FORTY SEVENTH ANNUAL REVIEW OF THE MILLING SEASON IN SOUTHERN AFRICA. (1971 — 72)

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Note: Except when otherwise stated, all data listed in the tables are as reported by the factories.

Introduction:

The 1971/72 milling season has been exceptionally good and has seen the establishment of new records for the

Highest sugar production by South African mills
Highest overall recovery
Highest mill extraction

Although the title of this paper has been modified, the main tables are in general similar to those of previous summaries. The principal changes are the grouping of cane varieties in a separate table and the introduction of data on cane transport.

The tables also contain for the first time data from Marracuene Agricola Acucareira, a new factory at Maragra in Mozambique, which is designated by the code letters MA.

The 1971/72 Season

The season started on the 15th April, 1971 at DK and ended on the 16th March, 1972, when TS stopped crushing. Most of the mills started in mid-May 1971 and closed their season in February 1972. The total length of the season for the industry was 336 days while the average number of crushing days was 278. These figures are based on total available time and include stops for weekends and public holidays.

Good rainfall during the growing season favoured cane growth and the official S.A. Sugar Association total for cane crushed is 16 751 102 tons which is second only to the record 1967/68 crop of 16 913 456 tons. Affiliated mills in neighbouring countries also had a good season. The two Swaziland sugar factories crushed 13% more cane than during the previous season while NH, in Malawi, crushed more than twice as much cane as in 1970/71 and exceeded its previous record by 19%. In Mozambique, the tonnage of cane processed by LB and MR was slightly lower than last year's.

Sugar production was the highest ever recorded in South Africa. The S.A. Sugar Association reports a production of 1 864 665 tons at an average pol of 99,36. This tonnage includes the sugar equivalent of high test molasses produced at ME during part of the season. The best previous production was 1 822 247 tons of 98,34 average pol sugar during the 1967/68 season.

Time Account

Overall time efficiency (76,01) was slightly lower than for the previous season (76,60), while time lost for other reasons, which is a reflection of the mechanical efficiency of the mills, is almost exactly the same as for last season.

The slight increase in percentage of weekend stops can be attributed to the longer season. Christmas and New Year stops, which are included in week-end stops, did not have as much effect on the average figure last season when more than half the mills finished grinding before Christmas. The additional number of grinding days which fell during the rainy season have also increased the percentage of time lost for lack of cane.

The best time efficiency is again reported by UF but this is due mainly to this factory's method of time accounting as pointed out in last season's summary. DL reports the next highest efficiency (80,08) mainly because of a reduction in week-end stops. In general, affiliated mills show better time efficiencies than South African mills, the best performance being that of UR with 87,04% efficiency. The main contributing factors to this high efficiency seems to have been reduced week-end stops (35% lower than South African average), very little time lost for lack of cane (2,07%) and a lower than average time lost for other reasons (3,08%).

Time lost for lack of cane averaged 18,32% at ML and seriously affected this mill's performance. Lack of cane stops at ML averaged only 5,95% up to the end of October but reached extremely high values during the last months of the season (36,5% in December.)

Cane Quality

Industrial average sucrose content of the cane for the season has been low (12,97). Data for the past 46 years which are listed in Table J show that only twice during this period have lower values been recorded. This low sucrose may be partly due to the length of the crushing season which inevitably resulted in more cane being crushed outside the peak sucrose months.

Curves showing the monthly average variation in sucrose content as well as variations reported by five mills in different geographical areas are plotted in Fig. 1. The month of February has been excluded from the average because some mills had stopped in January. These curves show a reduced seasonal effect for UC and UK but a very marked influence at ML where sucrose is high at the beginning of the season but falls sharply after November. EM and TS follow very closely the industrial average with little change in sucrose content from August to December.

PG reports the highest sucrose in cane (13,82)

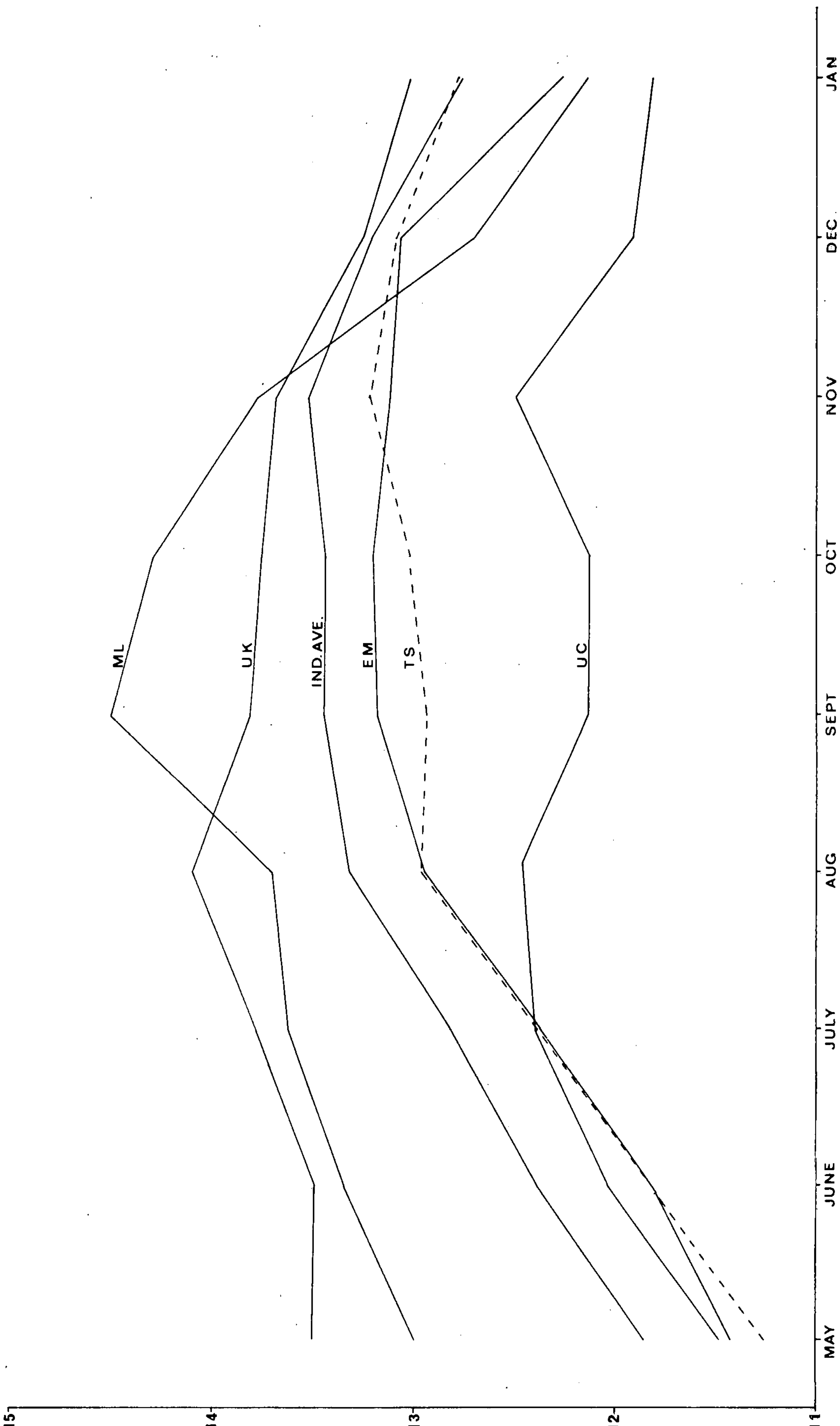

Fig I Monthly variations in sucrose % cane in South Africa but this is still well below figures recorded at two of the affiliated mills in Mozambique (14,33 at MA and 14,23 at LB).

The good juice purity (85,14) has compensated to a certain extent for the low sucrose content of cane: This purity is the highest recorded since 1964.

Average fibre % cane was 14,82. Only once during the past 46 years has a lower fibre content of cane been reported. Comparison of figures listed in Table G and inspection of Fig. 2 show that in spite of yearly variations, there is a definite downward trend in fibre % cane.

Brix of cane is reported for the first time in the tables as this figure is required to calculate the estimated recoverable sugar in some of the formulae which have been proposed for cane payment.

