

# EIGHTEENTH ANNUAL SUMMARY OF CHEMICAL LABORATORY REPORTS.

FROM SOUTH AFRICAN SUGAR FACTORIES. Season 1942-1943.

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In the Annual Summary for the 1941-42 season presented last year, it was recorded that the crop of cane and of sugar was the lowest for six years, because of the very unfavourable weather conditions during 1940 and 1941.

For the 1942-43 season there was a considerable improvement in output because of the greatly improved weather conditions during 1942, so that the crop was 4,704,430 tons of 2,000 lbs. cane and 524,975 tons of 2,000 lbs. (476,254 metric tons) of sugar. However, this also is much below the record of the seasons 1939 and 1940 inclusive, because most of the cane harvested in 1942 had suffered from the record low rainfall of 1941. The ratio of cane to sugar is 8.96, corresponding to a yield of 11.16 per cent. of sugar on weight of cane.

During 1942 the average rainfall from 44 recording stations within the sugar-growing belt was 49.41 inches, a total that had been only once exceeded during the 14 years that systematic records have been compiled, in 1936, when it was 50.10 inches. The rainfall for 1942 was 19 per cent. above the fourteen-year average of 41.55 inches and was normally and very favourably distributed for the growth, ripening, harvesting, and planting of the sugarcane crop. This rainfall was associated with a high mean annual temperature, free from injurious extremes, high humidity, and plenty of sunshine, all favourable factors in the sugar crop. These favourable weather conditions have on the whole continued through the present year to date, so that if good conditions are further maintained a very good crop may be expected for the coming season.

## CANE VARIETY POSITION.

The relative proportions of the crop formed by the different varieties commercially grown over recent years are as follow:—

	Per cent. of total crop.				
	1942/43.	1941/42.	1940/41.	1939/40.	1938/39
Uba... ..	11.1	16.6	23.2	30.2	32.2
Co.281 ... ..	52.4	42.4	37.5	28.3	21.0
Co.290 ... ..	19.1	26.5	28.2	30.0	35.0
Co.301 ... ..	10.6	5.9	3.3	2.4	0.3
P.O.J.2725 and 2878 ... ..	6.8	8.6	7.8	9.1	11.3
	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

The proportion of Uba has further diminished, together with Co.290 and the P.O.J. varieties. The factories crushing more than 10 per cent. of the latter draw much of their supplies from the alluvial flats of Zululand.

Co.281 continues to increase greatly in popularity, and is very widespread, no factory now crushing less than 37 per cent. of this variety. Two of the factories already crush more than 22 per cent. of Co.301, which is also rapidly increasing, especially in the central North Coast area.

The average cane analyses for the season carried out by the Central Board, as before, were done at 13 factories, representing 61.5 per cent. of the total crop. They show similar relations between the average sucrose contents of the individual varieties to the general average of all varieties as in the previous season; also, as before, the proportion of P.O.J. canes in their returns is somewhat lower and the proportion of Co.281 somewhat higher than those for the total crop, because of the omission of such factories as Umfolozi crushing over 52 per cent. of P.O.J. canes.

Weighted average analyses of cane milled at 13 factories serviced by the Sugar Industry Central Board:—

Variety.	Per cent. total cane.	Per cent. total sucrose.	Sucrose per cent. cane.	Purity of crusher juice.	Java Ratio.
Uba... ..	10.60	10.22	13.01	87.17	76.94
Co.281 ... ..	55.05	55.74	13.66	89.33	76.84
Co.290 ... ..	20.18	19.80	13.24	88.10	78.84
Co.301 ... ..	10.13	10.06	13.41	88.23	76.87
P.O.J. ....	4.04	4.18	13.96	88.76	80.61
Totals... ..	<u>100.00</u>	<u>100.00</u>	<u>13.49</u>	<u>88.41</u>	<u>77.40</u>

The returns by months confirm the facts already pointed out by one of us, that Uba is a late-ripening variety that does not maintain its maximum sucrose for long, and therefore should be cut during the peak months of August to October inclusive for the best results, using other varieties for early or late harvesting. It is realized, however, that Uba nowadays consists mainly of old ratoons which it is advantageous to cut early, especially if they are to be ploughed out.

The monthly analyses indicate again that Co.281 and Co.301 are relatively early-ripening varieties and that P.O.J.2725 is of outstanding value for late harvesting, since it holds its sucrose remarkably late compared with other varieties.

It is too early yet to have any information concerning general harvesting results from Co.331, which was released for commercial planting for the first time in 1941.

## GENERAL QUALITY OF CANE.

Notwithstanding the generally favourable distribution of rainfall of last season the general average sucrose content of cane for the season, 13.40 per cent., is considerably below the high content for the 1941 season, 14.00 per cent., and slightly below the 15-year average of 13.49 per cent. The average sucrose for the optimum manufacturing period of July to November inclusive was, however, slightly above the average for that period, so that the low general average may be attributed to the unusually low sucrose contents in May and June so soon after the abundant rains of the growing season, and the very low sucrose contents in November and December due to the very heavy rainfall of those months. This position was no doubt accentuated by the relatively high proportions of Uba cane harvested in May and June, Uba not being an early-ripening variety. In any case a favourable season for cane-growing such as 1942 is not usually associated with a very high sucrose content of cane, which is more likely to occur in dry seasons.

The peak months for sucrose content of cane were August and September, when it was 14.09 in both months.

Only twice before, in 1929 and 1930, was the peak reached as early as August. In 11 seasons the peak was in September, which has therefore the highest monthly average sucrose of 14.18 per cent., and on four occasions it occurred in October.

The lowest sucrose content in 1942 was in May, when it was only 11.89 per cent., one of the lowest on record for that or any period. For November it was 13.38 and for December 12.33 per cent., both much below the averages for those months.

The general average fibre content of cane for the season was 15.24 per cent. This is considerably below that for the two previous seasons of deficient or badly distributed rainfall, and is appreciably less than the 15-year average of 15.50 per cent., but is higher than for any of the four seasons ending 1939. This is probably caused by the steady increase in the proportion of Co.281 grown, which is a high-fibred variety, especially when harvested late in the season. The fibre content of cane was at its lowest in July, 15.10 per cent., and from thence steadily increased to a maximum of 15.66 per cent. for the December period. As pointed out last year, this progressive increase in

fibre content throughout the main harvesting season is characteristic of the Co. canes.

The purity of mixed juice for the season, 85.96, is above the average of previous seasons and was only surpassed in 1935, 1938 and 1939. The peak of the season was in September, as in the previous season. Over recent years the highest purity of mixed juice occurred once in August, five times in September, nine times in October, and twice in November. The lowest for 1942 was in May, when it was only 83.38.

The reducing sugar ratio in mixed juice for the season was 3.07, which is much below the 14-year average and the lowest since 1936.

It has already been pointed out that the difference in sucrose content of cane between what we call the "optimum period" of the season from July to November inclusive and the earlier and later months, is much greater than usual. The same applies to the purity of the juice and consequently to the ratio of cane to sugar, and unfortunately the quantity of cane harvested out of season, which was 23 per cent. in 1941, has again reached the 13-year average proportion of 25 per cent., entailing a considerable loss of sugar through this cause:

**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.
1928	Optimum period ...	75.74	9.20	14.07	15.75	85.07
	Balance of crop ...	24.26	10.17	12.97	16.31	84.81
1929	Optimum period ...	73.06	9.74	13.28	15.44	86.34
	Balance of crop ...	26.94	11.04	12.29	15.82	84.35
1930	Optimum period ...	70.95	9.20	14.08	15.60	86.27
	Balance of crop ...	29.05	10.07	13.09	15.91	85.16
1931	Optimum period ...	77.86	9.29	14.13	15.57	85.33
	Balance of crop ...	22.14	10.20	12.75	16.23	84.32
1932	Optimum period ...	81.10	9.32	13.79	15.44	85.01
	Balance of crop ...	18.90	10.82	12.28	16.25	84.76
1933	Optimum period ...	73.97	8.93	14.17	15.68	85.51
	Balance of crop ...	26.03	10.27	13.03	15.74	83.47
1934	Optimum period ...	81.35	10.54	11.95	15.12	84.09
	Balance of crop ...	18.65	11.16	11.52	15.57	83.83
1935	Optimum period ...	78.80	9.03	13.83	15.81	86.62
	Balance of crop ...	21.20	9.78	13.06	15.94	85.74
1936	Optimum period ...	75.71	9.02	13.62	14.85	85.73
	Balance of crop ...	24.29	10.27	12.27	15.46	84.12
1937	Optimum period ...	71.73	8.46	14.32	15.02	86.22
	Balance of crop ...	28.27	9.81	12.67	15.51	83.66
1938	Optimum period ...	73.90	8.57	14.04	14.37	86.84
	Balance of crop ...	26.10	9.95	12.50	14.77	84.43
1939	Optimum period ...	66.56	8.55	13.89	14.65	87.10
	Balance of crop ...	33.44	9.85	12.46	15.11	85.06
1940	Optimum period ...	66.83	8.86	13.63	15.54	86.02
	Balance of crop ...	33.17	10.07	12.27	15.63	83.85
<b>Mean, 1928/1940—</b>						
	Optimum period ...	74.43	9.13	13.75	15.30	85.86
	Balance of crop ...	25.57	10.27	12.55	15.71	84.39
1941	Optimum period ...	76.55	8.42	14.28	15.69	85.91
	Balance of crop ...	23.45	9.35	13.09	15.56	84.89
1942	Optimum period ...	74.83	8.62	13.78	15.23	86.44
	Balance of crop ...	25.17	9.99	12.27	15.26	84.53

**GENERAL FACTORY PERFORMANCE.**

This continues to show the progressive improvement that has characterized recent seasons. Again the smaller crop has made possible less overloading of factories, and the quality of the cane, as we have seen, was not below normal. Consequently there was continued scope for improvement in technique and performance, which was well maintained notwithstanding acute shortage of skilled labour for the factories.

The mill extraction, 92.69, and reduced extraction, 94.19, reach new levels for this country; the same may be said of the boiling house recovery, 88.98, and reduced boiling house recovery, 88.10, and consequently of the overall recovery, 82.48, and reduced overall recovery, 82.98.

