FORTIETH ANNUAL SUMMARY OF CHEMICAL LABORATORY REPORTS

OF SOUTHERN AFRICA SUGAR FACTORIES (SEASON 1964-1965)

By CHARLES PERK

N.B.—The figures in the Annual Summary are as declared by the Mills in their Final Laboratory Reports.

A.—GENERAL (S.A. Factories)

Record Sugar Production: Final production of sugar by the South African Sugar Industry in the past season was a record 1,395,446 short tons, 130,742 tons more than the previous best of 1,264,704 in 1963/64.

With the addition of Swaziland's production to December 30, 1964, when the marketing arrangement with that country ended, total sugar production was 1,491,317 tons.

Note.—For the specification of the grades of sugar manufactured we refer to Table 1 at the end of this Summary.

The first S.A. factory to start was Sezela, opening the 1964/65 season on 26th April 1964, while the season closed on the 20th February 1965, when the last stick of cane passed the Empangeni tandem. The shortest season was had by Glendale; 3695 hours Mill Open or 26 weeks. Empangeni recorded the longest season of all S.A. factories, i.e. 5977 hours Mill Open or 41 weeks.

The total hours Mills Open of all 17 factories was 92,457 hours, rendering an average per Mill of 5439 hours or 37¾ weeks. As the total tonnage of cane crushed amounted to 11,752,031 tons, the average total tonnage crushed per week by the 17 Mills was 311,310 tons of cane.

Ever since the launching of the Sugar Expansion Programme in 1949, Mill owners have taken measures to cope with the expected increase in cane tonnages to be crushed. The table at the foot of the page shows how far they have succeeded in maintaining the duration of the average season at 39 weeks or less.

The following table compares the past season with the previous two crops:

Season	1962/63	1963/64	1964/65
Total Tons Cane Crushed	10,749,410	10,956,448	11,752,031
Number of Mills crushing	17	17	17
Total Hours Mills open	97,100	91,038	92,457
Total Hours Actual crushing	90,034	82,111	85,266
Overall Time Efficiency	93%	90%	92%
Number of Weeks per Average Season	40	37½	37¾

The 1964/65 season was also remarkable because it was the first time in the history of the S.A. Sugar Industry that six Mills crushed more than 1,000,000 tons of cane and produced more than 100,000 tons sugar each. These Mills are:

1964/65	Tons Cane	Tons Sugar
Tongaat	1,470,420	171,797
Darnall	1,149,165	140,522
Gledhow	1,175,276	135,067*
Umfolozi	1,046,324	126,796
Empangeni	1,045,658	127,022
Mount Edgecombe	1,079,323	125,843

*This is the official tonnage according to the S.A.S.A.

Season	1950/51	1951/52	1952/53	1953/54	1954/55	1955/56
Tons Cane/Week	181,646	176,423	185,237	187,915	199,609	228,451
Number of Weeks	31	27	31	33	37	35
Season	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62
Tons Cane/Week	231,188	227,298	249,486	251,602	268,939	285,981
Number of Weeks	32	37	41	36	32	33
Season	1962/63	1963/64	1964/65			
Tons Cane/Week	271,005	292,016	311,312			
Number of Weeks	40	37½	37¾			

Note (i) During the 1953/54 season Esperanza had stopped crushing, while Pongola had not yet started up.
Note (ii) Commencing with the season 1958/59 Glendale is included in the averages.

The crop results of the last fifteen seasons are tabulated below:

Season	Sugar Production	Cane Crushed	Cane/Sugar Ratio
1950/51 .	685,798	5,721,390	8.34
1951/52 .	532,505	4,805,249	9.02
1952/53 .	670,188	5,722,583	8.54
1953/54 .	725,429	6,221,531	8.58
1954/55 .	828,555	7,374,241	8.90
1955/56 .	938,980	8,005,990	8.53
1956/57 .	848,645	7,533,372	8.88
1957/58 .	959,872	8,594,618	8.85
1958/59 .	1,128,187	10,257,876	9.09
1959/60 .	1,043,301	9,123,395	8.73
1960/61 .	994,363	8,653,968	8.70
1961/62 .	1,098,781	9,390,544	8.51
1962/63 .	1,193,279	10,751,263	9.01
1963/64 .	1,264,704	10,970,338	8.66
1964/65 .	1,395,446	11,752,031	8.42

The Prospects of the 1965/66 Season: The prospects of the next crop are far from good. The summer drought experienced along the South African cane belt was increased in severity by a very dry February and March. The adverse effect of this drought on cane growth can be appreciated when it is realised that the drought was within the normal period of optimum growth and comprise almost the whole of it. The reduced yields resulting from this retarded growth will lead to a short season and postponed opening dates of the Mills.

B.—THE CANE COMPOSITION (S.A. Factories)

The 1964/65 season started with a higher sucrose % cane than usual, which higher level was maintained, resulting in a high average sucrose content for the season. We have to go as far back as the 1945/46 season for an even higher sucrose percentage, i.e. 14.28% which is an all-time record.

Season	Per cent Cane		Tons Cane per Ton		Mixed Juice Purity
	Sucrose	Fibre	Sugar	96°Sugar	
1945/46	**14.28**	15.99	8.29	8.08	86.23
1955/56	13.87	15.74	8.51	8.28	85.96
1956/57	13.35	15.81	8.87	8.62	85.49
1957/58	13.11	15.38	8.93	8.67	85.10
1958/59	13.12	15.92	9.09	8.82	84.46
1959/60	13.66	15.92	8.74	8.44	85.52
1960/61	13.69	15.22	8.70	8.41	85.63
1961/62	13.75	**14.52**	8.54	8.26	86.04
1962/63	13.29	15.52	9.01	8.91	**83.36**
1963/64	13.55	15.50	8.66	8.42	85.30
1964/65	13.90	15.38	8.42	8.20	85.52

Incidentally, this table shows that in 1961/62 the lowest fibre % cane and in 1962/63 the lowest mixed juice purity was experienced.

C.—COMPARATIVE RESULTS OF CANE HARVESTED DURING THE OPTIMUM PERIOD AND CANE CRUSHED BEFORE JULY AND AFTER NOVEMBER, FOR THE PAST FIVE SEASONS (S.A. Sugar Factories)

	Percentage of Crop	Sucrose % Cane	Fibre % Cane	Cane to Sugar Ratio	Purity of Mixed Juice
Season 1960/61					
Optimum Period	69	14.11	15.16	8.38	86.10
Balance of Crop	31	12.72	15.34	9.62	84.37
TOTAL CROP	100	13.69	15.22	8.70	85.63
Season 1961/62					
Optimum Period	69	14.11	14.46	8.23	86.69
Balance of Crop	31	12.98	14.63	9.18	84.52
TOTAL CROP	100	13.75	14.52	8.51	86.04
Season 1962/63					
Optimum Period	56	13.77	15.32	8.58	83.51
Balance of Crop	44	12.65	15.73	9.63	83.15
TOTAL CROP	100	13.30	15.50	9.01	83.36
Season 1963/64					
Optimum Period	59	13.91	15.38	8.36	86.09
Balance of Crop	41	13.02	15.66	9.06	84.10
TOTAL CROP	100	13.55	15.50	8.63	85.30
Season 1964/65					
Optimum Period	60	14.41	15.20	8.06	86.01
Balance of Crop	40	13.17	15.62	9.01	84.74
TOTAL CROP	100	13.90	15.38	8.38	85.52

As the two seasons in question, i.e. the 1945/46 and the 1964/65 seasons were not equally long and the length of the season affects the average sucrose content, comparison of the results of the optimum periods will give a truer picture:

Results of the Optimum Periods of the same seasons

Season	Per cent Cane		Cane to Sugar Ratio	Mixed Juice Purity
	Sucrose	Fibre		
1945/46	14.66	16.03	8.06	86.33
1954/55	13.79	15.96	8.53	86.42
1955/56	14.45	15.60	8.13	86.30
1956/57	13.84	15.70	8.51	86.19
1957/58	13.73	15.24	8.44	85.96
1958/59	13.77	15.73	8.57	85.10
1959/60	13.99	15.67	8.47	86.06
1960/61	14.11	15.16	8.38	86.10
1961/62	14.11	14.46	8.23	86.69
1962/63	14.10	15.07	8.41	83.48
1963/64	13.90	15.36	8.35	86.16
1964/65	14.40	15.20	8.06	86.07

Comparison of the two tables shows that the sucrose percentages of the two seasons in question are much closer when comparing the Optimum Periods than the seasonal averages. It shows too that in the Optimum Periods of both seasons the same cane/sugar ratio of 8.06 was obtained. Since the sucrose % cane of the 1945/46 season was higher, it indicates that the Overall Recovery of the 1964/65 season has been better (which was greatly due to improved mill performance, aided by a lower fibre content of the cane in 1964/65 season).

In the 30th as well as in the 36th Annual Summary the results of the Optimum Periods compared with those of the Balance of the Crops are given right from the beginning of the time of recording this feature, i.e. from 1928 onward.

D.—ABOUT THE DATA IN THIS SUMMARY

As the official data regarding the Tons of Sugar Produced and the Percentages of Varieties crushed have been received early this year from the South African Sugar Association and the Sugar Industry Central Board respectively, these official data are used as far as possible.

The official sugar tonnage, i.e. 1,395,466 tons for South Africa and the total sugar tonnages according to the Laboratory Reports, i.e. 1,401,817 tons differ materially, because Gledhow and Sezela record on their Laboratory Reports only the sugar passing the rawhouse part of their factories and not the actual sugar bagged. As the official tons of sugar are only at hand once each year, i.e. after all mills have closed down, for tables such as those where part of the season's results are compared with the season's average, the official figures cannot be used; these kinds of tables are completely based on the date of the Laboratory Reports. Therefore for the cane to sugar ratio for the whole season in the table comparing Optimum Periods with the balance of the Crops we will find different final cane to sugar ratios than in the official table on page 2.

In Table 2 the official sugar tonnages and the corresponding cane to sugar ratios are shown, notwithstanding the fact that the other data are all based on the Laboratory Report sugar tonnages. This makes no difference for most of the factories, with exception of Gledhow and Sezela where recoveries, etc. are based on the higher sugar weights, i.e. on the tons of sugar passing the rawhouse scales.

As in Table 6 different periods of the season are compared. Therefore the sugar tonnages and also the cane to sugar ratios are those according to the Laboratory Reports.

E.—THE CHANGING VARIETAL SCENE

As it is of interest to know what varieties were crushed in the season with the highest sucrose % cane, i.e. the 1945/46 season with 14.28% sucrose in cane, the summary of cane varieties harvested includes this time the 1945/46 season also.

Season	1945/46	1960/61	1961/62	1962/63	1963/64	1964/65
UBA	2.83	0.01	0.01	0.01	0.01	0.005
Co.281	67.77	0.01	0.01	0.01	0.01	0.01
Co.290	2.65	0.01	0.01	0.01	0.01	nil
Co.301	28.16	1.18	0.56	0.24	0.12	0.07
Co.331	0.60	12.81	8.97	8.89	6.32	4.41
P.O.J.'s	3.34	0.01	0.01	0.02	0.01	0.01
N:Co.310	nil	59.06	55.65	54.00	50.75	46.91
N:Co.292	nil	2.83	2.36	2.28	2.03	1.32
N:Co.293	nil	4.94	5.23	4.62	4.93	3.72
N:Co.334	nil	0.36	0.42	0.33	0.44	0.42
N:Co.339	nil	4.74	4.75	3.67	3.23	2.57
N:Co.376	nil	10.42	17.03	18.04	21.45	23.36
N:Co.382	nil	0.42	1.11	1.92	1.81	2.87
N:50/211	nil	—	0.01	0.22	1.23	2.84

The table reveals that in the record year 1945/46, 67.77% of all cane crushed consisted of Co.281, the other main variety being Co.301.

The season 1945/46 is also the year of the maximum extension of Co.281. Since then it has been gradually replaced by other varieties. First it was Co.301 which partly replaced Co.281, but after Co.301 had reached its peak of 41.89% in 1949/50, two other varieties came to the fore, replacing not only Co.281, but also Co.301.