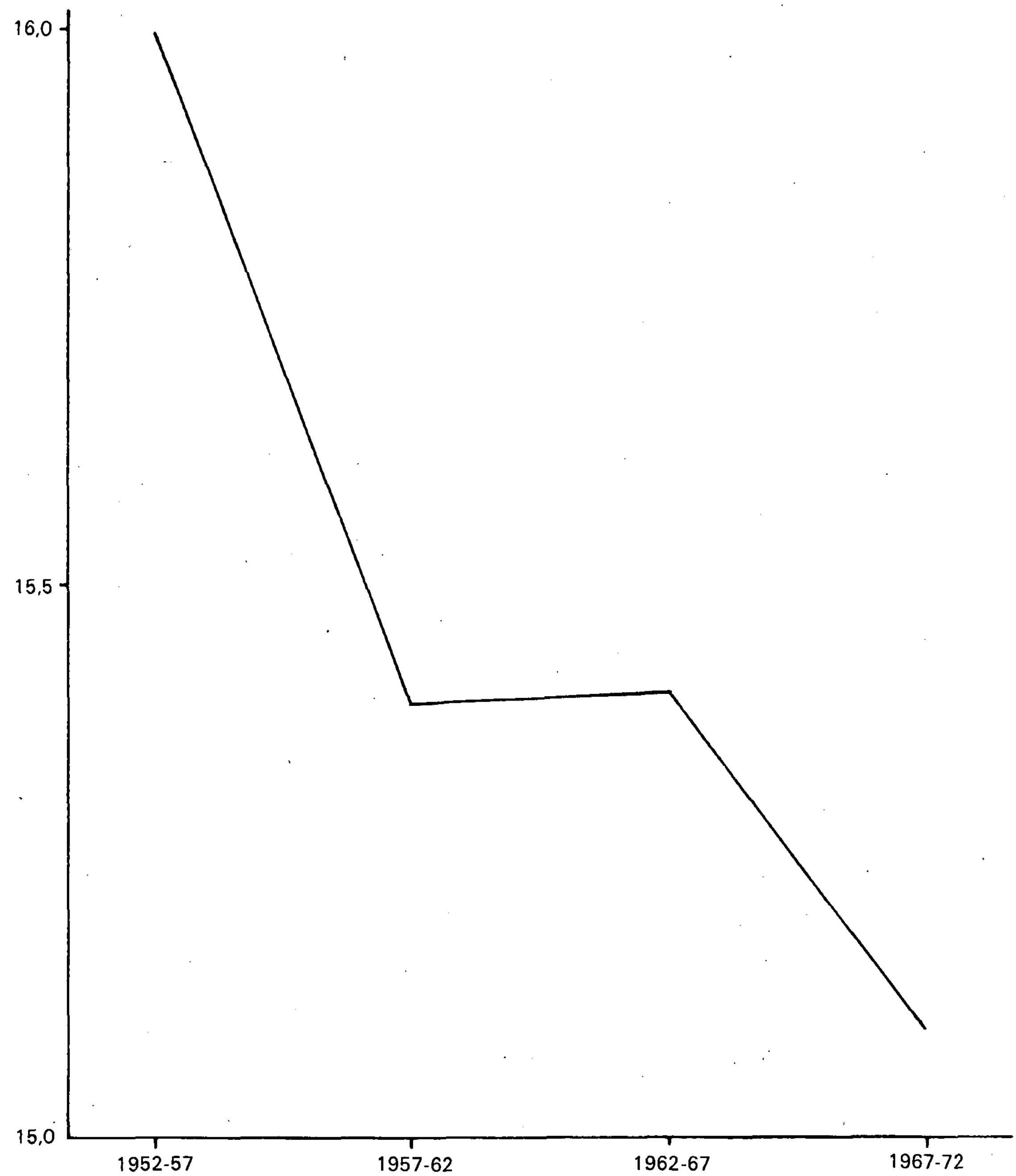

Fig 2. Fibre % cane 1952 - 1972

Cane Varieties

A complete variety breakdown of all cane crushed by South African mills is listed in Table G. This information has been compiled by the Central Board and is published with their permission. The high percentage of "mixed cane" (17,24%) is noteworthy. This is specially high at EM and AK which report 62,06 and 67,77% mixed cane respectively.

Change in the percentage of six varieties which have been the most popular during the past five years are recorded in Table 1. The decrease in the percentage of NCo 310 and the corresponding increase in NCo 376 which had been noted during the past seasons seem to have evened off. There is no marked change in the proportion of other varieties except for N 55/805 which is becoming more popular and which is listed for the first time in this summary. This variety accounts for about 10% of the cane crushed at GD, TS and ME.

NCo 376 is the most popular variety in Swaziland and at LB and MR in Mozambique. It accounts for 71% of the cane at MH. The other major variety supplied to these factories is NCo 310 which makes up 25 to 30% of the cane. In Malawi, the situation is reversed with 23% NCo 376 and 75% NCo 310, while MA reports 100% NCo 310.

TABLE I

Percentages of the main cane varieties crushed during past seasons

(South African Mills)

	1971/72	1970/71	1969/70	1968/69	1967/68
N55/805	3,91	—	—	—	—
NCo 310	13,79	11,85	13,47	19,21	24,77
NCO 293	5,50	6,28	4,40	7,03	6,21
NCo 376	50,49	54,18	52,60	44,52	41,46
NCo 382	4,17	4,48	3,95	6,43	6,42
N50/211	1,96	2,12	3,64	3,08	3,80

Cane Transport

Data on the type of vehicle used to transport cane to South African mills (excluding the two cooperatives) has been provided by the Central Board and is listed in Table H. Over 70% of the cane is transported by road while PG, FX and UF (not listed) rely almost entirely on rail or tramway transport.

Cane Preparation and Juice Extraction

The interest in cane preparation, which was mentioned in last year's summary, has gathered momentum and very noticeable progress has been made in this field by several mills. Routine determinations of the percentage of broken cells in prepared cane are now carried out in the majority of mills. The reliability of some of the figures quoted may be questioned mainly because the sampling of prepared cane is not always representative but this situation will change soon when all mills are equipped with automatic sampling hatches for cane payment purposes.

The trend is towards improving shredder performance by fitting heavier hammers to the Searby shredders found in most mills. The most important modifications have been carried out at DL and AK where the shredders have been rebuilt and fitted with 17kg hammers and heavy breaker plates. Power requirements of the shredders have increased proportionately and the new modified units are rated at about 37 KW/ton fibre/hour. At ML cane preparation has been improved by replacing one of the knives sets by heavy new swing knives driven by two 600 hp motors coupled to each end of the shaft.

The main development in the field of juice extraction has been the commissioning of a new Saturne diffuser at UF. This unit has had a remarkably trouble free start and has impressed by its mechanical simplicity and reliability. Average extraction of the diffusion plant, including first and dewatering mills averaged 95,3 for the season but extractions of over 96 were achieved towards the end of the season.

There have been no major changes in the operation of the other diffusers in 1971/72. The number of washing stages has been halved on the BMA diffuser at EM by coupling two successive juice distributors. The reduction in total amount of juice to be percolated through the bed per unit area has enabled the diffuser to accept more finely prepared cane and has improved the extraction.

UC has operated its diffuser for several weeks alternately with and without press water clarification with no apparent effect on Boiling House work or losses in molasses.

Industrial average Lost Absolute Juice % Fibre was 29,15 as against 30,85 last season in spite of a 5% increase in fibre throughput. UC still leads with 17,36 L.A.J. followed by two other diffusion factories: EN (22,78), and EM (24,39).

Of the milling factories, JB, DL, AK and ME have achieved very good extractions with L.A.J. of between 25 and 26. The performance of AK deserves special mention. This mill, which was already heavily loaded at 250 T.C.H., increased its throughput from 250 to 280 T.C.H. while at the same time reducing its Lost Absolute Juice % Fibre from 29 to 25, and with a reduction of 1,36 points in final bagasse moisture. This was achieved in spite of a 5% reduction in imbibition % fibre.

The increased throughput of ML and EM are also noteworthy as they indicate that diffusers are also capable of being pushed and still maintain their efficiency. ML reports a 13% and EM a 10% increase in capacity and, in both cases, extraction has been slightly improved.

There has been a general improvement in moisture content of bagasse. Industrial average has dropped from 53,07 to 52,66 since last season. Lowest values are reported by UC (49,04) but noticeable improvements have been achieved by EM, AK, GH, ME and RN. It seems that this is the aspect of milling work where there is still the greatest scope for improvement. A lower fibre

% cane and greater industrial use of bagasse may accentuate the importance of low bagasse moisture.

It may be relevant to point out that experiments carried out at SZ during the season have confirmed that there is no increase in moisture content of final bagasse with increases in imbibition rate.

Imbibition % fibre dropped from 285 to 277 during the past two seasons probably more as a result of the greater cane throughput than because of a change in milling technique. In several mills, reduction in imbibition rate has not resulted in a lowering of the extraction probably because this has been compensated for by better cane preparation. It would appear that in many mills and most of our diffusers, juice drainage problems are becoming the limiting factor to improved performance and that we should aim at better preparation rather than increased imbibition to improve performance.

Specific feed rates of mills have not been included in this season's tables because it is felt that, with the general use of heavy feeder rollers and even two roll pressure feeders, this formula may be misleading as it is based only on the total volume of the three mill rollers.

Clarification, Filtration and Evaporation

Although clarification difficulties were experienced in September and October in several factories on the coast, in general juices have not been refractory during the season.

A large four tray BMA clarifier has been commissioned at DL but it seems that interest in the industry is shifting towards short retention time clarifiers. A pilot EIS clarifier with a retention time of about ten minutes has been successfully operated at JB while some other factories are working towards conversion of existing units to fast type clarifiers. A logical application for these fast clarifiers would be to process filtrate which would no longer have to be recirculated.

With the cost of flocculants remaining more or less unchanged and that of clarifiers increasing rapidly, the relative cost of operating large clarifiers at low flocculant levels and fast clarifiers at high flocculant concentration must be constantly reviewed. The trend however favours fast clarifiers wherever additional clarifier capacity is required; otherwise, the increase in the cost of polyelectrolytes can only be balanced against reduced sugar losses during clarification and week-end stops. These are difficult to estimate but observations carried out at JB and listed in Table 2 indicate that long retention time in clarifiers may influence losses in final molasses.