The ratio of cane to sugar, 8.93, or 8.69 based on sugar of 96° pol., is not as good as for the seasons 1937, 1938 and 1941, when, however, the sucrose content of cane was considerably higher.

The sucrose content of bagasse, 2.88 per cent., and the primary juice loss, 40.66, are the lowest recorded for any season in this country, as is the total sucrose per cent. of cane, 2.34, lost in manufacture.

Taking the sucrose losses in manufacture per cent. of total original sucrose in cane in detail, the loss in bagasse, 7.31 per cent., is the lowest on record for this country. The same may be said of the loss in filter cake, 0.41 per cent., and of the total losses of sucrose, 17.52 per cent., which is, of course, the difference between the overall recovery and 100. The loss of sucrose in molasses, however, is somewhat higher than in the 1938 and 1939 seasons, when lower purities of final molasses were gained.

Unfortunately, it is not possible to discriminate accurately between losses in molasses and undetermined losses, with which they have to be included in our crop returns, since there are still several factories that do not indicate weights of final molasses.

The average purity of final molasses for the season, 43.24, is well below the 14-year average, but has been better in several seasons. As usual in recent seasons, it attained its maximum in November, when it was 44.38, and its lowest during the first month of the season.

The moisture content of the bagasse, 51.24 per cent., is the lowest since 1931, but still leaves much room for improvement when compared with other countries or with certain individual factories in this country.

The same may be said of our recovery figures generally, which show considerable improvement over recent seasons but are still a long way below the best international standards, some of which are shown in the accompanying tables.

**INDIVIDUAL FACTORY RECORDS.**

The 19 factories represented and their code numbers are the same as before, and there are, as before, three small factories, producing 1.56 per cent. of the crop in all, that are not included in our factory returns. Taking these factories into account, the ratio of cane to sugar for the crop is 8.96, not 8.93 which is the ratio for the 98.5 per cent. of the crop of which we have detailed manufacturing records.

As in past years, there are wide differences between the opening and closing dates of manufacture at different factories, so that crop conditions vary very considerably both for this reason and because of wide differences in the quality and proportions of varieties of the cane milled; these differences must greatly influence individual factory performances and efficiencies.

The highest average sucrose content of cane for the season is again recorded at factory No. 21 with 14.19 per cent., three other factories also showing over 14 per cent. Generally speaking, the factories showing the higher sucrose contents of cane draw most of their supplies of cane from relatively high altitudes at some distance from the coast.

Factories 2 and 3 both have fibre contents of cane of under 14, 13.39 and 13.92 per cent. respectively; at the other extreme, one factory recorded over 17 per cent. fibre.

The high average purity of mixed juice is shown by factory No. 3, 88.42, only one other factory, No. 21, topping the 88 mark.

Of the factories recording reducing sugar ratio of mixed juice, No. 6 had a season's average as low as 2.28.

The highest extraction was again recorded by factory No. 3 with 95.89, associated with a moisture content of bagasse of only 44.02 per cent. This factory gains also the lowest milling loss, 4.23, the lowest extraction ratio, 0.30, and the lowest primary juice loss, 25.42. No. 1 factory comes second in extraction with 94.96, as well as in the other milling efficiency figures.

Factory No. 20 gained the highest boiling house recovery, 91.83, only one other factory, No. 16 with 91.73, exceeding the 91 mark. No. 20 also leads in overall recovery with 86.30, and No. 16 takes second place with 85.96. No. 1 factory is also over 85, this factory producing sugars of a much higher average polarization, mainly for direct consumption without the intervention of the refinery.

There is a range of 7.5 points between the highest and lowest overall recoveries.

Several factories show considerable improvement over last year's overall recovery. Outstanding in this respect is No. 11, followed by Nos. 19, 17 and 4.

The lowest ratio of cane to sugar is gained by factory No. 21 with 8.22, or 7.93 based on sugars of 96° pol. Other factories with very satisfactory records in this respect are Nos. 9, 3 and 17, that is to say, all those with a sucrose content of cane of over 14.

There were seven factories this season with a moisture content of bagasse of 49 or less, but some had over 53 per cent.

The lowest purity of final molasses was gained by factory No. 20 with 36.80 (apparent purity); five others had purities of less than 40 and four had over 46.

No. 1 factory crushed 535,157 tons of 2,000 lbs. of cane in a single train of mills to make 61,137 tons of sugar at an average crushing rate of 135.5 tons of cane per hour. No. 5 also crushed over half a million tons of cane to make 60,339 tons of sugar at a crushing rate of 128.76 tons of cane per hour, while No. 12 made 50,727 tons of sugar; both Nos. 5 and 12 are double-tandem mills.

#### WORLD PRODUCTION OF SUGAR.

It has been our custom in recent years to quote estimates of the world sugar crop concurrent with that of the South African Experiment Station,

South African Sugar Association,

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crop under review, so as to assess the proportion of the whole contributed by this and certain other countries. On this occasion, however, no estimates of world production of sugar for the 1942-43 season are yet available from any authoritative sources, so that this feature will have to be omitted.

#### SUGAR PRODUCTION IN SOUTH AFRICA IN RECENT YEARS.

As last year, output of cane and sugar of South Africa since 1929 is tabulated. Production figures are in tons of 2,000 lbs. according to South African usage.

Season.	Cane crushed.	Inches of rainfall.	Sugar produced.	Ratio Cane/Sugar.
1929/30 ... ..	3,005,663	48.30	298,635	10.06
1930/31 ... ..	3,803,883	37.20	393,205	9.67
1931/32 ... ..	3,130,783	39.39	325,899	9.61
1932/33 ... ..	3,489,960	48.20	358,905	9.72
1933/34 ... ..	3,673,375	31.12	391,173	9.39
1934/35 ... ..	3,874,215	44.60	358,738	10.80
1935/36 ... ..	3,867,536	46.12	417,289	9.27
1936/37 ... ..	4,180,973	50.10	446,409	9.37
1937/38 ... ..	4,489,022	39.48	507,219	8.85
1938/39 ... ..	4,658,962	40.38	522,732	8.91
1939/40 ... ..	5,346,006	47.63	595,556	8.98
1940/41 ... ..	5,309,227	43.37	572,880	9.72
1941/42 ... ..	3,921,436	26.18	452,119	8.67
1942/43 ... ..	4,704,430	49.41	524,975	8.96

#### ACKNOWLEDGMENTS OF RESULTS FROM OVERSEAS SUGAR INDUSTRIES.

The receipt of technical information and reports from countries overseas continues to be subject to many obstacles and delays arising out of the war conditions. We are glad, however, to be able to reproduce records of recent seasons in Mauritius, Puerto Rico, Hawaii and Trinidad.

For these we are greatly indebted to the Sugar Industry Reserve Fund Committee of Mauritius, the Sugar Producers' Association of Puerto Rico, the Experiment Station of the Hawaiian Sugar Planters' Association, and the Sugar Manufacturers' Association of Trinidad.\*

