THIRTY-FIRST ANNUAL SUMMARY OF CHEMICAL LABORATORY REPORTS

SOUTH AFRICAN SUGAR FACTORIES: SEASON 1955-56

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A. Production Data for South African Sugar Factories for Seasons 1946-1955

During the 1955-56 season, further records were established for the total tonnages of sugar produced and of cane harvested, transported and crushed. The cane harvest amounted to 8,005,990 short tons, from which 938,980 short tons of sugar (tel-quel) were made. Three factories exceeded the 100,000 tons of sugar mark, i.e. Darnall which made 115,759 tons of raw sugar, Tongaat with 106,840 tons, and Natal Estates which bagged 100,529 tons of sugar, of which 87,236 tons were refined sugar.

The following table (A) shows the sugar and cane productions from the season 1946-47 onward in tons of 2,000 lbs.; the sugar tel-quel:

TABLE A

Sugar Production in South Africa in Recent Years

Season	Sugar Produced	Cane Crushed	Season	Sugar Produced	Cane Crushed
1946-47	474,769	3,990,017	1951-52	532,505	4,805,249
1947-48	512,005	4,543,255	1952-53	670,188	5,722,583
1948-49	607,845	5,216,144	1953-54	725,429	6,221,531
1949-50	561,122	4,929,580	1954-55	828,555	7,374,241
1950-51	685,789	5,721,390	1955-56	938,980	8,005,990

The figures show a steady incline in sugar production from 1951-52 onward and if this increase can be maintained it will not need many years before the one million tons sugar mark will be reached.

B. General

From here on the discussions and the tables in this summary will refer to the results of seventeen of the nineteen factories which have been in operation this season, viz. to those seventeen factories which report regularly to the S.M.R.I. Since these seventeen factories produced 99.1 per cent. of all sugar made and milled 98.9 per cent. of all cane harvested, the data shown and discussed in this summary are largely representative for the whole South African Sugar Industry.

With the increased quantities of cane which had to be crushed, more extensive work was demanded to deal with the crop and a further increase in the average crushing rate was recorded. Actually over 50 per cent. of our factories crushed at a rate of over one hundred tons of cane per hour.

The milling results show a decrease in extraction and an increase in moisture content of the bagasse. A gratifying feature of the process work is the continued upward trend which the boiling house performance has exhibited for some years. This improvement is a result of the better exhaustion of the final molasses in recent years and, with respect to last season's improvement, also of the reduction in undetermined losses and sucrose losses in filter cake.

From an overall point of view we may state that the 1955-56 season has shown improvement, because:

(*a*) the average overall recovery was slightly higher and

(*b*) the average duration of the crushing season has been reduced by eight days, notwithstanding the larger crop handled.

C. Cane Quality

Umfolozi was, previous to 1954, the only factory which regularly crushed late in the season. Since the 1954-55 season Umfolozi has been joined by Pongola, a factory which crushes cane with a much higher sucrose content than the other factories. In recent years, forced by the large crops, other mills had to extend their crushing seasons into the next year. It is therefore that the average sucrose content of the whole season is not a suitable base for comparison between different seasons. A better base can be found in the following table, where the qualities of the cane harvested in similar periods are compared. The season is therefore divided in an optimum period, i.e. the period from the beginning of July and ending at the end of November, and the balance of the crop comprising all other months.

Table B shows that during the last four seasons the portion of cane milled in the optimum period amounted to 65 to 59 per cent. of all cane milled, which is thus considerably less than the average of the previous (1945-1954) decade, which amounted to 70 per cent.

The sucrose content of the cane harvested during the July-November period, i.e. 14.45 per cent., is very satisfactory, when compared with the average of the optimum period of the previous decade of 14.14 per cent. Equally gratifying is the sucrose content of 13.04 per cent. for the balance of the 1955-56 crop, when we consider that 41 per cent. o the crop was harvested in months other than the optimum ones.

TABLE B

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. Cane	Fibre Per cent. Cane	Purity Mixed Juice
Mean 1928-1934					
Optimum period...	76.29	9.46	13.64	15.51	85.37
Balance of crop ...	23.71	10.53	12.56	15.98	84.31
Mean 1935-1944					
Optimum period...	71.51	8.86	13.89	15.21	86.46
Balance of crop ...	28.49	9.79	12.61	15.46	84.72
1945 Optimum period	73.75	8.06	14.66	16.03	86.33
Balance of crop	26.25	9.01	13.21	15.88	85.95
1946 Optimum period	85.64	8.27	14.33	16.20	85.74
Balance of crop	14.36	8.96	13.49	16.27	86.48
1947 Optimum period	77.07	8.65	13.58	15.78	85.88
Balance of crop	22.93	9.57	12.45	15.87	85.43
1948 Optimum period	70.48	8.30	14.26	15.83	86.02
Balance of crop	29.52	9.22	13.01	16.07	85.68
1949 Optimum period	67.49	8.50	13.86	16.20	86.49
Balance of crop	32.51	9.36	12.81	16.17	85.66
1950 Optimum period	64.20	7.92	14.79	15.99	86.69
Balance of crop	35.80	9.14	13.11	15.46	85.88
1951 Optimum period	72.06	8.88	13.47	16.36	84.94
Balance of crop	27.94	9.26	12.98	16.06	84.87
1952 Optimum period	65.02	8.16	14.39	15.98	86.71
Balance of crop	34.98	9.24	12.91	16.32	85.40
1953 Optimum period	64.83	8.26	14.32	16.31	86.07
Balance of crop	35.17	9.15	13.22	16.31	84.75
Mean 1945-1954					
Optimum period...	70.09	8.35	14.14	16.06	86.20
Balance of crop ...	29.91	9.24	12.98	16.05	85.43
1955-56 Season					
Optimum period...	59.14	8.13	14.45	15.60	86.39
Balance of crop ...	40.86	9.12	13.04	15.95	85.27

Finally when we want to compare the average sucrose content of the whole season, i.e. 13.87 per cent., the Table VII at the end of this summary will be helpful. It shows that since the mean sucrose content of the 1945-54 period is 13.79 per cent., last season's sucrose percentage is very gratifying; again keeping in mind that so much more cane has been crushed outside the optimum period than as an average during the 1945-54 period.

We want to draw special attention to the lower fibre content of last season's cane, i.e. 15.75 per cent. compared with a mean fibre content of 15.96 per cent. for the 1945-54 period.

The average mixed juice purity, i.e. 85.96 of last season, is equal to the mean of the 1945-54 period; the reducing sugars sucrose ratio slightly higher (3.40 compared with 3.29).

D. The Changing Varietal Scene

TABLE C

Changes in Percentages of Varieties Crushed during Recent Years

	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56
Uba	0.23	0.16	0.13	—	—	—
P.O.J.	1.99	1.65	1.23	0.69	0.26	—
Co.281	35.99	25.34	10.97	5.71	2.34	1.01
Co.301	37.98	38.30	31.80	28.21	20.97	14.93
Co.331	7.87	12.51	15.87	22.01	25.27	23.46
N:Co.310 ...	15.07	21.12	37.86	41.35	49.41	55.66
N:Co.339 ...	—	—	—	—	0.05	1.35
N:Co.293 ...	—	—	—	—	0.10	1.00
Rest	0.53	0.92	2.15	2.02	1.60	2.59

The 1955-56 crop was again almost entirely composed of three varieties. More than half the cane crushed consisted of N:Co.310, less than a quarter of Co.331 and a seventh of Co.301.

Co.301 obtained its greatest extension in 1949-50, i.e. 41.89 per cent., and has decreased in importance ever since.

Co.331 obtained its greatest extension in 1954-55, i.e. 25.27 per cent., and is also on the decline.

N:Co.310 is still increasing.

Of the recently distributed varieties, the varieties N:Co.339 and N:Co.293 last season reached percentages of 1.35 and 1.00 respectively; compared with 0.05 and 0.10 per cent. during the 1954-55 season. In addition, small quantities of N:Co.276, N:Co.292 and N:Co.334 were crushed during the 1954-55 and the 1955-56 seasons.