Although no conclusions can be drawn from observations made in only one factory, mills having several clarifiers should always attempt to use the minimum number of units required. Sometimes minor modifications can increase the efficiency of a clarifier and reduce the number of units required. A typical example is provided by DK which operated during the past season with only one clarifier out of two as a result of improved efficiency of a Rapidorr clarifier after the juice draw-off piping had been modified.

TABLE II

Effect of retention time in clarifiers in final molasses production at JB

Period	No. of Clarifiers used	Estimated Retention time hrs.	Tons Mol. at 85 Bx % N.S. in mixed juice
4 weeks	1	2,8	147
8 weeks	1½	3,5	152
20 weeks	2	4,3	159

Unfortunately clarification control is still very empirical and unsatisfactory. We have no standards against which to judge clarification and we have to be content with visual estimation of juice colour and turbidity. This at least could be placed on a more scientific basis by having recording photo electric cells on clear juice draw off pipes.[1]

The average pH of clear juice and syrups has decreased gradually during the past five years as shown in Table 3. An interesting aspect of fast clarifiers is that there is no pH drop during clarification.

TABLE III

Industrial average pH of clear juice and syrup

Season	pH clear juice	pH syrup
1971/72	7,21	6,50
70/71	7,27	6,57
69/70	7,32	6,61
68/69	7,30	6,68
67/68	7,40	6,70

Filter operation would warrant more attention in a number of mills. Pol % filter cake ranges from 0,52 to 3,10 with the lowest value reported by UR which has one of the lowest filter capacity per ton of cane. The additional sugar which could be produced by improving filter efficiency is not negligible. Reduction of pol % cake from 1,3 (industrial average) to 0,6 would have enabled a typical 175 T.C.H. factory to produce about 250 tons of additional sugar last season.

Table 4 shows that the average Brix of syrup has gradually increased from 53,3 during the 1951/52 season to 62,53 for this season. With modern instrumentation to prevent crystallization during sudden changes in evaporation rate, it should be possible to produce syrup at 70° Brix and even higher although viscosity may reduce the heat transfer coefficient at high Brixes if the vacuum in the last effect is high. This is already normal practice in some cane and beet factories overseas. The highest Brix for the season (68,10) is reported by LB and three other factories have recorded average syrup Brixes higher than 65.

Two new evaporator first effects have operated during the season : a semi-Kestner at RN and a conventional Roberts vessel at UK.

TABLE IV

Brix of Syrup

Season	Bx. of Syrup
1971/72	62,53
70/71	62,12
69/70	61,03
68/69	61,23
67/68	58,91
66/67	60,35
65/67	59,33
64/65	58,77
63/64	58,06
62/63	57,92
61/62	57,80
60/61	56,90
56/57	54,50
51/52	53,30

Boiling House

Boiling House work has been easier than during the previous season with lower viscosities of low grade products. The trend towards continuous centrifugals continues and a number of machines were installed for low grade massecuite curing in various mills. The transition from batch to continuous machines can create problems unless it is carried out in one step. Some mills have mixed batteries of batch and continuous units and therefore have to cure at lower viscosities to suit the batch machine at the expense of molasses purity from the continuous centrifugals.

A new vacuum pan with a built in condenser was commissioned at DL during the season and has performed very well. In the same factory, the batch low grade crystallizers have been converted to continuous flow while an all new continuous crystallizer plant has operated at EM during the season. A feature of the EM crystallizers is that the cooling elements have a rocking instead of a rotary movement.

There have been no significant changes in what has now become the conventional boiling process of remelting C sugar and using B magma as a footing for the A strike. The size of the B sugar crystal and therefore the proportion of this sugar which has to be remelted appears to vary considerably from factory to factory. A few mills boil a B sugar of almost commercial size which requires very little building up in the A pan. This practice reduces the amount of B sugar which has to be remelted and is more economical in steam. It is to be recommended provided the sugar produced meets the specifications for quality.

This is the first season during which refractometers have been generally used for Brix measurements and average Boiling House figures are therefore not comparable with those of former years. Unfortunately, four factories in Natal and three of the affiliated mills have used spindles for Brix determination while a number of mills have determined Brix of boiling house products with refractometers and Brix of juices with hydrometers. Comparison between factories may therefore be misleading especially if they are based on performance indices calculated from purities and non sucrose. The effect of different methods of Brix measurement will be commented on later in this report.

Data on massecuites and exhaustion are listed in Table D. The industrial average volume of the different massecuites per ton of Brix in mixed juice has remained unchanged since the previous season, but the variations between values reported by different mills is sometimes considerable. The low volumes of A massecuite produced by PG and GH are exceptional in view of the fact that both these factories refine a large proportion of their raws and pump back refinery returns to the raw house.

Better exhaustion of both A and B massecuites could be obtained by boiling to a higher Brix. AK for example boils its A massecuites at 96,32 Brix and obtains an exhaustion of 70,01 as against the industrial averages of 92,62 Bx and 63,38 exhaustion. Alternatively longer cooling time in crystallizers would achieve the same purpose, the choice between the two methods being dictated mainly by availability or relative cost of pans and crystallizers.

The best molasses exhaustion in the industry is reported by DL and inspection of this factory's figures shows that this is due to a combination of three factors:

(a) boiling to a high Brix (98,34) as compared to the industrial average of 96,05,
(b) boiling low purity C massecuites (56,36)
(c) a purity drop of 22,14 points between massecuite and molasses as a result of the high Brix and good crystallizer work.

Average losses in molasses have been the lowest of the past five years. Unfortunately it is very difficult to separate the effect of juice quality from that of factory operation when judging boiling house work but to appreciate fully the better work being done, one should keep in mind that higher extraction at the mills will increase the amount of molasses per ton of cane. This is illustrated by calculated values listed in Table 5. For case I and II it has been assumed that the higher extraction had no effect on mixed juice purity while case III is calculated on the more probable assumption that mixed juice purity would be lowered.

TABLE V

Effect of extraction on molasses production

	Case I	Case II	Case III
Extraction	94,0	97,0	97,0
Mixed juice purity	85,0	85,0	84,0
Molasses % cane	3,4	3,5	3,8

Reporting of sucrose lost in molasses as a percentage of sucrose in cane penalizes factories processing low sucrose cane. Quite apart from the effect which lower juice purities usually associated with lower sucrose content cane will have on molasses production, the weight of sucrose lost in molasses is divided by a smaller denominator (sucrose in cane) and the losses in molasses are artificially inflated. Comparative figures for sucrose in molasses % cane and % sucrose in cane are listed in Table 6.

TABLE VI

Losses in final molasses expressed as % sucrose in cane and as % cane

Factory	Suc. in Mol % suc. in cane	Suc. in Mol % cane
ML	10,14	1,38
PG	7,57	1,05
UF	9,83	1,27
EM	9,07	1,14
FX	8,36	1,03
EN	9,99	1,28
AK	7,99	1,05
DK	7,87	1,01
GD	8,34	1,10
DL	7,75	1,02
GH	9,23	1,19
MV	7,61	0,96
JB	9,99	1,23
UC	9,45	1,16
TS	7,65	0,96
ME	7,84	1,02
IL	9,55	1,26
RN	8,06	1,10
SZ	6,96	0,92
UK	7,56	1,03
Average	8,43	1,09
MH	7,65	1,06
UR	9,50	1,28
LB	6,39	0,84
MR	9,07	1,29
NA	10,75	1,54
NH	8,28	1,08

Typical examples are provided by PG and FX. This last factory's losses in molasses are 2% lower than PG's when reported as % cane and 10% higher if expressed as % sucrose in cane.

Additional Fuels

The figures listed in Table D should be interpreted with caution since many of the factories have outside loads: refineries, irrigation, by-product plants etc. Two typical cases are AK and GH. The first of these two factories is shown as having used additional fuel equivalent to 1,94 tons of bagasse per 1 000 tons of cane, but the surplus bagasse which was burnt or used for particle board manufacture is not reported. Similarly GH uses additional fuel when he refinery is operating but has a huge bagasse surplus when producing only raw sugar.

Chemical Control

Refractometer Brix:

As mentioned earlier in this report, this season has seen the general adoption of refractometers for Brix determination in the South African sugar industry. Difficulties with some of the instruments and the necessity of recording hydrometer Brix of mixed juice and sucrose calculated from this Brix for cane payment purposes have led to a certain amount of confusion in the reporting of data. The use of Schmidtz tables to calculate pol from Brix determined at 20°C on thermostatically controlled refractometers and saccharimeter readings taken at higher temperatures has also introduced appreciable errors at certain factories.

Direct Cane Analysis:

The Sugar Industry Central Board has commissioned new laboratories for direct analysis of shredded cane at several mills. This procedure replaces the Java ratio method of sucrose assessment of growers' cane. Mechanical samplers and sub samplers have been developed and Brix and pol are determined on a water extract obtained by cold disintegration.