## FINAL MANUFACTURING RESULTS, NATAL SUGAR FACTORIES, SEASON 1942/43.

FACTORY NUMBER	...	...	...	...	1	2	3	4	5	6	8	9	10	11	12	14	15	16	17	18	19	20	21	SEASON		
Crushing period	From	...	...	...	14.5.42	26.6.42	17.6.42	19.5.42	8.5.42	15.6.42	20.5.42	21.5.42	11.5.42	22.5.42	11.5.42	15.5.42	28.5.42	14.5.42	27.6.42	12.5.42	21.5.42	4.5.42	26.5.42	4.5.42		
	To	...	...	...	5.12.42	1.3.43	15.12.42	19.12.42	12.12.42	12.1.43	21.12.42	31.10.42	21.12.42	11.12.42	19.12.42	31.12.42	16.12.42	31.12.42	12.12.42	26.12.42	28.11.42	9.12.42	30.11.42	1.3.42		
Tons of 2,000 lbs. Cane crushed	...	...	...	...	535,157	323,116	38,619	257,359	527,107	362,952	194,736	79,996	319,857	287,821	463,895	308,728	154,695	104,957	76,610	156,058	107,953	160,280	165,834	4,625,730		
Cane crushed—metric tons	...	...	...	...	485,494	293,131	35,035	233,476	438,191	329,270	176,664	72,572	290,174	261,111	430,845	280,078	140,339	95,217	69,501	141,576	97,935	145,406	150,444	4,196,458		
Tons of 2,000 lbs. Sugar bagged and estimated	...	...	...	...	61,137	32,582	4,662	29,010	60,339	39,740	21,487	9,672	33,439	32,411	50,727	35,734	17,309	12,002	9,196	18,095	11,866	18,731	20,178	518,317		
Sugar bagged and estimated—metric tons	...	...	...	...	55,463	29,558	4,229	26,318	54,739	36,052	19,493	8,774	30,336	29,403	46,219	32,418	15,703	10,888	8,342	16,416	10,765	16,993	18,305	470,217		
Tons Cane per ton of Sugar	...	...	...	...	8.75	9.92	8.28	8.87	8.74	9.13	9.06	8.27	9.56	8.88	9.15	8.65	8.94	8.74	8.33	8.62	9.10	8.56	8.22	8.93		
Tons Cane per ton of Sugar calculated as Sugar of 96° Pol.	...	...	...	...	8.44	9.75	8.01	8.58	8.54	8.94	9.06	8.07	9.25	8.57	8.88	8.40	8.65	8.55	8.12	8.48	8.83	8.31	7.93	8.69		
Time Crushing per cent. Available Time (no allowance for cane shortage)	...	...	...	...	97.98	94.46	98.42	93.51	93.38	96.41	92.24	98.70	98.26	96.95	97.58	98.20	92.20	94.32	97.49	97.16	92.72	98.80	97.31	96.11		
Tons of 2,000 lbs. of Cane per hour Actual Crushing	...	...	...	...	135.50	72.67	12.78	63.73	128.76	92.62	52.63	27.80	74.20	86.11	111.57	72.05	42.11	28.95	24.57	36.08	30.77	38.93	45.34	82.89		
Tons of 2,000 lbs. White Sugar made	...	...	...	...	51,746	45	3,687	19,505	—	—	—	—	21,837	18,617	1,026	—	10,280	—	20	8	1,460	—	14,379	142,610		
Tons of 2,000 lbs. Government Grade Sugar made...	...	...	...	...	7,744	8,282	537	6,975	10,482	32,150	—	455	160	13,794	410	—	7,079	8,581	7,383	13,438	3,461	—	4,031	124,962		
Tons of 2,000 lbs. Raw Sugar made	...	...	...	...	1,647	24,256	437	2,530	49,857	7,590	21,487	9,217	11,442	—	49,291	—	—	3,421	1,793	4,649	6,944	18,731	1,768	215,060		
Sucrose per cent. Cane...	...	...	...	...	13.34	12.40	14.34	13.35	13.30	13.17	13.44	14.14	12.84	13.81	13.34	13.79	13.80	13.07	14.29	13.68	13.78	13.38	14.44	13.40		
Fibre per cent. Cane	...	...	...	...	15.44	13.39	13.92	14.83	14.87	15.68	15.15	15.04	14.75	15.38	15.95	15.74	15.54	15.78	15.23	14.55	17.25	15.79	15.40	15.24		
Java Ratio	...	...	...	...	77.90	79.46	77.42	76.90	77.50	76.64	78.16	77.87	78.18	77.71	76.43	77.97	77.18	77.48	78.43	78.48	77.96	76.90	78.61	77.67		
Milling Loss	...	...	...	...	4.35	8.02	4.23	6.37	5.54	6.58	8.78	6.45	6.22	7.69	7.28	6.45	5.88	5.22	7.83	7.19	7.93	5.09	6.45	6.42		
Extraction Ratio	...	...	...	...	0.33	0.65	0.30	0.48	0.42	0.50	0.65	0.46	0.48	0.56	0.55	0.47	0.41	0.40	0.55	0.53	0.58	0.38	0.45	0.48		
Primary Juice Loss	...	...	...	...	27.60	56.02	25.42	40.60	34.78	42.11	55.50	38.81	41.32	47.10	45.90	39.45	34.78	33.62	46.48	45.10	47.59	32.11	37.85	40.67		
Imbibition per cent. Cane	...	...	...	...	38.94	24.58	34.43	28.40	26.38	32.55	35.02	28.47	30.90	34.83	39.47	34.69	30.14	30.58	29.43	39.56	31.35	28.68	38.27	32.82		
Extraction (Sucrose in Mixed Juice % Sucrose in Cane)...	...	...	...	...	94.96	91.34	95.89	92.92	93.79	92.17	90.09	93.13	92.85	91.44	91.29	92.63	93.60	93.70	91.65	92.32	90.08	93.98	93.11	92.69		
Sucrose per cent. Bagasse	...	...	...	...	1.99	3.35	2.25	2.91	2.55	2.85	3.85	3.09	2.76	3.56	3.11	2.80	2.74	2.66	3.83	3.21	3.57	2.30	3.02	2.88		
Moisture per cent. Bagasse	...	...	...	...	51.64	53.59	44.02	50.68	50.71	52.95	51.26	48.27	51.99	49.01	53.29	53.12	48.32	45.28	46.28	51.44	50.39	51.83	49.00	51.24		
Sucrose per cent. Cane lost in manufacture...	...	...	...	...	1.97	2.55	2.36	2.17	2.06	2.44	2.85	2.24	2.46	2.62	2.53	2.37	2.70	1.84	2.46	2.36	2.90	1.83	2.33	2.34		
Overall Recovery (Sucrose in Sugar % Sucrose in Cane)...	...	...	...	...	85.22	79.41	83.55	83.74	84.52	81.47	78.79	84.13	80.81	81.06	81.01	82.83	80.43	85.96	82.76	82.74	78.93	86.30	83.88	82.48		
Recovery on Mixed Juice (Sucrose in Sugar % Sucrose in Mixed Juice)	...	...	...	...	89.74	86.94	87.13	90.11	90.11	88.40	87.45	90.33	87.04	88.65	88.74	89.42	85.93	91.73	90.30	89.62	87.62	91.83	90.09	88.98		
Available Sucrose % Sucrose in Mixed Juice	...	...	...	...	86.65	85.51	89.75	89.73	88.64	83.31	84.35	91.44	87.39	88.25	86.81	86.72	89.01	90.25	90.51	90.17	88.51	91.45	89.42	87.54		
Recovery Efficiency (Sucrose in Sugar % Available Sucrose in Mixed Juice)	...	...	...	...	103.57	101.67	97.08	100.42	101.66	106.11	103.68	98.79	99.60	100.45	102.22	103.11	96.54	101.64	99.77	99.39	98.99	100.42	100.75	101.68		
Sucrose in Bagasse per cent. Sucrose in Cane (A)	...	...	...	...	5.04	8.66	4.11	7.08	6.21	7.83	9.91	6.87	7.15	8.56	8.71	7.37	6.40	6.30	8.35	7.68	9.92	6.02	6.89	7.31		
Sucrose in Filter Cake per cent. Sucrose in Cane (b)	...	...	...	...	0.49	0.27	—	0.16	0.24	0.22	2.35	0.46	0.20	—	0.27	0.35	0.38	0.23	0.98	0.86	—	0.21	0.06	0.41		
Sucrose in Molasses per cent. Sucrose in Cane (c)	...	...	...	...	7.57	9.47	7.62	7.18	—	9.03	8.03	6.46	—	—	9.41	8.30	—	—	—	7.72	7.75	—	7.62	—		
Undetermined Sucrose per cent. Sucrose in Cane (d)	...	...	...	...	1.68	2.19	4.72	1.84	9.03	1.45	0.92	2.08	11.84	10.38	0.60	1.15	12.79	7.51	7.91	0.99	3.40	7.47	1.55	9.80		
Sucrose lost in Boiling House per cent. Sucrose in Cane (b)+(c)+(d)	...	...	...	...	9.74	11.93	12.34	9.18	9.27	10.70	11.30	9.00	12.04	10.38	10.28	9.80	13.17	7.74	8.89	9.57	11.15	7.68	9.23	10.21		
Sucrose in total Losses per cent. Sucrose in Cane (A)+(b)+(c)+(d)	...	...	...	...	14.78	20.59	16.45	16.26	15.48	18.53	21.21	15.87	19.19	18.94	18.99	17.17	19.57	14.04	17.24	17.26	21.07	13.70	16.12	17.52		
FIRST EXPRESSED JUICE.																										
Brix	...	...	...	...	19.60	18.12	20.33	19.54	19.44	19.56	19.53	20.12	18.97	19.92	19.78	19.83	19.97	19.07	20.39	19.65	19.91	19.57	20.30	19.54		
Purity (apparent)	...	...	...	...	87.40	86.10	91.22	88.90	88.30	87.80	88.07	90.20	86.60	89.20	88.28	89.19	89.50	88.41	89.40	88.70	89.00	88.90	90.50	88.27		
LAST EXPRESSED JUICE.																										
Brix	...	...	...	...	2.22	4.97	3.38	5.28	2.69	4.13	3.87	4.20	3.03	2.54	3.09	3.18	4.07	3.64	6.33	2.76	3.70	2.11	2.06	3.33		
Purity (apparent)	...	...	...	...	74.08	73.04	82.34	80.90	77.70	77.00	77.52	81.50	74.00	76.24	77.70	79.90	80.30	72.21	79.60	80.29	78.90	76.30	72.71	76.86		
Purity drop from First Expressed Juice	...	...	...	...	13.32	13.06	8.88	8.00	10.60	10.80	10.55	8.70	12.60	12.96	10.58	9.29	9.20	16.20	9.80	8.41	10.10	12.60	17.79	11.41		
MIXED JUICE.																										
Brix	...	...	...	...	14.05	14.60	14.37	14.93	15.45	14.73	14.14	15.50	14.51	14.38	13.95	14.95	15.15	14.32	15.31	13.58	15.21	15.39	14.49	14.62		
Purity (Clerget)	...	...	...	...	85.76	83.78	88.42	86.60	85.90	85.50	85.22	87.60	84.20	86.43	85.53	86.84	87.10*	85.79	87.00*	87.04	87.60	87.20*	88.06	85.96		
Reducing Sugar Ratio	...	...	...	...	3.35	3.33	3.66	2.78	—	2.28	2.90	—	3.70	2.91	3.26	3.43	2.33	3.01	—	3.42	2.81	2.51	2.81	3.07		
Purity drop from First Expressed Juice	...	...	...	...	1.64	2.32	2.80	2.30	2.40	2.30	2.85	2.60	2.40	2.77	2.75	2.35	2.40	2.62	2.40	1.66	1.40	1.70	2.44	2.31		

**CLARIFIED JUICE.**

Brix ...	12.38	14.37	14.70	15.32	14.82	15.72	14.27	15.10	13.49	14.06	14.20	14.05	15.23	14.34	14.61	13.80	15.78	14.22	14.04	<b>14.27</b>
Purity (apparent) ...	91.18	85.18	90.36	87.30	87.60	86.80	86.90	88.90	86.00	87.36	86.90	88.30	87.50	86.70	88.10	87.81	88.20	88.00	88.64	<b>87.69</b>
Reducing Sugar Ratio ...	1.28	2.89	3.52	—	—	2.09	2.40	—	3.13	—	2.88	2.93	2.10	2.77	—	—	2.36	—	2.21	<b>2.42</b>
pH ...	7.19	7.26	—	7.04	7.80	7.81	—	—	7.30	7.51	7.04	7.60	—	7.84	7.40	—	7.50	7.69	7.21	<b>7.42</b>
Ash per cent. Brix ...	2.45	3.65	—	—	—	—	—	—	—	—	3.56	3.24	—	—	—	—	2.36	—	—	<b>3.10</b>

**FILTER CAKE.**

Per cent. Sucrose ...	0.67	0.62	—	0.47	0.72	0.61	5.21	1.19	0.57	0.51	0.82	0.94	0.94	0.61	4.64	3.95	7.22	0.46	0.26	<b>1.19</b>
Weight per cent. Cane ...	9.73	5.26	—	4.60	4.54	4.61	6.04	5.44	4.58	—	4.43	5.22	5.55	5.00	2.92	3.40	—	6.17	3.25	<b>5.38</b>