These two varieties were Co.331 and N:Co.310. The first never exceeded 25.27% (in 1954/55) and the latter was never higher than 60% (in 1957/58 and 1958/59). The case history of N:Co.310 recalls that of 2878 P.O.J. Like this variety it found greater extension outside than inside the country of origin. A number of years ago more than 90% of the cane planted in Somalia and Taiwan consisted of N:Co.310, an extension it could not obtain in South Africa. With regard to the extension of N:Co.310 in Taiwan, owing to complaints of the Japanese refiners about the high starch content of the Formosan rawsugar, N:Co.310 is now replaced by other varieties, among others F.146, F.148 and F.152. The Giohar plant in Somalia turns out direct consumption (white/sugar).

F.—OPERATIONAL RESULTS OF THE FACTORIES

(1) Operation of the Milling Tandems

In the following table the performance of the tandems is evaluated according to the amount of absolute juice left in the bagasse, after the milling process. The table shows not only the lost juice percentages but also some of the "circumstances" under which the tandems operated and which affected the results. For example, the degree of loading of the tandem is indicated by the specific feed load, being the lbs. of fibre milled per hour and indicated per cu. ft. of Total Roller Volume. Though there may be perhaps not a straight linear connection between "lost juice" and "spec. feed rate", it cannot be denied that there is a strong correlation between the two.

Since the final result obtained with the milling tandem is due to a combination of alternative squeezing and diluting, the amount of water and the number of times imbibition are applied should be mentioned. Again there is not only a strong correlation between "lost juice" and "imbibition rate", but also between "lost juice" and "the number of imbibition steps".

The effect of the imbibition with regard to diluting the residual juice in bagasse is indicated by the "dilution ratio"; the latter being the result of "imbibition rate" as well as of "number of imbibition steps", a high imbibition rate and a high number of steps promoting a high dilution ratio.

Perusing the mill performance table, it reveals that the lost juice percentage ranges from 29 to 63%, the specific feed rates from 26 to 63 lbs. of fibre, the imbibition ratio from 197 to 372 parts per 100 parts of fibre and the imbibition steps from 3 to 6. There is one tandem (Glendale) with only 3 steps, there are five tandems with 4 steps, and three with 6 steps, but the greater part of the tandems use five steps. Umfolozi with 29% lost juice has a specific feed rate of only 26 lbs. fibre/hour/cu.ft. T.R.V. while Marromeu with 62% lost juice pushes 63 lbs. fibre through its mills. Moreover, Umfolozi applies 6 and 5 imbibition steps, against Marromeu's only four. This example illustrates clearly the effect of the "circumstances" on the final result.

Mill	Lost Abs. Juice % Fibre	Specific Feed Rate	Imbibition % Fibre	Number of Imb. Steps	Dilution Ratio
PG .	37	33	298	5	77
UF .	29	26	269	6 + 5	84
EM .	43	64	285	5	78
FX .	39	35	261	5 + 5	75
EN .	40	47	248	4	68
AK .	40	49	261	5	70
DK .	43	55	261	5	74
GD .	51	50	286	3	66
DL .	30	56	372	5	85
GH .	36	49	188	5	78
MV .	49	58	254	5	71
TS .	35	42	207	6 + 5	74
ME .	39	30	249	6	74
IL .	31	49	282	5	82
RN .	38½	46	210	5	70
SZ .	39	46	214	4 + 4	71
UK .	39	63	197	5	78
Mean.	37	47	256	5	75
MH .	45	31	256	5	71
UR .	36	60	226	4	73
LB .	53	52	197	5	64
MR .	62	63	212	4	53
TR .	42	61	168	5	67

The coming season will show a number of changes in the milling scene. Amatikulu in its new appearance will crush with the aid of a 21-roller tandem preceded by a shredder instead of the old 18-roller train with the shredder halfway down the line. The number of mills equipped with pressure feeders will increase by four. Sezela will have replaced three ordinary mills by Walker mills of bigger size, while a Walker mill will be added to the Tongaat tandem. Glendale will have its two-roller crusher replaced by a three-roller one of bigger roller size and preceded by a shredder, not only to be able to increase the crushing rate, but also the performance as in future the number of imbibition steps can be increased from three to four.

The same pattern is followed at Umbombo Ranches viz. the existing 15-roller tandem will be preceded by a three-roller crusher of bigger roller size and a shredder. Here again a higher crushing rate and an increase in the number of imbibition steps is the object.

Umzimkulu is continuing the replacement of existing units by bigger ones, while Renishaw and Melville have started to make such replacement during this off-season.

However, we will have to wait till the 1966/67 season for a real change in the milling scene as that season milling-cum-diffusion will be introduced in the S.A. Sugar Industry; the exponents of this modern trend being the Entumeni Sugar Milling Company and the Co-operative Bark & Sugar Company. At Entumeni a de Smet diffusion plant and at Dalton a B.M.A. (Egyptian) diffuser will be installed; both plants being preceded by a three-roller crusher and followed by two de-watering mills.

Note.—For reasons of steam economy all three mills at Entumeni will be electrically driven by variable speed motors.

In the same season Jaagbaan will start operating — also in the Noodsberg area like the Dalton factory — with a 18-roller mill of advanced design, each mill driven individually by a new system of electric mill drive; here too, heat economy being the main factor in the decision to use electrically driven mills.

DIFFUSION: We have to see the system of milling-cum-diffusion from a point of view of dilution and not of diffusion, as 90% of the cells will be opened after the cane has passed the crusher. In this respect it is of interest to mention that in Egypt where so far two mills preceded the diffusion plants, the juice is only pumped five time around, while here in South Africa where only one mill precedes the diffuser, the juice will be pumped around nine times. However, if no squeezing instrument precedes the diffuser the juice has to be pumped around 18 times. This shows how diffusion-cum-milling is governed by dilution, as is the case with straight milling.

Increasing the number of "imbibition steps" in the event of a diffusion plant is a simple operation. It consists of lengthening the plant by another six or eight feet and installing another juice pump. These alterations carried out on a percolation system of diffuser will increase the total power requirement by approximately 15 kW. However, it is not as simple in the case of straight milling. Here, adding one imbibition step means adding another complete unit, i.e. a three-roller mill, with carrier, gearing, foundations and last but not least, another 650 B.H.P. steam turbine. All this only to increase the number of imbibition steps by one; no other advantages being derived from the adding of another unit. It will not improve the moisture content of the bagasse and if we added the additional unit to increase the capacity, the moisture content may even go up.

In connection with the question of the dilution of the residual juices in the intermediate bagasses as a result of imbibition, we draw attention to the last column of the table under discussion, where the average dilution ratios obtained during the past season by the different tandems are shown.

Study of the table reveals the effect of the number of imbibition steps and of the magnitude of the imbibition rate on the dilution ratio. For example, Glendale's tandem with only *three* imbibition steps recorded a dilution ratio of 66%; Entumeni 68% with *four* steps; however, Entumeni's tandem is preceded by a shredder. As an average for five steps 75% dilution ratio is recorded; however, Darnall with a much higher imbibition ratio than the other mills obtained 85% with five steps. Umfolozi has also a high ratio, i.e. 84%, a moderate imbibition rate, but a low specific load.

In order to illustrate the progress made in recent years by the S.A. Mills with regard to milling performance, the following table will show the lost juice figures of the last six years together with data indicating some of the "circumstances" under which the milling results were achieved.

Mean	Lost Abs. Juice % Fibre	Specific Feed Rate	Imbibition % Fibre
1964/65	36.98	47	256
1963/64	37.47	46	288
1962/63	37.36	42	266
1961/62	38.96	41	253
1960/61	42.03	45	238
1959/60	43.00	46	218

It is a pity that some of the tandems experienced a big improvement only after the season was well on its way, otherwise the improvements of these tandems and of the average of the whole Industry would have been even greater than shown in the previous table.

The Mills recording the best averages for lost juice % fibre are shown here:

Factory	Umfolozi	Darnall	Gledhow	Tongaat	Illovo
% Lost Juice	29	30	36	35	31
% Imbibition	269	372	188	207	282
Spec. Feed Rate	26	56	49	42	49

Umfolozi shows the lowest lost juice, but also the lowest feed rate. Darnall, a close second in lost juice percentage, shows the highest feed rate and the highest imbibition rate.

(2) Fuel Supply and Demand

The following table shows comparative btu consumptions in recent years. All quantities are indicated as btu's available in bagasse and supplementary fuel (oil, coal, wood) *per lb. of Brix in mixed juice.*
Note.—The available heat is expressed as btu's per lb. of Brix, because there is strong correlation between required btu's by the factory and the amount of Brix processed. This is not the case between required btu's and tons cane crushed nor tons sugar produced.

Season	1964/65	1963/64	1962/63	1961/62
Mills	Bag + Supp. = Total	Total	Total	Total
PG	5453 + 1184 = 6637	6110	6680	6456
UF	6085 + 2357 = 8442	8277	8402	8101
EM	7068 + 805 = 7874	7951	8204	7256
FX	6262 + 1281 = 7543	8750	7820	7470
EN	6615 + 355 = 6970	7063	7047	6694
AK	7184 + 212 = 7396	7845	7963	7265
DK	6518 + 146 = 6664	7554	7876	7265
GD	7027 + 104 = 7131	7882	8939	8676
DL	6967 + 14 = 6981	7249	7260	6577
GH	6997 + 604 = 7601	7907	7671	7589
MV	7312 + 690 = 8002	7859	8062	7295
TS	7496 + — = —	—	—	—
ME	7239 + — = 7239	7115	—	—
IL	6838 + 431 = 7269	7795	8150	8507
RN	7434 + Nil = 7434	7250	7416	6638
SZ	7124 + 651 = 7775	7955	7905	7646
UK	6974 + 2 = 6976	7459	7346	7003
Mean	6870 + 635 = 7505	—	—	—
MH	5863 — —	—	7483	—
UR	6706 — —	6563	6614	—
LB	6474 + 560 = 7034	6784	6937	—
MR	6257 + 464 = 6721	7593	7341	—
TR	5835 — —	—	—	—

Again one of the factories will be chosen for explanation; the example being this time: *Glendale*. Below the overall time efficiency and the density of the syrup of this factory, together with the fuel consumption for the last four years, are shown.

Year	1964	1963	1962	1961
Overall Time Efficiency	90.25	86.97	73.61	85.34
°Brix of Syrup	59.63	58.29	55.87	47.33
Btu's per lb. Brix	7131	7882	8939	8676

It is obvious that the lower btu consumption is the result of a better time efficiency and a higher Brix of Syrup.

To conclude this section attention is drawm to the natural fuel available at such factories as Pongola (5453 btu), Triangle (5835 btu) and Mhlume (5863 btu per lb. Brix) compared with factories such as Tongaat (7496 btu) and Renishaw (7434 btu per lb. Brix). It means that the first three factories have to be far more economical with regard to heat requirements than the others, if they want to avoid using supplementary fuel.

(3) Lower Calorific Value of the Final Bagasse

Beginning with the 1951/52 season the Lower Calorific Value (L.C.V.) of the bagasse has been calculated by the S.M.R.I. with the aid of the von Pritzelwitz van der Horst formula:

L.C.V. = 7650 — 18.0 Pol — 86.4 Moisture

As the Mauritius Sugar Industry Research Institute has recently published the result of their investigation into this matter, it seems to be of interest to show Mauritius's formula together with that of another country with a similar formula to ours:

Mauritius L.C.V. = 7470 — 13.5 Pol — 85.5 Moisture.

Queensland L.C.V. = 7783 — 22.1 Pol — 88.27 Moisture.

It shows that the von Pritzelwitz van der Horst formula lies just between the other two. Actually it is nearly equal to the arithmetical average of the Mauritius and Queensland formulae.