Proportions of Cane Varieties Milled Monthly, for the Periods Ended as Shown

Period Ended	28 May 1955	2 July 1955	30 July 1955	27 Aug. 1955	1 Oct. 1955
Variety					
Co.281 ...	2.80	1.86	1.07	0.56	0.62
Co.301 ...	27.73	23.41	16.98	13.92	17.92
Co.331 ...	26.64	23.35	23.74	26.53	26.26
N:Co.310 ...	41.01	48.90	56.00	55.06	50.87
Miscellaneous	1.82	2.48	2.21	3.93	4.33

Period Ended	29 Oct. 1955	26 Nov. 1955	31 Dec. 1955	28 Jan. 1956	3 March 1956
Variety					
Co.281 ...	0.35	0.40	0.87	0.38	3.68
Co.301 ...	3.05	11.69	11.49	10.89	2.50
Co.331 ...	25.01	22.18	20.69	18.21	6.10
N:Co.310 ...	64.97	61.03	60.65	65.00	54.69
Miscellaneous	6.62	4.70	6.30	5.59	33.68

Owing to the steady increase in proportion of N:Co.310 the harvesting of this variety has been accelerated again. In the 1953-54 season we had to wait till August before 40 per cent. of the cane harvested consisted of N:Co.310. In the 1954-55 season this percentage appeared two months earlier. Last season, however, the season started off with 40 per cent. N:Co.310 in the first month of crushing. The highest percentage for any period in the 1953-54 season amounted to 55.76 per cent.; in the 1954-55 season to 59.39 per cent.; and last season to 65 per cent.; in all cases the maximum fell in the January period. Also in the seasons previous to 1953-54 the highest percentage fell in the January period, because Umfolozi in those seasons already crushed a high percentage of N:Co.310.

E. General Factory Performance

The following table (Table E) shows how the last three crops were milled:

TABLE E

Season	1953-54	1954-55	1955-56
Number of Factories	16	17	17
Tons Cane Crushed	6,159,770	7,296,805	7,917,674
Total Hours Mills Open ...	75,524	87,748	84,832
Average Number of Weeks ...	33	36	35
Total Hours Actual Crushing	69,449	78,525	77,390
Average Days Actual Crushing	181	192	190
MEAN CRUSHING RATE (t.c.h.)	89	93	102
MEAN TIME EFFICIENCY (per cent.)	92	89	91
Total Hours of Stoppage per cent. Hours Mills Open ...	8	11	9
Hours of Stoppage due to Cane Shortage per cent. Hours Mills Open	4	5	4

The further increase in the crop was met by a further increase in crushing rate; the result being that notwithstanding the larger crop this season, 35 weeks only were required to mill the crop compared to 36 weeks in 1954-55.

The next table shows the part that each factory played in the increase in joint crushing rate:

TABLE F

Crushing Rates in Tons of Cane per Hour Actual Crushing

Season...	1951-52	1952-53	1953-54	1954-55	1955-56
PG ...	—	—	—	49	65
UF ...	131	137	145	151	158
ZM ...	100½	97	98	113	127
FX ...	90	87	90	100	135
EN ...	15	14	15	16	17
AK ...	87	88	94	103	106
DK ...	30	31	33	40	42
DL ...	119	121	150	171	182
GL ...	77	81	86	97	109
MV ...	33	36	36	40	50
CK ...	40	42½	44	43	42½
TS ...	169	170	171	174	190
NE ...	134	140	146	152	157
IL ...	49	62	59	64	71
RN ...	42	42	42	42	44
ES ...	44	48	—	—	—
SZ ...	88	98	108	124	118
UK ...	28½	28	28	31	33
Sum of all Rates ...	1277	1322	1345	1511	1647

Compared with the aggregate actual crushing rate of the 1952-53 season the joint rate increased from 1277 t.c.h. to 1647 t.c.h., or an increase of 29 per cent. in a period of only four years.

A comparison of average data of recent years with respect to performance of the milling trains is shown in Table G:

TABLE G

Season	1952-3	1953-4	1954-5	1955-6
Tons Cane per hour ...	80.56	88.70	92.92	102.01
Tons Fibre per hour ...	12.97	14.47	14.90	16.06
Lost Absolute Juice per cent. Fibre	40.8	41.7	44.1	45.5
Imbibition per cent. Fibre...	217	200	191	204
Imbibition per cent. Cane...	34.9	32.7	30.7	32.1
EXTRACTION	93.00	92.67	92.40	92.32
Sucrose per cent. Bagasse...	2.65	2.75	2.75	2.91
Moisture per cent. Bagasse...	52.52	52.47	52.92	53.18

The best average figure ever obtained for Lost Absolute Juice in Final Bagasse per cent. Fibre is 39.3 per cent., a figure achieved with the aid of 206 per cent. imbition on fibre during the 1950-51 season. Since that season the average figure for Lost Absolute Juice per cent. Fibre has been steadily increasing; the same has to be said about the moisture content of the bagasse.

A comparison of average data of recent years regarding the performance of the boiling house is shown in Table H:

TABLE H

Season	1952-3	1953-4	1954-5	1955-6
Tons Brix per hour ...	12.20	13.38	13.34	15.20
Tons Sugar per hour ...	9.47	10.37	10.47	11.99
Purity of Mixed Juice ...	86.25	85.61	85.86	85.96
Red. Sugars/Sucrose Ratio	2.92	3.66	3.28	3.40
Purity of Final Molasses ...	39.3	39.5	39.3	39.5
BOILING HOUSE PERFORMANCE	97.2	96.9	97.4	97.9
Boiling House Recovery ...	89.96	89.36	90.04	90.51
Percentage Undetermined Losses	1.46	1.59	1.44	1.21

The improvement in Boiling House Performance when comparing the 1955-56 season's average, i.e. 97.9, with the mean of the previous decade, i.e. 96.8, is caused mainly by the better exhaustion of the final molasses; the 1955-56 average being 39.5 against a 1945-54 average of 40.7. The further increase of Boiling House Performance experienced last season is the result of reduced losses in final molasses, and in filter cake, in addition to lower undetermined losses.

Regarding the higher gravity purity of last season's final molasses, i.e. 39.5 compared with 39.3 in 1954-55, it is not improbable that the true purity should not have shown a rise, perhaps it would even have shown a slight drop. It has mainly been observed that defecation and sulphitation molasses with the same true purity show a different gravity purity; the defecation molasses showing the higher one. Since a greater part of the molasses

produced in the season 1955-56 consisted of defecation molasses than during the previous season, it is possible that the higher purity is only apparent, and not true.

A review of all losses, i.e. in bagasse, in filter cake, in molasses and undetermined for recent years, is given in Table I:

TABLE I

Season	1952-53	1953-54	1954-55	1955-56
Lost in Bagasse ...	7.00	7.33	7.60	7.68
Lost in Filter Cake ...	0.43	0.49	0.54	0.47
Lost in Final Molasses ...	7.45	7.78	7.22	7.08
Undetermined Losses ...	1.46	1.59	1.44	1.21
Boiling House Losses:				
(B)+(C)+(D)	9.34	9.86	9.20	8.76
Total of All Losses:				
(A)+(B)+(C)+(D)	16.34	17.19	16.80	16.44
Overall Recovery	83.66	82.81	83.20	83.56
	(+)			
Sucrose in Cane ...	...100.00	100.00	100.00	100.00

The sucrose losses in filter cake are lower because the quantity of filter cake and the sucrose content of the cake were less. Regarding the reduction in undetermined sucrose losses, the following table (J) shows the individual losses of those factories which weighed their molasses.

TABLE J

Factory Season:	1952-53	1953-54	1954-55	1955-56
PG	not in operation		2.59	1.46
UF	2.00	1.00	1.06	1.55
ZM	1.24	0.69	0.95	1.06
FX	1.04	0.95	1.17	(1.00)
EN	2.30	1.56	1.54	1.18
AK	0.71	1.05	0.74	0.66
DK	3.15	2.20	2.17	1.34
DL	1.12	1.36	1.12	0.72
GL	1.40	1.38	1.54	1.33
MV	1.16	1.26	1.34	0.77
TS	—	1.90	1.36	1.32
NE	2.72	3.34	3.30	1.84
IL	0.36	0.59	0.45	0.96
RN	—	1.41	0.74	0.90
SZ	—	—	—	—
UK	—	—	—	—
Arithmetical Average:	1.56	1.45	1.43	1.14
Estimated Weighted Average:	1.46	1.59	1.44	1.21
Number of Participants:	11	14	15	14

Since, owing to extension of the factory, the molasses scale at Felixton was not in operation during the 1955-56 season, the undermentioned losses of Felixton were calculated in the same manner as described in previous summaries and have been done so far for Sezela and Umzimkulu. In conformity with previous years the ratio of 0.83 was used for these calculations. This resulted in undetermined losses of 1.38 and 1.13 per cent. for Sezela and Umzimkulu respectively. In the case of Felixton, however, a ratio of 0.83 led to an undetermined gain. Assuming an undetermined loss of 1.00 per cent. for Felixton gave a ratio of 0.65. In order to peruse if perhaps the defecation process was the cause of this lower ratio, the ratios for all factories (for the sulphitation and the defecation periods separately) have been calculated.

The results are tabulated in Table K.

