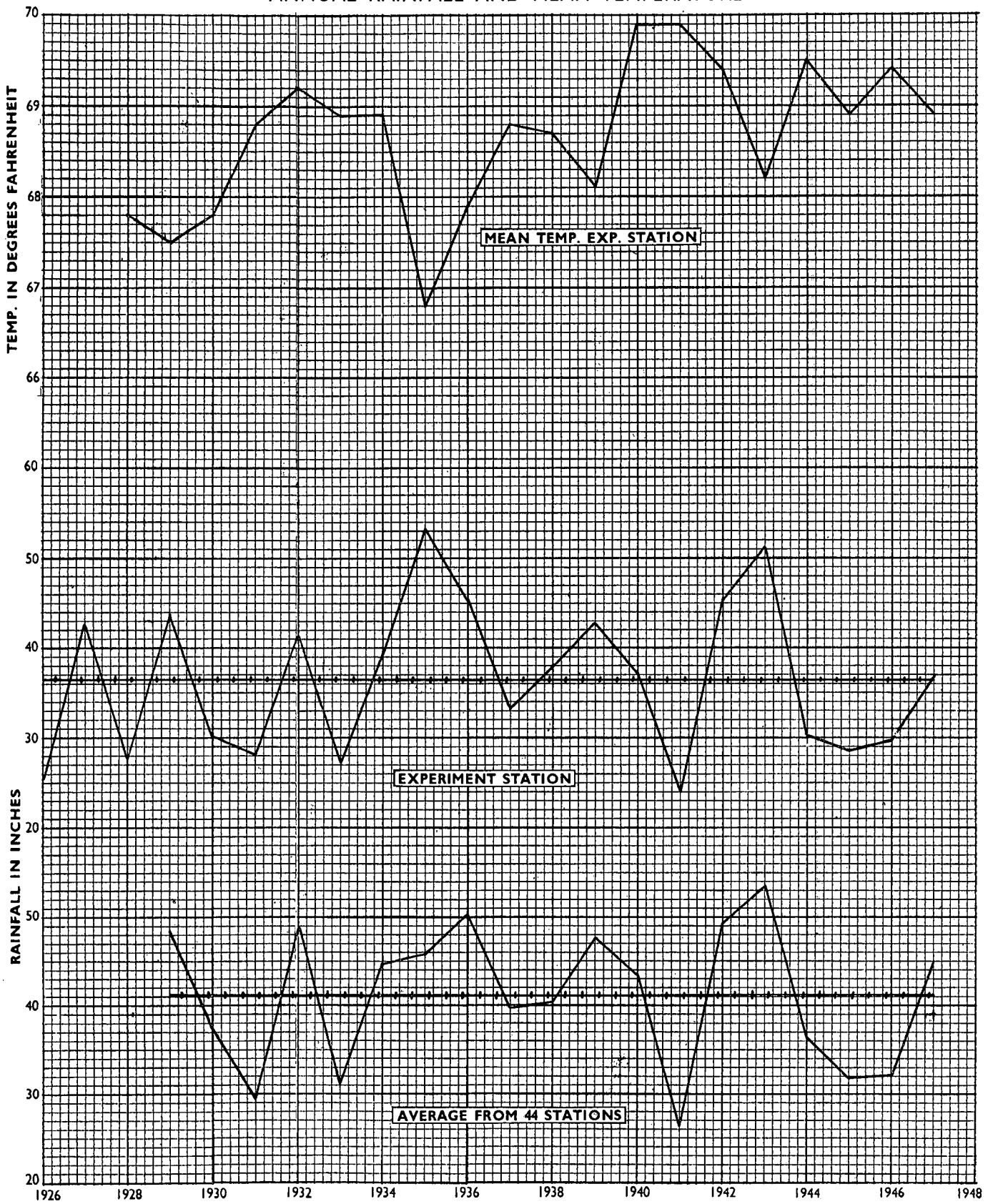
ANNUAL RAINFALL 1929-1947.