Applying the three formulae to a bagasse with 2% Pol and 50% Moisture we arrive at the following results:

v. P. v.d. H. Formula
L.C.V. = 3294 btu/lb.
Mauritius Formula
L.C.V. = 3168 btu/lb. }
Queensland Formula } 3246.5 btu/lb.
L.C.V. = 3325 btu/lb. }

Applying the von Pritzelwitz van der Horst formula to the final bagasse of the factories concerned, the following L.C.V's were obtained:

PG	3011	btu/lb	DL	3106	btu/lb	MH	2999	btu/lb
UF	3071	btu/lb	GH	3021	btu/lb	UR	3194	btu/lb
EM	2769	btu/lb	MV	2966	btu/lb			
FX	3073	btu/lb	TS	3184	btu/lb	LB	2996	btu/lb
EN	**3286**	btu/lb	ME	3076	btu/lb	MR	3018	btu/lb
AK	3182	btu/lb	IL	3060	btu/lb			
DK	2962	btu/lb	RN	3238	btu/lb	TR	3226	btu/lb
GD	3016	btu/lb	UK	2964	btu/lb			

Attention is drawn to the L.C.V. of Entumeni, i.e. 3286 btu/lb; the result of bagasse with a moisture content below 50%!

Average Fuel Consumption

The table showing the btu's in bagasse and supplementary fuel for all factories revealed that the average btu consumption for all Natal factories was 7505 btu per lb. Brix. This result was calculated as follows:

Per lbs. Brix in Mixed Juice:

Average 2.2445 lbs. Bagasse @ 3060.7 btu/lb. = 6870 btu

Average 0.0586 lbs. Coal @ 12000 btu/lb. = 583 btu

Average 0.0144 lbs. Wood @ 3600 btu/lb. = 52 btu

Total: 7505 btu

Assuming that the bagasse was burnt with a boiler efficiency of 60%, the coal with 65% and the wood with 50% B.E., the amount of heat transmitted to the feed water would have been:

Per lbs. Brix in Mixed Juice:

From bagasse 0.60 x 6870 = 4122 btu
From coal 0.65 x 583 = 379 btu
From wood 0.50 x 52 = 26 btu

Total: 4527 btu.

corresponding with 4527/971 or 4.66 lbs steam from and at 212°F, per lb. Brix. This ratio, i.e. 4.66 steam/Brix, is a *too* high value, even where remelting is practised. To improve this ratio the density of the syrup should be raised to well above the 60 degrees and the application of vapour bleeding should be extended, in general.

Mean	B.H.P.	Final Mol. Purity	Mixed Juice		Undetermined Sucrose Loss
			Purity	Ratio	
1964/65	97.07	39.87	85.52	3.32	1.09
1963/64	97.19	39.45	85.30	3.44	1.43
1962/63	96.61	39.62	83.36	5.11	1.07
1961/62	97.10	39.51	86.04	3.31	1.32
1960/61	96.94	40.30	85.63	3.31	0.97
1957/58	98.45	38.52	85.10	3.69	1.04

(4) Boiling House Performance

Boiling House Performance percentages and relevant data are tabulated hereunder in the usual sequence of the factories:

Fact.	B.H.P.	Final Mol. Purity	Mixed Juice		Undetermined Sucrose Losses (per cent)
			Purity	R.S. Ratio	
PG	98.02	38.02*	83.92	3.42	1.06
UF	97.12	40.13	84.12	3.13	0.93
EM	96.02	42.52	85.94	2.93	1.04
FX	97.11	40.17	85.04	3.88	1.27
EN	96.37	40.20*	87.83	2.84	2.09
AK	95.74	42.54	85.48	3.30	1.53
DK	97.19	41.46	87.44	2.49	1.21
GD	98.34	36.32*	85.48	3.24	0.93
DL	97.88	39.53	85.14	3.42	0.99
GH	97.18	39.72	85.08	3.50	1.14
MV	96.70	40.40	86.52	2.90	0.93
TS	97.54	40.54	85.62	3.42	0.27
ME	91.17	37.64	85.36	3.48	1.22
IL	96.72	38.02	85.75	4.15	1.94
RN	95.85	40.70*	87.22	3.42	2.57
SZ	96.64	38.89	86.80	2.71	0.90
UK	97.90	38.13	88.17	—	1.49†
Mean	97.07	39.87	85.52	3.32	1.09
MH	96.29	40.39*	85.08	—	2.10
UR	94.89	40.94	82.62	5.48	0.80
LB	95.84	41.08	86.60	2.58	1.16
MR	95.23	43.45	86.36	2.24	1.92
TR	96.76	34.56	84.38	5.60	0.88

* indicates "Apparent Purity".
† indicates "Estimated Loss".

The same data as above, but this time as averages of South African factories are shown at the bottom of the previous column for the last five seasons, plus the 1957/58 season, the year that the highest B.H.P. in addition to the lowest molasses purity was obtained.

Perusing this table there is one conclusion which we can draw, viz. South Africa will have to reduce the final molasses purity to again obtain Boiling House Performance figures of 98% and higher.

(5) Quantitative Data

The foregoing tables show all comparisons of qualitative figures, viz. figures which can be used to evaluate the standard of performance. The following tables, however, are more reviews than comparisons of data. Since they contain quantitative data as: extraction, boiling house and overall recoveries and tons cane per ton sugar, they can *not* be used for mutual comparisons of the factories. Extraction is affected by the fibre content of the cane and the sucrose content of cane juice. Boiling house recovery is affected by the purity of the mixed juice as well as the purity of the bagged sugar, while overall recovery is affected by all factors affecting extraction and boiling house recovery. Finally, the cane to sugar ratio is affected by all factors affecting overall recovery in addition to the sucrose content of the cane.

Mill	Extraction	Boiling H. Recovery	Overall Recovery	Tons Cane per Ton Sugar
PG . .	95.47	89.58	85.52	8.27
UF . .	95.96	89.35	85.74	8.25
EM . .	92.71	88.93	82.44	8.23
FX . .	93.66	89.24	83.58	8.81
EN . .	94.00	89.89	84.50	8.28
AK . .	93.22	88.40	82.41	8.57
DK . .	93.33	91.17	85.09	7.82
GD . .	91.60	90.59	82.99	8.47
DL . .	95.20	90.29	85.96	8.18
GH . .	94.46	89.04	84.10	8.49
MV . .	91.67	90.27	82.75	8.43
TS . .	93.87	90.25	84.72	8.56
ME . .	93.74	89.35	83.94	8.58
IL . .	95.32	89.70	85.50	8.23
RN . .	93.67	89.81	84.13	8.31
SZ . .	94.27	89.96	84.81	8.29
UK . .	93.86	91.56	85.94	8.12
MH . .	93.62	88.37	82.73	8.21
UR . .	94.48	86.08	81.33	9.17
LB . .	92.66	88.64	82.14	8.50
MR . .	90.64	88.25	79.98	8.20
TR . .	94.01	88.73	83.43	8.32

For example, Doornkop requires only 7.82 tons of cane to produce one ton of sugar; the other factories all requiring more than 8 tons of cane. If we analyse Doornkop's cane to sugar ratio, then it appears that the extraction has been favourably affected by a low fibre content of the cane and a high sucrose content of the cane juice. The boiling house recovery is assisted by a high purity of the mixed juice and a low purity of the final product. A good extraction and a good boiling house recovery resulted in a good overall recovery; the latter combined with a high sucrose content of the cane gave a low cane to sugar ratio. This analysis of Doornkop is not executed to denigrate Doornkop's achievement, but only to illustrate how many factors there are which affect a quantitative data, as ton cane per ton sugar.

The following table is a review of the same quantitative figures as averages of the South African factories for recent years:

Season	Extraction	Boiling H. Recovery	Overall Recovery	Cane to Sugar Ratio
1964/65 .	94.16	89.65	84.42	8.42
1963/64 .	94.08	89.60	84.30	8.66
1962/63 .	94.15	87.01	82.67	9.01
1961/62 .	94.21	89.72	84.53	8.54
1960/61 .	93.35	89.40	83.45	8.74

This season's good Cane to Sugar Ratio is caused by a good Overall Recovery and a high sucrose content of the cane.

(6) Factory Control

Bagasse Weight: The fundamental equation is very old, but nearly as old is the wish to check the result, i.e. to compare the actual bagasse weight with that obtained by inference. Doubt that the actual bagasse weight would tally with the calculated weight was expressed as long ago as 1893.* At that time advocates of bagasse weighing even wanted to replace the cane weighing by bagasse weighing, because they claimed that this would lead to more accurate figures. Later it was suggested to check-weigh the cane by crane scale weighing, avoiding in this manner loss of material caused by mud and trash left in the millyard and loss of weight of the cane due to standing in the hot sunshine after weighing.

Sugar technologists have, however, had to wait until now to receive the answer to the question: "Is the calculated bagasse weight equal to the actual weight of bagasse?" The reason for this delay was two-fold. There were no reliable and accurate, automatic weighing machines suitable for such a bulky (light) material as bagasse on the market in those days. Moreover, the acquisition of such a machine could not be covered by an immediate financial profit.

Though there are now suitable weighers on the market, it had to wait until the introduction of diffusion, before weighing of bagasse could become a reality, because *here* bagasse weighing is a "must". Owing to evaporation of water in the diffusion plant the fundamental equation cannot be applied in the case of cane diffusion; the bagasse weight being required for our *present* cane payment system.

Note.—Direct analysis of cane would make the weighing of bagasse superfluous. *For evaluating the milling performance, "Undiluted Juice % Fibre" could be used. This ratio can be calculated every hour with the aid of the hourly analysis of bagasse and juices; no weights of bagasse, juice or water being required.* For fuel consumption calculations we can calculate the bagasse weight as done in Queensland, viz. with the aid of the ratio of fibre in cane and bagasse.

The Sugar Industry is indebted to the Management of Entumeni Mill for conducting a test during the past season in order to investigate this question before introducing diffusion. From the 7th May till the 1st August 1964 the actual bagasse weight as determined by a Servo Balance was compared with the calculated weight. The results are not yet statistically analysed, but the test showed a difference between actual and calculated weight equal to 0.07% of the caneweight for the whole period of the test. Since the actual caneweight was lower than the calculated weight, the difference can be explained by loss of material in the millyard (mud, dead sticks, trash) and evaporation between cane and water weighing and bagasse weighing.

Previously similar tests had been carried out in Queensland. Here discrepancies up to 7% were experienced, pointing to evaporation due to application of hot imbibition.

**See H. G. Pennink; Control Methods; Archief 1893; Vol. 1 pp. 68/80.*

Brix-free Water % Fibre (or "W"). Discrimination should be made between "W", i.e. Brix-free water % Fibre used as a check figure and the actual Brix-free water in cane fibre (See: Quarterly Bulletin of the S.M.R.I. No. 25 or S.A. Sugar Journal, October 1963 issue) determined by chemical measures.

Note.—Brix-free Water % Fibre or "W" as a check figure is discussed in Communication of the S.M.R.I. No. 18 (L953).

"W" is calculated by the formula:

$$\frac{100\,(\text{Tons Absolute Juice}-\text{Tons Undiluted Juice})}{\text{Tons Fibre}}$$

in which formula Tons Absolute Juice is found by subtracting Tons Fibre from Tons of Cane and Tons Undiluted Juice by the formula:

$$\text{Tons Undiluted Juice} = \frac{\text{Tons Brix in Cane x 100}}{{}^{\circ}\text{Brix Undiluted Juice}}$$

Though Tons Brix in Cane is a simple calculation, the determination of °Brix Undiluted Juice is far from that. Therefore it is routine to assume:

°Brix Undiluted Juice = °Brix Primary Juice.

However in Natal Primary Juice is not sampled, but First Expressed Juice is. Therefore in Natal °Brix First Expressed Juice is substituted for °Brix Undiluted Juice instead of °Brix Primary Juice. This has its consequences. Firstly the two Brixes are not identical and secondly °Brix First Expressed Juice varies with the variations in pressure exerted by the first pair of rollers. That the two Brixes are not equal is shown by the following comparison (See: Archief 1940 pp. 272/9):

First Expressed Juice			Primary Juice		
°Brix	% Pol.	Purity	°Brix	% Pol.	Purity
18.66	16.22	86.92	18.48	15.99	86.53

These data are the average analysis of the samples of the juice of the two-roller crusher (i.e. First Expressed Juice) and of the mixture of juices squeezed out by the two-roller crusher and the first mill.