Bagasse Weighing:

New installations for direct weighing of bagasse were commissioned at EM and UF. In both cases, gamma ray weighers fitted on belt conveyors are used. Both these factories operate diffusers and the higher evaporation rate with warm bagasse yielded suspiciously high calculated fibre values. At EM the difference between calculated and weighed bagasse was found to range from 2 to 5%. A check carried out over a week at EN where all bagasse is weighed in a Servo Balans scale has shown that this weight differed by less than 1% from that recorded by a gamma ray weigher.

Molasses Exhaustion Formula:

A new molasses exhaustion formula has been determined experimentally and tentatively proposed by the Sugar Milling Research Institute for application to raw sugar factories. It reads:

$$\text{True purity} = 51{,}02 - 10{,}89\ \frac{\text{Reducing sugars\%}}{\text{Ash \%}}$$

Application of this formula to analyses of molasses from some factories with good recoveries has shown that the predicted exhaustion was very near actual molasses purities except when the reducing sugar to ash ratio was high. This aspect is the object of further investigation.

Acknowledgements

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TABLE A
SOUTH AFRICAN SUGAR ASSOCIATION FINAL PRODUCTION 1971/72 SEASON
METRIC TONS

MILL	LOCAL MARKET			EXPORT MARKET		TOTAL
	White	Refinery Raws	Brown	Very High Pol	H.T. Molasses (Sugar Equivalent)	
Malelane	97 002,709	—	3 896,041	—	—	100 898,750
Pongola	55 113,000	—	24 888,244	—	—	80 001,244
Umfolozi	—	4 310,650	9 350,000	114 469,746	—	128 130,396
Empangeni	—	121 393,400	290,000	—	—	121 683,400
Felixton	—	90 594,800	215,000	5 025,100	—	95 834,900
Entumeni	10 843,125	22,500	2 457,150	12 486,400	—	25 809,175
Amatikulu	—	6 829,400	12 770,000	167 773,884	—	187 373,284
Doornkop	—	—	116,250	40 673,750	—	40 790,000
Glendale	—	24 083,890	49,700	—	—	24 133,590
Darnall	—	39 007,100	235,750	99 111,450	—	138 354,300
Gledhow	131 825,750	14 735,550	89,000	9 053,150	—	155 703,450
Melville	—	14 118,250	2 890,750	24 360,452	—	41 369,452
Jaagbaan	—	331,300	—	68 951,596	—	69 282,896
Union Co-op	—	542,850	88,670	26 431,316	—	27 062,836
Tongaat	—	81 785,200	325,700	109 171,240	—	191 282,140
Mount Edgecombe	—	51 541,300	23 157,365	—	34 660,801	109 359,466
Illovo	—	24,250	14 472,598	43 467,000) Syrup 25,765)		57 989,613
Sezela	66 272,500	366,750	76,600	72 819,895	—	139 535,745
Renishaw	83,00	—	38 213,027	—	—	38 296,027
Umzimkulu	—	2 519,550	88,000	89 166,750	—	91 774,300
Raws for Refined Exports	—	(50 272,824)	—	50 272,824	—	—
TOTAL	361 140,084	401 933,916	133 669,845	933 260,318	34 660,801	1864 664,964

TABLE B

CANE CRUSHED AND SUGAR MADE, CANE COMPOSITION,

(SEASON

SYMBOLS OF FACTORIES	ML	PG*	UF	EM	FX	EN	AK	DK	GD	DL	GH*
Tons Sugar made	**100 899**	**81 718**	**128 130**	**121 797**	**95 860**	**25 809**	**187 841**	**40 790**	**24 157**	**138 352**	**160 526**
Percentage of white sugar made	96	69	Nil	Nil	Nil	42	Nil	Nil	Nil	Nil	82
Average °pol of all sugars made	99,78	99,38	99,26	99,34	99,46	99,61	99,46	99,63	99,37	99,53	99,88
Tons of cane crushed	**887 797**	**679 871**	**1 165 121**	**1 142 987**	**910 084**	**233 057**	**1 634 635**	**372 008**	**216 781**	**1 195 674**	**1 446 912**
Season started on	18.5.71	12.5.71	9.6.71	28.5.71	29.4.71	21.5.71	29.4.71	15.4.71	21.5.71	29.4.71	30.4.71
Season completed on	4.2.72	27.1.72	12.2.72	25.2.72	6.3.72	11.2.72	2.3.72	22.1.72	5.3.72	5.3.72	9.3.72
Number of crushing days	263	259	248	301	310	266	307	280	289	311	285
Time Account:											
Hours crushing % available hours	63,29	73,95	85,99	79,86	75,79	77,15	79,16	76,57	71,91	80,08	77,99
Hours week-end stop available hours	7,79	12,54	0,71	10,08	10,44	10,61	10,88	15,58	14,33	9,84	13,52
Hours lack of cane % available hours	18,32	3,90	3,35	6,41	8,21	4,43	5,75	6,00	11,35	5,02	3,20
Other hrs. of stoppages % avail. hrs.	10,60	9,61	9,95	3,64	5,56	7,82	4,21	1,86	2,41	5,07	5,28
Throughputs per hour actual crushing:											
Tons of cane crushed	222,21	147,90	227,95	197,85	161,64	47,36	279,96	72,22	43,41	199,91	245,58
Tons of fibre milled	32,05	19,43	30,20	33,78	25,27	6,41	42,91	10,46	6,22	29,23	37,07
Tons of Brix processed	34,28	23,18	33,71	28,46	22,94	6,89	41,69	10,03	6,33	30,05	35,54
Tons of sugar bagged	25,25	17,78	25,07	21,08	17,03	5,24	32,17	7,92	4,84	23,13	27,25
Composition of Cane Crushed:											
Sucrose % cane	**13,59**	**13,82**	**12,94**	**12,56**	**12,34**	**12,84**	**13,10**	**12,88**	**13,15**	**13,14**	**12,88**
Fibre % can	**14,42**	**13,14**	**13,25**	**17,07**	**15,64**	**13,53**	**15,33**	**14,49**	**14,32**	**14,62**	**15,10**
Brix % cane	16,31	16,57	15,64	15,14	14,93	15,09	15,60	14,93	15,67	15,73	15,25
Java Ratio	79,54	80,95	81,18	76,60	78,64	77,56	79,57	77,92	79,89	80,28	80,01
Tons cane per ton of sugar	8,80	8,32	9,09	9,38	9,49	9,03	8,70	9,12	8,97	8,64	9,01
Tons cane per ton of 96°sugar	8,46	8,09	8,79	9,07	9,16	8,70	8,40	8,79	8,67	8,33	8,71
Performances:											
Imbibition % cane	41,63	34,83	38,14	49,43	40,56	45,06	41,53	32,44	38,35	46,64	35,41
Imbibition % fibre	289	265	288	290	259	333	271	224	268	319	235
Lost absolute juice % fibre	**32,30**	**35,93**	**35,74**	**24,39**	**26,82**	**22,78**	**25,04**	**40,99**	**41,68**	**25,90**	**28,75**
Extraction	95,60	95,65	95,48	95,71	95,76	97,56	96,47	93,96	94,01	96,88	96,24
Boiling house recovery	87,26	89,73	88,33	88,08	88,67	88,05	90,44	90,27	89,57	90,49	88,87
Overall recovery	83,42	85,83	84,34	84,30	84,91	85,90	87,24	84,82	84,20	87,67	85,52
Sucrose Balance:											
Lost in bagasse (a)	4,40	4,35	4,52	4,29	4,24	2,44	3,53	6,04	5,99	3,12	3,76
Lost in filter cake (b)	0,32	0,87	0,52	0,18	0,70	0,99	0,30	0,45	0,29	0,33	0,66
Lost in final molasses (c)	10,14	7,57	9,83	9,07	8,36	9,99	7,99	7,87	8,34	7,75	9,23
Undetermined losses (d)	**1,71**	**1,38**	**0,79**	**2,16**	**1,79**	**0,68**	**0,94**	**0,81**	**1,17**	**1,13**	**0,83**
Boiling house losses (b)+(c)+(d)	12,17	9,82	11,14	11,41	10,85	11,66	9,23	9,13	9,81	9,21	10,72
Sum of all losses (a)+(b)+(c)+(d)	16,57	14,17	15,66	15,70	15,09	14,10	12,76	15,18	15,80	12,33	14,48

*Sugar tonnages and Boiling House data reported by these factories are based on weight of sugar leaving rawhouse and not on actual sugar production of the factory cum refinery.

x Including sugar equvalent of H.T.M.