**SYRUP.**

Brix ...	56.83	51.39	56.18	54.90	49.98	49.66	55.05	51.80	52.02	53.77	56.47	54.95†	54.56	49.47	52.05	53.24	55.48	47.18	58.64	<b>53.40</b>
Purity (apparent) ...	92.44	85.31	90.56	87.40	87.60	86.40	87.03	89.00	85.20	87.55	87.40	88.77	87.00	86.83	—	86.93	88.40	88.50	88.89	<b>87.85</b>
Reducing Sugar Ratio ...	1.09	3.16	2.72	2.54	—	2.14	2.35	—	3.01	—	—	2.36	2.06	2.45	—	—	2.26	—	2.05	<b>2.24</b>
pH ...	—	7.14	—	7.01	—	7.21	—	—	—	7.13	6.90	7.50	—	7.52	7.21	—	6.95	7.34	6.91	<b>7.14</b>
Purity drop from First Expressed Juice ...	-5.04	0.79	0.66	1.50	0.70	1.40	1.04	1.20	1.40	1.65	0.88	0.42	2.60	1.58	—	1.77	0.60	0.40	1.61	<b>0.42</b>
Purity increase from Mixed Juice ...	6.68	1.53	2.14	0.80	1.70	0.90	1.81	1.40	1.00	1.12	1.87	1.93	-0.10	1.04	—	-0.11	0.80	1.30	0.83	<b>1.89</b>

**FIRST MASSECUITE.**

Brix ...	90.86	94.93	91.88	93.00	91.06	93.64	91.94	93.10	94.24	93.12	93.36	91.40†	92.90	92.27	92.10	92.04	93.42	91.30	91.78	<b>92.53</b>
Purity (apparent) ...	92.15	76.68	85.87	86.00	86.00	80.50	84.69	82.60	81.40	86.95	82.40	82.70	83.50	86.55	81.60	92.04	93.42	85.30	88.20	<b>84.38</b>
Purity of Run-off ...	79.44	—	65.80	64.80	69.50	60.10	66.76	60.40	59.30	68.55	59.00	—	63.20	65.61	62.60	56.48	66.60	70.70	69.32	<b>66.19</b>
Cubic feet per ton of Sugar (all Masseccutes) ...	65.89	34.30	—	51.17	—	51.89	—	49.10	51.10	50.85	46.49	54.70	—	46.14	—	—	47.90	—	—	<b>51.31</b>

**SECOND MASSECUITE.**

Brix ...	93.93	97.83	92.60	97.71	92.86	96.73	92.83	95.70	96.96	95.68	97.84	91.50†	95.81	97.91	95.00	94.18	95.05	95.00	95.77	<b>95.34</b>
Purity (apparent) ...	80.93	66.02	72.29	68.10	78.40	71.30	72.62	70.90	68.20	72.46	67.70	73.70	70.80	68.48	68.10	69.12	71.70	75.20	72.30	<b>72.36</b>
Purity of Run-off ...	59.25	—	52.00	45.10	60.60	50.20	53.53	46.30	44.40	48.31	44.90	53.50	48.20	41.70	48.09	48.00	48.90	49.20	49.02	<b>51.02</b>

**THIRD MASSECUITE.**

Brix ...	99.53	—	—	98.33	94.70	98.29	—	97.40	—	96.22	—	91.50†	97.66	98.79	96.10	—	—	97.90	97.43	<b>96.83</b>
Purity (apparent) ...	68.97	—	—	56.20	68.20	64.40	—	57.30	—	63.80	—	65.70	60.60	55.71	57.62	—	—	59.20	65.21	<b>64.16</b>
Purity of Run-off ...	45.06	—	—	38.90	47.00	44.60	—	37.69	—	42.81	—	47.60	41.60	37.27	38.85	—	—	36.80	43.84	<b>43.56</b>

**JELLY.**

Brix ...	—	—	—	—	94.39	95.20	91.77	—	96.98	95.18	94.20	83.80†	—	—	—	90.68	94.03	—	—	<b>93.24</b>
Purity (apparent) ...	—	—	—	—	47.80	47.50	54.18	—	44.50	47.66	45.10	48.70	—	—	—	50.19	40.00	—	—	<b>47.64</b>

**FINAL MOLASSES.**

Brix ...	86.58	89.06	83.87	83.90	89.85	80.90*	88.60	91.00	89.78	89.53	86.87	79.99†	89.66	91.79	88.00	85.80	83.56	92.10	85.28	<b>86.96</b>
Purity (Clerget) ...	46.35	42.81	43.91	39.90	40.90*	49.60*	47.43	37.69*	40.20*	42.81*	43.80	46.71	42.60*	37.06	38.85*	39.77*	44.80*	36.80*	43.84*	<b>43.24</b>
Weight per cent. Cane at 85.0° Brix ...	2.57	3.14	2.89	2.82	—	2.83	2.67	3.03	—	—	3.37	2.71	—	—	—	3.12	2.78	—	2.52	<b>2.88</b>

**POLARIZATION OF SUGARS.**

White ...	99.90	—	99.70	99.90	—	—	—	99.50	99.80	99.65	—	99.80	—	99.80	99.80	99.85	—	99.82	—	<b>99.30</b>
Government Grade ...	97.60	—	98.25	97.79	98.60	98.05	—	98.38	98.46	98.90	98.88	98.78	98.35	98.32	98.55	97.59	98.81	—	98.85	<b>98.23</b>
Raw ...	97.60	—	97.05	97.79	98.14	98.00	96.00	98.38	98.83	—	98.84	—	—	98.01	98.25	97.59	98.81	98.85	98.87	<b>98.20</b>
Average of all Sugars ...	99.55	97.61	99.28	99.21	98.21	98.04	96.00	98.38	99.27	99.42	98.86	98.79	99.21	98.23	98.49	97.59	98.94	98.85	99.54	<b>98.65</b>
SO <sub>2</sub> in parts per million ...	—	63.00	—	65.19	—	53.00	—	—	—	44.35	49.00	79.00	—	91.00	50.00	—	60.73	65.00	28.30	<b>57.69</b>

**VARIETIES CRUSHED.**

Uba per cent. ...	12.40	1.26	0.13	13.73	9.64	1.41	13.10	24.98	3.08	17.40	13.26	3.78	28.21	10.40	9.38	13.16	30.01	24.50	11.38	<b>11.09</b>
Co.281 per cent. ...	44.86	40.06	65.80	39.20	48.52	70.58	52.06	37.86	57.37	50.76	58.89	60.03	53.84	53.28	74.36	42.96	38.82	56.29	61.13	<b>52.41</b>
Co.290 per cent. ...	26.05	3.29	26.14	21.14	23.37	12.65	24.47	32.88	20.02	25.02	16.54	19.00	13.28	12.68	11.49	27.75	19.16	3.42	24.88	<b>19.08</b>
Co.301 per cent. ...	13.90	3.01	0.35	22.37	16.87	5.03	5.60	4.25	7.14	6.29	9.85	15.55	1.82	22.56	3.93	15.48	11.85	14.00	2.17	<b>10.60</b>
P.O.J.2725 per cent. ...	2.79	52.38	7.58	3.56	1.60	10.33	4.77	0.03	12.39	0.53	1.46	1.64	2.85	1.08	0.84	0.66	0.16	1.80	0.44	<b>6.82</b>

<b>FACTORY NUMBER</b> ...	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>SEASON</b>
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\* Apparent purity.

† Brix by refractometer.

**Average Manufacturing Results by periods for Natal Sugar Factories Reporting to the Experiment Station, Season 1942/43.**

Period ending	MAY 30, 1942.	JUNE 27, 1942.	AUG. 1, 1942.	AUG. 29, 1942.	OCT. 3, 1942.	OCT. 31, 1942.	NOV. 28, 1942.	JAN. 2, 1943.	SEASON 1942-43.
Tons of 2,000 lbs. Cane crushed ... This period To date	242,369	524,519 766,889	799,007 1,565,897	628,108 2,194,006	782,981 2,976,986	629,117 3,606,102	604,935 4,154,784	307,691 4,536,062	<b>4,625,730</b>
Tons of 2,000 lbs. Sugar bagged and estimated ... This period To date	23,078	54,050 77,128	90,068 167,198	74,762 241,960	93,419 335,373	73,724 409,098	67,803 469,719	31,176 510,113	<b>518,317</b>
Tons Cane per ton Sugar ... This period To date	10.50	9.70 9.94	8.87 9.37	8.40 9.07	8.38 8.88	8.53 8.81	8.92 8.84	9.87 8.89	<b>8.93</b>
Tons Cane per ton of Sugar, calculated as sugar of } This period 96° Pol. ... } To date	-10.19	9.42 9.65	8.63 9.11	8.17 8.82	8.15 8.63	8.30 8.57	8.68 8.60	9.65 8.65	<b>8.69</b>
Sucrose per cent. Cane ... This period To date	11.89	12.56 12.35	13.46 12.91	14.09 13.25	14.09 13.47	13.89 13.54	13.38 13.51	12.33 13.44	<b>13.40</b>
Fibre per cent. Cane ... This period To date	15.31	15.14 15.19	15.10 15.15	15.12 15.13	15.15 15.14	15.38 15.18	15.49 15.23	15.66 15.26	<b>15.24</b>
Java Ratio ... This period To date	79.12	78.58 78.73	78.02 78.33	77.82 78.18	77.49 77.99	77.09 77.83	76.95 77.70	76.86 77.78	<b>77.67</b>
Sucrose per cent. Bagasse ... This period To date	2.76	2.84 2.82	2.90 2.86	2.96 2.89	2.89 2.89	2.89 2.89	2.82 2.87	2.88 2.88	<b>2.88</b>
Moisture per cent. Bagasse ... This period To date	52.43	51.70 51.94	51.27 51.60	51.11 51.46	50.97 51.33	50.91 51.26	51.14 51.30	51.90 51.27	<b>51.24</b>
Imbibition per cent. Cane ... This period To date	34.20	33.40 33.66	33.25 33.45	33.46 33.45	32.92 33.31	32.74 33.21	32.78 33.20	30.72 32.97	<b>32.82</b>
Extraction ... This period To date	91.92	92.32 92.19	92.76 92.49	92.96 92.64	93.14 92.77	92.94 92.80	92.78 92.82	91.75 92.75	<b>92.69</b>
Recovery on Mixed Juice ... This period To date	86.24	87.88 87.38	89.11 88.31	89.70 88.73	89.73 89.01	89.52 89.10	89.00 89.07	87.74 89.01	<b>88.98</b>
Overall Recovery ... This period To date	79.27	81.13 80.56	82.66 81.68	83.38 82.20	83.57 82.57	83.20 82.68	82.57 82.67	80.50 82.56	<b>82.48</b>
Purity of Mixed Juice ... This period To date	83.38	85.08 84.52	86.03 85.32	86.35 85.63	86.79 85.94	86.74 86.09	86.27 86.10	84.86 86.04	<b>85.96</b>
Reducing Sugar Ratio ... This period To date	4.62	3.48 3.83	3.04 3.41	2.86 3.24	2.55 3.05	2.70 2.99	3.03 2.97	3.52 3.01	<b>3.07</b>
Purity of Syrup ... This period To date	85.52	87.17 86.65	87.91 87.30	88.29 87.60	88.85 87.94	88.80 88.08	88.30 88.11	86.43 87.92	<b>87.85</b>
Sucrose in Filter Cake (A) ... This period To date	2.05	1.58 1.64	1.73 1.77	1.75 1.75	1.68 1.72	1.64 1.70	1.49 1.52	1.26 1.69	<b>1.69</b>
Purity of Final Molasses ... This period To date	40.55	42.14 41.82	42.68 42.13	42.91 42.36	43.75 42.74	44.26 43.02	44.38 43.29	43.90 43.29	<b>43.24</b>
Average Polarization of Sugar ... This period To date	98.95	98.88 98.90	98.69 98.79	98.68 98.75	98.68 98.74	98.62 98.71	98.61 98.70	98.19 98.67	<b>98.65</b>
SO <sub>2</sub> in Sugar p.p.m. ... This period To date	56.94	53.23 54.03	55.10 54.80	52.37 52.82	63.26 56.73	59.85 57.22	60.04 57.85	61.77 58.07	<b>57.69</b>