In addition to a difference between First Expressed and Primary Juices, there is the question of the variations in First Expressed Juice analysis caused by variations in pressure exerted by the first pair of rollers. (The late Mr. O. A. Feltham, Supervisor of the Sugar Industry Central Board, pointed out that these differences in pressure exerted by the first pair of rollers led to variations in the Java Ratio factor). It is obvious that these variations in °Brix First Expressed Juice will find repercussion in the value of "W".

However, there are more factors affected "W". On the first day of the week, and the tandem starting with empty carriers, a low value for "W" will always be found, while on the last day of the week when the carriers are emptied, a high "W" will be calculated. Rain causes a drop in "W", because the sample of First Expressed Juice will be diluted by the rain water clinging to the cane.

The position is worse in the case of mechanical harvesting as the cane comes to the factory so dirty that it has to be cleaned in the so-called cane laundry. Here so much water clings to the cane after washing operations that the dilution of the First Expressed Juice sample is such that a negative "W" is found. It is obvious that in such a case no cane payment system based on the analysis of the First Expressed Juice can be applied. Moreover the decrease in cane-weight owing to the cleaning after weighing makes the Fundamental Equation non-valid.

Therefore there should be no other value attributed to "W" than as a general check figure and we are not allowed to base any theory on the variations in "W". *The only thing that we are allowed to do when variations in "W" are encountered is to try to find the reasons of these variations in order that they can be cured. The same holds for abnormal values of "W".*

Note.—We refer to Table 3 at the end of this Summary wheie the aveiage values of "W" for the whole season of each factoiy aie shown. They range from 13% to 41%, but should not be lower than 18% or higher than 25%. (Brix-free water % Fibre determined by chemical means is higher; ranging from 25% to 30% on bone-dry fibre according to the method applied).

Imbibition Efficiency is another check figure shown in Table 3. In cases of a low imbibition ratio the figure is higher than where a generous imbibition is applied.

Weighed Mean of Last Expressed Juice Purity. It seems that the average purity as recorded in the Laboratory Analysis Books differs sometimes materially from the Weighed Mean calculated according to the method shown in our Monthly Calculation Sheets. This statement is based on the experience that some factories record only the Weighed Mean.

(7) Non-Sugar Account

The next item to be discussed is the so-called "Non-Sugar Account", viz. the ratio between the non-sugar present in mixed juice and the non-sugar present in final molasses and in the molasses film around the sugar crystals.

Non-Sugar Account for Recent Years

Mill	1964	1963	1962	1961	1960
PG . . .	79	74	78	81	81
UF . . .	79	66	77	83	85
EM . . .	84	80	86	84	81
FX . . .	79	81	83	74	77
EN . . .	86	87	85	80	86
AK . . .	80	81	85	77	78
DK . . .	81	82	79	92	86
GD . . .	90	81	90	—	85
DL . . .	80	78	83	79	77
GH . . .	82	79	85	71	71
MV . . .	87	83	82	75	76
TS . . .	83	77	—	—	—
ME . . .	85	84	90	87	66 (C)
IL . . .	88	83	92	90	98
RN . . .	82	83	89	86	89
SZ . . .	93	92	90	88	93
UK . . .	—	—	—	—	—
Mean . .	83	79	85	81	81
LB . . .	92	88	80	80	—
MR . . .	75	76	75	79	—
MH . . .	78	75	78	83	90
UR . . .	100	73	88	105	—
TR . . .	108	—	—	—	—

It is recommended that the weights of Final Molasses be checked at those factories where the N.S. Account is either more than 85% or less than 75%.

Low undetermined losses accompanied by a high N.S. Account is nearly always due to a *too* high final molasses weight. In addition to a sucrose balance based on sucrose in mixed juice, a Brix balance based on Brix in clarified juice should be drawn up and the undetermined losses of the two balances should be compared. It is fact that a high N.S. Account could be caused by an abnormally high inversion, but in that case the undetermined Sucrose losses should be high too. As said before, when N.S. Account is high and Undetermined Sucrose Losses low, the weight of the final molasses is *too* high.

(8) Reducing Sugars Account

Hereunder the R.S. Accounts of the different factories for the last two seasons are shown; both being based on R.S. in mixed juice = 100. In general some reducing sugars are decomposed during liming; hence the figure for R.S. in Clarified juice ranges between 90 and 95%. Some reducing sugars are formed in the evaporator and a slight increase should be noted. During the boiling process reducing sugars are formed as well as destroyed. In general the figure for R.S. in Final Molasses is slightly higher than that in Clarified Juice, but should not be higher than in Mixed Juice.

Therefore the next table will show the undetermined sucrose losses, in order that these losses can be compared with the previous two tables, i.e. the Non-Sugar Account and the Reducing Sugars Account tables.

(9) Undetermined Sucrose Losses

per 100 Sucrose in Mixed Juice

Season	1964	1963	1962	1961	1960
PG	1.11	1.57	2.16	0.30	0.62
UF	0.96	3.04	2.12	1.09	0.49
EM	1.12	1.02	1.07	1.97	1.90
FX	1.36	1.63	1.39	0.90	1.16
EN	2.22	2.10	1.62	2.26	2.00
AK	1.64	1.90	1.94	1.87	1.55
DK	1.30	1.56	1.16	1.90	1.64
GD	1.02	0.63	0.93	n.a.	2.77
DL	1.04	1.26	0.95	1.07	0.97
GH	1.21	1.95	1.52	1.71	1.88
MV	1.01	0.57	0.42	0.60	1.85
TS	0.30	0.55	n.a.	n.a.	n.a.
ME	1.30	0.94	1.49	3.76	1.78
IL	2.04	2.83	0.61	2.23	3.57
RN	2.74	2.53	1.54	0.80	0.36
SZ	0.96	1.62	0.92	0.35	0.36
UK	n.a.	n.a.	n.a.	n.a.	n.a.
LB	1.25	0.19	0.44	0.42	—
MR	2.12	0.74	0.43	1.24	—
ML	2.24	1.62	1.17	1.66	3.61
UR	0.85	0.82	1.26	4.61	n.a.
TR	0.94	—	—	—	—

SEASON 1964/65				SEASON 1963/64			
Mill	Clarified Juice	Syrup	Total Final Molasses	Mill	Clarified Juice	Syrup	Total Final Molasses
PG	93	70	n.a.	PG	94	78	n.a.
UF	96	99	92	UF	100	101	86
EM	n.a.	100	100	EM	95	93	97
FX	91	88	85	FX	88	84	88
EN	115	87	n.a.	EN	109	49	n.a.
AK	97	92	89	AK	94	88	97
DK	n.a.	81	96	DK	n.a.	93	103
GD	90	82	n.a.	GD	86	75	n.a.
DL	95	91	88	DL	95	89	91
GH	91	92	81	GH	85	84	84
MV	99	96	89	MV	93	86	87
TS	n.a.	84	109	TS	n.a.	84	91
ME	87	88	101	ME	85	86	101
IL	108	89	115	IL	100	85	91
RN	83	96	n.a.	RN	94	104	n.a.
SZ	94	80	119	SZ	99	83	119
UK	n.a.	n.a.	n.a.	UK	n.a.	n.a.	n.a.
LB	104	93	134	LB	100	84	100
MR	101	94	90	MR	102	92	113
MH	n.a.	n.a.	n.a.	MH	n.a.	n.a.	n.a.
UR	82	74	112	UR	95	81	n.a.
TR	n.a.	74	n.a.	TR	—	—	—

When the reducing sugars account in final molasses is high and the non-sugar account (see previous table) is high, but the undetermined losses are low, surely the undetermined losses are flattered by a too high final molasses weight!

If, contrariwise, the undetermined sucrose losses are high and so are both the Non-Sugar and Reducing Sugars Accounts, it indicates that an abnormally high inversion has taken place. This should be further checked by drawing up a Brix Balance (Tons Brix in Clarified Juice = 100%). A check should also be carried out on the correctness of the reducing sugar analysis. The new Laboratory Manual for S.A. Sugar Factories gives on page 52 the method of analysis while Table IV at the back of the Manual should be used for the calculation.

As 95 parts of sucrose are converted into 100 parts of invert-sugar, inversion will increase the undetermined sucrose losses, but decrease the undetermined Brix losses. When inversion has taken place, the Brix Balance should also reveal this.

(10) Non-Sugar Circulation

No matter how long we spin the C-massecuite, a film of final molasses will always cling onto the C-sugar crystals; which will circulate with the C-sugar through the boiling system. When we double cure the C-massecuite we can limit the circulation to the system C-m.c. foreworkers, C-m.c. afterworkers and C-m.c. pans, provided the run-off of the C-m.c. afterworkers is boiled back into the C-massecuite.

When the C-m.c. is single cured, it depends on the boiling system how far the circulation will extend. If we remelt the single-cured C-sugar in mixed juice, then the circulation takes place over the whole factory, with the exception of the mills. If we mingle the single-cured C-sugar into a magma and use this magma only for B-sugar, then the circulation will go not further back than the B-massecuite.

However, in the event of double curing of the C-massecuite it is also important to spin the C-massecuite as long as possible, because the circulation of the molasses film adhering to the C-sugar increases the volume of C-massecuite to be boiled and its viscosity too.

With the aid of the cu.ft. of C-massecuite and its analysis we can calculate the tons of non-sugar present in the C-massecuite, while with the weight of the final molasses and its analysis we can determine the tons of non-sugar present in weighed final molasses. When we compare these two tonnages we can get an idea of the extent of the non-sugar circulation caused by the final molasses film adhering to the crystals of the once cured C-sugar.

After ½ hour to ¾ hour spinning of the C-massecuite there will still adhere from 15% to 20% of final molasses on the C-sugar crystal, depending on the

Season	1964	1963	1962	1961	1960
PG	126	132	121	114	117
UF	148	159	123	105	122
EM	137	132	114	125	121
FX	152	130	114	124	134
EN	111	121	111	124	126
AK	129	126	125	119	132
DK	163	155	130	129	131
GD	142	144	118	n.a.	108
DL	124	116	104	118	121
GH	121	137	111	144	144
MV	141	135	121	111	132
TS	146	143	n.a.	n.a.	n.a.
ME	132	139	132	140	130
IL	146	172	147	137	140
RN	166	130	100	114	117
SZ	125	133	120	127	126
LB	137	151	148	144	—
MR	156	155	146	n.a.	—
MH	n.a.	121	106	102	—
UR	115	143	115	108	—
TR	n.a.	—	—	—	—

Note: UK is left out as this factory does not declare its weight of final molasses.

grain size, the exerted "g" and the viscosity of the final molasses. Therefore the ratio:

$$\frac{100 \text{ (Tons Non-sugar in C-massecuite)}}{\text{Tons Non-sugar in Final Molasses}}$$

should always be more than 100. If it is less than 100%, cu. ft. of C-massecuite its analysis should be checked; while the correctness of the final molasses weight should be checked as mentioned in the previous pages. A too high figure, for example, higher than 120% should be checked in the same manner, but it should also be investigated if the figure cannot be improved by heating the C-massecuite to saturation temperature, longer spinning and other appropriate measures.

(11) Exhaustion of the Massecuites

The definition of exhaustion reads: the parts of crystal recovered per 100 parts sucrose originally present in the massecuite. Exhaustion is calculated with the aid of the formula:

$$\frac{100 \text{ (Purity of massecuite — Purity of Runoff)}}{\text{Purity of Massecuite (100 — Purity of Runoff)}}$$

which formula is derived from the formula of Hulla-Suchomel (see: Quarterly Bulletin No. 13 or S.A. Sugar Journal, January 1960 issue).

Note.—Written in another form the Hulla-Suchomel formula is called the SJM formula of Noel Deerr.