THROUGHPUTS AND TIME ACCOUNTS, PERFORMANCES AND LOSSES

1971 — 1972)

MV	JB	UC	TS	ME	IL	RN	SZ*	UK	Totals & Averages	MH	UR	LB	MR	MA	NH
41 397	**69 360**	**27 164**	**191 282**	**109 651x**	**57 990**	**38 296**	**141 477**	**91 798**	**1 875484x**	**86 668**	**90 526**	**73 112**	**70 259**	**44 134**	**32 423**
Nil	Nil	Nil	Nil	Nil	Nil	Nil	47	Nil	19	3	23	21	52	39	47
99,34	99,52	99,77	99,41	99,02	99,48	98,56	99,66	99,59	99,36	98,62	98,83	98,49	99,14	98,63	96,01
372 007	**668 579**	**258 623**	**1 745 133**	**964 681**	**523 592**	**332 644**	**1 219 685**	**781 243**	**16751114**	**720 861**	**794 245**	**643 272**	**606 505**	**399 053**	**288 113**
5.5.71	17.5.71	3.5.71	5.5.71	5.5.71	29.4.71	18.5.71	3.5.71	19,5,71	15.4.71	7.5.71	28.4.71	13.5.71	5.5.71	25.5.71	5.5.71
23.2.72	13.12.72	15.1.72	16.3.72	13.2.72	12.2.72	22.1.72	25.1.72	19.2.72	16.3.72	9.1.72	25.1.72	14.11.71	14.11.71	17.1.72	30.11.71
295	210	258	312	284	288	250	268	274	278	246	270	185	193	238	206
71,74	74,85	75,50	77,34	78,23	75,10	70,97	77,72	75,42	76,01	82,65	87,04	85,64	80,83	64,41	79,17
15,44	10,47	16,47	7,78	15,42	13,51	16,02	12,90	15,17	12,00	6,35	7,81	3,62	8,49	9,99	9,93
7,33	3,88	4,19	5,53	4,63	7,42	8,38	4,38	5,84	6,39	6,74	2,07	3,49	3,78	13,06	1,54
5,49	10,81	3,84	9,34	1,72	3,97	4,62	5,00	3,57	5,60	4,26	3,08	7,25	6,91	12,55	9,37
73,35	177,13	55,25	301,53	180,94	100,89	78,24	244,08	157,46	164,34	147,64	140,80	169,16	161,99	108,55	73,60
10,90	26,47	7,69	45,57	27,18	13,76	11,70	36,50	22,28	24,36	20,08	20,12	27,54	23,96	14,49	11,71
10,37	24,89	7,74	42,42	26,66	14,97	11,38	35,21	23,45	24,01	22,51	21,19	23,42	24,75	17,01	10,56
8,16	18,38	5,80	33,05	H.T.M.	11,17	9,01	28,31	18,50	18,29	17,75	16,05	19,22	18,77	12,01	8,28
12,67	**12,33**	**12,18**	**12,59**	**12,99**	**13,15**	**13,60**	**13,24**	**13,58**	**12,97**	**13,87**	**13,52**	**13,17**	**14,23**	**14,33**	**13,04**
14,86	**14,94**	**1392**	**15,11**	**15,02**	**13,64**	**14,96**	**14,95**	**14,15**	**14,82**	**13,60**	**14,29**	**16,28**	**14,79**	**13,34**	**15,91**
14,93	14,72	14,42	14,88	15,41	15,71	15,56	15,25	15,61	15,39	16,23	16,01	15,13	16,76	17,15	15,22
78,08	79,00	—	77,95	79,95	80,09	79,32	79,71	79,98	80,51	80,23	80,04	C.L.	C.L.	80.98	78,44
8,98	9,64	9,52	9,12	8,80	9,03	8,69	8,55	8,51	8,93	8,32	8,77	8,80	8,63	9,04	8,89
8,68	9,30	9,16	8,81	8,49	8,71	8,46	8,28	8,20	8,63	8,10	8,52	8,58	8,36	8,80	8,88
43,87	45,97	31,64	33,65	48,41	37,39	38,57	44,73	46,33	41,05	31,49	30,84	27,36	29,18	25,81	38,72
295	307	227	223	322	274	258	299	327	277	231	216	168	197	193	243
30,43	**25,50**	**17,36**	**30,54**	**24,92**	**35,37**	**37,17**	**30,86**	**28,11**	**29,15**	**38,51**	**36,17**	**43,64**	**50,95**	**55,92**	**30,19**
95,72	96,48	97,81	95,16	96,72	95,61	94,55	95,66	96,22	95,91	94,38	94,86	92,38	91,94	92,15	94,55
91,12	86,78	88,00	90,97	89,59	87,64	88,25	91,58	89,53	89,41	90,55	87,82	92,03	87,79	82,60	87,60
87,22	83,73	86,07	86,57	86,65	83,80	83,44	87,61	86,14	85,76	85,46	83,31	85,02	80,71	76,11	82,83
4,28	3,52	2,19	4,84	3,28	4,39	5,45	4,34	3,78	4,09	5,62	5,13	7,62	8,06	7,85	5,45
0,35	0,52	0,47	0,75	0,41	0,32	0,88	0,45	0,36	0,49	0,33	0.17	0,45	0,30	1,08	1,19
7,61	9,99	9,45	7,65	7,84	9,55	8,06	6,96	7,56	8,43	7,65	9,50	6,39	9,07	10,75	8,28
0,54	**2,24**	**1,82**	**0,19**	**1,83**	**1,94**	**2,17**	**0,64**	**2,15**	**1,23**	**0,94**	**1,88**	**0,51**	**1,85**	**4,21**	**2,24**
8,50	12,75	11,74	8,59	10,08	11,81	11,11	8,05	10.07	10,15	8,92	11,55	7,35	11,22	16,04	11,71
12,78	16,27	13,93	13,43	13,36	16,20	16,56	12,39	13,85	14,24	14,54	16,68	14,97	19,28	23,89	17,16

TABLE C

ANALYSIS OF BAGASSE, JUICES, FILTER CAKE,

(SEASON 1971 — 1972)

SYMBOLS OF FACTORIES	ML	PG	UF	EM	FX	EN	AK	DK	GD	DL	GH
Final Bagasse:											
Sucrose % bagasse	**1,78**	**2,08**	**1,90**	**1,39**	**1,57**	**1,05**	**1,40**	**2,28**	**2,45**	**1,28**	**1,46**
Moisture % bagasse	**54,41**	**51,38**	**54,32**	**53,92**	**50,81**	**53,13**	**51,38**	**54,45**	**51,96**	**52,03**	**52,26**
Fibre % bagasse	42,95	45,50	42,91	44,11	46,96	45,07	46,48	42,51	44,83	45,78	45,40
Bagasse % cane	33,58	28,88	30,87	38,71	33,30	30,02	32,98	34,09	32,09	31,94	33,26
LCV in kJ per kg bagasse	6 784	7 380	6 797	6 899	7 516	7 072	7 409	6 755	7 248	7 283	7 229
Brix free water % fibre	**30**	**26**	**23**	**21**	**10**	**47**	**17**	**43**	**24**	**14**	**20**
First Expressed Juice:											
Brix	20,08	19,86	18,70	19,08	18,05	18,85	18,99	18,84	19,06	18,88	18,63
Apparent purity	85,11	85,95	85,27	85,91	86,94	87,86	86,68	87,74	86,36	86,67	86,42
Last Expressed Juice:											
Brix	2,78	2,92	2,20	2,88	2,18	0,95	1,91	3,82	2,58	1,95	1,79
Apparent purity	67,63	67,12	69,36	70,87	70,50	57,63	65,46	75,00	72,14	58,70	65,13
Purity drop	**17,48**	**18,83**	**15,91**	**15,04**	**16,44**	**30,23**	**21,22**	**12,74**	**14,22**	**27,97**	**21,29**
Mixed Juice:											
Brix	14,28	14,79	13,78	12,99	12,91	12,65	13,72	14,13	13,73	13,10	14,17
Apparent purity	84,32	84,38	83,57	—	—	—	—	87,10		—	—
Purity drop	**0,79**	**1,57**	**1,70**	**2,36**	**3,64**	**1,77**	**1,81**	**0,64**	**1,58**	**2,00**	**0,82**
Gravity purity	84,24	84,38	—	83,55	83,30	86,09	84,87	85,86	84,78	84,67	85,60
Reducing sugars/Sucrose ratio	5,79	3,88	3,86	3,72	4,10	2,74	4,32	3,16	4,64	4,20	5,61
Clarified Juice:											
Brix	14,30	15,16	13,54	12,61	12,14	12,92	13,07	13,28	13,42	13,23	13,01
Apparent purity	85,10	85,42	82,42	84,95	85,30	86,78	86,45	87,16	85,30	85,90	86,33
Reducing sugars/Sucrose ratio	5,11	3,62	3,76	3,32	4,40	2,62	3,80	3,44	4,64	3,92	3,79
Average pH	**7,17**	**7,00**	**6,95**	**7,30**	**7,30**	**7,62**	**7,33**	**7,10**	**7,22**	**7,20**	**7,33**
Filter Cake:											
Pol % filter cake	1,32	2,11	1,36	0,62	1,44	2,55	0,79	1,15	1,29	0,88	1,86
Filter cake % cane	3,35	5,68	5,00A	3,73	6,00A	5,00A	5,00A	4,99	3,00A	4,96	4,55
Syrup:											
Brix	63,43	65,93	61,83	63,12	61,31	64,68	59,64	57,54	65,78	66,72	61,82
Apparent purity	84,74	84,58	84,28	85,62	86,70	87,08	87,12	88,05	85,74	86,40	86,80
Reducing sugars/Sucrose ratio	6,07	2,79	4,16	2,90	3,90	1,96	3,51	3,06	4,09	3,71	3,76
Average pH	**6,21**	**6,76**	**6,18**	**6,20**	**6,40**	**6,92**	**6,55**	**6,60**	**6,67**	**6,40**	**6,66**
Final Molasses:											
Refractro Brix	86,14	S92,58	89,11	89,30	87,30	86,37	91,95	89,88	S93,78	89,80	84,79
Pol/Refracto Brix purity	36,84	S39,10	—	38,90	38,40	—	—	37,88	S35,10	34,49	40,40
Sucrose/Refracto Brix purity	41,59	S39,20	40,37	—	39,20	42,11	37,89	39,21	S37,17	37,08	40,65
Percentage reducing sugars	17,57	—	14,38	11,90	16,80	—	14,62	15,40	—	—	11,92
Percentage sulphated ash	11,17	—	15,17	—	—	12,85	11,63	15,27	—	—	—
Reducing sugar/ash ratio	1,57	—	0,95	—	—	—	1,26	1,01	—	—	—
Molasses of 85° Ref. Brix % cane	3,90	S3,14	3,71	3,46	3,10	3,58	3,25	3,04	S3,47	3,23	3,44