TABLE K

Calculated Ratios between Non-Sucrose in Mixed Juice and Non-Sucrose in Total Final Molasses for those Factories which Weighed Their Final Molasses in 1954-55 as well as in 1955-56

	Sulphitation	Defecation Season 1955-56	Average	Average 1954-55
PG ...	0.807	—	0.807	0.82
UF ...	0.728	0.750	0.739	0.82
ZM ...	0.831	—	0.831	0.88
EN ...	0.830	—	0.830	0.77
AK ...	0.731	0.668	0.704	0.74
DK ...	0.830	—	0.830	0.87
DL ...	0.766	0.659	0.798	0.86
GL ...	0.825	—	0.825	0.84
MV ...	0.793	—	0.793	0.76
TG ...	—	0.764	0.764	0.79
IL ...	—	0.751	0.751	0.68
RN ...	0.828	—	0.828	0.88
Arithmetical Averages:	0.797	0.718	0.792	0.81

Perusing the data of Table K, the only conclusion which can be drawn is that in general the ratio has been lower in 1955-56 than in the 1954-55 season. Since Umfolozi shows a higher ratio and Darnall and Amatikulu a lower ratio during the defecation period, a definite conclusion that defecation results in a lower ratio may not be drawn, although it is probably true.

The slightly higher purity of the mixed juice and the lower ratio in 1955-56 than in 1954-55 explains why the percentage sucrose lost in molasses has been lower.

TABLE L

Final Molasses Purities in Recent Years

	1951-52	1952-53	1953-54	1954-55	1955-56
PG ...	—	—	—	41.8	41.1
UF ...	41.8	40.0	39.5	38.9	39.7
ZM ...	40.4	40.9	37.1	37.8	38.2
FX ...	37.8	37.8	38.5	38.5	39.6
EN ...	43.5*	42.1*	40.8*	41.7*	42.6*
AK ...	40.1	36.8	37.7	38.9	39.3
DK ...	38.5*	39.4*	38.4*	39.3*	38.7*
DL ...	38.6	37.6	37.5	37.3	39.4
GL ...	40.1	39.1	39.3	38.7	38.3
MV ...	40.6	40.8	42.0	39.7	40.2
CK ...	38.5	39.5	38.6	39.2	39.6
TG ...	40.5	39.0	38.8	38.5	39.1
NE ...	43.7	47.2	47.3	47.2	45.4
IL ...	42.7	42.0	42.8	40.5	40.3
RN ...	39.0*	40.7*	39.4*	38.6*	39.2*
ES ...	37.8	39.0	—	—	—
SZ ...	38.0	37.7	37.5	36.8	35.4
UK ...	40.9*	39.0*	40.2*	38.5*	38.3
	10	10	8	7	10

**Apparent Purity*

The figures under the columns indicate the number of factories showing molasses purities of more than 39.0. It shows that in 1955-56 a setback was suffered and there are again ten factories with molasses higher than 39.0.

Lime and Other Clarifying Agents

Table III at the end of this summary shows the average consumption figures for lime and other clarifying agents; in the following table (N) the consumptions of the defecation and sulphitation factories are shown separately.

TABLE N

SULPHITATION

	1954-55	1955-56
Lime		
lbs. per ton of cane	4.96	5.03
lbs. per ton of sugar... ...	44.51	42.90
Parts per 1000 parts brix ...	17.44	16.92
Sulphur		
lbs. per ton of cane	1.74	1.99
lbs. per ton of sugar... ...	18.28	17.00
Parts per 1000 parts brix ...	7.16	6.70
Phosphoric		
lbs. per ton of cane	0.60	0.60
lbs. per ton of sugar... ...	5.41	5.09
Parts per 1000 parts brix ...	2.12	2.01

DEFACTION

	1954-55	1955-56
Lime		
lbs. per ton of cane	1.25	1.32
lbs. per ton of sugar... ...	10.28	11.26
Parts per 1000 parts brix ...	4.20	4.47
Phosphoric		
lbs. per ton of cane	0.27	0.19
lbs. per ton of sugar... ...	2.20	1.62
Parts per 1000 parts brix ...	0.90	0.64

During the 1954-55 season the mixed juice of 589,320 tons of cane was treated according to the defecation method and 71,775 tons of sugar were made in this manner. The mixed juice of 5,951,061 tons of cane was treated according to the Natal sulpho-defecation process; 663,627 tons of sugar being made from this cane. Finally to the mixed juice of 756,427 tons of cane the double carbonatation process was applied; 86,799 tons of sugar resulting from this cane.

During the 1955-56 season 2,523,428 tons of cane and 296,729 tons of sugar were handled by the defecation process; 4,542,956 tons of cane and 533,054 tons of sugar by the sulphitation process and 852,190 tons of cane and 100,529 tons of sugar by the carbonatation method.

Table I.—CANE CRUSHED, CANE QUALITY, VARIETIES, SUGARS PRODUCED, TIME ACCOUNT AND THROUGHPUT

FACTORY	PG	UF	ZM	FX	EN	AK	DK	DL	GL	MV	CK	TS	NE	IL	RN	SZ	UK	Totals Averages
Crushing period From	**8.6.55**	**2.6.55**	**2.5.55**	**9.5.55**	**2.6.55**	**3.5.55**	**11.5.55**	**2.5.55**	**19.5.55**	**9.5.55**	**20.4.55**	**26.4.55**	**2.5.55**	**3.6.55**	**9.5.55**	**10.5.55**	**10.6.55**	**20.4.55**
Crushing period To	**25.1.56**	**4.2.56**	**21.2.56**	**3.3.56**	**20.12.55**	**9.2.56**	**22.12.55**	**19.2.56**	**14.1.56**	**13.2.56**	**17.1.56**	**24.12.55**	**27.1.56**	**5.12.55**	**3.12.55**	**10.1.56**	**9.12.55**	**3.3.56**
CANE CRUSHED Tons of 2,000 lbs.	275,437	735,533	697,047	681,591	65,782	567,515	171,102	975,745	505,013	245,165	220,865	884,430	852,190	233,675	176,792	536,332	93,446	7,917,674
CANE CRUSHED *Metric tons*	**249,872**	**667,265**	**632,360**	**618,329**	**59,677**	**514,849**	**155,221**	**885,195**	**458,140**	**222,413**	**182,222**	**802,342**	**773,094**	**211,986**	**160,383**	**486,552**	**84,773**	**7,182,797**
CANE QUALITY																		
Sucrose per cent.	15.58	13.94	14.09	13.05	13.81	13.75	13.64	13.84	14.13	13.78	13.74	13.73	13.93	13.60	14.40	13.73	14.55	13.87
Fibre per cent.	12.69	13.48	16.82	15.97	15.62	16.05	15.48	15.78	15.92	16.25	15.70	15.51	16.57	16.06	16.06	16.97	15.05	15.74
Java Ratio	82.48	79.38	77.46	76.69	75.88	78.61	77.71	77.43	77.58	77.28	77.83	77.29	77.73	77.95	77.17	76.88	80.39	77.87
Tons Cane per ton Sugar	7.65	8.51	8.54	9.29	8.72	8.53	8.89	8.43	8.35	8.60	8.83	8.27	8.48	8.79	8.16	8.55	8.08	8.51
Tons Cane per ton Sugar of 96° Sugar	7.40	8.31	—	—	8.48	8.33	8.62	8.26	8.08	8.42	8.54	8.08	8.17	8.53	7.91	8.27	7.90	8.28
VARIETIES CRUSHED																		
Co.281 per cent.	0.32	1.38	5.65	1.53	—	0.75	0.08	0.31	0.08	0.17	0.02	0.24	0.26	1.12	0.01	—	4.16	1.01
Co.301 per cent.	0.77	2.01	5.71	8.31	0.41	5.44	11.30	13.28	23.63	24.81	21.39	18.53	28.98	10.15	36.12	28.92	8.42	14.93
Co.331 per cent.	4.92	1.96	9.82	17.77	54.33	40.89	35.05	29.98	10.93	36.68	37.15	29.60	23.35	33.00	20.22	35.49	30.33	23.46
N:Co.310 per cent.	93.27	92.87	77.19	65.51	43.42	49.12	48.24	49.98	51.53	33.69	39.58	49.75	44.20	53.20	39.83	21.46	52.11	55.66
N:Co.339 per cent.	0.30	1.20	1.13	1.38	0.10	1.92	1.65	2.08	0.72	2.82	1.06	1.09	1.56	0.01	1.84	0.62	2.87	1.35
N:Co.293 per cent.	0.34	—	0.38	0.66	1.55	1.87	3.68	1.58	0.17	1.74	0.78	0.70	1.30	0.02	1.85	1.72	1.43	1.00
Miscellaneous per cent.	0.08	0.58	0.12	4.84	0.18	0.01	—	2.79	12.94	0.09	0.02	0.09	0.35	2.41	0.13	11.79	0.68	2.59
TOTAL RAINFALL, Year 1955 (ins.)	31.27	32.85	48.24	58.51	47.47	39.49	44.91	43.07	35.78	36.78	36.08	39.87	36.79	35.07	47.75	43.42	48.71	42.14
SUGARS																		
Tons of 2,000 lbs. White Sugar	20,440	—	—	—	4,056	—	9,902	—	38,614	—	13,223	—	87,236	13,939	9,135	35,222	33	231,800
Tons of 2,000 lbs. Government Grade	14,677	12,922	41,492	5,262	1,337	3,483	3,839	17,798	855	5,053	7,964	9,822	13,293	4,739	3,441	4,052	5,766	155,795
Tons of 2,000 lbs. Raw Sugar	900	73,506	40,149	68,094	2,112	63,022	5,502	97,962	21,011	23,467	3,825	96,972	—	7,906	9,102	23,424	5,763	542,717
Total Sugar made Tons of 2,000 lbs.	36,017	86,428	81,642	73,356	7,505	66,505	19,244	115,759	60,480	28,520	25,012	106,794	100,529	26,583	21,679	62,648	11,561	930,312
Total Sugar made *Metric tons*	**32,674**	**78,405**	**74,065**	**66,547**	**6,808**	**60,333**	**17,459**	**105,016**	**59,867**	**25,873**	**22,691**	**96,882**	**91,199**	**24,116**	**19,666**	**56,879**	**10,489**	**843,965**
White Sugar per cent. Total Sugar Made	57	—	—	—	54	—	52	—	64	—	53	—	87	52	42	56	—	25
SO_2 p.p.m. in White Sugar	65	—	—	—	—	—	—	—	—	—	—	—	—	—	—	48	—	—
SO_2 p.p.m. in Government Grade	84	—	54	62	—	49	—	106	78	—	—	—	—	—	—	70	—	—
Safety Factor of Raw Sugar	—	0.30	0.36	0.24	—	0.34	0.34	0.22	—	0.43	—	—	—	0.31	—	—	0.34	—
Polarization of Government Grade	98.47	98.50	98.58	98.66	98.59	98.56	98.20	98.12	98.00	98.14	—	98.39	—	99.14	98.54	98.52	98.24	98.46
Polarization of Raw Sugar	—	98.22	98.28	98.37	98.50	98.34	98.20	97.90	98.00	98.00	—	98.28	—	97.14	98.39	98.31	98.24	98.20
Average Polarization of All Sugars	99.20	98.26	98.43	98.39	98.76	90.35	99.04	97.93	99.18	98.02	99.28	98.29	99.66	98.92	99.01	99.24	98.24	98.65
OVERALL TIME EFFICIENCY (Hours Actual Crushing per cent. Hours Mill Open)	91.41	92.19	92.07	87.92	91.59	90.65	88.17	87.66	93.52	88.65	93.62	89.96	97.97	87.72	96.40	88.79	93.97	91.23
Hours of Stoppage due to Shortage of Cane per cent. Hours Mill Open	2.44	3.12	4.27	8.32	7.43	6.14	6.66	7.03	2.56	4.16	1.36	5.85	0.61	7.96	1.66	9.00	3.92	4.85
Hours Mechanical Losses per cent. Hours Mill Open	6.14	4.69	3.66	3.76	0.98	3.21	5.16	5.31	3.92	7.17	5.02	4.19	1.42	4.32	1.93	2.21	2.11	3.92
THROUGHPUT per Hour Actual Crushing																		
Tons of Cane Crushed	65.19	158.36	127.00	134.86	17.21	106.45	42.17	182.26	108.76	49.58	42.45	189.60	156.89	70.75	43.60	118.13	32.54	102.01
Tons of Fibre Milled	8.27	21.34	21.36	21.54	2.69	17.08	6.53	28.76	17.31	8.06	6.67	29.40	26.00	11.36	7.00	20.05	4.90	16.06
Tons of Brix Processed	10.88	23.92	18.76	18.81	2.52	15.71	6.13	26.77	16.26	7.20	6.15	24.76	23.85	10.56	6.85	17.52	5.17	15.20
Tons of Sugar Bagged	8.52	18.61	14.88	14.51	1.99	12.47	4.74	21.62	13.02	5.77	4.81	19.86	18.50	8.05	5.35	13.81	4.03	11.99