Station.	Recorder.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	1936.	1937.	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.	1946.	1947.	Average
Port Shepstone ..	Lightkeeper, S.A.R. & H. . . .	61.89	42.82	51.06	49.71	40.58	38.55	42.01	49.63	38.25	42.52	44.08	27.66	23.12	54.16	51.65	31.24	33.43	37.14	48.19	42.50
Umzumbe .. . .	A. H. G. Blamey* . . . . .	56.28	34.95	40.31	42.04	36.35	37.50	43.66	51.24	40.63	42.82	42.86	27.74	23.78	51.98	44.86	26.93	31.51	36.61	47.78	39.99
Esperanza .. . .	Reynolds Bros., Ltd.** . . . .	57.47	42.10	36.13	38.36	32.81	46.13	43.70	44.74	36.14	41.41	47.31	30.48	19.49	44.29	63.64	39.09	35.30	31.16	55.66	41.34
Renishaw. . . . .	Crookes Bros., Ltd. . . . .	58.24	37.22	31.86	41.56	34.43	42.17	42.69	46.10	44.40	36.13	46.00	31.83	25.16	43.33	46.74	35.26	24.35	29.63	49.09	39.32
Park Rynie .. . .	Ellingham Estate . . . . .	58.84	39.25	38.94	44.14	37.71	46.53	47.89	52.85	46.10	43.22	56.25	34.46	27.40	47.14	51.25	40.16	31.78	35.30	49.54	43.62
Illovo .. . . .	Illovo Sugar Estates, Ltd. . . .	49.22	38.12	31.54	36.89	26.94	41.00	39.03	51.65	30.79	43.09	42.22	30.10	26.17	56.12	43.40	30.49	28.85	30.67	53.42	38.40
Umbogintwini ..	African Explosives & Industries, Ltd.	47.88	42.10	32.42	39.67	36.43	45.59	52.87	53.09	34.78	41.94	48.53	31.26	28.18	51.89	49.16	37.75	31.74	34.91	56.69	41.94
Durban (Berea) ..	Natal Herbarium . . . . .	46.87	38.93	31.51	44.74	31.61	42.28	58.08	46.71	36.09	41.23	47.26	38.35	30.06	51.12	52.97	31.30	28.91	32.49	49.68	41.06
Durban (Point) ..	S.A. Railways & Harbours . . . .	59.97	38.92	43.68	49.45	34.42	47.45	60.93	56.85	45.84	41.89	62.57	40.99	34.95	58.91	61.86	34.04	28.63	38.91	52.55	46.99
Effingham .. . .	Natal Estates, Ltd. . . . .	33.52	26.17	21.33	30.56	19.63	30.57	46.86	42.28	28.25	32.40	35.33	26.75	22.15	42.90	43.83	29.80	29.03	28.85	44.77	32.37
Westbrook .. . .	Natal Estates, Ltd. . . . .	46.97	33.01	27.03	45.62	31.18	38.49	55.06	52.14	33.56	41.68	45.75	40.05	29.09	52.43	60.15	37.04	33.78	31.18	40.87	40.79
Milkwood Kraal ..	Natal Estates, Ltd. . . . .	35.60	26.90	23.17	33.05	22.15	31.96	43.07	36.45	23.49	34.98	36.24	34.97	23.02	45.03	48.46	27.35	26.70	27.83	40.99	32.70
Mount Edgcombe ..	Natal Estates, Ltd. (Mill) . . . .	48.30	34.52	32.98	40.19	30.94	40.03	57.41	49.60	36.55	43.13	46.06	40.23	28.34	51.66	55.40	32.66	30.31	30.66	40.93	40.52
Mount Edgcombe ..	S.A.S.A. Experiment Station . . . .	43.83	30.03	28.01	41.36	27.14	39.42	53.25	45.36	33.21	37.97	42.87	37.31	24.35	45.41	51.32	30.32	28.50	29.55	36.74	37.16
Cornubia .. . . .	Natal Estates, Ltd. . . . .	46.22	33.45	27.85	42.53	29.98	40.25	59.21	52.27	40.37	44.84	51.66	42.80	30.66	53.17	59.51	35.15	34.78	29.25	43.42	41.97
Burnside .. . . .	Natal Estates, Ltd. . . . .	46.01	31.78	27.01	38.79	27.55	39.61	53.26	47.48	34.01	39.76	48.07	44.91	29.54	50.68	56.39	33.71	32.29	31.81	42.45	39.77
Blackburn .. . .	Natal Estates, Ltd. . . . .	48.97	34.09	23.78	37.52	24.94	33.94	48.78	43.67	34.70	35.45	49.84	36.99	22.68	43.48	51.96	29.73	28.49	27.98	35.50	36.45
Beach .. . . .	Natal Estates, Ltd. . . . .	56.49	39.25	30.15	51.64	31.53	43.18	59.09	49.19	38.62	44.24	54.88	40.81	28.76	48.74	49.53	33.07	37.26	32.79	48.20	42.76
Saccharine .. . .	Natal Estates, Ltd. . . . .	48.73	32.82	29.76	38.37	29.22	42.38	51.95	55.98	32.07	36.91	42.05	38.41	23.73	46.57	51.70	34.14	32.04	28.83	40.84	38.76
Ottawa .. . . .	Natal Estates, Ltd. . . . .	40.38	29.21	24.49	34.72	28.72	39.08	47.55	44.66	47.32	37.83	41.95	39.18	22.16	52.57	55.55	32.65	27.16	31.69	40.03	37.72
La Mercy .. . . .	Gersigny Bros. . . . .	53.37	36.40	29.26	56.65	31.16	37.64	56.27	45.65	35.17	45.36	49.41	42.63	25.26	53.89	50.86	32.34	31.39	34.87	39.50	41.42
Tongaat .. . . .	Tongaat Sugar Co., Ltd. . . . .	50.55	34.26	29.88	48.79	26.59	38.44	47.54	50.87	35.61	40.85	44.67	40.87	22.72	55.67	53.08	31.37	30.75	33.90	39.84	39.80
Sinembe .. . . .	H. C. Heenan . . . . .	49.78	37.02	30.36	52.71	38.64	49.99	41.84	56.80	35.17	42.07	45.80	43.53	25.25	51.64	50.42	34.15	30.86	33.48	47.21	41.93
Umhlali .. . . .	G. P. Ladlau . . . . .	50.38	40.07	20.09	49.85	35.13	41.20	53.61	56.87	40.29	56.88	58.14	39.72	29.49	54.74	52.60	37.16	34.25	37.12	43.93	44.22
Chaka's Kraal ..	Waldene Sugar Estate . . . . .	42.78	33.06	22.52	43.09	30.14	35.09	43.38	46.74	32.87	38.40	42.27	30.81	21.78	47.42	44.33	31.01	32.15	30.67	39.01	36.18
Tinley Manor .. .	Sir J. L. Hulett & Sons, Ltd. . . .	51.36	33.22	30.97	47.44	35.44	41.20	50.97	56.83	38.38	46.35	48.93	41.16	24.37	47.73	47.78	32.49	27.46	32.59	45.08	41.04
Riet Valley .. . .	H. E. Essery . . . . .	50.07	35.65	25.38	54.64	37.98	47.70	44.33	65.99	35.28	41.96	51.39	45.90	27.37	54.75	61.35	39.17	36.31	33.68	45.75	43.93
Keareney .. . . .	Sir J. L. Hulett & Sons, Ltd. . . .	49.20	43.36	26.31	55.49	37.45	53.57	38.42	64.34	39.73	44.30	47.46	50.80	31.91	49.74	58.02	37.05	32.67	39.18	47.95	44.58
Darnall .. . . .	Mrs. Mann . . . . .	40.75	37.36	23.03	44.14	25.45	49.91	44.04	56.32	40.68	45.56	44.65	48.48	25.49	48.19	54.84	43.26	34.88	32.28	46.62	41.36
Darnall .. . . .	Sir J. L. Hulett & Sons, Ltd. . . .	42.38	40.63	24.31	52.27	29.22	48.24	40.23	52.09	39.75	43.74	43.80	47.10	25.27	46.02	52.45	38.59	28.46	30.58	41.27	40.34
Mandini .. . . .	St. Andrews Estate . . . . .	42.05	40.41	24.40	50.98	27.41	55.34	45.88	51.25	35.34	40.86	38.34	41.01	26.70	48.91	56.67	41.28	30.24	30.41	47.18	40.77
Amatikulu .. . .	Sir J. L. Hulett & Sons, Ltd. . . .	42.23	40.80	21.09	47.16	29.86	47.66	43.41	47.86	35.38	37.24	47.53	50.40	27.80	48.87	55.37	39.08	28.45	26.34	38.61	39.74
Gingindlovu .. .	P. C. Lilburn . . . . .	42.42	47.72	24.60	53.85	33.08	50.91	53.16	52.68	39.62	40.10	54.12	53.75	30.35	56.40	62.73	47.02	36.28	29.98	42.55	44.81
Mtunzini .. . . .	R. D. Shaw . . . . .	42.57	48.99	32.92	61.97	40.03	59.28	53.02	55.62	43.57	44.23	65.11	62.16	39.08	60.31	66.31	53.71	50.98	39.63	50.17	51.03
Esihowe .. . . .	District Forest Officer . . . . .	49.97	44.26	30.36	65.05	47.31	71.85	46.18	66.61	47.56	46.40	52.55	70.67	36.57	47.44	68.80	50.17	45.40	41.57	52.04	51.62
Felixton .. . . .	Sir J. L. Hulett & Sons, Ltd. . . .	59.39	44.57	38.03	69.08	31.43	58.72	50.16	58.71	51.96	38.62	54.99	61.15	30.08	53.45	52.48	48.62	37.62	39.40	56.43	49.21
Empangeni West ..	W. H. Simpson . . . . .	51.61	36.82	20.56	48.32	22.92	41.08	36.40	36.62	39.10	32.93	47.01	41.24	24.50	40.74	48.47	38.05	23.64	25.00	37.62	36.71
Empangeni .. . .	Morris Bros. . . . .	46.05	33.56	30.35	49.58	27.72	45.60	37.28	47.54	45.31	35.99	52.02	53.46	26.79	48.11	54.13	44.67	33.98	33.13	50.85	41.90
Empangeni .. . .	Zululand Sugar Millers & Plant- ers.	48.95	33.80	31.98	55.34	29.55	48.72	38.18	49.48	47.87	33.49	51.79	53.11	24.54	45.06	50.05	39.56	30.78	33.21	50.88	41.91
Kulu Halt .. . . .	S. B. Forrest . . . . .	51.94	37.44	25.96	66.55	30.15	48.26	35.03	48.39	56.80	36.95	52.91	57.61	23.97	52.28	55.73	43.02	32.45	31.75	50.74	44.10
Mposa .. . . .	W. Springorum . . . . .	45.80	37.83	24.29	59.33	25.43	46.45	29.59	46.81	51.80	33.08	47.63	51.62	20.58	43.56	44.64	34.04	29.49	28.05	42.86	39.10
Kwambonambi ..	S. Larsen . . . . .	55.97	42.99	28.14	64.34	29.35	64.21	34.27	41.64	49.37	33.42	42.91	53.82	20.81	47.01	50.75	36.50	28.38	27.44	39.43	41.62
Eteza .. . . .	Haworth Bros. . . . .	41.27	36.86	31.27	59.43	29.85	44.05	25.73	42.21	49.95	35.98	41.26	61.81	22.04	41.15	54.36	33.55	26.90	24.47	36.29	38.87
Riverview .. . .	Umfolozo Co-op. Sugar Planters, Ltd.	34.65	38.45	22.38	51.29	25.05	37.36	21.44	35.98	39.45	36.33	39.93	54.95	16.45	38.92	50.42	36.11	33.97	22.83	28.06	34.95
		48.34	37.30	29.33	48.37	31.15	44.74	45.83	50.13	39.57	40.33	47.68	43.48	26.18	49.40	53.31	36.45	31.99	32.02	44.83	41.08