As in the previous Summaries the exhaustion obtained in the different massecuites by the different factories are tabulated overleaf:

Recovered Crystal per 100 Sucrose in Massecuite

Mill	A-m.c.	B-m.c.	C-m.c.	Mean
PG . . .	61.6	58.2	58.6	59.5
UF . . .	56.9	56.0	56.9	56.6
EM . . .	61.7	63.4	53.1	59.4
FX . . .	60.4	62.6	56.4	59.8
EN . . .	60.3	60.6	51.7	57.5
AK . . .	64.8	62.7	52.9	60.1
DK . . .	67.2	60.0	56.0	61.1
GD . . .	68.1	65.7	58.3	64.0
DL . . .	61.6	63.1	57.6	60.8
GH . . .	70.2	59.2	55.7	61.7
MV . . .	61.4	60.3	52.5	58.1
TS . . .	60.9	55.9	52.2	57.0
ME . . .	63.0	54.0	55.6	57.5
IL . . .	62.6	62.3	66.3	63.7
RN . . .	61.6	67.2	59.7	62.8
SZ . . .	57.2	55.2	58.5	57.0
UK . . .	62.4	59.1	59.8	60.4
Mean . . .	62.5	60.3	56.6	59.8
LB . . .	59.1	56.3	56.5	57.3
MR . . .	60.9	55.9	55.4	57.4
UR . . .	62.1	59.7	57.1	59.6

In the last column under the heading "Mean" the arithmetical average of the exhaustions of the three massecuites is shown. The mean calculated in this manner is — of course — open to controversy. It would have been better to have the exhaustion of the C-m.c. more heavily weighted, as the exhaustion of this massecuite is of prime importance (purity of final molasses, Boiling House Performance depend on the exhaustion of the C-m.c.). However, calculated by weighting the three exhaustions equally, it appears that Glendale has the best mean exhaustion, closely followed by Illovo. Illovo has also the best exhaustion of the C-m.c., i.e. 66.3%; the same as the previous season. Second with regard to C-m.c. exhaustion is Umzimkulu with 59.8%, followed by Renishaw with 59.7%.

(12) Final Molasses Purities

In continuation of the previous chapter dealing with exhaustions of the massecuites, here, the final results, i.e. the final molasses purities will be discussed. However, discrimination should be made between gravity and apparent purities of the final molasses.

Gravity Purity

Mill	Gravity Pruity	Apparent Purity
ME	37.64	37.47
IL	38.02	34.58
UK	38.13	36.57
SZ	38.89	—
DL	39.55	—
GH	39.72	—
UF	40.13	39.85
FX	40.17	—
MV	40.38	40.20
TS	40.54	40.10
UR	40.94	38.00
LB	41.08	39.50
DK	41.46	41.03
AK	42.54	42.00
EM	42.52	42.16
MR	43.45	41.10

Mount Edgecombe at the time it turned out carbonatation millwhite sugar, always recorded the highest final molasses purities, and has since not spared cost or effort to reduce the purity of its final molasses. Finally the efforts have been crowned with success: Mount Edgecombe now topping the list of purities.

A close second is Illovo, which in its turn is closely followed by Umzimkulu. Sezela which in previous years had a neck and neck race with Illovo for the top place, is now fourth as a result of the increased crushing rate without an extension of its C-m.c. foreworkers capacity. However, the coming season there will be a material increase in C-m.c. boiling and curing capacities, with a view to the planned further increase in crushing rate.

Apparent Purity

Mill	Gravity Purity	Apparent Purity
TR	—	34.56
GD	—	36.32
PG	—	38.02
EN	—	40.20
MH	—	40.39
RN	—	40.70

Here Triangle with a reducing sugars to sucrose ratio of 5.60 in mixed juice has taken the top position. (It is a pity that neither red. sugars/ash nor gravity purity of the final molasses is known). Second is Glendale and third Pongola.

G.—TABLES

The following tables are added to this Summary:

Table 1 showing the official tonnages of sugars manufactured by the South African Mills at the close of the 1964/65 season and those produced by the Swaziland Mills up till the 31st December 1964.

Tables 2, 3 and 4 showing the average analysis of the products, cane varieties crushed, etc. of all South African factories.

Table 5 showing the main data of Sena Sugar Estates' Mills, Triangle and the Swaziland factories.

Table 6 showing the average manufacturing returns by monthly periods for the South African Mills (Season 1964/65).

Table 7 gives a comparison of the average final results for the last ten seasons.

Table 8 records the comparative data of the South African Mills from 1925 onwards.

TABLE I

SUGAR PRODUCTION, SEASON 1964/1965, ACCORDING TO DATA SUPPLIED BY THE SOUTH AFRICAN SUGAR ASSOCIATION

February, 1965

Mill	White Sugar	Cargo Refining	Normal Export	Japanese Assortment	Golden Brown	TOTAL
Darnall	—	95939.415	41639.185	2516.420	426.500	140521.520
Amatikulu	—	33886.720	29207.920	—	15139.200	78233.840
Felixton	—	57272.040	39771.900	—	290.000	97333.940
Empangeni	—	77631.780	32893.245	—	16497.450	127022.475
Mt. Edgecombe	—	—	125843.490*	—	—	125843.490
Tongaat	—	124400.315	24287.7855	22697.5230	411.850	171797.4735
Melville	698.500	2904.850	—	29419.9625	1000.000	34023.3125
Illovo	—	8469.670	617.4000	42204.8510	3562.188	54854.1090
Umfolozi	—	124 200	—	126304.4195	367.800	126796.4195
Glendale	—	—	11237.5200	—	416.300	11653.8200
Reynolds	78640.000	—	8752.3800	—	210.000	87602.3800
Crookes	—	—	—	31208.2855	66.000	31274.2855
Pongola	150.000	—	10000.0950	—	70112.950	80263.0450
Gledhow	126540.000	—	8443.2600	—	84.000	135067.2600
Umzimkulu	—	—	—	—	35541.475	35541.4750
Doornkop	—	—	—	36151.1500	1931.000	38082.1500
Entumeni	9630.650	—	7852.1100	—	2051.950	19534.7100
	215659.150	400628.990	340546.2905	290502.6115	148108.663	1395445.7050
Ubombo	21710.565	—	25063.4850	—	4942.910	51716.9600
Mhlume	22430.825	—	17984.6100	—	3738.850	44154.2850
	259800.540	400628.990	383594.3855	290502.6115	156790.423	1491316.950

* Canadian

Table 2—CANE CRUSHED, SUGAR MADE, CANE VARIETIES AND THROUGHPUTS

NAME OF FACTORY	PG	UF	EM	FX	EN	AK	DK	GD	DL	GH*	MV	TS	ME	IL	RN	SZ*	UK	Weighed Means and Totals
Crushing Season from	12.5.64	1.5.64	14.5.64	7.5.64	7.5.64	1.5.64	4.5.64	20.5.64	8.5.64	6.5.64	6.5.64	30.4.64	29.4.64	21.5.64	19.5.64	26.4.64	6.5.64	26.4.64
End of Season	23.1.65	19.1.65	20.2.65	14.2.65	3.2.65	13.2.65	2.12.64	18.11.64	14.2.65	19.2.65	31.1.65	8.2.65	14.2.65	19.12.64	12.1.65	30.1.65	24.12.64	20.2.65
TONS CANE CRUSHED	663,952	1,046,324	1,045,658	857,207	161,891	670,599	297,763	98,694	1,149,165	1,175,276	286,918	1,470,420	1,079,323	451,798	259,880	748,597	288,568	11,752,031
CANE QUALITY:																		
Sucrose % Cane	13.96	13.80	14.53	13.42	14.16	13.97	14.68	14.05	13.99	13.86	13.98	13.55	13.69	13.90	13.86	14.02	14.21	13.90
Fibre % Cane	12.56	14.00	16.18	15.99	14.19	15.59	14.72	15.03	15.86	15.60	15.48	16.00	15.65	15.39	15.86	15.45	15.32	15.38
Java Ratio	81.73	79.69	77.49	77.27	78.18	77.93	78.59	77.11	77.95	78.76	77.64	76.76	78.24	79.31	78.30	79.51	78.47	78.35
Tons Cane per Ton Sugar	8.27	8.25	8.23	8.81	8.28	8.57	7.82	8.47	8.18	8.70	8.43	8.56	8.58	8.23	8.31	8.55	8.12	8.42
Tons Cane per Ton 96° Sugar	8.04	7.92	8.01	8.56	8.03	8.34	7.68	8.23	7.98	8.36	8.30	8.36	8.35	8.08	8.17	8.22	7.86	8.20
CANE VARIETIES																		
Percentage Co.331	0.12	1.98	0.48	3.55	3.10	2.27	2.57	19.29	4.91	1.67	11.20	1.86	6.10	25.99	5.26	8.70	5.97	4.41
,, N:Co.310	89.34	85.12	88.05	46.94	17.32	75.69	30.32	30.80	54.73	37.98	14.34	20.84	21.39	28.22	11.60	18.59	34.50	46.91
,, N:Co.292	0.01	0.26	0.20	1.83	1.86	Nil	0.53	0.02	0.19	0.88	1.14	1.42	4.07	0.19	6.68	4.13	0.45	1.32
,, N:Co.293	1.57	0.04	0.10	0.09	48.53	0.20	19.91	6.73	1.64	3.32	1.23	1.81	1.41	29.14	2.58	2.52	6.35	3.72
,, N:Co.339	0.39	2.60	0.92	3.94	1.55	0.56	0.51	0.73	1.93	2.24	9.10	4.81	2.81	2.53	2.98	2.59	2.03	2.57
,, N:Co.376	7.93	6.77	8.41	25.81	23.33	15.36	37.35	12.13	22.91	38.87	25.09	24.74	18.12	11.36	59.54	46.56	49.86	23.36
,, N:Co.382	0.01	2.54	0.34	5.07	0.79	2.10	4.02	0.01	1.56	2.10	1.40	5.89	5.15	0.80	6.29	3.56	0.12	2.87
,, N.50/211	0.37	0.43	1.42	1.94	1.04	3.60	3.31	1.45	3.77	2.87	7.04	6.87	2.51	0.21	4.84	2.51	0.29	2.84
,, Mixed	0.26	0.26	0.08	10.83	2.48	0.22	1.48	28.84	8.36	10.07	29.46	31.76	38.44	1.56	0.23	10.84	0.43	12.00
TOTAL RAINFALL (ins.)	23.51	29.06	38.28	45.68	38.55	36.96	26.76	22.30	36.12	32.00	32.59	31.88	40.54	42.82	42.55	50.95	51.88	36.88
TONS SUGAR MADE	80,263	126,796	127,022	97,334	19,535	78,234	38,082	11,654	140,522	135,067	34,023	171,797	125,843	54,854	31,274	87,602	35,541	1,395,446
Percentage Whites	Nil	Nil	Nil	Nil	49	Nil	Nil	Nil	Nil	94% Ref.	Nil	Nil	Nil	Nil	Nil	90% Ref.	Nil	15.45
Average Pol of all Sugars	98.795	97.657	98.614	98.800	99.054	98.674	97.707	98.757	98.336	99.89	97.544	98.272	98.581	98.853	97.601	99.01	99.130	98.599
TIME ACCOUNT																		
Time Crushed % Time Mills Open	92.73	90.17	88.64	89.45	97.32	94.48	94.74	90.25	91.19	96.18	92.14	95.53	88.93	86.53	95.35	92.36	90.46	92.22
Cane shortage % Time Mills Open	2.25	0.88	2.34	5.00	0.62	3.34	4.66	5.25	3.32	0.97	2.63	1.71	3.54	9.03	1.84	5.01	4.19	3.33
THROUGHPUTS (per hour actual crushing)																		
Tons of Cane Crushed	138.70	185.01	197.38	158.64	28.68	116.11	72.80	29.59	209.40	199.94	56.70	238.82	189.42	118.67	56.09	154.63	77.41	137.83
Tons of Fibre Milled	17.41	25.90	31.94	25.36	4.07	18.10	10.72	4.45	33.21	31.19	8.78	38.24	29.65	18.26	8.89	23.90	11.86	21.19
Tons of Brix Processed	22.02	29.13	30.94	23.45	4.23	16.71	10.81	4.46	29.88	30.76	8.40	35.48	28.48	18.34	8.41	23.55	11.70	18.04
Tons of Sugar Bagged	16.77	22.41	23.98	18.01	3.37	12.80	8.82	3.49	23.36	23.55	6.72	27.90	22.09	14.41	6.75	18.65	9.53	16.37

Identity of the Symbols used to indicate the Factories:

PG Pongola S.M.C. Ltd.
UF Umfolozi Co-op S.P. Ltd.
EM Hulett's Empangeni Mill
FX Hulett's Felixton Mill
EN Entumeni S.M. Co. (Pty) Ltd.
AK Hulett's Amatikulu Mill
DK Doornkop S.C. (Pty) Ltd.
GD Glendale Sugar Millers
DL Hulett's Darnall Mill
GH Gledhow Sugar Co. Ltd.
MV Melville Sugar Estates
TS Tongaat Sugar Co., Ltd.
ME Hulett's Mount Edgecombe Mill
IL Illovo Sugar Estates Ltd.
RN Crookes Brothers' Renishaw
SZ Reynolds Brothers' Sezela
UK Umzimkulu Sugar Co. Ltd.
MH Mhlume (Swaziland) Sugar Co. Ltd.
UR Ubombo Ranches Ltd.
LB Sena Sugar Estates' Luabo
MR Sena Sugar Estates' Marromeu
TR Hulett's (Rhodesia) Triangle Ltd.