Table. II.—SUCROSE BALANCE, RECOVERIES, BAGASSE, JUICES, FILTER CAKE AND SYRUP.

FACTORY	PG	UF	ZM	FX	EN	AK	DK	DL	GL	MV	CK	TS	NE	IL	RN	SZ	UK	Averages
SUCROSE BALANCE (Sucrose per cent. Sucrose in Cane)																		
Sucrose in Bagasse (A)	7.06	7.59	9.64	10.00	7.47	8.44	8.14	8.39	7.60	8.83	9.24	4.92	6.31	7.68	6.52	7.07	7.31	7.68
Sucrose in Filter Cake (B)	0.56	0.93	0.46	0.43	1.77	0.24	1.46	0.28	0.35	0.60	0.38	0.18	0.67	0.26	0.32	—	0.22	0.47
Sucrose in Final Molasses (C)	7.67	7.09	7.11	—	7.25	6.82	7.42	6.64	6.63	7.05	7.62	7.10	6.80	8.40	7.97	—	—	7.08
Undetermined Losses (D)	1.46	1.55	1.06	—	1.18	0.66	1.34	0.72	1.33	0.77	0.94	1.32	1.84	0.96	0.90	—	—	1.21
Sucrose lost in Boiling House (B)+(C)+(D)	9.69	9.57	8.56	8.87	10.20	7.72	10.22	7.64	8.31	8.42	8.94	8.00	9.31	9.62	9.19	8.46	9.18	8.76
Total of all loses (A)+(B)+(C)+(D)	16.75	17.16	18.20	18.87	17.67	16.16	18.36	16.03	15.91	17.25	18.18	13.52	15.62	17.30	15.71	15.53	16.49	16.44
LOST ABSOLUTE JUICE PER. CENT. FIBRE	55.0	53.6	53.1	57.5	45.3	47.5	47.5	49.3	43.9	48.8	47.5	31.0	36.0	43.8	38.0	39.4	44.9	45.46
BOILING HOUSE PERFORMANCE	96.7	97.2	97.8	98.3	96.0	99.4	96.3	98.5	98.0	97.0	95.9	97.8	97.9	98.0	97.9	98.5	98.0	97.92
Imbibition Water per cent. Fibre	165	171	203	192	235	216	185	241	179	178	186	187	227	215	226	210	248	204.05
Imbibition Water per cent. Cane	20.9	23.1	34.2	30.6	36.7	34.7	28.6	38.0	28.6	28.9	29.3	28.9	37.6	34.5	36.4	35.6	37.3	32.12
EXTRACTION	92.9	92.4	90.4	90.0	92.5	91.6	91.9	91.6	92.4	91.2	90.8	95.1	93.7	92.3	93.5	92.9	92.7	92.32
BOILING HOUSE RECOVERY	89.6	89.6	90.5	90.2	89.0	91.6	88.9	91.7	91.0	90.8	89.1	91.0	90.0	89.6	90.2	90.9	90.1	90.51
OVERALL RECOVERY	83.2	82.8	81.8	81.1	82.3	83.8	81.6	84.0	84.1	82.8	81.8	86.5	84.4	82.7	84.3	84.5	83.5	83.56
FINAL BAGASSE																		
Sucrose per cent. Bagasse	3.63	3.25	3.42	3.38	3.06	2.93	3.20	2.98	2.93	3.33	3.09	1.99	2.39	2.95	2.72	2.53	3.29	2.91
Moisture per cent. Bagasse	53.32	54.43	53.20	54.18	49.67	55.76	51.51	55.61	52.79	51.35	52.41	51.70	51.67	50.76	49.92	52.43	49.19	53.18
Fibre per cent. Bagasse	41.89	41.34	42.33	41.39	46.31	40.52	44.51	40.54	43.51	44.49	43.68	45.62	45.14	45.38	46.51	44.19	46.55	43.02
Weight of Bagasse per cent. Cane	30.29	32.59	39.75	38.58	33.74	39.60	34.78	38.92	36.58	36.53	35.95	34.00	36.71	35.40	34.54	38.40	32.32	36.58
Lower Calorific Value (7,650-18S-86.4W Btu/lb.)	**2978**	**2889**	**2992**	**2908**	**3303**	**2780**	**3142**	**2792**	**3036**	**3153**	**3066**	**3147**	**3186**	**3211**	**3288**	**3075**	**3341**	**3003**
FIRST EXPRESSED JUICE																		
Brix	21.37	20.17	20.69	19.55	20.24	19.89	19.79	20.31	20.62	20.20	19.99	20.17	20.37	20.21	21.01	20.31	20.72	20.33
Purity (Apparent)	88.4	87.0	87.9	87.0	89.7	87.9	88.7	88.0	88.0	88.3	88.3	88.1	88.0	86.3	88.8	87.9	87.4	88.00
LAST EXPRESSED JUICE																		
Brix	4.71	3.73	3.57	4.10	2.14	4.22	4.44	2.94	4.66	3.81	3.64	2.56	2.25	2.31	3.56	4.14	4.60	3.49
Purity (Apparent)	75.8	76.9	76.5	76.2	76.2	78.7	80.2	77.5	79.3	80.7	78.7	74.3	75.0	74.9	76.2	74.9	78.5	76.67
Purity Drop from First Expressed Juice	12.6	10.1	11.4	10.8	13.5	9.2	8.5	10.5	8.7	7.6	9.6	13.8	13.0	13.4	12.6	13.1	8.9	11.33
MIXED JUICE																		
Brix	18.42	16.69	15.63	15.15	14.25	15.52	15.48	16.82	16.26	15.73	15.54	15.86	15.06	15.05	15.43	15.25	15.20	15.60
Purity (Gravity)	86.5	85.3	86.2	84.2	87.1	85.3	86.24*	86.3	87.3	86.4	87.1	86.7	85.9	84.2	85.7*	86.1	84.8*	85.96
Reducing Sugars/Sucrose Ratio	2 18	2 75	3.41	4 27	3.54	3.91	—	3 69	3.18	3.60	2.81	—	3 32	4.30	2 64	3 36	—	3.40
Purity Drop from First Expressed Juice	1.9	1.7	1.7	2.8	2.6	2.6	2.5	1.7	0.7	1.9	1.2	1.4	2.1	2.2	3.1	1.8	2.6	2.04
CLARIFIED JUICE																		
Brix	18.72	16.08	16.25	13.78	13.98	14.35	16.03	14.07	15.74	15.60	15.49	15.83	13.92	15.14	16.07	14.56	15.00	15.42†
Purity (Apparent)	87.0	88.1	86.8	85.6	88.2	86.6	87.7	87.0	88.2	87.0	87.6	87.8	91.7	86.1	86.6	87.2	85.6	87.07†
Reducing Sugars/Sucrose Ratio	2.11	2.51	3.19	3.52	2.84	3.75	—	3.50	—	3.40	—	—	1.54	3.72	2.62	3.23	—	3.13†
Average pH	7.0	7.2	7.4	7.1	6.9	7.3	7.0	7.3	6.8	7.3	6.8	—	6.9	7.4	—	6.9	7.2	7.11†
FILTER CAKE																		
Sucrose per cent. Filter Cake	1.57	2.13	1.30	0.75	3.52	0.67	3.82	0.72	1.00	1.66	1.02	0.63	0.80	0.87	0.70	1.27	0.78	1.18†
Weight of Cake per cent. Cane	5.66	6.08	5	7.40	6.93	4.86	5.20	5.39	5.01	5	5.13	3.84	11.66	4	6.52	—	4	5.28†
SYRUP																		
Brix	58.2	59.3	52.8	52.5	61.8	52.3	51.0	55.6	51.8	52.8	48.1	51.6	60.2	61.5	60.4	59.9	52.6	55.14†
Purity (Apparent)	86.8	87.3	86.8	85.6	88.6	87.0	89.1	87.2	89.0	87.6	87.7	87.8	91.7	85.8	86.6	86.6	85.5	87.19†
Reducing Sugars/Sucrose Ratio	1.87	2.51	3.14	3.47	2.80	3.59	—	3.29	2.95	3.20	—	—	1.53	3.68	2.69	2.83	—	3.02†
Average pH	6.9	6.8	7.1	7.0	6.7	7.1	6.8	6.9	6.7	7.2	—	—	7.1	7.1	—	6.6	7.0	6.92†