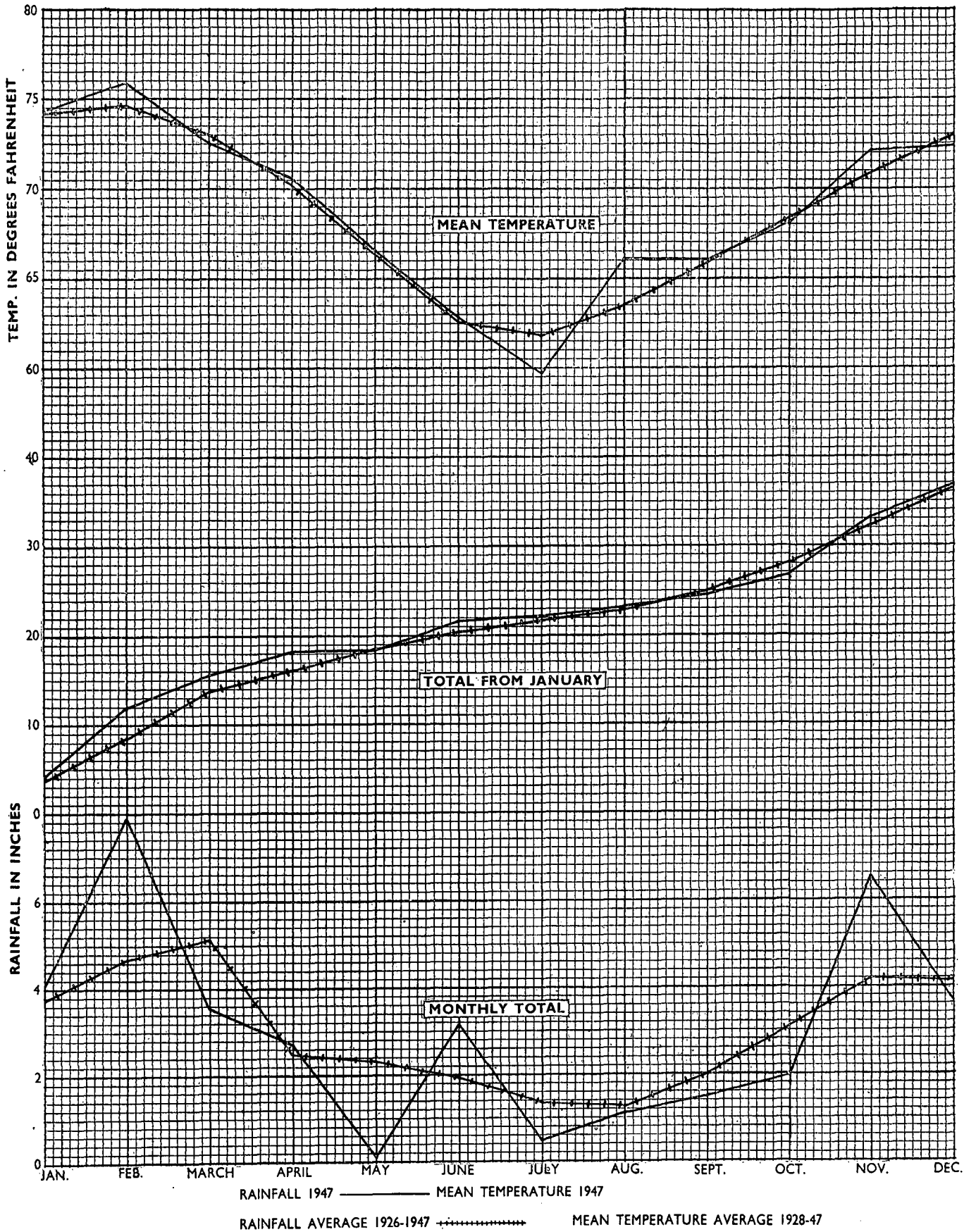
\* Previous to 1947 rainfall records obtained from the late Mrs. M. G. Lomas.