(A) Arithmetic averages.

## COMPARATIVE RESULTS FOR RECENT YEARS.

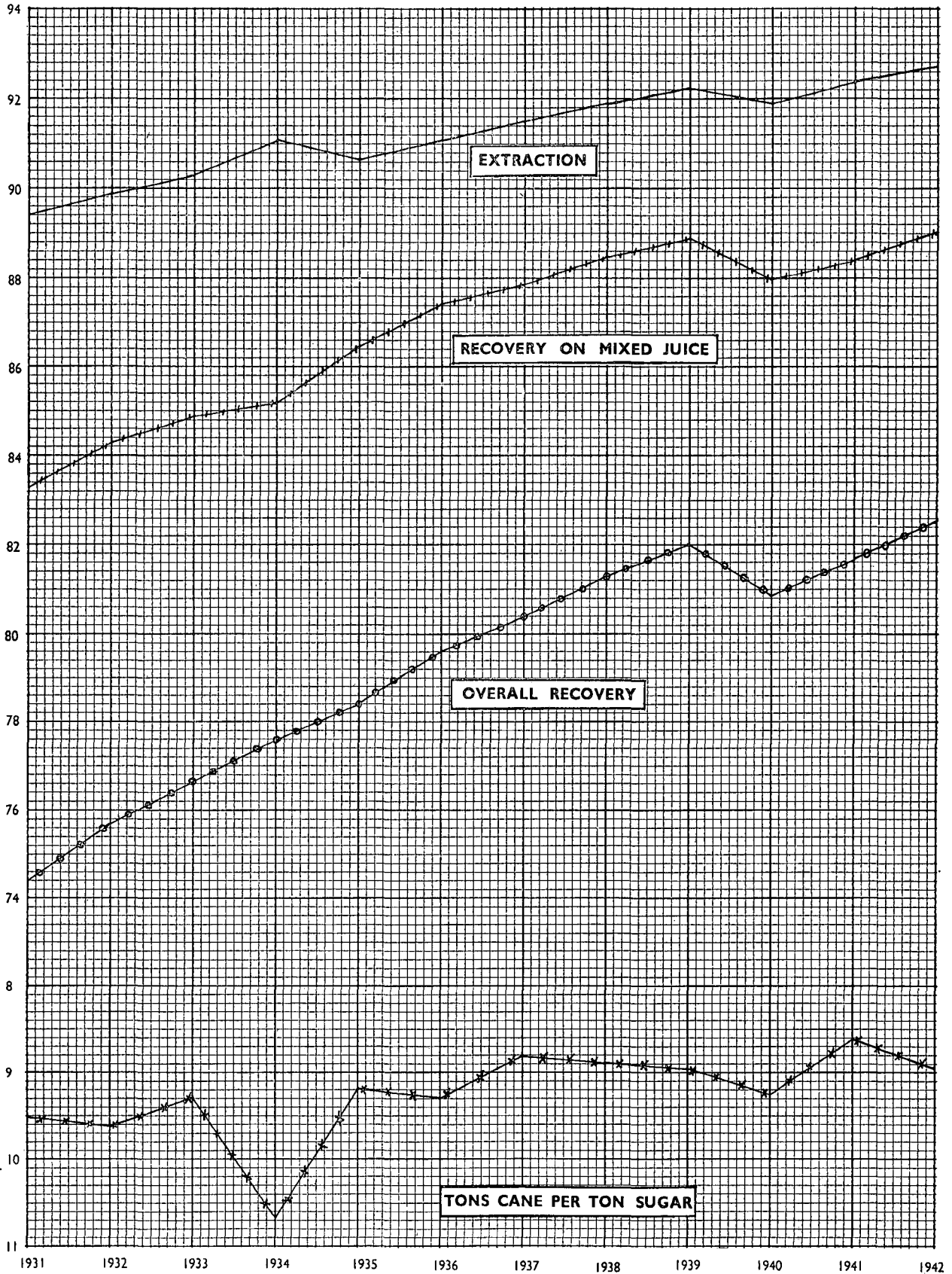
COUNTRY .. .. .	NATAL											
YEAR .. .. .	1932.	1933.	1934.	1935.	1936.	1937.	1938.	1939.	1940.	1941.	1942.	
<b>CANE—</b>												
Per cent. Sucrose .. .. .	13.48	13.88	11.88	13.65	13.30	13.92	13.64	13.41	13.19	14.00	13.40	
Per cent. Fibre .. .. .	15.65	15.78	15.24	15.92	15.01	15.14	14.51	14.80	15.56	15.66	15.24	
<b>JUICES—</b>												
Purity of First Crusher .. .. .	87.89	87.46	86.03	89.35	88.18	88.15	88.37	88.45	87.44	87.94	88.27	
Purity of Mixed Juice .. .. .	85.30	84.92	84.02	86.49	85.43	85.60	86.36	86.46	85.34	85.67	85.96	
Purity of last Roller Juice .. .. .	79.20	78.26	76.71	78.05	76.87	76.81	76.86	77.07	76.15	77.46	76.86	
Purity of Syrup .. .. .	86.84	86.57	85.53	88.28	87.53	87.70	88.22	88.12	87.11	87.69	87.85	
Drop in purity Crusher to Mixed Juice .. .. .	2.59	2.54	2.01	2.86	2.75	2.55	2.01	1.99	2.10	2.27	2.31	
Drop in purity Crusher to last Roller .. .. .	8.69	9.20	9.32	11.30	11.31	11.34	11.51	11.38	11.29	10.48	11.41	
Drop in purity Crusher to Syrup .. .. .	1.05	0.89	0.50	1.07	0.65	0.45	0.15	0.33	0.33	0.25	0.42	
Increase in purity Mixed Juice to Syrup .. .. .	1.54	1.65	1.51	1.79	2.10	2.10	1.86	1.66	1.77	2.02	1.89	
Reducing Sugar Ratio of Mixed Juice .. .. .	3.09	4.01	4.21	2.65	3.04	3.23	3.08	3.27	3.81	3.35	3.07	
JAVA RATIO .. .. .	76.99	77.27	78.66	76.24	77.44	77.43	78.87	78.70	77.94	77.74	77.67	
<b>BAGASSE—</b>												
Per cent. Sucrose .. .. .	3.83	3.71	3.05	3.48	3.40	3.40	3.30	3.11	3.02	3.03	2.88	
Per cent. Moisture .. .. .	51.89	51.62	52.11	51.93	52.76	52.01	52.17	51.79	51.60	51.50	51.24	
<b>EXTRACTION—</b>												
Imbibition % Cane .. .. .	29.66	30.45	30.25	33.04	32.40	31.84	31.70	31.28	32.59	34.76	32.82	
Sucrose in Mixed Juice % Sucrose in Cane .. .. .	89.86	90.28	91.07	90.64	91.08	91.53	91.90	92.24	91.91	92.37	92.69	
Reduced Extraction (based on 12.5% Fibre) .. .. .	92.19	92.59	92.90	92.94	92.78	93.22	93.18	93.62	93.72	94.13	94.19	
Primary Juice loss .. .. .	54.65	51.88	49.67	49.43	50.71	47.47	47.73	44.67	43.93	41.12	40.66	
<b>FILTER CAKE—</b>												
Per cent. Sucrose .. .. .	4.50	4.04	3.65	3.69	3.20	3.37	2.63	2.19	2.03	1.71	1.19	
Weight % Cane .. .. .	5.41	5.18	5.07	5.01	4.71	4.75	4.74	4.78	5.12	5.63	5.38	
<b>FINAL MOLASSES—</b>												
Purity .. .. .	45.06	44.92	42.58	46.00	43.89	43.69	43.12	42.67	42.91	43.45	43.24	
<b>RECOVERY—</b>												
Sucrose % Cane lost in manufacture .. .. .	3.36	3.27	2.52	2.94	2.71	2.73	2.55	2.42	2.52	2.57	2.34	
Sucrose in Sugar % Sucrose in Cane .. .. .	75.73	76.63	77.59	78.40	79.64	80.41	81.31	81.98	80.86	81.66	82.48	
Reduced Overall Recovery (12.5% Fibre, 85° pur. Mixed Juice)	77.34	78.67	80.14	78.76	80.73	81.33	81.16	81.89	82.07	82.61	82.98	
Sucrose in Sugar % Sucrose in Mixed Juice .. .. .	84.27	84.88	85.20	86.52	87.44	87.85	88.48	88.88	87.98	88.40	88.98	
Reduced Boiling House Recovery (based on 85° pur. Mxd. Juice)	83.89	84.97	86.27	84.74	87.01	87.25	87.10	87.47	87.57	87.76	88.10	
<b>YIELD—</b>												
Tons Cane per ton Sugar .. .. .	9.61	9.28	10.67	9.19	9.29	8.80	8.89	8.95	9.26	8.62	8.93	
Tons Cane per ton Sugar of 96° Pol. .. .. .	9.40	9.03	10.40	8.96	9.06	8.58	8.66	8.73	9.03	8.39	8.69	
<b>LOSSES—</b>												
Sucrose in Bagasse % Sucrose in Cane (A) .. .. .	10.14	9.72	8.93	9.36	8.92	8.47	8.10	7.76	8.09	7.63	7.31	
Sucrose in Filter Cake % Sucrose in Cane (B) .. .. .	—	—	—	1.37	1.14	1.15	0.91	0.78	0.60	0.52	0.41	
Sucrose in Molasses % Sucrose in Cane (C) .. .. .	—	—	—	—	—	—	—	—	—	—	—	
Undetermined Sucrose % Sucrose in Cane (D) .. .. .	—	—	—	10.87	10.30	9.97	9.68	9.48	10.43	10.18	9.80	
Sucrose lost in Boiling House % Sucrose in Cane (B)+(C)+(D)	14.13	13.65	13.48	12.24	11.44	11.12	10.59	10.26	11.03	10.70	10.21	
Sucrose in Total Losses % Sucrose in Cane (A)+(B)+(C)+(D)	24.27	23.37	22.41	21.60	20.36	19.59	18.69	18.02	19.12	18.34	17.52	
<b>SUGAR—</b>												
Average Polarization of all Sugars .. .. .	98.14	98.68	98.45	98.42	98.43	98.50	98.60	98.36	98.44	98.58	98.65	