A = Assumed Weight
S = Spindle Brix

SYRUP AND FINAL MOLASSES

MV	JB	UC	TS	ME	IL	RN	SZ	UK	Totals & Averages	MH	UR	LB	MR	MA	NH
1,65	**1,28**	**0,95**	**1,79**	**1,33**	**1,81**	**2,23**	**1,73**	**1,61**	**1,61**	**2,53**	**2,14**	**2,66**	**3,43**	**3,66**	**1,81**
52,28	**53,79**	**49,04**	**53,21**	**50,90**	**54,50**	**51,93**	**52,41**	**53,49**	**52,66**	**52,58**	**52,86**	**53,50**	**51,32**	**51,82**	**57,24**
45,30	44,26	49,52	44,41	46,98	42,75	45,01	45,09	44,25	44,97	44,25	44,16	43,10	44,24	43,38	40,54
32,80	33,77	28,12	34,03	31,98	31,91	33,23	33,16	31,98	32,97	30,76	32,37	37,78	33,43	30,77	39,25
7 217	**6 929**	**7 898**	**7 025**	**7 508**	**6 764**	**7 263**	**7 188**	**6 976**	**7 143**	**7 120**	**7 080**	**6 930**	**7 336**	**7 225**	**6 214**
27	**27**	**—**	**36**	**14**	**26**	**23**	**18**	**25**	**23**	**36**	**29**	**—**	**—**	**17**	**25**
18,40	18,18	—	18,73	18,60	18,99	19,08	18,51	18,98	18,55	19,91	19,64	C.L.	C.L.	20,33	19,01
88,22	85,85	—	86,22	87,36	86,47	89,86	89,68	89,52	86,83	86,86	86,27	C.L.	C.L.	87,03	87,48
1,88	1,56	2,47	2,51	1,48	1,93	2,48	2,18	1,75	2,21	3,70	2,10	5,01	5,17	3,54	4,77
68,51	65,17	65,99	75,27	62,69	65,80	72,98	69,27	70,86	67,80	79,78	71,84	78,24	76,96	76,54	81,76
19,71	**20,68**	**—**	**10,95**	**24,67**	**20,67**	**16,88**	**20,41**	**18,66**	**19,16**	**7,08**	**14,43**	**—**	**—**	**10,49**	**5,72**
12,73	12,53	13,53	14,12	12,65	14,06	13,80	12,93	13,02	13,48	15,13	15,28	15,46	15,95	16,25	14,43
—	—	84,72	—	—	—	—	87,62	87,56	—	—	85,07	87,05	—	84,26	85,42
2,41	**1,22**	**—**	**1,08**	**2,08**	**1,70**	**1,44**	**2,06**	**1,96**	**1,65**	**0,96**	**1,20**	**—**	**—**	**2,77**	**1,54**
85,81	84,63	84,99	85,14	85,28	84,77	88,42	87,78	87,78	85,14	85,90	85,23	87,84	85,64	—	85,94
3,51	6,76	4,99	4,75	4,41	4,35	3,32	3,14	3,20	4,20	3,71	4,38	3,90	3,53	3,99	3,87
12,00	12,21	13,63	13,71	12,04	13,22	14,81	13,06	12,43	13,19	14,45	14,87	16,01	15,00	16,13	14,74
86,55	84,80	85,91	86,30	86,09	85,85	89,33	88,13	89,22	86,16	87,78	85,70	87,51	85,59	85,68	88,47
3,34	5,73	4,63	4,31	4,08	4,02	2,82	2,94	3,03	3,85	3,31	4,39	3,64	3,96	3,73	2,90
7,20	**7,20**	**7,00**	**7,09**	**7,30**	**7,46**	**7,01**	**7,32**	**7,03**	**7,21**	**7,00**	**7,13**	**7,00**	**6,90**	**7,20**	**7,80**
1,04	1,02	1,14	1,89	1,00	1,23	2,10	1,25	1,23	1,34	1,69	0,52	1,39	0,85	3,10	2,47
4,24	4,26	5,04	5,04	5,26	3,48	5,69	4,77	4,00A	4,74	2,68	4,51	4,29	5,00A	5,00A	6,30
62,91	61,81	60,52	62,71	60,21	64,51	63,81	60,47	61,78	62,53	63,13	60,36	68,10	62,59	59,76	61,66
86,70	85,20	86,58	86,81	86,95	85,30	89,12	88,17	88,54	86,52	88,15	85,78	86,90	86,10	86,18	86,93
3,26	5,49	4,38	4,19	4,33	3,04	2,85	2,76	3,24	3,65	2,85	4,35	3,33	3,08	3,72	2,85
6,50	**6,40**	**6,30**	**6,22**	**6,20**	**6,79**	**6,70**	**6,52**	**6,75**	**6,50**	**6,60**	**6,47**	**6,70**	**6,90**	**6,50**	**7,20**
87,35	88,77	85,18	85,90	87,26	S90,99	88,06	85,79	S85,10	88,16	89,15	S92,13	S88,32	S90,67	S89,39	85,19
39,52	37,12	38,85	37,00	39,57	S38,70	—	40,15	S37,70	38,11	40,70	S38,36	S40,68	S42,33	S43,30	40,14
40,10	38,91	40,36	39,02	40,33	S40,38	43,53	40,37	S38,86	39,40	—	S40,25	S42,89	S43,30	—	40,76
15,26	16,07	15,06	17,02	16,11	13,25	—	13,15	11,66	14,68	—	16,80	14,06	18,28	10,38	8,88
—	13,11	11,87	15,40	13,73	11,23	—	12,93	14,91	13,27	—	14,70	12,07	14,28	14,02	—
—	1,23	1,27	1,10	1,17	1,18	—	1,02	0,78	1,14	—	1,14	1,16	1,28	0,74	—
2,83	3,72	3,48	2,90	3,08	S3,69	2,96	2,69	S3,11	3,26	3,07	S3,75	S2,31	S3,51	S4,19	3,12

TABLE D

MASSECUITES, EXHAUSTIONS, CLARIFYING AGENTS

(SEASON 1971 — 1972)