\*\*Same station but records now kept by Reynolds Bros., Ltd.

### ANNUAL RAINFALL AND MEAN TEMPERATURE



### RAINFALL AND TEMPERATURE AT THE EXPERIMENT STATION BY MONTHS



## APPENDIX—SUGARCANE CROP STATISTICS, 1946-47

According to the "Special Census of Sugarcane Plantations, 1946-47—European Planters only," 3,716,192 tons of 2,000 lbs. of sugarcane were harvested from 168,984 acres. The average yield of cane per acre was therefore only 21.99 tons or the lowest since 1936 when it was 21.27 tons per acre. Even in the drought stricken year 1941 the yield was better at 22.36 tons per acre. The average yields for the years 1942 to 1946 were as follows:— 25.49, 30.87, 29.08, 25.70 and 21.99 tons per acre. During the last 6 years only the 1943 crop was not affected by drought and the 1946 crop was the worst as it was most adversely affected by the cumulative effects of the drought cycle extending from November 1944 to 1946.

The yield of cane or the areas harvested by non-Europeans are not available, but the total crop handled by the mills during the 1946-47 season amounted to 3,990,017 tons of cane, so that the non-Europeans were responsible for 273,825 tons of cane or 6.86 per cent of the total crop. This represents a drop in the percentage crop harvested by non-Europeans, their average being generally about 8.75 per cent of the total crop.

Of interest this year is the fact that for the first time a return is shown for the Piet Retief district, which represents the Pongola area and is not in the Province of Natal but in the Transvaal. The yield obtained from this area, 39.16 tons per acre is excellent and by far the highest for any individual district, but it should be considered as an individual return only and not necessarily representative of the area for only one planter sent in a return and more than 91 per cent. of the cane cut was plant cane and the rest first ratoon.

Another point of interest in the latest return is that Co.331 is now given as a separate variety and its average yield 27.73 tons per acre is only surpassed by the P.O.J. varieties, which yielded 29.44 tons per acre. The P.O.J. varieties are, however, almost entirely grown on alluvial flats where better yields can be expected from the highly fertile lands. On the other hand, however, it must be stated that Co.331 is mostly represented by plant cane and younger ratoons as it is the last variety listed in these returns to be released. But even if a comparison is made on plant cane only, it will be seen that Co.331 has outyielded the more widely grown varieties Co.281 and Co.301 as the following table will show:—

YIELD OF CANE PER ACRE (PLANT CANE ONLY).					
Uba	Co.281	Co.290	Co.301	Co.331	P.O.J.
18.00	24.18	24.04	25.86	28.26	37.76

Co.331 is sometimes criticised because of its low sucrose percentage, but the increase in tons of cane

per acre does much to off-set this disadvantage, as will be seen from the following table where the yields apply to all the cane harvested by Europeans and the sucrose percentages are the averages for the varieties mentioned obtained in 1946 by the Sugar Industry Central Board.

	Uba	Co.281	Co.290	Co.301	Co.331	P.O.J.
Yield ... ..	13.84	21.24	19.06	24.07	27.73	29.44
Sucrose per cent.	13.47	14.50	13.73	14.34	13.66	15.39
Sucrose per acre	1.86	3.09	2.62	3.45	3.79	4.53

Particularly Uba and also Co.290 and to a lesser extent Co.281 suffer in a comparison of this nature because their average yields are depressed as a result of the large proportion of old ratoons now being harvested. It is, nevertheless, of interest to see that the average yield of Co.301 is better than that from Co.281 and the same applies, although to a smaller extent, if the comparison is based on plant cane only. Like in previous years, however, Co.281 did out-yield Co.301 in Zululand by a small margin and the difference in favour of Co.301 south of the Tugela is consequently larger.

Apart from the single return from Piet Retief, the Inanda district again had the highest yield of cane per acre 27.20 followed by the lower Umfolozi and Hlabisa districts with 25.83 and 23.68 tons per acre respectively.

There has been a drop in yield compared with the previous season in every district except for Port Shepstone where the yield per acre in 1946 was slightly higher than in 1945. Although the South Coast still had the lowest yield per acre of the three main divisions, the decrease from the previous season is less marked here than in the other two areas:—

### YIELD IN TONS OF CANE PER ACRE.

	1945	1946
South Coast ... ..	19.59	18.01
North Coast ... ..	28.57	24.23
North of Tugela ... ..	26.30	22.15

Where the drought was progressively more severe from North to South up to the end of 1945, the reverse was true thereafter..