## COMPARATIVE RESULTS FOR RECENT YEARS.

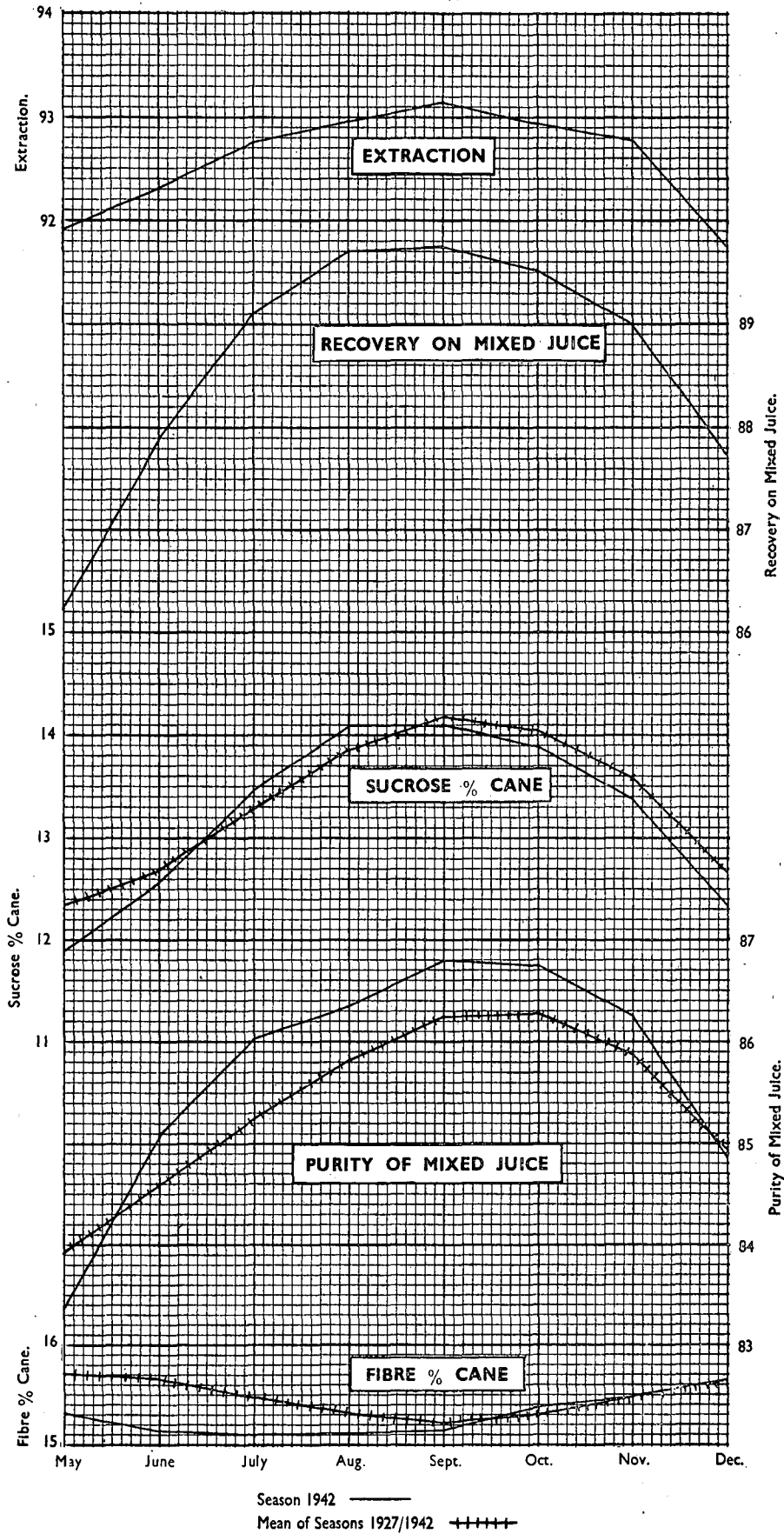
COUNTRY .. .. .	MAURITIUS.			PUERTO RICO.			HAWAII.			TRINIDAD.	
YEAR .. .. .	1939.	1940.	1941.	1940.	1941.	1942.	1939.	1940.	1941.	1940.	1941.
<b>CANE—</b>											
Per cent. Sucrose .. .. .	12.71	13.29	13.30	12.79	13.27	12.73	12.31	12.23	11.95	13.40	12.69
Per cent. Fibre .. .. .	13.00	12.60	12.60	13.36	13.19	13.42	13.94	13.51	13.44	14.34	14.25
<b>JUICES—</b>											
Purity of First Crusher .. .. .	87.40	88.10	88.10	85.25	85.35	84.82	85.17	84.62	85.36	85.75	82.67
Purity of Mixed Juice .. .. .	84.60	85.30	85.30	82.61	82.70	82.21	82.27	81.86	82.38	83.55	80.33
Purity of last Roller Juice .. .. .	73.50	74.50	74.20	—	—	—	67.55	67.70	68.76	75.76	73.36
Purity of Syrup .. .. .	84.90	85.80	85.90	83.80	84.28	83.59	83.75	83.16	83.51	—	82.08
Drop in purity Crusher to Mixed Juice .. .. .	2.80	2.80	2.80	2.64	2.65	2.61	2.90	2.76	2.98	2.20	2.34
Drop in purity Crusher to last Roller .. .. .	13.90	13.60	13.90	—	—	—	17.62	16.92	16.60	9.09	9.31
Drop in purity Crusher to Syrup .. .. .	2.50	2.30	2.20	1.45	1.07	1.23	1.42	1.46	1.85	—	0.59
Increase in purity Mixed Juice to Syrup .. .. .	0.30	0.50	0.60	1.19	1.58	1.38	1.48	1.30	1.13	—	1.75
Reducing Sugar Ratio of Mixed Juice .. .. .	4.20	4.00	4.00	—	—	—	—	—	—	8.02	10.03
JAVA RATIO .. .. .	79.04	79.51	80.12	79.29	79.37	78.92	86.54	86.49	86.72	78.00	77.38
<b>BAGASSE—</b>											
Per cent. Sucrose .. .. .	2.60	2.62	2.64	2.56	2.65	2.57	1.77	1.76	1.76	3.28	3.41
Per cent. Moisture .. .. .	44.70	44.60	44.50	48.03	48.28	48.41	43.80	44.14	43.53	47.73	48.27
<b>EXTRACTION—</b>											
Imbibition % Cane .. .. .	20.49	20.78	20.42	24.68	25.76	24.67	38.51	37.35	36.35	24.85	22.29
Sucrose in Mixed Juice % Sucrose in Cane .. .. .	94.90	95.20	95.20	94.26	94.30	94.22	96.31	96.34	96.32	92.68	91.82
Reduced Extraction (based on 12.5% Fibre) .. .. .	95.10	95.20	95.10	94.68	94.64	94.67	96.75	96.65	96.61	93.75	92.97
Primary Juice loss .. .. .	34.13	33.30	33.30	37.22	37.51	37.29	22.78	23.43	23.70	43.73	49.22
<b>FILTER CAKE—</b>											
Per cent. Sucrose .. .. .	7.30	7.30	7.60	2.60	2.48	2.74	0.84	0.79	0.84	4.20	4.38
Weight % Cane .. .. .	1.61	1.56	1.60	2.31	2.42	2.19	5.47	5.18	5.27	2.22	1.97
<b>FINAL MOLASSES—</b>											
Purity .. .. .	39.70	39.70	38.70	31.69	30.67	31.30	33.73	33.67	35.46	31.71	32.90
<b>RECOVERY—</b>											
Sucrose % Cane lost in manufacture .. .. .	2.06	2.01	1.98	1.67	1.72	1.73	1.46	1.41	1.48	2.12	2.59
Sucrose in Sugar % Sucrose in Cane .. .. .	83.80	84.86	85.10	86.94	87.04	86.41	88.10	88.48	87.65	84.18	79.61
Reduced Overall Recovery (12.5% Fibre, 85° pur. Mixed Juice) .. .. .	84.45	84.68	84.92	88.52	88.50	88.27	89.99	90.38	89.44	86.02	84.06
Sucrose in Sugar % Sucrose in Mixed Juice .. .. .	88.40	89.14	89.50	92.23	92.31	91.71	91.47	91.85	91.00	90.83	86.70
Reduced Boiling House Recovery (based on 85° pur. Mxd. Juice) .. .. .	88.80	88.95	89.30	93.49	93.51	93.24	93.01	93.51	92.58	91.75	90.42
<b>YIELD—</b>											
Tons Cane per ton Sugar .. .. .	9.26	8.61	8.71	8.72	8.40	8.82	8.91	9.01	9.31	8.58	9.57
Tons Cane per ton Sugar of 96° Pol. .. .. .	9.01	8.39	8.48	8.63	8.31	8.73	8.78	8.88	9.17	8.51	9.50
<b>LOSSES—</b>											
Sucrose in Bagasse % Sucrose in Cane (A) .. .. .	5.10	4.80	4.80	5.55	5.50	5.78	3.69	3.66	3.68	7.32	8.18
Sucrose in Filter Cake % Sucrose in Cane (B) .. .. .	0.92	0.86	0.91	0.47	0.45	0.47	0.37	0.34	0.37	0.59	0.68
Sucrose in Molasses % Sucrose in Cane (C) .. .. .	—	—	—	6.72	6.63	6.91	7.30	7.69	8.44	7.11	10.25
Undetermined Sucrose % Sucrose in Cane (D) .. .. .	10.18	9.48	9.19	0.32	0.38	0.43	0.54	-0.17	-0.14	0.80	1.28
Sucrose lost in Boiling House % Sucrose in Cane (B)+(C)+(D) .. .. .	11.10	10.34	10.10	7.51	7.46	7.81	8.21	7.86	8.67	8.50	12.21
Sucrose in Total Losses % Sucrose in Cane (A)+(B)+(C)+(D) .. .. .	16.20	15.14	14.90	13.06	12.96	13.59	11.90	11.52	12.35	15.82	20.39
<b>SUGAR—</b>											
Average Polarization of all Sugars .. .. .	98.70	98.50	98.60	96.99	97.03	97.03	97.46	97.45	97.48	96.76	96.69