*Apparent Purity †Exclusive Natal Estates

Table III.—MASSECUITES AND MOLASSES, CHEMICALS.

FACTORY	PG	UF	ZM	FX	EN	AK	DK	DL	GL	MN	CK	TS	NE	IL	RN	SZ	UK	Averages§
A-MASSECUITE																		
Cub. feet per ton of Brix†	24.2	25.3	19.6	24.2	21.5	23.7	29.7	23.6	26.1	25.7	24.5	19.9	37 4	28 6	—	21 3	22 8	23 26
Brix of Massecuite	91 9	92.8	93.3	92 9	91 3	91 8	90.0	92 5	90.5	91.4	90.4	92 8	91.4	92.0	93.2	92.1	91 6	91.91
Purity of Massecuite	85 0	84 6	86.2	81.4	88.7	84.4	87.7	83.7	89.2	82.8	88.2	87.9	93.8	86.2	86.3	86.3	85.0	85.84
Purity of Molasses	70.3	65.7	65.6	64.6	72.4	65.7	72.9	66.2	72.6	62.4	71.5	68.5	85.1	68.3	69.6	68.9	65.2	68.15
Drop in Purity	14.6	18.9	20.6	16.8	16.4	18.7	14.8	17.5	16.6	20.4	16.7	18.4	8.7	17.8	16.7	17.4	19.8	17.69
Crystal per cent. Massecuite	45.3	51.1	55.9	44.1	54.1	50.0	49.2	47.9	54.8	49.6	52.9	54.2	54.9	51.8	51.2	51.6	52.1	51.05
B-MASSECUITE																		
Cub. feet per ton of Brix†	7.6	8.0	11.4	12.35	9.8	11.2	10.0	11.8	10.2	13.5	14.6	11.1	22.7	11.0	—	10.6	8.2	10.85
Brix of Massecuite	96.5	95.5	97.4	96.6	94.2	95.3	94.0	95.4	94.8	94.2	94.3	95.0	94.2	93.1	97.7	95.3	94.2	95.22
Purity of Massecuite	73.6	73.1	70.8	71.6	74.0	70.9	75.8	71.0	72.3	68.5	73.4	74.5	82.9	75.8	72.2	73.4	73.3	72.76
Purity of Molasses	52.2	49.9	43.3	48.4	57.2	46.4	53.6	48.1	45.8	46.2	48.8	51.4	63.3	52.9	50.3	48.0	50.5	49.57
Drop in Purity	21.4	23.3	26.5	23.2	16.8	24.5	22.2	22.9	26.5	22.3	24.6	23.1	19.5	22.8	21.9	25.4	22.8	23.19
Crystal per cent. Massecuite	43.2	44.3	45.5	43.4	37.0	43.6	45.0	42.1	46.4	39.0	45.3	45.2	50.2	45.1	43.0	46.5	43.4	43.78
C-MASSECUITE																		
Cub. feet per ton of Brix†	6.6	7.0	7.1	7.3	9.3	6.6	7.9	6.4	6.1	6.8	7.0	7.4	7.3	7.6	—	8.0	8.2	7.20
Brix of Massecuite	100.2	98.5	99.2	98.1	96.0	96.3	96.4	96.6	96.0	96.4	96.2	96.7	99.5	96.0	100.7	99.4	96.5	97.44
Purity of Massecuite	61.5	59.7	58.3	59.5	63.6	59.6	62.4	59.6	58.6	56.4	60.5	62.2	68.4	60.0	59.3	58.2	56.1	59.73
Purity of Molasses	40.6	38.7	36.5	39.7	42.6	38.7	38.7	38.8	37.4	40.2	39.6	37.0	44.5	37.6	39.2	36.1	38.3	38.73
Drop in Purity	20.9	21.0	21.8	19.8	21.0	20.9	23.7	20.8	21.2	16.2	20.0	25.2	24.0	22.4	20.1	22.0	17.8	21.00
Crystal per cent. Massecuite	35.2	33.7	34.0	32.2	35.2	32.8	37.3	32.8	32.5	26.1	33.2	38.7	42.9	34.4	33.2	34.3	27.8	33.40
TOTAL CUB. FEET OF ALL MASSECUITES																		
Per ton of Sugar Made	49.1	51.9	48.0	56.9	52.0	52.4	61.5	51.8	52.9	57.5	58.9	47.9	86.8	62.0	—	52.0	50.4	52.28
Per ton of Brix†	38.5	40.4	38.0	43.9	40.6	41.6	47.6	41.9	42.4	46.0	46.0	38.4	67.4	47.2	—	41.0	39.2	41.31
FINAL MOLASSES																		
Brix	90.5	91.9	93.7	92.0	82.8	88.2	84.9	90.2	86.8	86.9	87.6	87.2	90.6	90.4	90.9	91.6	91.1	89.96
Gravity Purity	41.1	39 7	38 2	39 7	42.6*	39.3	38.7*	39.4	38.3	40.2	39.6	39.1	45.4	40.3	39.2*	35.4	38.3	39.58
Reducing Sugars per cent.	—	15.31	12.85	14.36	—	14.56	—	14.16	12.71	13.40	—	14.20	9.46	13.94	—	—	—	14.20
Sulphated Ash per cent.	—	17.71	15.57	12.87	—	11.59	—	12.45	—	—	—	—	14.59	13.60	—	—	—	13.96
Reducing Sugars/Ash Ratio	—	0.86	0.82	1.12	—	1.26	—	1.14	—	—	—	—	0.65	1.02	—	—	—	1.02
Weight of Molasses (at 85° Brix) per cent. Cane	3.21	2.92	3.08	—	2.27	2.82	3.08	2.74	2.82	2.84	3.07	2.86	2.45	3.34	3.44	—	—	2.95
CONSUMPTION OF LIME AND OTHER CLARIFYING AGENTS																		
Lime—lbs. per ton of Cane	6.46	2.76	4.24	3.03	7.66	2.68	5.41	2.25	5.38	6.00	4.65	1.04	CARBONATATION	1.60	5.78	6.80	5.39	3.71
lbs. per ton of Sugar	49.37	23.48	36.19	35.74	66.82	22.85	48.10	18.93	44.90	51.61	41.00	8.64		14.07	46.96	58.15	43.59	31.58
parts per 1,000 parts of Brix†	19.34	9.13	14.35	13.79	26.11	9.07	18.63	7.64	18.00	20.66	16.02	3.47		5.36	18.32	22.92	16.96	12.48
Sulphur—lbs. per ton of Cane	2.74	0.72	1.70	0.86	3.16	0.74	1.93	0.77	1.96	2.45	1.89	—		—	2.33	2.98	2.33	1.28
lbs. per ton of Sugar	20.93	6.15	15.24	8.02	27.59	6.30	17.15	6.50	16.37	21.03	16.71	—		—	19.00	25.52	18.86	10.92
parts per 1,000 parts of Brix†	8.20	2.39	6.04	3.09	10.78	2.50	6.64	2.62	6.56	2.46	6.53	—		—	7.41	10.06	7.34	4.31
Phosphoric—lbs. per ton of Cane	0.82	0.09	0.55	0.24	0.67	0.22	1.20	0.12	0.84	0.33	0.91	0.04		0.06	0.72	0.91	0.58	0.39
lbs. per ton of Sugar	6.27	0.79	4.71	2.24	5.83	1.90	13.51	1.03	7.01	2.80	8.00	0.32		0.51	5.90	7.82	4.65	3.33
parts per 1,000 parts of Brix†	2.46	0.31	1.87	0.86	2.28	0.75	4.14	0.41	2.81	1.12	3.12	0.13		0.19	2.30	3.08	1.81	1.31