NOTE: Tons of Sugar Made are according to data supplied by the S.A.S.A.; the cane/sugar ratios and the average Pols of the Sugars are based on these data.

All other data are as declared by the Mills in their Laboratory Reports. Gledhow & Sezela's figures (recoveries, etc.) refer to rawhouse operation only; being based on 138,432 and 90,289 tons sugar leaving the rawhouse with respectively 98.95° and 98.59° average Pol.

Table 3—SUCROSE BALANCE, ANALYSIS OF BAGASSE, JUICES, CAKE AND SYRUP

FACTORY	PG	UF	EM	FX	EN	AK	DK	GD	DL	GH	MV	TS	ME	II.	RN	SZ	UK	Means
SUCROSE BALANCE																		
Lost in Bagasse (A)	4.53	4.05	7.29	6.34	6.00	6.78	6.67	8.40	4.80	5.54	8.33	6.13	6.26	4.68	6.33	5.73	6.14	5.84
Lost in Filter Cake (B)	0.53	0.74	0.44	0.56	0.34	0.49	0.49	0.16	0.28	0.43	0.55	0.69	0.52	0.24	0.30	0.75	0.57	0.52
Lost in Final Molasses (C)	8.36	8.56	8.78	8.25	7.07	8.79	6.54	7.52	7.97	8.79	7.44	8.19	8.06	7.64	6.67	7.81	5.86	8.13
UNDETERMINED LOSSES (D)	1.06	0.92	1.04	1.27	2.09	1.53	1.21	0.93	0.99	1.14	0.93	0.27	1.22	1.94	2.57	0.90	1.49	1.09
Boiling House Losses (B)+(C)+(D)	9.95	10.22	10.27	10.08	9.50	10.81	8.24	8.61	9.24	10.36	8.92	9.15	9.80	9.82	9.54	9.46	7.92	9.73
Total of All Losses (A)+(B)+(C)+(D)	14.48	14.27	17.56	16.42	15.50	17.59	14.91	17.01	14.04	15.90	17.25	15.28	16.06	14.50	15.87	15.19	14.06	15.58
OVERALL RECOVERY	85.52	85.73	82.44	83.58	84.50	82.41	85.09	82.99	85.96	84.10	82.75	84.72	83.94	85.50	84.13	84.81	85.94	84.42
BOILING HOUSE PERFORMANCE	98.02	97.12	96.02	97.11	96.37	95.74	97.19	98.34	97.88	97.18	96.70	97.54	97.17	96.72	95.85	96.64	97.90	97.07
Boiling House Recovery	89.58	89.35	88.93	89.24	89.89	88.40	91.17	90.59	90.29	89.04	90.27	90.25	89.55	89.70	89.81	89.96	91.56	89.65
LOST ABSOLUTE JUICE % FIBRE	37.12	29.05	43.24	38.66	40.32	40.30	43.04	51.43	29.51	36.19	49.48	35.04	39.10	31.39	38.56	39.22	38.62	36.98
Imbibition % Fibre	298	269	285	261	248	261	261	286	372	188	254	207	249	282	210	214	197	256
Specific Feed Rate	32.8	26.0	63.9	35.4	47.2	48.6	54.7	50.0	55.5	48.7	57.8	42.3	48.9	48.7	46.5	45.9	62.6	46.88
Sucrose Extraction	95.47	95.96	92.71	93.66	94.00	93.22	93.33	91.60	95.20	94.46	91.67	93.87	93.74	95.32	93.67	94.27	93.86	94.16
Imbibition % Cane	37.47	37.66	46.11	41.80	34.50	40.61	38.40	43.06	59.00	29.28	39.35	33.25	38.93	43.40	33.30	33.12	30.19	39.37
FINAL BAGASSE																		
Sucrose % Bagasse	2.20	1.79	2.65	2.36	2.79	2.75	2.84	3.36	1.91	2.15	3.19	2.38	2.42	1.88	2.57	2.36	2.45	2.34
Moisture % Bagasse	53.23	52.63	56.01	52.49	49.93	51.40	53.67	52.93	52.19	53.13	53.55	51.20	52.43	52.74	50.53	51.21	53.72	52.64
Fibre % Bagasse	43.66	44.87	40.42	44.25	46.52	46.31	42.68	42.78	45.09	43.85	42.40	45.76	44.25	44.56	46.05	45.34	43.10	44.74
L. C. V. of Bagasse (btu/lb)	3011	3071	2769	3073	3286	3182	2962	**3016**	**3106**	**3026**	**2966**	**3184**	**3076**	**3060**	**3238**	**3183**	**2964**	**3061**
Imbibition Efficiency	50	50	49	47	26	47	57	51	35	58	44	53	45	58	48	46	48	48
Brix-free Water % Fibre	24	21	24	25	41	23	31	38	21	18	30	33	21	18	23	13	30	25½
Bagasse % Cane	28.77	31.20	40.03	36.14	30.50	33.66	34.49	35.13	35.17	35.58	36.51	34.96	35.37	34.54	34.36	34.08	35.57	34.36
FIRST EXPRESSED JUICE																		
Degree Brix	19.88	19.89	21.41	19.95	20.30	20.36	20.98	20.89	20.51	20.19	20.38	20.21	20.00	20.01	20.10	19.89	20.30	20.27
Degree Purity (Apparent)	85.92	87.07	87.59	87.07	89.20	88.05	89.06	87.20	87.52	87.10	88.30	87.30	87.50	87.56	88.70	88.64	89.16	87.54
LAST EXPRESSED JUICE																		
Degree Brix	2.76	2.29	2.96	2.76	1.75	3.02	3.62	3.79	1.66	3.17	3.08	2.95	2.72	1.89	3.08	2.94	2.69	2.77
Degree Purity (Apparent)	70.65	71.35	74.21	72.50	78.45	77.45	77.86	78.30	72.96	69.60	78.84	78.19	72.89	69.31	75.20	68.37	76.95	74.30
MIXED JUICE																		
Degree Brix	14.61	14.76	14.78	13.99	14.58	14.34	15.08	13.95	12.63	16.43	14.40	15.11	14.52	14.19	15.16	15.38	15.98	14.58
Degree Purity (Apparent)	83.98	84.12	—	—	—	—	87.44	85.5	—	—	86.52	—	—	85.27	87.22	—	88.17	}
Degree Purity (Gravity)	83.92	—	85.94	85.04	87.83	85.48	87.67	—	85.14	85.08	—	85.62	85.36	85.75	—	86.80	—	85.52
Red. Sugar/Sucrose Ratio	3.42	3.13	2.93	3.88	2.84	3.30	2.49	3.24	3.42	3.50	2.90	3.42	3.48	4.15	3.42	2.71	—	3.32
CLARIFIED JUICE																		
Degree Brix	15.28	14.48	14.07	13.02	14.97	13.89	15.47	13.62	12.14	15.34	13.49	14.30	13.80	14.27	16.53	15.50	16.67	14.52
Degree Purity (Apparent)	84.88	85.38	86.34	85.75	87.50	86.00	88.24	86.00	85.90	86.10	87.40	86.50	86.00	86.76	88.80	87.10	89.50	86.71
Red. Sugar/Sucrose Ratio	3.21	3.03	2.93	3.56	3.29	3.23	—	2.92	3.27	3.21	2.90	—	3.03	4.49	2.83	2.58	—	3.17
Average pH	7.39	6.94	7.12	7.20	7.30	7.30	7.20	7.10	7.50	7.37	7.10	7.20	7.39	7.34	—	7.18	7.21	7.24
FILTER CAKE																		
% Sucrose (Pol)	1.93	1.99	1.23	1.19	0.95	0.91	1.54	0.70	0.79	1.02	1.55	1.86	1.22	1.05	0.86	2.11	2.02	1.30
Filter Cake % Cane	3.87	5.11	5.26	6.34	5.00	7.58	4.60	3.19	4.91	5.86	5.00	5.00	5.82	3.14	4.97	4.98	4.00	5.25
SYRUP																		
Degree Brix	62.12	61.12	60.46	54.03	54.64	54.15	61.95	59.61	60.74	54.47	57.21	60.50	59.75	62.63	56.09	57.63	59.03	58.77
Degree Purity (Apparent)	84.60	85.92	86.32	85.96	87.70	86.47	88.31	86.00	86.20	86.30	87.20	86.80	85.90	86.17	88.40	87.12	88.51	86.70
Red. Sugar/Sucrose Ratio	2.41	3.13	2.93	3.42	2.48	3.04	2.27	2.66	3.13	3.25	2.80	2.90	3.07	3.72	3.29	2.19	—	2.98
Average pH	7.12	6.52	6.57	6.70	7.20	6.90	6.50	—	6.90	7.15	6.70	6.50	7.00	6.60	—	6.98	6.64	6.80