	1945 Rainfall.	1945 Rainfall as per cent. of average.	1946 Rainfall.	1946 Rainfall as per cent. of average.
South Coast... ..	30.50	73.4	34.09	82.8
North Coast... ..	31.41	78.3	31.84	80.3
North of Tugela... ..	33.83	78.4	30.94	72.8

Probably one contributory cause of the low yields on the South Coast is the fact that canes are allowed to ratoon longer here than on the North Coast. Thus in 1946 only 49 per cent. of the total cane from the South Coast was plant or first ratoons while the percentage fourth and older ratoons amounted to nearly 15 per cent. On the North Coast, however, nearly 60 per cent. of the cane harvested was plant and first ratoons while only 4.3 per cent. was fourth and older ratoons. A similar picture is revealed if

we study the age of the cane at the time of ploughing out. The average age of cane in the industry is 7.17 years but the average age at ploughing out is 8.22 years at Umzinto and 8.25 years at Port Shepstone.

During the year ending 30th April 1946, there were 9,387 acres of virgin land planted to cane, and 67,969 acres of old cane lands were ploughed out, of which 39,872 acres or 58.7 per cent. were given a long fallow. The percentage land under long fallow is therefore somewhat less than last year and on the North Coast it is only 53.8 per cent. of the cane lands ploughed out.

The number of individual returns have increased

from 700 in 1945 to 739 for this period. The total area of sugar farms is 768,359 acres of which 352,917 acres are under cane and 168,984 acres or 47.8 per cent. were cut. There still remain 85,221 acres of suitable virgin land in the area now under cultivation.

The Lower Tugela is still the district with the biggest total production of cane, 1,035,855 tons or 19.6 per cent. of the total crop, and is followed by the Lower Umfolozi and Inanda districts with 16.6 and 16.4 per cent. of the total crop respectively. The South Coast has been able to increase its proportion of the total crop from 17.2 per cent. in 1945 to 19.6 per cent. in 1946.

Experiment Station,  
South African Sugar Association,  
Mount Edgecombe,  
March, 1948.

# YIELDS OF CANE HARVESTED BY DISTRICTS (EUROPEAN PLANTERS ONLY).

COMPILED FROM UNION DEPARTMENT OF CENSUS RETURNS.

DISTRICT.	YIELD OF CANE IN TONS.										
	1936.	1937.	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.	1946.
PORT SHEPSTONE.. .. .	56,685	75,028	74,856	89,585	81,811	43,704	84,444	97,113	79,993	57,630	67,743
UMZINTO .. .. .	564,427	692,159	663,609	744,981	733,332	457,518	582,516	682,713	728,879	528,593	515,571
DURBAN AND PINETOWN .. .. .	146,676	124,109	188,183	213,958	193,938	167,970	191,737	195,923	165,164	136,253	146,087
<b>Total South of Umgeni River .. .. .</b>	<b>767,788</b>	<b>891,296</b>	<b>926,648</b>	<b>1,048,524</b>	<b>1,009,081</b>	<b>669,192</b>	<b>858,697</b>	<b>975,749</b>	<b>974,036</b>	<b>722,476</b>	<b>729,401</b>
Ratio to 1926 (= 100) .. .. .	172.2	199.9	207.9	235.2	226.3	150.1	192.6	218.9	218.5	162.1	163.6
INANDA .. .. .	629,945	615,227	683,261	807,094	816,215	627,454	774,840	812,986	823,041	737,413	608,736
LOWER TUGELA .. .. .	1,184,839	1,138,342	1,122,528	1,285,888	1,299,769	921,709	1,120,740	1,331,681	1,310,186	1,144,887	1,035,855
<b>Total for North Coast between Umgeni and Tugela Rivers .. .. .</b>	<b>1,814,784</b>	<b>1,753,569</b>	<b>1,805,789</b>	<b>2,092,982</b>	<b>2,115,984</b>	<b>1,549,163</b>	<b>1,895,580</b>	<b>2,144,667</b>	<b>2,133,227</b>	<b>1,882,300</b>	<b>1,644,591</b>
Ratio to 1926 (= 100) .. .. .	219.1	211.7	218.0	252.7	255.5	187.1	228.9	259.0	257.6	227.3	198.6
<b>Total for Natal South of the Tugela ..</b>	<b>2,582,572</b>	<b>2,644,865</b>	<b>2,732,437</b>	<b>3,141,506</b>	<b>3,125,065</b>	<b>2,218,355</b>	<b>2,754,277</b>	<b>3,120,416</b>	<b>3,107,263</b>	<b>2,604,776</b>	<b>2,373,992</b>
Ratio to 1926 (= 100) .. .. .	202.7	207.6	214.5	246.6	245.3	174.1	216.2	244.9	243.9	204.5	186.3
MTUNZINI .. .. .	413,802	435,154	462,271	525,787	507,644	426,608	457,698	533,560	556,524	465,147	358,378
ESHOWE .. .. .	120,935	151,020	193,847	243,829	240,962	217,695	243,392	264,198	293,602	236,115	211,170
LOWER UMFOLOZI .. .. .	616,326	713,675	703,527	777,371	765,381	601,315	655,366	758,217	769,436	741,972	618,269
HLABISA .. .. .	74,276	136,249	140,794	155,775	158,176	138,416	154,945	168,982	171,555	153,689	145,062
PIET RETIEF .. .. .	—	—	—	—	—	—	—	—	—	—	9,321
<b>Total North of the Tugela .. .. .</b>	<b>1,225,339</b>	<b>1,436,098</b>	<b>1,500,439</b>	<b>1,702,762</b>	<b>1,672,163</b>	<b>1,384,034</b>	<b>1,511,401</b>	<b>1,724,957</b>	<b>1,791,117</b>	<b>1,596,923</b>	<b>1,342,200</b>
Ratio to 1926 (= 100) .. .. .	134.8	158.0	165.1	187.4	184.0	152.3	166.3	189.8	197.1	175.7	147.7
<b>GRAND TOTAL FOR UNION .. .. .</b>	<b>3,807,911</b>	<b>4,080,963</b>	<b>4,232,876</b>	<b>4,844,268</b>	<b>4,797,228</b>	<b>3,602,389</b>	<b>4,265,678</b>	<b>4,845,373</b>	<b>4,898,380</b>	<b>4,201,699</b>	<b>3,716,192</b>
Ratio to 1926 (= 100) .. .. .	174.5	187.0	193.9	221.9	219.8	165.0	195.4	222.0	224.4	192.5	170.3