*Apparent Purity †Brix present in Mixed Juice

§NOTE—All averages are exclusive of Natal Estates' figures, with the exception of the averages referring to Final Molasses

Table IV.—COMPARATIVE RESULTS OF FINAL DATA FOR RECENT YEARS.

COUNTRY	SOUTH AFRICA									
YEAR	1946.	1947.	1948.	1949.	1950.	1951.	1952.	1953.	1954.	*1955.*
CANE										
Sucrose per cent....	14.21	13.32	13.89	13.52	14.19	13.33	13.87	13.93	13.34	13.87
Fibre per cent.	16.21	15.80	15.90	16.19	15.80	16.28	16.10	16.31	16.03	15.74
JAVA RATIO	77.03	76.99	76.98	76.47	77.42	76.56	77.04	77.07	77.39	77.87
JUICE QUALITIES										
Purity of First Expressed Juice	88.22	88.48	88.12	88.64	88.70	87.60	88.60	87.48	87.94	88.00
Purity of Last Expressed Juice	75.1	75.0	75.5	67.2	75.8	74.5	76.2	76.46	76.81	76.67
Purity of Mixed Juice	85.9	86.24	85.92	86.22	86.40	84.92	86.25	85.61	85.86	85.96
Purity of Syrup	87.44	87.98	87.54	87.93	87.60	96.20	87.65	86.46	87.13	87.19
Purity Drop First to last Expressed Juice	13.08	13.45	12.58	12.48	12.90	13.10	12.40	11.02	11.13	11.33
Purity Drop First to Mixed Juice	2.36	2.24	2.20	2.42	2.30	2.68	2.35	1.87	2.08	2.04
Purity Drop First to Syrup	0.75	0.47	0.56	0.71	1.10	1.40	1.20	1.02	1.27	0.81
Purity Increase Mixed Juice to Syrup	1.60	1.75	1.64	1.71	1.30	1.30	1.40	0.85	0.81	1.23
Reducing Sugar/Sucrose Ratio of Mixed Juice	3.30	2.95	3.67	3.11	3.12	3.52	2.92	3.66	3.28	3.40
Reducing Sugar/Sucrose Ratio of Syrup	2.80	2.62	3.07	2.55	2.81	3.25	2.66	3.31	3.01	3.02
EXTRACTION AND RECOVERIES										
Sucrose lost in manufacture % Cane	2.42	2.26	2.33	2.25	2.32	2.33	2.26	2.39	2.24	2.26
Sucrose in Sugar % Sucrose in Cane (Overall Rec.)	82.94	83.73	83.19	83.35	83.65	82.50	83.66	82.81	83.20	83.56
Sucrose in Mixed Juice % Sucrose in Cane (Extraction)	93.07	93.44	93.32	92.94	93.33	92.98	93.00	92.67	92.40	92.32
Sucrose in Sugar % Sucrose in Mixed Juice (B.H. Rec.)	89.12	89.61	89.14	89.68	89.63	88.72	89.96	89.36	90.04	90.51
Imbibition % Fibre	217	218	214	208	206	215	217	200	191	204
Imbibition % Cane	35.2	34.4	34.1	33.7	32.8	35.0	34.9	32.7	30.7	32.1
Lost Absolute Juice % Fibre in Bagasse	40.5	39.8	39.8	41.0	39.3	40.2	40.9	41.7	44.1	45.5
Boiling House Performance	96.7	96.8	96.5	96.9	96.88	96.66	97.2	96.91	97.43	97.92
BAGASSE										
Sucrose per cent....	2.79	2.54	2.67	2.66	2.72	2.57	2.65	2.75	2.75	2.91
Moisture per cent.	50.32	50.46	50.53	50.84	51.22	51.71	52.53	52.47	52.92	53.18
Lower Calorific Value	*3252*	*3244*	*3236*	*3209*	*3176*	*3136*	*3063*	*3057*	*3028*	*3003*
FILTER CAKE										
Sucrose per cent....	0.96	1.06	1.29	1.12	1.20	1.28	0.94	1.05	1.18	1.18
Weight % Cane	5.91	5.99	5.90	5.91	5.51	5.68	6.34	5.86	5.48	5.28
GRAVITY PURITY OF FINAL MOLASSES	41.75	41.10	41.53	41.39	40.50	40.28	39.33	39.46	39.29	39.58
Average Polarization of All Sugars	98.70	98.83	98.93	98.84	98 77	98.80	98.63	98.66	98.51	98.65
YIELD										
Tons Cane per Ton Sugar	8.36	8.84	8.55	8.76	8.32	8.98	8.50	8.55	8.87	8.51
Tons Cane per Ton 96° Sugar	8.14	8.60	8.31	8.52	8.09	8.73	8.27	8.32	8.65	8.28
SUCROSE BALANCE										
Sucrose in Bagasse % Sucrose in Cane (A)	6.93	6.56	6.68	7.06	6.67	7.01	7.00	7.33	7.60	7.68
Sucrose in Filter Cake % Sucrose in Cane (B)	0.28	0.32	0.36	0.34	0.37	0.52	0.43	0.49	0.54	0.47
Sucrose in Molasses % Sucrose in Cane (C)	—	—	—	—	7.97	8.61	7.45	7.78	7.22	7.08
Undetermined Sucrose % Sucrose in Cane (D)	9.85	9.39	9.77	9.25	1.34	1.36	1.46	1.59	1.44	1.21
Boiling House Losses % Sucrose in Cane (B) + (C) + (D)	10.13	9.71	10.13	9.59	9.68	11.28	9.34	9.86	9.26	8.76
Total Losses % Sucrose in Cane (A) + (B) + (C) + (D)	17.06	16.27	16.81	16.65	16.35	17.50	16.34	17.19	16.80	16.44

Table V.—AVERAGE MANUFACTURING RESULTS BY MONTHLY PERIODS FOR S.A. SUGAR FACTORIES REPORTING TO THE SUGAR MILLING RESEARCH INSTITUTE, SEASON 1955-1956