SYMBOLS OF FACTORIES	ML	PG	UF	EM	FX	EN	AK	DK	GD	DL	GH
Brix in Mixed Juice % Cane	**15,43**	**15,67**	**14,79**	**14,38**	**14,19**	**14,55**	**14,89**	**13,89**	**14,58**	**15,03**	**14,47**
A-Massecuite:											
m^3 per ton Brix in mixed juice	1,24	0,95	0,93	0,96	0,91	1,35	0,98	0,95	0,94	1,01	0,93
Brix of massecuite	91,67	S91,88	93,88	93,47	93,06	91,53	96,32	93,46	S93,02	94,47	92,97
Purity of massecuite	83,69	85,95	85,26	87,68	87,00	84,66	89,18	90,27	87,41	87,98	90,24
Purity of A-molasses	71,12	70,48	69,64	69,94	71,60	72,38	71,20	74,62	68,97	71,52	73,20
Purity drop	12,57	15,47	15,62	17,74	15,40	12,28	17,98	15,65	18,44	16,46	17,04
Exhaustion	**52,01**	**60,97**	**60,43**	**67,31**	**62,33**	**52,52**	**70,01**	**68,31**	**67,99**	**65,69**	**70,46**
Purity A mc — Purity Syrup	**—1,05**	**1,37**	**0,98**	**2,06**	**0,30**	**—2,42**	**2,06**	**2,22**	**1,67**	**1,58**	**3,44**
B-Massecuite:											
m^3 per ton Brix in mixed juice	0,44	0,33	0,32	0,36	0,30	0,46	0,29	0,31	0,39	0,30	0,35
Brix of massecuite	93,44	S93,59	93,96	96,75	94,09	95,44	95,50	93,10	S95,78	95,08	93,89
Purity of massecuite	72,21	74,36	70,99	70,92	72,30	74,46	72,57	74,89	69,42	72,76	73,81
Purity of B-molasses	52,72	55,71	50,80	51,01	49,70	52,52	49,73	56,52	48,00	47,15	52,90
Purity drop	19,49	18,65	20,19	19,91	22,60	21,94	22,84	18,37	21,42	25,61	20,91
Exhaustion	**57,09**	**56,63**	**57,81**	**57,31**	**62,14**	**62,09**	**62,61**	**56,42**	**59,34**	**66,60**	**60,15**
C-Massecuite:											
m^3 per ton Brix in mixed juice	0,28	0,26	0,25	0,26	0,25	0,26	0,24	0,27	0,23	0,24	0,26
Brix of massecuite	95,77	S98,31	96,29	98,63	96,23	96,82	96,98	94,79	S98,60	98,34	95,28
Purity of massecuite	58,38	60,25	59,64	57,84	59,50	58,85	59,72	61,23	53,48	56,36	60,30
Purity of C-molasses	36,84	39,10	40,37	38,90	38,40	42,11	38,01	37,88	35,10	34,22	40,40
Purity drop	21,54	21,15	19,29	18,94	21,10	16,74	21,71	23,35	18,38	22,14	19,90
Crystal % massecuite	**34,10**	**34,73**	**32,32**	**31,00**	**34,25**	**28,92**	**35,02**	**37,59**	**28,32**	**33,66**	**33,39**
Exhaustion	**58,42**	**57,64**	**54,19**	**53,59**	**57,57**	**49,14**	**58,64**	**61,39**	**52,96**	**59,72**	**55,37**
White Sugar Massecuites:											
Kgs sugar per m^3	612	727	—	—	—	—	—	—	—	—	775
Total Volume of all Massecuites:											
m^3 per ton brix in mixed juice	3,12	2,26	1,50	1,58	1,46	2,07	1,51	1,53	1,56	1,55	2,35
Clarrifying Agents:											
Tons limestone per 1 000 T.C.	—	4,83	—	—	—	—	—	—	—	—	4,38
Tons coke per 1 000 T.C.	—	0,48	—	—	—	—	—	—	—	—	0,49
Tons lime per 1 000 T.C.	1,63	—	0,50	0,73	0,62	0,91	0,49	0,48	0,60	0,53	0,74
Tons sulphur per 1 000 T.C.	0,02	0,02		—	—	0,08	1	—	—	—	—
Phosphoric acid ppm mixed juice	—	—	—	—	—	—	—	—	—	—	—
Flocculents ppm mixed juice	0,52	1,39	3,24	1,01	—	5,11	—	3,41	1,30	1,37	—
Additional Fuels:											
Per 1 000 Tons of Cane											
Tons of fuel oil	—	—	—	—	—	—	—	—	—	—	—
Tons of coal	17,27	9,56	4,59	0,78	17,16	13,60	0,48	—	10,13	—	6,43
Tons of wood	—	0,09	0,06	0,66	—	13,67	—	12,73	2,50	2,04	1,38
Converted into bagasse	**69,08**	**38,35**	**18,43**	**3,91**	**68,65**	**70,76**	**1,94**	**15,24**	**43,54**	**2,45**	**27,38**

$$\text{Exhaustion} = \frac{10000\ (\text{Pty massecuite} - \text{Pty run off})}{\text{Pty massecuite}\ (100 - \text{Pty run off})}$$

$$\text{Crystal content} = \frac{10000\ (\text{Pty massecuite} - \text{Pty run off})}{100 - \text{Pty run off}}$$

AND ADDITIONAL FUELS

MV	JB	UC	TS	ME	IL	RN	SZ	UK	Total & Averages	MH	UR	LB	MR	MA	NH
14,14	**14,05**	**14,01**	**14,07**	**14,73**	**14,84**	**14,54**	**14,43**	**14,89**	**14,61**	**15,24**	**15,05**	**13,85**	**15,28**	**15,67**	**14,35**
1,11	1,06	1,05	1,01	0,99	1,24	0,74	1,14	0,97	1,02	1,00	1,01	0,93	0,90	0,67	0,91
92,27	92,19	91,40	93,00	91,57	S93,02	90,97	91,12	S91,12	92,62	93,10	91,30	93,21	92,50	92,86	90,35
89,60	87,40	87,80	87,30	87,67	88,25	87,58	88,16	88,88	87,60	85,94	88,56	84,87	86,03	85,29	85,28
74,80	72,10	73,28	70,30	73,07	73,65	71,71	73,86	74,95	72,12	70,29	73,03	69,44	69,93	66,64	69,39
14,80	15,30	14,52	17,00	14,60	14,60	15,87	14,30	13,93	15,48	15,65	15,53	15,43	16,10	18,65	15,89
65,55	**62,74**	**61,89**	**65,57**	**61,84**	**62,79**	**64,05**	**62,05**	**62,57**	**63,38**	**61,29**	**65,02**	**59,49**	**62,24**	**65,55**	**60,87**
2,90	**2,20**	**1,22**	**0,49**	**0,72**	**2,95**	**−1,54**	**−0,01**	**0,34**	**1,07**	**−2,21**	**2,78**	**−2,12**	**−0,07**	**−0,89**	**−1,65**
0,35	0,36	0,47	0,36	0,38	0,34	0,33	0,33	0,32	0,35	0,44	0,37	0,43	0,47	0,44	0,35
93,50	93,45	93,12	93,60	93,25	S92,75	92,07	91,70	S93,13	93,86	94,42	93,78	94,47	95,04	94,62	91,99
74,40	75,20	73,00	70,60	75,52	74,66	77,73	74,63	75,81	73,36	73,86	75,80	72,42	74,47	75,04	74,66
49,70	52,60	50,91	50,30	52,44	52,72	56,19	51,13	56,46	51,96	52,07	52,19	53,47	54,75	57,48	53,35
24,70	22,60	22,09	20,30	20,08	21,94	21,54	23,50	19,35	21,40	21,79	23,61	18,95	19,72	17,56	21,31
66,00	**63,40**	**61,64**	**57,85**	**58,22**	**62,15**	**63,25**	**64,43**	**58,62**	**60,72**	**61,55**	**65,15**	**56,24**	**58,52**	**55,03**	61,18
0,24	0,32	0,29	0,23	0,27	0,30	0,24	0,24	0,25	0,26	0,25	0,33	0,31	0,26	0,28	0,19
94,82	95,91	94,47	94,90	95,91	S96,86	93,07	94,11	S94,88	96,05	96,37	97,41	98,31	99,73	96,76	96,70
58,60	60,70	59,38	56,50	59,99	60,99	63,95	59,81	62,00	59,37	62,22	62,97	59,70	62,51	62,63	56,18
39,52	37,12	38,85	37,00	39,57	38,70	43,53	40,15	37,70	38,67	40,70	38,36	40,68	38,58	43,30	40,14
19,08	23,58	20,54	19,50	20,42	22,29	20,42	19,66	24,30	20,70	21,52	24,61	19,02	23,93	19,33	16,04
31,55	**37,50**	**33,57**	**30,95**	**33,79**	**36,36**	**36,16**	**32,85**	**39,00**	**33,75**	**36,29**	**39,93**	**32,06**	**38,96**	**34,09**	**26,79**
53,84	**61,78**	**56,54**	**54,78**	**56,33**	**59,62**	**56,55**	**54,92**	**62,91**	**56,85**	**58,33**	**63,40**	**53,71**	**62,33**	**54,43**	**47,70**
—	—	—	—	—	—	—	514	—	—	547	508	—	647	—	711
1,69	1,74	1,81	1,59	1,64	1,88	1,32	2,45	1,54	—	1,73	2,05	1,67	2,24	1,39	2,01
—	—	—	—	—	—	—	2,85	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	0,37	—	—	—	—	—	—	—	—
0,55	0,65	0,94	0,41	0,48	0,44	0,51	1,42	0,48	—	0,78	1,02	1,42	1,43	0,77	1,72
—	—	—	—	—	—	—	0,01	—	—	—	0,001	0,14	0,01	0,001	—
—	403	437	—	—	—	—	—	—	—	—	—	—	0,95	501	159
3,37	6,80	3,96	—	—	6,30	—	1,55	1,10	—	0,69	1,79	0,59	2,93	5,27	3,80
—	—	—	—	—	—	—	0,03	—	—	—	—	0,03	4,30	—	—
3,63	—	12,08	7,47	0,16	6,73	—	3,02	—	—	4,39	12,26	0,98	1,26	25,07	—
1,58	8,30	0,73	0,20	—	8,69	2,95	0,20	0,68	—	—	—	20,40	12,61	—	—
16,41	**9,96**	**49,19**	**30,12**	**0,64**	**37,32**	**3,54**	**12,50**	**0,82**	**—**	**17,57**	**49,03**	**28,52**	**45,97**	**100,29**	**—**

1 m³ fuel oil is equivalent to 5,5 tons of bagasse
1 ton of fuel oil is equivalent to 6 tons of bagasse
1 ton of coal is equivalent to 4 tons of bagasse
1 m³ firewood is equivalent to 0,42 tons of bagasse

TABLE E

COMPARATIVE MANUFACTURING DATA OF RECENT YEARS (S.A. MILLS)