**YIELDS OF CANE HARVESTED BY DISTRICTS (EUROPEAN PLANTERS ONLY).**  
**COMPILED FROM UNION DEPARTMENT OF CENSUS RETURNS.**

DISTRICT.	PER CENT. OF TOTAL TONNAGE.												
	1934.	1935.	1936.	1937.	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.	1946.
PORT SHEPSTONE .. .. .	1.9	1.7	1.5	1.8	1.8	1.8	1.7	1.2	2.0	2.0	1.6	1.3	1.8
UMZINTO .. .. .	17.0	15.6	14.8	17.0	15.7	15.4	15.3	12.7	13.7	14.1	14.9	12.6	13.9
DURBAN AND PINETOWN .. .. .	5.1	3.9	3.9	3.0	4.4	4.4	4.0	4.7	4.5	4.0	3.4	3.2	3.9
<b>Total South of Umgeni River.. .. .</b>	<b>24.0</b>	<b>21.2</b>	<b>20.2</b>	<b>21.8</b>	<b>21.9</b>	<b>21.6</b>	<b>21.0</b>	<b>18.6</b>	<b>20.1</b>	<b>20.1</b>	<b>19.9</b>	<b>17.2</b>	<b>19.6</b>
INANDA .. .. .	17.2	19.0	16.5	15.1	16.2	16.7	17.0	17.4	18.2	16.8	16.8	17.6	16.4
LOWER TUGELA .. .. .	28.2	29.2	31.1	27.9	26.5	26.5	27.1	25.6	26.3	27.5	26.7	27.2	27.9
<b>Total for North Coast between Umgeni and Tugela Rivers ..</b>	<b>45.4</b>	<b>48.3</b>	<b>47.6</b>	<b>43.0</b>	<b>42.7</b>	<b>43.2</b>	<b>44.1</b>	<b>43.0</b>	<b>44.4</b>	<b>44.3</b>	<b>43.5</b>	<b>44.8</b>	<b>44.3</b>
<b>Total for Natal South of the Tugela .. .. .</b>	<b>69.4</b>	<b>69.5</b>	<b>67.8</b>	<b>64.8</b>	<b>64.6</b>	<b>64.8</b>	<b>65.1</b>	<b>61.6</b>	<b>64.6</b>	<b>64.4</b>	<b>63.4</b>	<b>62.0</b>	<b>63.9</b>
MTUNZINI .. .. .	11.6	11.4	10.9	10.7	10.9	10.9	10.6	11.8	10.7	11.0	11.4	11.1	9.6
ESHOWE .. .. .	3.6	3.6	3.2	3.7	4.6	5.0	5.0	6.0	5.7	5.5	6.0	5.6	5.7
LOWER UMFOLOZI .. .. .	13.6	14.1	16.2	17.5	16.6	16.0	16.0	16.7	15.4	15.6	15.7	17.7	16.6
HLABISA .. .. .	1.8	1.4	1.9	3.3	3.3	3.2	3.3	3.8	3.6	3.5	3.5	3.7	3.9
PIET RETIEF .. .. .	—	—	—	—	—	—	—	—	—	—	—	—	0.3
<b>Total North of the Tugela .. .. .</b>	<b>30.6</b>	<b>30.5</b>	<b>32.2</b>	<b>35.2</b>	<b>35.4</b>	<b>35.1</b>	<b>34.9</b>	<b>38.4</b>	<b>35.4</b>	<b>35.6</b>	<b>36.6</b>	<b>38.0</b>	<b>36.1</b>
<b>GRAND TOTAL FOR UNION .. .. .</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

# YIELDS OF CANE HARVESTED BY DISTRICTS (EUROPEAN PLANTERS ONLY).

COMPILED FROM UNION DEPARTMENT OF CENSUS RETURNS.

DISTRICT.	TONS CANE PER ACRE.												
	1934.	1935.	1936.	1937.	1938.	1939.	1940.	1941.	1942.	1943.	1944.	1945.	1946.
PORT SHEPSTONE... .. .	16.34	14.78	13.51	21.53	29.33	26.52	18.15	13.73	23.08	31.32	22.95	19.18	19.26
UMZINTO .. . . .	20.69	18.20	18.22	22.41	23.50	25.94	23.02	16.47	20.20	24.68	24.18	19.51	17.59
DURBAN AND PINETOWN .. . . .	23.34	20.27	19.77	20.42	27.65	31.76	24.74	20.28	25.63	24.01	24.16	20.11	19.05
<b>Total South of Umgeni River .. . . .</b>	20.76	18.21	18.02	22.04	24.65	27.00	22.83	17.05	21.48	25.07	24.07	19.59	18.01
Ratio to 1926 (= 100).. . . .	112.58	98.75	97.72	119.52	133.68	146.42	123.81	92.46	116.49	135.95	130.53	106.24	97.67
INANDA .. . . .	25.90	26.76	25.95	26.19	31.27	36.57	33.24	28.20	32.94	40.45	37.51	32.32	27.20
LOWER TUGELA .. . . .	21.62	20.83	22.61	22.90	25.19	29.51	27.35	21.30	24.42	31.10	29.49	26.58	22.77
<b>Total for North Coast between Umgeni and Tugela Rivers .. . . .</b>	23.07	22.83	23.67	23.96	27.19	31.89	29.35	23.64	27.31	34.09	32.14	28.57	24.23
Ratio to 1926 (= 100).. . . .	123.97	122.68	127.19	128.75	146.10	171.36	157.71	127.03	146.75	183.18	172.70	153.52	130.20
<b>Total for Natal South of the Tugela .. . . .</b>	22.21	21.19	21.65	23.27	26.27	30.07	26.87	21.18	25.18	30.64	29.08	25.35	21.90
Ratio to 1926 (= 100).. . . .	119.73	114.23	116.71	125.44	141.62	162.10	144.85	114.18	135.74	165.18	156.77	136.66	118.06
MTUNZINI .. . . .	19.56	18.75	18.85	20.97	24.67	27.86	27.06	22.67	24.96	30.71	27.19	23.73	18.02
ESHOWE .. . . .	17.95	17.64	17.26	20.69	28.03	29.89	26.62	23.53	25.11	27.46	27.27	22.68	20.27
LOWER UMFOLOZI .. . . .	17.93	18.28	23.04	28.81	34.40	33.25	31.00	26.10	26.51	33.45	31.47	30.07	25.83
HLABISA .. . . .	14.79	12.72	18.60	25.36	30.91	28.81	29.60	26.31	29.84	30.79	29.00	25.52	23.68
PIET RETIEF .. . . .	—	—	—	—	—	—	—	—	—	—	—	—	39.16
<b>Total North of the Tugela .. . . .</b>	18.28	18.00	20.52	24.68	29.62	30.51	28.91	24.55	26.09	31.28	29.08	26.30	22.15
Ratio to 1926 (= 100).. . . .	76.71	75.54	86.11	103.57	124.30	128.03	121.32	103.02	109.48	131.26	122.03	110.37	92.95
<b>GRAND TOTAL FOR UNION .. . . .</b>	20.84	20.10	21.27	23.75	27.37	30.22	27.55	22.36	25.49	30.87	29.08	25.70	21.99
Ratio to 1926 (= 100).. . . .	101.96	98.34	104.06	116.19	133.90	147.85	134.78	109.38	124.71	151.03	142.27	125.73	107.58
Rainfall of all Districts (inches) <i>(Average from 44 centres).</i>	44.74	45.83	50.13	39.57	40.33	47.68	43.48	26.18	49.40	53.31	36.45	31.99	32.02