Period ended		28 May, 1955	2 July, 1955	30 July, 1955	27 Aug., 1955	1 Oct., 1955	29 Oct., 1955	26 Nov., 1955	31 Dec., 1955	28 Jan., 1956	3 Mar., 1956
Tons of 2,000 lbs. Cane Crushed	This period	—	1,056,177	915,307	925,095	1,140,322	876,160	825,321	877,473	541,834	201,746
	To date	548,226	1,614,403	2,529,710	3,454,805	4,595,127	5,471,287	6,296,607	7,174,086	7,715 914	7,917,674
Tons of 2,000 lbs. Sugar Made and Estimated	This period	—	115,483	108,065	113,846	145,341	109,506	98,841	99,717	61,671	21,555
	To date	56,408	171,891	279,956	393,802	539,143	648,649	747,490	847,207	908,878	930,312
Tons of Cane per Ton of Sugar	This period	—	9.15	8.47	8.10	7.85	8.00	8.35	8.80	8.79	9.36
	To date	9.90	9.39	9.04	8.76	8.52	8.43	8.42	8.47	8.49	8.51
Sucrose per cent. Cane	This period	—	12.91	13.83	14.48	14.98	14.72	14.08	13.49	13.43	12.96
	To date	12.20	12.67	13.09	13.46	13.84	13.98	13.99	13.93	13.90	13.87
Fibre per cent. Cane	This period	—	15.47	15.47	15.47	15.56	15.63	15.88	16.17	16.43	16.85
	To date	15.72	15.56	15.53	15.51	15.52	15.54	15.59	15.66	15.71	15.74
Java Ratio	This period	—	78.83	78.52	78.43	78.03	77.84	77.32	76.55	76.37	77.99
	To date	78.84	78.84	78.71	78.63	78.47	78.36	78.23	78.03	77.91	77.87
Sucrose per cent. Bagasse	This period	—	2.74	2.89	3.05	3.09	3.06	2.94	2.87	2.86	2.94
	To date	2.50	2.66	2.74	2.82	2.89	2.92	2.92	2.91	2.91	2.91
Moisture per cent. Bagasse	This period	—	52.84	52.65	52.94	52.74	53.12	53.35	53.69	54.03	54.84
	To date	53.35	53.02	52.88	52.90	52.86	52.90	52.96	53.06	53.13	53.18
Extraction	This period	—	92.50	92.60	92.47	92.53	92.43	92.27	91.93	91.72	90.70
	To date	92.58	92.46	92.54	92.52	92.52	92.51	92.48	92.41	92.36	92.32
Boiling House Recovery	This period	—	90.47	90.98	90.71	90.70	90.59	90.96	90.30	91.00	88.80
	To date	88.42	89.78	90.21	90.36	90.46	90.48	90.54	90.52	90.55	90.51
Overall Recovery	This period	—	83.65	84.25	83.87	83.93	83.75	83.93	83.02	83.46	80.53
	To date	81.86	83.05	83.48	83.59	83.69	83.70	83.73	83.65	83.63	83.56
Purity of Mixed Juice	This period	—	85.05	85.82	86.20	86.19	86.88	87.00	86.47	85.28	83.54
	To date	84.34	84.81	85.19	85.48	85.67	85.87	86.02	86.07	86.02	85.96
Reducing Sugar/Sucrose Ratio of Mixed Juice	This period	—	3–64	3.34	3.21	3.34	2.89	2.74	3.10	4.07	5.49
	To date	4.41	3.82	3.64	3.54	3.48	3.38	3.29	3.28	3.36	3.40
Reducing Sugar/Sucrose Ratio of Syrup	This period	—	3.22	3.29	2.89	2.87	3.06	2.24	2.52	3.12	4.69
	To date	3.68	3.29	3.15	3.10	3.06	2.96	2.86	2.83	2.88	3.00
Gravity Purity of Final Molasses	This period	—	38.2	38.4	39.0	39.7	41.1	41.6	40.7	40.8	39.1
	To date	37.5	38.1	38.2	38.4	38.7	39.4	39.5	39.5	39.6	39.6

Table VI.—COMPARATIVE RESULTS FROM OTHER COUNTRIES FOR RECENT YEARS.

COUNTRIES	Mauritius		Philippines		Jamaica		British Guiana		South Africa	
YEARS	1953	1954	1952-53	1953-54	1953	1954	1953	1954	1954-55	1955-56
CANE										
Sucrose per cent.	12.96	13.44	12.63	12.81	12.18	11.94	10.54	10.55	13.34	13.87
Fibre per cent.	11.65	11.68	11.58	11.76	14.31	14.04	15.13	15.17	16.03	15.74
JUICES										
Brix per cent. of First Expressed Juice	18.42	18.78	18.66	18.97	18.38	17.97	17.02	16.90	19.61	20.33
Purity of First Expressed Juice	87.2	88.0	84.4	84.5	84.0	83.8	82.0	82.3	87.9	88.0
Purity of Last Expressed Juice	74.3	74.4	77.0	77.3	76.4	75.9	74.7	75.3	76.0	76.7
Gravity Purity of Mixed Juice	85.1	86.1	83.9	84.1	82.2*	82.0*	79.7*	80.1*	85.9	86.0
Reducing Sugar/Sucrose Ratio	5.1	4.5	—	—	7.95	8.20	8.85	8.45	3.28	3.40
MILLING FIGURES										
Imbibition per cent. Fibre	167	197	100	98	134	184	156	151	191	204
Lost Absolute Juice per cent. Fibre	**44.8**	**42.4**	**62.5**	**60.6**	**33.4**	**35.9**	**48.3**	**51.6**	**44.1**	**45.5**
Imbibition per cent. Cane	19.5	23.0	11.6	11.5	19.2	19.6	23.7	22.9	30.7	32.1
Sucrose Extraction	94.8	95.3	92.5	92.5	94.4	94.5	91.4	91.3	92.4	92.3
Sucrose per cent. Bagasse	2.80	2.71	3.74	3.74	2.38	2.33	2.93	2.95	2.75	2.91
Moisture per cent. Bagasse	47.20	47.40	49.32	49.19	45.46	47.30	47.24	47.47	52.92	53.18
Lower Calorific Value of Bagasse	**3525**	**3506**	**3321**	**3400**	**3684**	**3521**	**3516**	**3496**	**3028**	**3003**
BOILING HOUSE FIGURES										
Boiling House Performance	96.2	97.0	99.1	98.7	97.9	98.2	97.8	97.5	97.4	97.9
Boiling House Recovery	88.5	89.7	91.1	91.0	89.1	89.3	87.8	87.8	90.0	90.5
Undetermined Losses per cent. Sucrose in Cane	—	—	0.48	0.47	1.54	1.52	1.03	2.03	1.44	1.21
AVERAGE POLARIZATION OF ALL SUGARS	98.6	98.5	97.39	97.37	96.91	96.91	96.79	96.89	98.51	98.65
FILTER CAKE										
Sucrose per cent. Cake	6.1	6.1	2.83	2.63	2.46	2.02	1.83	1.93	1.18	1.10
Weight per cent. Cake	1.94	1.99	1.83	2.02	2.28	2.29	2.85	3.11	6.11	5.97
FINAL MOLASSES										
Gravity Purity	37.6	37.3	36.2	35.5	33.2*	32.4*	31.0*	31.4*	39.3	39.6
OVERALL RECOVERY	83.7	85.4	84.3	84.2	84.1	84.3	80.3	80.1	83.2	83.6
TONS CANE PER TON OF 96° SUGAR	8.83	8.36	9.08	8.96	9.37	9.53	11.35	11.36	8.65	8.28

**Apparent Purity*

Table VII—COMPARATIVE DATA OF REPORTING S.A. FACTORIES FROM 1925 TO 1955 INCLUSIVE.