Table 4—MASSESCUITES AND MOLASSES CONSUMPTION OF CLARIFYING AGENTS

FACTORIES	PG	UF	EM	FX	EN	AK	DK	GD	DL	GH	MV	TS	ME	IL	RN	SZ	UK	Averages
100 × Tons Brix in Mixed Juice / Tons Cane crushed	15.88	15.74	15.68	14.78	15.16	15.23	15.62	15.06	15.64	15.38	14.81	14 86	15.03	15.24	14.99	15.23	15.12	15.31
A-MASSECUITE																		
Cubic Feet per ton Brix**	24.20	37.58	23.57	20.92	27.18	23.78	28.32	22.60	28.56	24.43	34 83	23 28	29.75	41.69	24.17	25.38	32.24	27.79
Brix of Massecuite	92.30	92.95	93.24	92.96	91.08	92.79	93.58	92.73	92.90	93.27	90 68	92 60	94.50	90.68	91.24	92.30	92.51	92.49
Purity of Massecuite	84.46	87.70	85.91	85.33	85.40	84.97	90.37	84.56	86.90	89.20	88.40	85.60	86 20	89.28	88.50	85.32	85.52	86.68
Purity of Molasses	67.62	75.44	70.03	69.73	69.90	66.56	75.48	63.58	71.80	71.10	74 60	69.90	69.80	75 68	74.70	71.35	68 92	70.95
Drop in Purity	16.84	12.26	15.88	15.60	15.50	18.41	14.89	20.98	15.10	18.10	13.80	15.70	16 40	13.60	13.80	13.97	16.60	15.73
Exhaustion	61.58	56.92	61.68	60.38	60.30	64.79	67.20	68.12	61.60	70.20	61.40	60.90	63.00	62 64	61.60	57.15	62.45	62.47
B-MASSECUITE																		
Cubic Feet per ton Brix**	7.77	10.32	9.62	10.41	10.12	10.44	10.72	12.37	8.37	12.93	13.27	10.97	13.95	15 00	12.55	14.33	8.44	11.27
Brix of Massecuite	95.32	96.31	95.82	94.24	94.06	94.85	94.12	95.74	95.30	94.81	93.29	94.80	97.40	92 71	94.12	96.14	94.04	94.87
Purity of Massecuite	71.77	71.88	75.65	76.30	72.30	74.14	75.93	72.05	73.20	72.50	74.60	72.70	69 00	76.03	77.75	71.79	70.81	73.43
Purity of Molasses	51.49	52.91	53.19	54.64	50.70	51.67	55.78	46.91	50.20	51.80	53.80	54.00	50.60	54.47	53.35	53.25	49.80	52.26
Drop in Purity	20.28	18.97	22.46	21.66	21.60	22.47	20.15	25.14	23.00	20.70	20.80	18.70	18.40	21.56	24.45	18.54	21.01	21.17
Exhaustion	58.25	56.04	63.42	62.58	60.60	62.71	60.01	65.72	63.10	59.20	60.30	55.90	54.00	62 28	67.25	55.24	59.10	60.39
C-MASSECUITE																		
Cubic Feet per ton Brix**	8.15	8.77	7.64	8.42	6.18	7.73	7.97	8.77	7.45	8.17	7.73	8.61	7.83	9.18	8.85	7.54	6.58	7.98
Brix of Massecuite	98.52	99.99	99.05	96.97	98.42	97.45	97.50	98.22	98.10	96.26	96.22	97.10	100.00	96.49	97.69	99.15	98.20	98.00
Purity of Massecuite	59.71	60.59	60.21	60.77	58.20	60.93	61.29	57.60	61.20	59.60	58.60	59.80	57.50	60.94	63.50	60.54	58.89	60 00
Purity of Molasses	38.02	39.85	41.52	40.34	40.20	42.35	41.03	36.18	40.10	39.50	40.20	40.50	37.50	34.45	41.20	38.88	36.57	39.32
Drop in Purity	21.69	20.74	18.69	20.43	18.00	18.58	20.26	21.42	21.10	20.10	18.40	19.30	20.00	26.49	22.30	21.66	22.32	20.68
Exhaustion	58.61	56.92	53.08	56.35	51.70	52.89	56.05	58.27	57.60	55.70	52.50	54.20	55.60	66.31	59.70	58.54	59.75	56.80
Crystal % Massecuite	34.48	34.47	31.66	33.21	29.60	31.41	30.61	32.97	34.60	32.00	29.60	31.50	32.00	39.00	37.00	35.14	34.55	33.40
Total cu. ft. of Masses Cuites																		
Per Ton Sugar made	52.69	73.65	52.77	52.38	54.56	54.78	57.61	55.78	56.77	59.47	69.74	54.51	66 43	83.81	56.77	59.43	58.02	65.33
Per Ton Brix Processed**	40.11	56.67	40.90	39.75	40.75	41.95	47.01	43.74	44.38	45.33	55.83	42.87	51.52	65.87	45.56	47.07	47.27	47.03
FINAL MOLASSES																		
Degree Brix	91.99	93.30	91.14	89.91	93.11	90.76	89.10	86.84	92.15	90.78	91.15	91.51	93.50	88.27	93.83	92 24	91.44	91.58
Apparent Purity	38 02	39.85	42.16	—	40.20	42.00	41.03	36.32	—	—	40.20	40.10	37.47	34.58	40.70	—	36.57	{39.87
Gravity Purity	—	40.13	42.52	40.17	—	42.54	41.46	—	39.55	39 72	40.38	40.54	37.64	38.02	—	38.89	38.13	
Reducing Sugars (%)	—	11.89	11.86	13.49	—	11.95	12.26	—	12.92	11.01	11.49	14 49	13.25	18.46	—	13.94	—	13.08
Sulphated Ash (%)	—	15.36	13.56	13.98	—	12.76	12.88	—	13.63	—	—	11.82	15.33	10 09	—	13.74	—	13.32
Red. Sugar/Ash Ratio	—	0.77	0.87	0.96	—	0.94	0.95	—	0.95	—	—	1.23	0.86	1.83	—	1.01	—	0.98
Molasses of 85° Brix % Cane	3.61	3.46	3.53	3.24	2.95	3.39	2.75	3.42	3.32	3.38	3.03	3.21	3.72	3.29	2.69	3.31	—	3.33
CLARIFYING AGENTS																		Def. / Sulph.
Per 1000 tons Cane:																		
tons limestone	—	—	—	—	—	—	—	—	—	8.93	—	—	—	—	—	7.20	—	— / —
tons coke	—	—	—	—	—	—	—	—	—	1.12	—	—	—	—	—	0.89	—	— / —
Per ton Cane:																		
lbs lime	1.53	0.67	1.53	1.25	3.64	1.16	0.91	1.02	1.02	(5.38)	1.75	1.38	3.44	1.27	5.92	(9.16)	1.96	1.20 / 5.42
lbs sulphur	—	—	—	—	1.35	—	—	—	—	0.89	0.22	—	1.22	—	2.09	1.81	—	— / 1.32
p.p.m. Juice																		
phosphoric paste	—	3.66	—	—	4.61	—	—	—	—	—	—	—	—	14 23	29.19	—	46.69	— / —
Separan AP-30	0.69	0.38	0.23	1.24	—	0.53	2.26	—	—	—	5.08	6.92	3.00	3.03	—	—	2.66	— / —

Exhaustion = Parts recovered crystal per 100 parts of sucrose in massecuite

Table 5—DATA OF LUABO AND MARROMEU, MHLUME AND UBOMBO RANCHES AND OF TRIANGLE

NAME OF FACTORY	Luabo	Marromeu	Triangle	Mhlume	Ubombo R.
Season started on	11.5.64	25.5.64	1.5.64	21.5.64	1.5.64
Final data of	26.9.64	20.11.64	22.12.64	30.12.64	20.1.65
TONS CANE CRUSHED	378,103	510,246	788,813	362,448	504,201
TONS SUGAR MADE	44,502	62,203	94,860	44,154	54,940
Percentage white sugar	94	36	Nil	51	42
Tons Cane crushed per hour	143	148	180	88	108
Overall Time Efficiency	91	90	87	90	84
SUCROSE % CANE	14.25	15.08	14.18	14.62	13.28
FIBRE % CANE	13.86	13.77	13.05	13.50	14.60
Tons Cane per Ton Sugar	8.50	8.20	8.32	8.21	9.17
Brix of First Expressed Juice	20.58	20.45	20.15	20.94	19.67
Purity of First Expressed Juice	87.80	88.50	86.01	87.40	84.63
LOST ABSOLUTE JUICE % FIBRE	53.22	62.39	42.25	44.99	36.14
Specific Feed Rate*	52.2	64.0	61.3	31.0	60.4
Imbibition % Fibre	197	212	168	226	198
SUCROSE EXTRACTION	92.66	90.64	94.01	93.62	94.48
Imbibition % Cane	27.57	23.70	21.96	30.50	28.91
Sucrose % Bagasse	3.18	4.30	2.97	2.96	2.30
Moisture % Bagasse	53.20	52.72	50.58	53.22	51.09
Bagasse % Cane	32.92	32.82	28.58	31.44	31.89
Lower Calorific Value (btu/lb)**	**2,996**	**3,018**	**3,226**	**2,999**	**3,914**
SUCROSE BALANCE:					
(a) Lost in Bagasse	7.34	9.36	5.99	6.38	5.52
(b) Lost in Filter Cake	0.46	0.97	0.32	0.40	0.73
(c) Lost in Final Molasses	8.90	7.77	9.40	8.39	11.62
(d) Undetermined Losses	1.16	1.92	0.88	2.10	0.80
(a/d) Total of All Losses	17.86	20.02	16.59	17.27	18.67
OVERALL RECOVERY	82.14	79.98	83.43	82.73	81.33
BOILING HOUSE PERFORMANCE	95.84	95.23	96.76	96.29	94.89
Boiling House Recovery	92.66	90.64	94.01	88.37	86.08
PURITY OF MIXED JUICE	86.60	86.36	84.38	85.08	82.62
Red. Sugar/Sucrose Ratios:					
(i) in Mixed Juice	2.58	2.24	5.60	—	5.48
(ii) in Syrup	2.41	2.12	4.16	—	4.09
(iii) in Final Molasses	36.00	23.34	—	—	47.10
Sucrose % Filter Cake	1.70	3.65	1.86	1.70	1.94
Filter Cake % Cane	4.00	4.00	2.45	3.43	5.00
DENSITY OF SYRUP (°Brix)	57.59	64.20	64.05	60.00	60.50
FINAL MOLASSES:					
Degrees Brix	91.41	90.90	94.25	93.61	92.40
Gravity Purity	41.08	43.45	—	—	40.94
Apparent Purity	39.50	41.10	34.56	40.39	38.00
Molasses (85° Brix) % Cane	3.28	3.17	4.10	3.24	4.54
CUBIC FEET PER TON BRIX:					
A-massecuite	35.13	25.08	—	—	27.32
B-massecuite	16.02	13.59	—	—	12.41
C-massecuite	8.56	8.11	—	—	10.15
Exhaustion of A-massecuite	59.13	60.94	—	—	62.10
Exhaustion of B-massecuite	56.26	55.90	—	—	59.70
Exhaustion of C-massecuite	56.50	55.40	—	—	57.10

*Lbs of fibre per hour, per cu. ft. Total Roller Volume

**L.C.V. $= 7650 - 18.0\,S - 86.4M$

Table 6—AVERAGE MANUFACTURING RETURNS BY MONTHLY PERIODS FOR SOUTH AFRICAN FACTORIES (SEASON 1964/1965)