EXTRACTION AND RECOVERY FIGURES, 1931/1942.



EXTRACTION AND RECOVERY FIGURES AND SUCROSE % CANE, PURITY OF MIXED JUICE, AND FIBRE % CANE, BY MONTHS.



## APPENDIX.

**SUGARCANE STATISTICS, 1941/42 CROP, BASED ON THE DEPARTMENT OF CENSUS  
"SPECIAL CENSUS OF SUGARCANE PLANTATIONS (EUROPEAN ONLY)."**

This census report was received later than usual this year, so that it was not possible to include extracts and comments based on it in the "Annual Summary" presented to the South African Sugar Technologists' Association Annual Conference in April last.

The report embodies data for the period 1st May, 1941, to 30th April, 1942, and therefore refers to the 1941/42 cane crop, which had been influenced not only by the very unfavourably distributed (though not generally deficient) rainfall of 1940, but also by the equally badly distributed and record low rainfall of 1941. The rainfall for 1941 ranged from about 20 inches in the extreme north and south of the sugar-growing belt of the coast to 39 inches in the wettest part of the coast, an average of 26.18 inches or 63.9 per cent. of the 13-year annual average from 44 recording stations in the sugar belt.

The area of cane harvested showed a considerable falling-off in every district except those of Mtunzini and Eshowe, where there was a slight increase in acreage of cane harvested but, like everywhere else, a great falling-off in quantity of cane harvested and in yield of cane per acre.

The area of cane harvested, 161,137 acres, has shown no tendency to increase since 1934, the first season when an appreciable proportion of cane varieties other than Uba was harvested (4 per cent.) and the area harvested was 172,447 acres.

There are indications, however, from the great increase in area of plant cane, from 78,564 acres in 1941 to 106,702 acres in 1942, that the crop to be harvested during the next few seasons at least will be considerably greater than in the past, given anything like normal or better than normal weather conditions. During the 1941-42 season 66,965 acres of land were ploughed out for replanting, of which 28,621 acres were replanted the same season and 5,570 acres of virgin land recorded planted; during the 1940-41 season 62,135 acres of land were ploughed out, of which 21,192 acres were planted the same season as well as 4,308 acres of virgin land.

This tendency to replant extensively has unfortunately reduced the ratio of long-fallowed to short-fallowed land from 2.88 in 1939 to 1.93 in 1940 and 1.34 in 1941, thus reverting to the proportions prevailing in the years previous to 1938, before the benefits of long-fallowing with green manuring were so much realized and before effects of over-production of cane became very acute.

Herewith is the proportion of the total crop contributed by various districts:—

District.	Per cent. of total.
Port Shepstone...	1.2 lowest on record.
Umzinto ... ..	12.7 lowest on record.
Durban ... ..	4.7 highest since 1934.
South Coast ... ..	18.6 lowest on record.
Inanda ... ..	17.4 highest since 1935.
Lower Tugela ... ..	25.6 lowest since 1933.
North Coast ... ..	43.0 above average of recent years.
Natal (excluding Zululand) ... ..	61.6 lowest since 1930.
Mtunzini ... ..	11.8 highest since 1931.
Eshowe ... ..	6.0 highest on record.
Lower Umfolozi ... ..	16.7 about the average.
Hlabisa ... ..	3.8 highest on record.
Zululand ... ..	38.4 highest since 1930.

As already indicated, the total quantity of cane harvested in 1941-42 was relatively small, being 3,602,389 tons, or over 1,000,000 tons less than in the two preceding seasons and the smallest since 1935.

The deficiency was particularly marked in the lower South Coast area, where the rainfall deficiency was the greatest both in 1940 and 1941. Thus the Port Shepstone division, with only 43,704 tons of cane, and Umzinto, with 457,518 tons, had the smallest crops since 1927.

Compared with these figures the shortfall in the Zululand areas were comparatively light.

These comparisons conform to those of the relative yields of cane per acre by districts. Thus the average yield of cane per acre was only 13.73 tons in Port Shepstone district and 16.47 tons for Umzinto, compared with averages over the four preceding seasons of 23.88 and 23.72 tons respectively. Every district showed a considerable falling-off in yield, the least diminution being shown in the Mtunzini and Eshowe areas, where it was only 2.47 and 2.78 tons per acre respectively compared with the average of the four preceding seasons; these two areas, as usual, had the highest rainfall during 1941, as well as the lowest relative deficiency of rainfall.

The yield of cane per acre for the whole crop was 22.36 tons per acre, the lowest since 1936; but when the crop consisted wholly of Uba this yield was only exceeded once, in 1930, when it was 22.39 tons after the abundant rains of the latter half of 1929.

The highest yield of cane per acre was again recorded in the Inanda district for the third successive year, with an average of 28.20 tons per acre; Hlabisa came next with 26.31 tons, closely followed by Lower Umfolozi with 26.10 tons. The yield for Zululand as a whole was 24.55 tons per acre, and the rest of Natal 21.18 tons, comprising the North Coast (between the Umgeni and Tugela Rivers) 23.64 tons, and the South Coast 17.05 tons of cane per acre.

The yield of Uba cane per acre ranged from 10.67 tons in the Port Shepstone area and 11.73 tons in Hlabisa to 20.78 tons for Inanda district. The yield for all other varieties combined varied from 14.17 tons per acre for Port Shepstone to 30.56 tons for Inanda, 27.17 tons for Hlabisa and 26.98 tons for Lower Umfolozi.

The proportion of new varieties under cultivation by districts ranged from 80.1 per cent. in Umzinto and 85.9 per cent. in Lower Tugela to 96.4 per cent. in Lower Umfolozi, 96.5 per cent. in Hlabisa, and 96.6 per cent. in Eshowe.

There is now very little Uba cane younger than second ratoons, the proportions being as follow:—

Total area under cane 30th April, 1942—		Per cent. of Uba.
	Acres.	
Plant cane ... ..	106,702	0.4
First ratoon... ..	66,184	1.5
Second ratoon ... ..	77,114	6.1
Third ratoon ... ..	49,680	17.7
Fourth ratoon ... ..	23,528	39.9
Other ratoons ... ..	19,562	72.2
Total crop ... ..	342,770	11.2

The figures for the 1941-42 crop harvested show similar relations.

Area reaped, yield of cane, and average yield per acre—

	AREA REAPED.		YIELD.		TONS PER ACRE.		
	Acres.	Per cent. Uba.	Tons of cane.	Per cent. Uba.	Uba.	Non-Uba varieties.	All
Plant cane ...	32,403	1.4	928,300	1.1	22.1	28.7	28.6
First ratoon ...	42,008	3.1	1,019,776	2.6	20.2	24.4	24.3
Second ratoon ...	39,710	11.1	843,059	9.0	17.2	21.7	21.2
Third ratoon ...	27,462	39.1	500,048	32.8	15.3	20.1	18.2
Fourth ratoon ...	10,782	62.4	185,377	54.1	14.9	21.0	17.2
Other ratoons ...	8,762	84.6	125,829	76.3	13.0	22.1	14.4
Total ...	161,127	19.3	3,602,389	13.1	15.2	24.1	22.4

There were in April, 1942, still 85,296 acres of virgin land suitable for sugarcane not yet planted, and 318,457 acres on established sugar farms not available or unsuitable for planting

cane. The production of sugar is therefore capable of considerable expansion extensively by increasing the area under cane, as well as intensively by improving the yield of cane and of sugar per acre; but the question naturally arises of a permanent remunerative market for this potential output.

We have mentioned previously the difficulty of arriving at the average age of the cane of each crop when harvested. There is evidence, however, to show that there has been a slight but definite tendency to cut cane at a lesser age since the new varieties came into cultivation.

Thus during the five seasons ending 1931, when practically no varieties other than Uba were harvested, the average proportion annually harvested of the total area under cane was 45.1 per cent., while for the ten years ending 1941, during which the proportion of Uba in the crop diminished from 99.997 per cent. to 8.7 per cent., the average proportion of the crop harvested each season was 48.1 per cent., and was 48.7 per cent. over the latter three years.

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

COMPILED FROM UNION DEPARTMENT OF CENSUS RETURNS.