## AREA OF CANE HARVESTED AND YIELDS BY DISTRICTS (EUROPEAN PLANTERS ONLY) 1946—47.

COMPILED FROM UNION DEPARTMENT OF CENSUS RETURNS.

DISTRICTS.	UBA.		Co.281.		Co.290.		Co.301.		Co.331.		P.O.J.2725 and 2878.		OTHER VARIETIES.	
	Acres.	Tons/ acre.	Acres.	Tons/ acre.	Acres.	Tons/ acre.	Acres.	Tons/ acre.	Acres.	Tons/ acre.	Acres.	Tons/ acre.	Acres.	Tons/ acre.
PORT SHEPSTONE ... ..	7	8.71	3,276	19.47	44	9.00	177	18.74	—	—	4	4.00	9	17.89
UMZINTO ... ..	1,206	14.03	21,525	17.40	1,320	15.65	4,987	19.44	164	22.30	116	23.84	—	—
DURBAN AND PINETOWN ... ..	11	13.09	5,102	20.40	145	9.86	2,395	16.71	3	8.33	14	26.29	—	—
<b>Total South of Umgeni River ...</b>	1,224	13.99	29,903	18.14	1,509	14.90	7,559	18.56	167	22.05	134	23.51	9	17.89
INANDA ... ..	980	14.62	12,936	27.24	340	21.88	7,848	28.89	207	30.24	44	20.95	29	22.28
LOWER TUGELA ... ..	315	10.27	25,503	21.00	1,104	22.09	18,122	25.40	409	28.43	36	20.97	—	—
<b>Total for North Coast between Umgeni and Tugela Rivers...</b>	1,295	13.56	38,439	23.10	1,444	22.04	25,970	26.45	616	29.04	80	20.96	29	22.28
<b>Total for Natal South of the Tugela</b>	1,519	13.77	68,342	20.93	2,953	18.39	33,529	24.67	783	27.55	214	22.56	38	21.24
MTUNZINI ... ..	100	12.63	16,000	17.40	565	21.34	2,835	19.61	258	28.48	128	39.34	—	—
ESHOWE ... ..	48	10.08	8,074	19.60	504	18.37	1,212	21.33	93	41.58	486	27.76	—	—
LOWER UMFOLOZI ... ..	215	16.00	18,579	25.93	229	18.94	2,606	23.50	1	14.00	2,309	29.26	—	—
HLABISA ... ..	—	—	3,912	22.88	540	21.02	507	17.07	4	12.50	1,161	30.51	2	38.50
PIET RETIEF ... ..	—	—	98	46.50	—	—	88	34.38	10	30.00	42	34.26	—	—
<b>Total North of the Tugela</b>	363	14.29	46,663	21.69	1,838	20.13	7,248	21.30	366	28.11	4,126	29.80	2	38.50
<b>TOTAL FOR UNION .. ..</b>	2,882	13.84	115,005	21.24	4,791	19.06	40,777	24.07	1,149	27.73	4,340	29.44	40	22.10

**AREA OF CANE HARVESTED AND YIELDS FOR DIFFERENT VARIETIES AND RATOONS.  
(EUROPEAN PLANTERS ONLY) 1946—47.**

**COMPILED FROM UNION DEPARTMENT OF CENSUS RETURNS.**

VARIETY.	PLANT CANE		FIRST RATOON		SECOND RATOON		THIRD RATOON		FOURTH RATOON		OTHER RATOONS		TOTAL	
	Acres.	Tons/ acre.	Acres.	Tons/ acre.	Acres.	Tons/ acre.	Acres.	Tons/ acre.	Acres.	Tons/ acre.	Acres.	Tons/ acre.	Acres.	Tons/ acre.
Uba ... ..	31	18.06	74	15.49	89	18.04	281	12.11	784	14.63	1,623	13.36	2,882	13.84
Co.281 ... ..	21,883	24.18	31,048	21.98	31,108	20.98	19,196	18.81	7,698	18.09	4,072	19.24	115,005	21.24
Co.290 ... ..	479	24.04	541	17.13	798	15.99	1,082	20.64	911	16.46	980	20.86	4,791	19.06
Co.301 ... ..	14,760	25.86	12,659	24.44	8,251	22.45	3,697	20.38	941	21.05	469	21.51	40,777	24.07
Co.331 ... ..	870	28.26	174	27.13	62	20.97	19	36.74	19	19.95	5	35.00	1,149	27.73
P.O.J.2725 and 2878 .	365	37.76	274	27.34	571	32.26	596	25.57	731	27.57	1,803	29.23	4,340	29.44
Other Varieties ... ..	5	30.00	19	19.84	10	24.70	6	18.33	—	—	—	—	40	22.10
<b>Total</b> ... ..	<b>38,393</b>	<b>25.05</b>	<b>44,789</b>	<b>22.66</b>	<b>40,889</b>	<b>21.33</b>	<b>24,877</b>	<b>19.22</b>	<b>11,084</b>	<b>18.59</b>	<b>8,952</b>	<b>20.49</b>	<b>168,984</b>	<b>21.99</b>

The PRESIDENT reminded the meeting that the present paper was only one item of a long series which constitutes the history of the industry over the past 23 years. It also afforded an opportunity of comparing our efforts with those of other countries and our increases in efficiency with theirs. He was sure everyone would be gratified with the decision of the Millers' Association to allow the names of the factories to be published.