MONTHLY PERIOD ENDED		May 30 1964	June 27 1964	August 1 1964	August 29 1964	September 26 1964	October 31 1964	November 28 1964	January 2 1965	January 30 1965	February 20 1965
TONS CANE CRUSHED	Month :	984,364	1,260,527	1,650,135	1,314,525	1,262,343	1,531,043	1,240,446	1,269,118	894,380	345,063
	To-date :	—	2,244,891	3,895,113	5,209,638	6,471,981	8,003,024	9,243,470	10,512,588	11,406,968	11,752,031
TONS CANE CRUSHED PER HOUR	Month :	133	135	138	134	134	135	136	144	146	178
	To-date :	—	134	135	135	135	135	135	136	137	138
TONS SUGAR MADE AND ESTIMATED	Month :	111,984	154,770	206,004	167,204	159,441	189,328	145,702	139,802	92,628	34,954
	To-date :	—	266,754	472,758	639,962	799.403	988.731	1,134,433	1,274,235	1,366,863	1,401,817*
SUCROSE % CANE	Month :	13.42	14.08	14.38	14.66	14.68	14.44	13.83	12.90	12.27	12.53
	To-date :	—	13.79	14.03	14.20	14.29	14.32	14.25	14.09	13.95	13.90
FIBRE % CANE	Month :	15.18	15.10	15.08	15.14	15.25	15.17	15.49	15.91	16.05	16.52
	To-date :	—	15.14	15.12	15.11	15.14	15.14	15.19	15.27	15.33	15.38
TONS CANE PER TON SUGAR	Month :	8.79	8.14	8.01	7.86	7.92	8.09	8.51	9.08	9.66	9.87
	To-date :	—	8.42	8.24	8.14	8.10	8.09	8.15	8.25	8.33	8.38
LOST ABSOLUTE JUICE % FIBRE	Month :	37.31	35.52	36.58	36.66	36.87	36.82	36.76	36.96	38.17	39.74
	To-date :	—	36.86	36.74	36.72	36.75	36.76	36.76	36.78	36.89	36.98
IMBIBITION % FIBRE	Month :	259	261	255	258	239	273	254	253	260	256
	To-date :	—	260	258	258	254	258	257	256	256	256
SUCROSE EXTRACTION	Month :	94.26	94.35	94.52	94.15	94.09	94.43	93.60	94.50	93.38	93.19
	To-date :	—	94.31	94.38	94.32	94.27	94.30	94.21	94.24	94.18	94.16
SUCROSE % BAGASSE	Month :	2.22	2.32	2.39	2.40	2.45	2.42	2.30	2.27	2.19	2.28
	To-date :	—	2.28	2.33	2.35	2.37	2.38	2.37	2.35	2.33	2.34
MOISTURE % BAGASSE	Month :	52.77	52.53	52.57	52.27	52.31	52 42	52.25	52.85	53.54	53.19
	To-date :	—	52.64	52.61	52.52	52.48	52 47	52.44	52.48	52.57	52.64
BOILING HOUSE PERFORMANCE	Month :	96.83	98.13	97.95	97.22	97.12	96.26	96.52	96.71	96.79	96.04
	To-date :	—	97.58	97.74	97.60	97.50	97.26	97.16	97.11	97.09	97.07
BOILING HOUSE RECOVERY	Month :	89.14	90.69	90.46	90.82	89 74	89.68	89.12	88 35	88 46	86.88
	To-date :	—	90.03	90.24	90.32	90.27	90.07	90.02	89.83	89.74	89.65
OVERALL RECOVERY	Month :	84.02	85.59	85.50	85.51	84 44	84.28	83.96	83.49	82.60	80.96
	To-date :	—	84.92	85.17	85.26	85.10	84.94	84.81	84.66	84.52	84.42
PURITY OF MIXED JUICE	Month :	85.15	85.76	86.32	86.13	85.97	86.01	85.65	84.77	83.60	82 02
	To-date :	—	85.51	85.77	85.87	85.90	85 92	85.89	85.76	85.61	85.52
REDUCING SUGARS/SUCROSE RATIO	Month :	3.76	3.41	3.13	2.90	3.17	3.00	3.09	3.59	4.03	5.34
	To-date :	—	3.56	3.31	3.18	3.16	3.12	3.12	3.16	3.20	3.32
SUCROSE IN FIN. MOLASSES % SUCROSE IN CANE	Month :	7.76	7.70	7.55	6.91	7.71	8.03	8.07	8.58	9.91	10.43
	To-date :	—	7.72	7.65	7.45	7.70	7.76	7.80	7.89	8.03	8.13
UNDETERMINED LOST % SUCROSE IN CANE	Month :	1.94	0.57	1.04	1.27	1.09	1.08	1.05	1.02	0.85	1.31
	To-date :	—	1.16	1.09	1.14	1.13	1.12	1.11	1.10	1.08	1.09
GRAVITY PURITY OF FINAL MOLASSES	Month :	38.40	39.46	39.09	40.17	40.99	40.73	40.44	39.90	39.40	39.90
	To-date :	—	39.00	39.04	39.32	39.61	39.82	39.97	39.92	39.87	39.87
MOLASSES (85° BRIX) % CANE	Month :	3.08	3.46	3.09	3.37	3.41	3.40	3.40	3.34	3.50	3.80
	To-date :	—	3.30	3.21	3.25	3.28	3.29	3.30	3.31	3.32	3.33
TOTAL MONTHLY RAINFALL IN INCHES		0.47	1.89	1.37	0.69	1.70	6.73	3.09	3.83	2.66	2.76
TOTAL RAINFALL FROM JANUARY 1ST		17.64	19.44	21.31	21.37	23.08	29.75	33.00	36.88	2.66	5.47

*All Sugar Tonnages according to Laboratory Reports.

Table 7.—COMPARISON OF FINAL RESULTS FOR S.A. SUGAR FACTORIES

(Season 1954 to Season 1964 inclusive)

SEASON	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Cane											
Sucrose per cent	13.34	13.87	13.35	13.11	13.12	13.66	13.69	13.75	13.29	13.55	13.90
Fibre per cent	16.03	15.74	15.81	15.38	15.92	15.92	15.22	14.52	15.50	15.50	15.38
JUICE											
Brix per cent First Expressed Juice	19.6	19.8	20.3	19.6	19.2	19.6	20.1	19.6	19.7	19.8	20.3
Purity of First Expressed Juice	87.9	88.0	87.3	87.3	86.7	87.7	87.8	88.0	85.5	87.4	87.5
Purity of Last Expressed Juice	76.8	76.7	75.8	76.1	74.4	75.0	75.6	74.7	71.5	72.7	74.3
Purity of Mixed Juice	85.9	86.0	85.5	85.1	84.5	85.5	85.6	86.0	83.4	85.3	85.5
Reducing Sugars/Sucrose Ratio	3.3	3.4	3.3	3.7	4.3	3.5	3.3	3.3	5.1	3.4	3.3
MILLING DATA											
Imbibition per cent Fibre	191	204	222	224	207	210	238	253	266	258	256
Lost Absolute Juice per cent Fibre	44.1	45.5	42.1	40.9	42.3	43.0	42.0	39.0	37.4	37.5	37.0
Imbibition per cent Cane	30.7	32.1	35.2	34.5	32.9	34.6	36.2	36.7	41.2	39.8	34.4
Sucrose Extraction	92.4	92.3	92.9	93.4	92.9	92.9	93.4	94.2	94.2	94.1	94.2
Sucrose per cent Bagasse	2.75	2.91	2.60	2.47	2.55	2.66	2.60	2.43	2.24	2.29	2.34
Moisture per cent Bagasse	52.92	53.18	53.12	53.06	53.28	53.26	53.01	52.54	52.17	52.46	52.64
Lower Calorific Value	**3,028**	**3,003**	**3,014**	**3,021**	**3,000**	**3,000**	**3,023**	**3,067**	**3,105**	**3,066**	**3,061**
RECOVERIES											
Overall Recovery	83.2	83.6	83.4	84.4	83.1	83.0	83.4	84.5	82.7	84.3	84.4
Boiling House Recovery	90.0	90.5	89.8	90.4	89.5	89.4	89.4	89.7	87.8	89.6	89.6
Boiling House Performance	97.4	97.9	97.4	98.5	97.8	97.1	96.9	97.0	96.6	97.2	97.1
Tons Cane per Ton Sugar	8.90	8.53	8.88	8.95	9.09	8.74	8.70	8.54	9.01	8.63	8.38
FILTER CAKE											
Sucrose per cent Cake	1.18	1.18	1.12	1.03	1.30	1.57	1.66	1.63	1.27	1.37	1.30
Cake per cent Cane	5.48	5.28	5.08	5.76	5.70	5.95	6.10	5.43	5.28	5.57	5.25
FINAL MOLASSES											
Gravity Purity	39.3	39.6	39.9	38.5	39.1	40.3	40.3	39.5	39.6	39.4	39.9
Brix per cent	89.7	90.0	89.9	90.3	90.2	90.6	90.9	92.5	89.1	91.2	91.6
Weight per cent Cane	2.88	2.95	3.02	2.98	3.24	3.13	3.22	3.16	3.91	3.15	3.33
UNDETERMINED LOSSES											
Per cent Sucrose in Cane	1.44	1.21	1.44	1.04	0.99	1.28	0.97	1.32	1.07	1.42	1.09
AVERAGE POLARIZATION											
of All Sugars	98.51	98.65	98.83	98.83	98.92	98.98	98.88	98.90	98.78	98.51	98.60

Table 8.—COMPARATIVE DATA OF REPORTING S.A. FACTORIES FROM 1925 TO 1964 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				
Average 1925-1934 ..	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	9.19	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 1935-1944 ..	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	92.24	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 1945-1954 ..	**13.79**	16.06	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
1956..	13.35	15.81	8.87	8.62	92.93	89.79	83.44	35.2	222	2.60	53.12	42.1	85.49	3.32	39.9	97.4	17 of 18	99.2
1957..	13.11	15.38	8.93	8.67	93.36	90.43	84.42	34.5	224	2.47	53 06	40 9	85 10	3 69	**38.5**	**98.5**	17 of 18	99.2
1958..	13.12	15.92	9.09	8.82	92.87	89.49	83.11	32.9	207	2.55	52.38	42.3	84.46	4.30	39.1	97.8	18 of 18	100.0
1959..	13.66	15.92	8.74	8.44	92.86	89.42	83.04	34.6	218	2.66	53.26	43.0	85.52	3.51	40.3	97.1	18 of 18	100.0
1960..	13.69	15.22	8.70	8.41	93.35	89.40	83.45	36.2	238	2.60	53.01	42.0	85.63	3.31	40.3	96.8	18 of 18	100.0
1961..	13.75	14.52	8.54	8.26	**94.21**	89.72	**84.53**	36.7	253	2.43	52.54	39.0	86.04	3.31	39.5	97.1	18 of 18	100.0
1962..	13.29	15.50	9.01	8.91	94.15	87.81	82.67	**41.2**	**266**	**2.24**	52.17	**37.4**	83.36	5.11	39.6	96.6	17 of 17	100.0
1963..	13.55	15.50	8.66	8.42	94.08	89.60	84.30	39.8	258	2.29	52.46	37.5	85.30	3.44	39.4	97.2	17 of 17	100.0
1964..	13.90	15.38	8.42	8.20	94.16	89.65	84.42	39.4	256	2.34	52.64	**37.0**	85.52	3.32	39.9	97.1	17 of 17	100.0
Average 1955-1964 ..	13.53	15.49	8.75	8.46	**93.43**	**89.58**	**83.69**	**36.3**	**235**	**2.51**	**52.78**	40.7	85.24	3.67	**39.6**	**97.4**	—	99.8

Mr. Gunn (in the chair): It would be very pleasant to have a 16 week season to coincide with the optimum period.

It is interesting to note that the calculated horsepower required for diffusion is 15 kW per stage of imbibition as compared with 650 B.H.P. for a 3-roller mill.

Mr. Bentley: One set of figures has perturbed me for some time and they have been reproduced this year. I refer to additional fuel that is used. Mr. Perk has converted steam raised by this fuel into brix in juice. One must be sure that the additional fuel has been used in the factory itself. It is obvious from the table that there are a lot of inconsistencies in the returns from the factories, a typical example being Mount Edgecombe, which shows that no additional fuel was used, their point being that such fuel was used for irrigation.

Tongaat, however, shows all additional fuel used although it includes an irrigation load of at least 1,000 horse-power and the plant lights most of Tongaat village and some outlying districts. This ought not to be converted back to steam raised to evaporate juice.

We should therefore have a consistent way of rendering returns so that all factories are comparable.

Mr. Perk: Big Bend also has a big irrigation load, but this is allowed for in my figures.

Figures from Mount Edgecombe for last year showed that at the week-end when irrigation was off no additional fuel was required.

Where possible I correct the figures for additional fuel. At Felixton, for instance, allowance is made for the bagasse used in the paper mill.

Mr. Fourmond: The yardstick used is fuel per ton of brix in mixed juice.

Darnall has an imbibition percentage of 372 and it still has to process the same amount of brix per hour, so the amount of water to be evaporated is much higher.

Therefore fuel per ton of brix is misleading.

Mr. Perk: Darnall compensates for the extra water used by the mills by a high heat efficiency, e.g., the high brix of the syrup and an extensive use of vapour bleeding.

Mr. du Toit: Many years ago when I prepared figures for the Annual Summary the optimum period was taken from 1st July to 30th November, which is quite a lot more than sixteen weeks, and Mr. Perk used also to accept that period, but last year, as this year, he refers to the period July to October.

Mr. Perk: I will correct the error and I accept that the period should be 1st July to 30th November.

Mr. Fourmond: Mr. Perk tries to correlate Lost Absolute Juice with Dilution Ratio. Umfolozi has Lost Absolute Juice Figures of 29 to a Dilution Ratio of 84, Darnall 30 to 85.

According to Dr. Douwes Dekker, under good conditions we should aim to lower the brix of the juice in cane to 15 per cent of its original value.

Dr. Douwes Dekker: The standard of dilution of 15 per cent of original value is a target which it is not expected to achieve in the near future.