DISTRICT.	YIELD OF CANE IN TONS.										
	1931.	1932.	1933.	1934.	1935.	1936.	1937.	1938.	1939.	1940.	1941.
PORT SHEPSTONE.. . . . .	60,231	81,823	64,018	67,974	59,259	56,685	75,028	74,856	89,585	81,811	43,704
UMZINTO .. . . .	486,803	638,701	598,308	611,231	553,401	564,427	692,159	663,609	744,981	733,332	457,518
DURBAN AND PINETOWN .. . . .	136,979	159,020	138,096	185,118	137,805	146,676	124,109	188,183	213,958	193,938	167,970
<b>Total South of Umgeni River</b> .. . . .	684,013	879,544	800,422	864,323	750,465	767,788	891,296	926,648	1,048,524	1,009,081	669,192
Ratio to 1926 (= 100).. . . .	153.4	197.3	179.54	193.9	168.3	172.2	199.9	207.9	235.2	226.3	150.1
INANDA .. . . .	375,763	455,816	504,540	618,853	672,954	629,945	615,227	683,261	807,094	816,215	627,454
LOWER TUGELA .. . . .	648,693	754,022	829,067	1,012,784	1,033,633	1,184,839	1,138,342	1,122,528	1,285,888	1,299,769	921,709
<b>Total for North Coast between Umgeni and Tugela Rivers</b> .. . . .	1,024,456	1,209,838	1,333,607	1,631,637	1,706,587	1,814,784	1,753,569	1,805,789	2,092,982	2,115,984	1,549,163
Ratio to 1926 (= 100).. . . .	123.7	146.1	161.00	197.0	206.1	219.1	211.7	218.0	252.7	255.5	187.1
<b>Total for Natal South of the Tugela (excluding Zululand)</b> .. . . .	1,708,469	2,089,382	2,134,029	2,495,960	2,457,052	2,582,572	2,644,865	2,732,437	3,141,506	3,125,065	2,218,355
Ratio to 1926 (= 100).. . . .	134.1	164.0	167.51	195.9	192.9	202.7	207.6	214.5	246.6	245.3	174.1
MTUNZINI .. . . .	331,561	360,130	353,287	414,821	403,121	413,802	435,154	462,271	525,787	507,644	426,608
ESHOWE .. . . .	109,525	105,836	120,099	130,104	128,191	120,935	151,020	193,847	243,829	240,962	217,695
LOWER UMFOLOZI .. . . .	426,516	525,498	582,636	489,547	496,591	616,326	713,675	703,527	777,371	765,381	601,315
HLABISA .. . . .	59,657	74,379	80,552	63,866	50,529	74,276	136,249	140,794	155,775	158,176	138,416
<b>Total North of the Tugela (Zululand)</b> .	927,259	1,065,813	1,136,574	1,098,338	1,078,432	1,225,339	1,436,098	1,500,439	1,702,762	1,672,163	1,384,034
Ratio to 1926 (= 100).. . . .	102.0	117.3	125.08	120.9	118.7	134.8	158.0	165.1	187.4	184.0	152.3
<b>GRAND TOTAL FOR NATAL (including Zululand)</b> .. . . .	2,635,728	3,155,195	3,270,603	3,594,298	3,535,484	3,807,911	4,080,963	4,232,876	4,844,268	4,797,228	3,602,389
Ratio to 1926 (= 100).. . . .	120.8	144.6	149.85	164.7	162.0	174.5	187.0	193.9	221.9	219.8	165.0



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

COMPILED FROM UNION DEPARTMENT OF CENSUS RETURNS.

DISTRICT.	TONS CANE PER ACRE.												
	1929.	1930.	1931.	1932.	1933.	1934.	1935.	1936.	1937.	1938.	1939.	1940.	1941.
PORT SHEPSTONE.. . . . .	17.40	18.60	18.80	19.57	20.47	16.34	14.78	13.51	21.53	29.33	26.52	18.15	13.73
UMZINTO .. . . .	20.10	22.30	20.80	22.24	21.68	20.69	18.20	18.22	22.41	23.50	25.94	23.02	16.47
DURBAN AND PINETOWN .. . . .	24.80	26.77	22.90	21.75	23.00	23.34	20.27	19.77	20.42	27.65	31.76	24.74	20.28
<b>Total South of Umgeni River</b> .. . . .	20.60	22.76	21.00	21.87	21.79	20.76	18.21	18.02	22.04	24.65	27.00	22.83	17.05
Ratio to 1926 (= 100) .. . . .	111.70	123.40	114.10	118.60	118.17	112.58	98.75	97.72	119.52	133.68	146.42	123.81	92.46
INANDA .. . . .	20.50	22.01	19.20	20.14	22.80	25.90	26.76	25.95	26.19	31.27	36.57	33.24	28.20
LOWER TUGELA .. . . .	20.80	22.12	18.20	18.36	19.45	21.62	20.83	22.61	22.90	25.19	29.51	27.35	21.30
<b>Total for North Coast between Umgeni and Tugela Rivers</b> .. . . .	20.68	22.08	18.60	18.99	20.59	23.07	22.83	23.67	3.96	27.19	31.89	29.35	23.64
Ratio to 1926 (= 100) .. . . .	111.10	118.10	100.00	102.00	110.64	123.97	122.68	127.19	1:8.75	146.10	171.36	157.71	127.03
<b>Total for Natal South of the Tugela (excluding Zululand)</b> .. . . .	20.65	22.31	19.40	20.11	21.03	22.21	21.19	21.65	23.27	26.27	30.07	26.87	21.18
Ratio to 1926 (= 100) .. . . .	111.30	120.30	104.60	108.40	113.37	119.73	114.23	116.71	125.44	141.62	162.10	144.85	114.18
MTUNZINI .. . . .	20.70	22.53	18.10	17.55	18.40	19.56	18.75	18.85	20.97	24.67	27.86	27.06	22.67
ESHOWE .. . . .	20.60	20.22	18.90	16.69	17.47	17.95	17.64	17.26	20.69	28.03	29.89	26.62	23.53
LOWER UMFOLOZI .. . . .	21.60	23.83	18.00	18.63	19.84	17.93	18.28	23.04	28.81	34.40	33.25	31.00	26.10
HLABISA .. . . .	17.80	19.55	14.60	16.17	17.31	14.79	12.72	18.60	25.36	30.91	28.81	29.60	26.31
<b>Total North of the Tugela (Zululand)</b> .. . . .	20.92	22.50	17.90	17.86	18.91	18.28	18.00	20.52	24.68	29.62	30.51	28.91	24.55
Ratio to 1926 (= 100) .. . . .	87.80	94.40	75.20	74.95	79.35	76.71	75.54	86.11	103.57	124.30	128.03	121.32	103.02
<b>GRAND TOTAL FOR NATAL (including Zululand)</b> .. . . .	20.75	22.39	18.90	19.29	20.24	20.84	20.10	21.27	23.75	27.37	30.22	27.55	22.36
Ratio to 1926 (= 100) .. . . .	101.50	109.50	92.60	94.40	99.02	101.96	98.34	104.06	116.19	133.90	147.85	134.78	109.38
Rainfall of all Districts (inches) <i>(Average from 44 centres).</i>	48.30	37.20	29.39	48.20	31.12	44.60	46.12	50.10	39.48	40.38	47.63	43.37	26.18

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

COMPILED FROM UNION DEPARTMENT OF CENSUS RETURNS.

DISTRICT.	TONS CANE PER ACRE, 1941/42		PERCENTAGE (AREA) OF NON-UBA CANES UNDER CULTIVATION. APRIL 30TH.							ACREAGE UNDER CULTIVATION. APRIL 30TH. PLANT CANE.		
	Uba.	Non-Uba.	1936.	1937.	1938.	1939.	1940.	1941.	1942.	1941.	1942.	Total Plant Cane, 1942, % Total Plant Cane, 1941.
PORT SHEPSTONE .. .. .	10.67	14.17	19.5	36.3	48.8	56.4	70.6	86.6	93.5	1,963	2,507	127.7
UMZINTO .. .. .	13.08	18.22	23.4	40.8	50.3	56.4	59.9	70.3	80.1	9,447	14,720	155.8
DURBAN AND PINETOWN .. ..	15.51	20.73	30.2	48.9	67.4	76.5	81.7	85.4	88.5	3,501	4,508	128.8
<b>Total South of Umgeni River..</b>	13.15	18.49	24.0	41.4	53.0	60.0	64.7	74.7	82.8	14,911	21,735	145.8
Ratio to 1926 (= 100) .. ..	71.31	100.27	—	—	—	—	—	—	—	—	—	—
INANDA .. .. .	20.78	30.56	24.6	36.4	49.4	59.8	69.7	77.7	86.4	11,175	15,256	136.5
LOWER TUGELA .. .. .	14.97	23.31	32.3	45.5	55.3	64.1	71.0	77.5	85.9	20,696	29,688	143.4
<b>Total for North Coast between Umgeni and Tugela Rivers..</b>	16.94	25.77	29.9	42.5	53.4	62.7	70.6	77.6	86.1	31,871	44,944	141.0
Ratio to 1926 (= 100) .. ..	91.03	138.47	—	—	—	—	—	—	—	—	—	—
<b>Total for Natal South of the Tugela (excluding Zululand) .. ..</b>	15.42	23.11	27.8	42.1	53.2	61.7	68.4	76.5	84.9	46,782	66,679	142.5
Ratio to 1926 (= 100) .. ..	83.13	124.58	—	—	—	—	—	—	—	—	—	—
MTUNZINI .. .. .	14.32	23.76	31.0	50.0	66.6	77.1	83.8	90.9	95.5	10,926	13,274	121.5
ESHOWE .. .. .	12.74	24.33	22.1	49.6	67.5	79.3	89.0	93.8	96.6	5,967	6,544	109.7
LOWER UMFOLOZI .. .. .	14.63	26.98	40.6	61.1	73.1	83.0	89.3	94.0	96.4	12,490	17,371	139.1
HLABISA .. .. .	11.73	27.17	34.5	52.2	70.2	80.0	90.6	92.5	96.5	2,399	2,834	118.1
<b>Total North of the Tugela (Zululand) .. .. .</b>	14.06	25.52	34.5	55.1	69.9	80.2	87.5	92.8	96.1	31,782	40,023	125.9
Ratio to 1926 (= 100) .. ..	59.00	107.09	—	—	—	—	—	—	—	—	—	—
<b>GRAND TOTAL FOR NATAL (including Zululand) .. .. .</b>	15.22	24.06	30.1	46.5	58.8	67.9	74.8	82.1	88.8	78,564	106,702	135.8
Ratio to 1926 (= 100) .. ..	74.46	117.71	—	—	—	—	—	—	—	—	—	—
Average Rainfall of all Districts	26.18	26.18	—	—	—	—	—	—	—	—	—	—