Mr. DU TOIT said that the past season had been remarkable in that efficiencies of nearly all factories had been increased, in some cases by a very big margin. He pointed out, however, that Central factory's 1940 record B.House recovery of 93.07, still stood. This factory ceased operations last year.

Natal Estates had this year increased its extraction from 94.7 to the record figure for South Africa of 95.3, with a through-put of 141.79 tons per hour. With this record extraction and high B.H. recovery, Natal Estates had attained their highest ever overall Recovery.

Umfolozi had a record through-put of 88.62 tons per hour with the second highest extraction for them of 93.56. During the last couple of months they showed a remarkable increase in purity from mixed juice to syrup. He would like to know how this affected the quantity of molasses and how far it was associated with decrease in ash and non-sugars. He thought Mr. Duchenne was to be congratulated on the figures obtained during the last months at Umfolozi.

Maidstone factory increased their through-put enormously to 151.8 tons of cane per hour. This was by far the largest through-put ever obtained in this country. Extraction and boiling house recovery were very good and he thought it must be very difficult to maintain a very high standard of efficiency together with such a large increase in crushing rate.

Zululand Sugar Millers and Planters Ltd. showed a very large increase in boiling house recovery, this figure and the overall recovery being higher than they had ever obtained before.

Illovo obtained its best boiling house recovery and overall recovery during the past year, indeed, over the last two years the rise in efficiency at Illovo has been very encouraging.

Doornkop achieved a record extraction.

Sezela has been commended on a very high increase in overall recovery due to their record extraction of 93.32. With a better boiling house recovery their overall recovery would be excellent.

Amatikulu had their best overall recovery and their best extraction ever.

Renishaw had records for extraction and for boiling house recovery and consequently for overall recovery.

Umzimkulu increased their extraction from 91.5 in 1946 to 94.3 in 1947. Extraction and overall recovery are records for this factory.

Chakas Kraal had a record through-put together with a record extraction, and the overall recovery was the highest ever achieved by that factory. Extraction had gone up nearly one per cent.

Melville also showed excellent results in record extraction and boiling house recovery.

The high efficiency of Esperanza which is well known, was maintained last season.

Mr. DUCHENNE explained the rise in purity from mixed juice to syrup as being due to a change in the process at Umfolozi. From experiments carried out as early as 1937, they had developed a process which gave them increased precipitation of colloids and ash elimination. The result was faster settlement and better boiling and curing which enabled them to crush up to 100 tons of cane per hour. Compound maceration was now successfully applied, and together with increased attention to mill settings, had increased the extraction last season to a record figure for Umfolozi.

The PRESIDENT, talking of the Zululand Sugar Millers and Planters Ltd. factory at Expangeni, at which he was Chief Chemist, said that the purity of mixed juice was last season the highest on record. This, together with the fact that their planters had been persuaded to send in cleaner cane, which had reduced the fibre percentage, had enabled them to obtain their high efficiency.

Mr. DAEGER said that the Illovo milling plant was rated as being capable of crushing 80 tons per hour. It consisted of two sets of knives, two crushers and five mills. Each mill engine was fitted with remote push button controls. Only 50.9 tons of cane per hour were crushed. The factory had worked the second season with the Oliver Campbell filter and by paying strict attention to general cleanliness at this station the pH of the filtrate was maintained at 7.3 with definite increase in efficiency.

Mr. BOOTH said that at Doornkop a high grade of mill white sugar was a primary consideration and to obtain this with the poor quality of cane crushed last year a fairly large proportion of the low grade sugars from third and massecuites had to be melted back to improve the syrup grade.

A more intensive screening of the raw juice had been of great help in every direction. Mill extraction had been a record.

Much of the cane was unburnt—it could not be termed “trashed” and in consequence the performance of both mill and factory had suffered.

Mr. GALBRAITH explained the improved extraction at Sezela as being due to the addition of an extra mill to each tandem.

Mr. STEYN, speaking of Umzimkulu factory, pointed out that an extra mill had been installed and this gave them their increased extraction. The installation was justified, the extraction showing an increase of 2.79 per cent. on the previous season.

Dr. DODDS thought that one of the important results of being able to publish the names of the factories was that one could appeal to individual members of this Association for comments on, and explanations of, improved efficiency figures.

Mr. VAN WYK remarked on the absence of any correlation between fertilizer treatment and yields of cane or sucrose content.

Dr. DODDS replied that the effects of fertilizer treatment were shown almost exclusively in records of individual field experiments. He had tried on

various occasions to get statistics of the total amount of fertilizer used by the industry, but had not hitherto been able to do so.

Mr. DU TOIT said that we had never found any positive correlation between application of potash and sucrose per cent. cane as is claimed to be the case in other countries. In one or two experiments there was definite evidence of depression of sucrose content due to application of nitrogen and application of phosphate.

Dr. DODDS pointed out that although we were third highest in overall recovery amongst the principal sugar-producing countries last year, if we compared our figures with the most recent ones available we were now second.

Hawaii was first with total losses of 14.51 per cent. of sucrose in cane. We came second with 16.27 per cent., Mauritius showed 16.30 per cent. and Trinidad 16.32 per cent. Queensland had had very unfavourable conditions in 1946, but taking the available results as they stand, we were now second amongst the world's most efficient producers.