	Per cent. Cane		Tons of Cane per ton of		Extraction	Boiling House Recovery	Overall Recovery	Imbibition		Bagasse		Lost Absolute Juice per cent. Fibre	Mixed Juice		Purity Final Molasses	Boiling House Performance	Number of factories reporting of factories in operation	Percentage of crop covered
	Sucrose	Fibre	Sugar	96° Sugar				Per cent. Cane	Per cent. Fibre	Per cent. Sucrose	Per cent. Moisture		Purity	Reducing Sugar Ratio				
1925	12.55	15.88	10.77	10.46	89.30	81.98	73.28	—	—	4.03	49.38	60.7	84.47	—	44.5	89.4	11 of 25	60.4
1926	12.23	16.01	9.92	9.74	90.86	81.97	74.48	—	—	3.53	**49.33**	52.8	84.65	—	45.3	88.8	13 of 23	73.3
1927	13.66	16.27	9.69	9.48	89.30	83.01	74.13	—	—	4.06	49.89	58.3	85.47	—	46.1	89.6	14 of 21	81.0
1928	13.75	15.88	9.49	9.30	89.47	83.90	75.06	26.3	166	4.10	50.01	59.8	84.90	3.86	45.3	90.8	14 of 25	83.3
1929	12.95	15.52	10.06	9.87	89.02	84.39	75.13	25.5	164	4.07	50.69	63.2	86.04	3.35	45.1	90.7	16 of 25	91.0
1930	13.66	15.82	9.59	9.40	89.78	83.80	74.77	26.6	168	4.20	50.66	57.4	85.88	3.35	45.9	90.2	17 of 23	94.9
1931	13.84	15.75	9.53	9.33	89.40	83.27	74.39	27.9	177	4.22	50.09	60.0	85.27	3.55	45.0	90.0	16 of 22	94.5
1932	13.48	15.65	9.61	9.40	89.86	84.27	75.73	29.7	190	3.83	51.89	58.4	85.30	3.09	45.1	91.1	16 of 23	94.4
1933	13.88	15.78	9.28	9.03	90.28	84.88	76.63	30.4	193	3.71	51.62	55.9	84.92	4.01	44.9	92.2	15 of 23	90.0
1934	11.88	15.24	10.67	10.40	91.07	85.20	77.59	30.2	198	3.05	52.11	57.7	84.02	4.21	45.6	92.9	17 of 23	96.5
Average ...	13.19	15.78	9.86	9.64	89.83	83.67	75.12	27.6	175	3.88	50.57	58.4	85.09	3.65	45.3	90.6	15 of 23	85.9
1935	13.65	15.92	19.19	8.96	90.64	86.52	78.40	33.0	208	3.48	51.93	54.2	86.49	**2.65**	46.6	93.0	17 of 23	97.1
1936	13.30	15.01	9.29	9.06	91.08	87.44	79.64	32.4	216	3.40	52.76	55.6	85.43	3.04	43.9	94.6	17 of 23	96.2
1937	13.92	15.14	8.80	8.58	91.53	87.85	80.41	31.8	210	3.40	52.01	52.4	85.60	3.23	43.7	95.0	17 of 23	96.4
1938	13.64	**14.51**	8.89	8.66	91.90	88.48	81.31	31.7	218	3.30	52.17	53.1	86.36	3.08	43.1	95.4	17 of 23	96.6
1939	13.41	14.85	8.95	8.73	92.24	88.88	81.98	31.3	211	3.11	51.79	49.6	86.46	3.27	42.7	95.7	19 of 22	98.5
1940	13.19	15.56	9.26	9.03	91.91	87.98	80.86	32.6	209	3.02	51.60	48.9	85.34	3.81	42.9	95.3	19 of 22	99.0
1941	14.00	15.66	8.62	8.39	92.37	88.40	81.66	34.8	222	3.03	51.50	45.1	85.67	3.35	43.4	95.6	19 of 22	98.5
1942	13.40	15.24	8.93	8.69	92.69	88.98	82.48	32.8	215	2.88	51.24	45.1	85.96	3.07	43.2	96.2	19 of 22	98.4
1943	13.14	15.26	8.98	8.74	92.97	88.84	83.52	31.6	207	2.76	50.80	43.8	**86.56**	3.18	41.8	96.7	19 of 22	98.6
1944	13.67	15.83	8.67	8.44	93.13	89.27	83.14	33.7	213	2.73	50.23	41.1	86.19	3.49	42.4	96.4	19 of 22	98.4
Average ...	13.53	15.30	8.96	8.73	92.05	88.36	81.34	32.6	213	3.11	51.60	48.9	86.01	3.22	43.3	95.4	18 of 22	97.8
1945	**14.28**	15.99	**8.29**	**8.08**	93.28	89.29	83.30	35.0	**219**	2.77	50.19	39.3	86.23	3.38	42.0	96.4	19 of 21	99.0
1946	14.21	16.21	8.36	8.14	93.07	89.12	82.94	**35.2**	217	2.79	50.32	40.5	85.86	3.30	41.8	96.7	19 of 21	99.2
1947	13.32	15.80	8.84	8.60	**93.44**	89.61	**83.73**	34.4	218	**2.54**	50.46	39.8	86.24	2.95	41.1	96.8	18 of 20	99.8
1948	13.89	15.90	8.55	8.31	93.32	89.14	83.19	34.1	214	2.67	50.53	39.8	85.92	3.67	41.5	96.5	18 of 20	99.1
1949	13.52	16.19	8.76	8.52	92.94	89.68	83.35	33.7	208	2.66	50.84	41.0	86.22	3.11	41.4	96.9	18 of 20	99.2
1950	14.19	15.80	8.32	8.09	93.33	89.63	83.65	32.8	206	2.72	51.22	**39.3**	86.40	3.12	40.5	96.9	17 of 19	99.2
1951	13.33	16.29	8.98	8.73	92.98	88.72	82.50	35.0	215	2.57	51.71	40.2	84.92	3.52	40.3	96.7	17 of 19	99.5
1952	13.87	16.10	8.50	8.27	93.00	89.96	83.66	34.9	217	2.65	52.53	40.8	86.25	2.92	**39.3**	97.2	17 of 19	99.3
1953	13.93	16.31	8.55	8.24	92.67	89.36	82.81	32.7	200	2.75	52.47	41.7	85.61	3.66	39.5	96.9	16 of 18	99.3
1954	13.34	16.03	8.87	8.65	92.40	**90.04**	83.20	30.7	191	2.75	52.92	44.1	85.86	3.28	**39.3**	97.4	17 of 19	99.2
Average ...	13.79	15.96	8.60	8.36	93.04	89.46	83.23	33.8	210	2.69	51.32	40.6	85.95	3.29	40.7	96.8	18 of 20	99.3
1955	13.87	15.74	8.51	8.28	92.32	**90.51**	83.56	32.1	204	2.91	53.18	45.5	85.96	3.40	39.6	**97.9**	17 of 19	99.1

During the reading of the summary Mr. Perk drew attention to the fact that the average ratio of 0.83 had been used by him alone and only to calculate the molasses weight of those factories which do not weigh their final molasses. In this respect he drew attention to last year's discussion when he had pointed out that the ratio was only a mathematical form and no yardstick for removal of nonsucrose.

Mr. Hendry enquired how many factories in South Africa produced string proof sugar.

Mr. Perk replied that Sezela still boiled such sugar, the volume of which he had included in that of C massequite. In answer to a further question by Mr. Hendry he stated that since mixed juice was not weighed in Australia, the Australian data was not considered particularly suitable for comparison. Another difference was that Australia gave the true purity of final molasses, and although this was a better figure than gravity purity it made comparison difficult.

Mr. Grant (President) asked Mr. Perk, while drawing attention to the increased output of South African mills and the higher absolute juice lost per cent fibre, if the two were not very intimately connected?

Mr. Perk said that he would have liked to have given the same review of obtained crushing rates and capacity ratings as he did last year, but Felixton starting with one tandem and finishing with two prevented his repeating the review. Next year he would put this comparison again in the annual summary.

Mr. Rennie asked how could it be considered that efficiency had improved, whereas the overall recovery figures remained fairly constant.

Mr. Perk pointed out that overall recovery was not a very good figure on which to make such a comparison. Boiling House Performance was a better figure.

Dr. Dodds said he agreed with Mr. Hendry that it would be preferable to have a greater range of foreign countries with which to compare figures. He noticed that the figures from British Guiana, which were usually low, for reasons beyond their control, were generally published in such comparisons, as remarked by a British Guiana representative at the Australian International Congress.

Mr. Perk said that he could only publish the figures he received. Regarding the figures from British Guiana, the Boiling House Recovery was not bad at all when you took the low mixed juice purity into account.

Mr. Hendry asked if further figures from Java could not be published.

Mr. Perk pointed out that the S.M.R.I. regularly received Java data, but the figures were not totalized nor averaged.

Mr. Main pointed out that now Formosa was crushing such a large quantity of N:Co.310, it would be interesting to have their figures. He pointed out that they were getting very high extraction figures on this cane.

Mr. Perk drew attention to two facts which would make comparison of milling data difficult. Firstly, the habit of the N:Co.310 grown in Formosa could be quite different from N:Co.310 grown in Natal. When in Formosa he could not recognize Java varieties, they had a different colour and a different stalk. Secondly, the cane preparation in Formosa is more intense than in Natal. The cane was really disintegrated by two sets of cane knives and a shredder before it arrived at the extracting units i.e., the mills. He would, however, endeavour to get the Formosan figures.

Mr. Barnes said that comparative figures were given in tons of 2,000 lbs. and in metric tons. He suggested that they should also be quoted in avoirdupois tons.

Mr. Perk replied that at the conclusion of the 3rd Congress of the I.S.S.C.T. a resolution was passed to publish all field and factory results in metric units, either exclusively or along with the customary units. Table I of the annual summary complied with this resolution.

Mr. Barnes stated that the big New York Sugar Brokers, Messrs. Willet and Grey expressed their weights in the three systems and, to make comparison easy, he offered a suggestion that the South African figures should be recorded similarly.

Mr. du Toit stated that primarily these figures were meant for domestic consumption. He was pleased, however, that so much attention was paid to them overseas. He considered it quite legitimate to record the British Guiana figures for comparison.

Mr. King said that N:Co.376 and N:Co.292 were distributed about 15 months ago. N:Co.334, however, had not yet been distributed so he would like to know why it should be bracketed with the others and, furthermore, he would like to know where it came from.

Mr. Pearson explained that this cane was grown on Experiment Station property at Umhlatuzi and Chaka's Kraal. The cane was not released to planters, but it was sent into the mill for crushing.