SEASON	1971/72	1970/71	1969/70	1968/69	1967/68
CANE					
Sucrose % cane	12,97	13,61	12,88	13,11	12,92
Fibre % cane	14,82	15,34	15,03	15,32	15,01
JUICES					
Brix of first expressed juice	18,55	20,10	19,00	19,54	19,16
Purity of first expressed juice	86,83	86,83	86,08	85,49	85,26
Purity of last expressed juice	67,80	68,48	68,78	69,72	71,43
Drop in purity	19,03	18,35	17,28	15,77	13,83
Purity of mixed juice	85,14	84,99	84,25	83,60	83,41
Reducing sugar/sucrose ratio	4,20	3,80	4,17	4,23	3,81
MILLING					
Imbibition % fibre	277	285	274	268	261
LOST ABSOLUTE JUICE % FIBRE	29,15	30,85	34,15	34,38	38,32
Imbibition % cane	41,05	43,17	41,22	41,12	39,15
Extraction	95,91	95,41	94,98	94,97	94,15
Sucrose % bagasse	1,61	1,80	1,89	1,98	2,19
Moisture % bagasse	52,66	53,07	53,30	53,52	53,47
Bagasse % cane	32,97	34,61	34,18	34,93	34,53
Lower calorific value kJ/kg	**7 143**	**7 052**	**7 005**	**6 997**	**6 957**
Available kJ per kg Brix	**16 119**	**15 967**	**16 479**	**16 444**	**16 477**
RECOVERIES					
Boiling house recovery	89,41	88,57	88,58	87,40	87,52
Overall recovery	85,76	84,51	84,13	82,72	82,33
Tons cane per ton sugar	8,93	8,64	9,10	9,06	9,28
FILTER CAKE					
Sucrose % filter cake	1,34	1,46	1,58	2,08	2,10
Filter cake % cane	4,73	4,82	4,49	4,71	4,71
FINAL MOLASSES					
Gravity purity	39,40	38,94	38,43	39,40	38,75
Degree Brix	88,16	91,82	91,37	91,81	92,03
Weight at 85° Brix % cane	3,26	3,69	3,55	3,78	3,69
AVERAGE SUGAR POLARISATION	99,36	99,38	98,68	98,42	98,34
SUCROSE BALANCE					
Lost in filter cake	0,49	0,51	0,55	0,77	0,80
Lost in final molasses	8,43	8,96	9,01	9,64	9,38
Undetermined losses	1,23	1,43	1,29	1,51	1,57
LOST IN BOILING HOUSE	10,15	11,05	10,85	11,92	11,75
Lost in bagasse	4,09	4,59	5,02	5,36	5,92
TOTAL OF ALL LOSSES	14,24	15,64	15,87	17,28	17,67
m^3 MASSECUITE PER TON BRIX					
A Massecuite	1,02	1,00	0,94	0,91	0,92
B Massecuite	0,35	0,36	0,36	0,36	0,37
C Massecuite	0,26	0,27	0,28	0,29	0,30
TOTAL	1,63	1,63	1,58	1,56	1,58
EXHAUSTION OF MASSECUITES					
A Massecuite	63,38	64,75	65,01	64,73	65,05
B Massecuite	60,72	61,06	60,96	60,35	61,31
C Massecuite	56,85	55,21	56,25	56,15	58,28
PURITY RISE					
A Massecuite purity	87,60	87,66	87,11	86,26	86,07
Syrup purity	86,53	86,37	85,45	84,92	84,59
RISE	+1,07	+1,29	+1,66	+1,34	+1,48
BRIX OF SYRUP	62,53	62,12	61,03	61,23	59,96

TABLE F

AVERAGE MANUFACTURING RESULTS BY MONTHLY PERIODS FOR SOUTH AFRICAN MILLS (SEASON 1971 — 1972)

END OF MONTHLY PERIOD:		May 29 1971	June 26 1971	July 31 1971	August 28 1971	October 2 1971	October 30 1971	November 27 1971	January 1 1972	January 29 1972	March 16 1972
TONS SUGAR MADE AND ESTIMATED	Month	(117 443)	(168 985)	237 267	206 209	256 549	205 568	(209 908)	(203 768)	(149 567)	(109 439)
	To date	(119 574)	(284 605)	(534 222)	(740 431)	(996 980)	(1 202 548)	(1 412 456)	(1 616 224)	(1 766 045)	(1 875 484)
TONS CANE CRUSHED	Month	1 161 921	1 577 069	2 134 029	1 781 967	2 208 652	1 766 271	1 791 595	1 789 034	1 371 164	1 061 702
	To date	1 184 188	2 719 843	4 980 717	6 762 685	8 971 338	10 737 606	12 529 200	14 318 236	15 689 400	16 751 102
TONS CANE CRUSHED PER HOUR	Month	168	162	158	165	166	165	168	163	162	176
ACTUAL CRUSHING	To date	165	163	160	162	162	163	163	163	163	164
SUCROSE % CANE	Month	11,86	12,39	12,82	13,32	13,45	13,44	13,52	13,21	12,76	12,05
	To date	11,85	12,17	12,44	12,67	12,86	12,96	13,04	13,06	13,03	12,97
FIBRE % CANE	Month	14,61	14,32	14,47	14,44	14,66	14,97	15,09	15,23	15,55	15,34
	To date	14,59	14,46	14,46	14,44	14,49	14,57	14,65	14,72	14,79	14,82
TONS CANE PER TON 96° SUGAR	Month	9,58	9,01	8,68	8,35	8,31	8,30	8,24	8,46	8,83	9,51
	To date	9,59	9,24	9,01	8,82	8,69	8,62	8,57	8,55	8,58	8,63
LOST ABSOLUTE JUICE % FIBRE	Month	32	30	29	28	28	27	29	30	30	33
	To date	32	31	30	30	29	29	29	29	29	29
IMBIBITION % FIBRE	Month	275	280	279	279	281	276	277	271	278	271
	To date	275	278	278	278	279	278	278	277	277	277
SUCROSE EXTRACTION	Month	95,60	95,95	95,97	96,14	96,11	96,13	95,91	95,75	95,62	95,61
	To date	95,58	95,78	95,86	95,94	95,98	96,01	95,99	95,96	95,93	95,91
SUCROSE % BAGASSE	Month	1,59	1,57	1,60	1,61	1,62	1,57	1,65	1,65	1,61	1,58
	To date	1,60	1,59	1,60	1,60	1,60	1,60	1,60	1,61	1,61	1,61
MOISTURE % BAGASSE	Month	53,00	52,89	52,71	52,44	52,33	52,40	52,57	52,85	52,83	52,82
	To date	53,06	52,96	52,86	52,75	52,65	52,61	52,60	52,63	52,65	52,66
BOILING HOUSE RECOVERY	Month	88,36	89,62	89,87	89,80	89,35	89,52	89,87	89,67	89,08	87,98
	To date	88,35	89,15	89,37	89,49	89,45	89,46	89,52	89,54	89,50	89,41
OVERALL RECOVERY	Month	84,47	85,99	86,25	86,33	85,87	86,06	86,20	85,86	85,18	84,12
	To date	84,44	85,38	85,67	85,85	85,86	85,89	85,94	85,93	85,86	85,76
MIXED JUICE PURITY	Month	83,75	84,38	84,69	85,48	85,73	86,11	85,88	85,93	84,40	83,25
	To date	83,75	84,14	84,36	84,67	84,94	85,14	85,25	85,33	85,25	85,14
R.S. SUCROSE RATIO	Month	5,16	4,57	4,49	3,94	3,93	3,57	3,68	3,83	4,59	5,39
	To date	5,11	4,79	4,73	4,53	4,38	4,25	4,15	4,10	4,15	4,20
PURITY OF FINAL MOLASSES	Month	37,88	38,46	38,45	39,61	40,41	40,97	39,97	39,68	38,94	38,61
	To date	37,89	38,18	38,32	38,65	39,08	39,38	39,46	39,49	39,44	39,40
SUCROSE LOST IN FINAL MOLASSES	Month	8,89	8,57	8,39	8,15	8,33	8,12	7,93	8,04	8,81	9,96
% SUCROSE IN CANE	To date	8,89	8,84	8,63	8,50	8,45	8,40	8,33	8,29	8,33	8,43
UNDETERMINED LOST SUCROSE %	Month	1,76	0,92	0,92	1,21	1,37	1,39	1,26	1,35	1,12	0,99
SUCROSE IN CANE	To date	1,76	1,09	1,12	1,15	1,20	1,23	1,24	1,25	1,24	1,23

Figures between brackets include the sugar equivalent of H.T.M. Manufactured.

TABLE G

CANE VARIETIES
(SEASON 1971 — 1972)

	ML	PG	UF	EM	FX	EN	AK	DK	GD	DL	GH
CANE VARIETIES CRUSHED											
N. Co. 376	55,63	28,56	8 ,72	17,11	47,86	66,27	26,98	78,96	56,19	80,92	69,36
N. Co. 310	29,40	67,85	72,53	17,10	29,80	1,45	1,04	1,48	7,38	2,53	1,60
N. Co. 293	0,18	0,30	—	0,06	0,01	22,47	0,40	6,05	3,14	0,06	0,85
N 50/211	—	0,05	5,86	0,71	1,35	2,81	0,40	0,73	1,85	1,68	2,24
N. Co. 382	1,24	0,21	10,80	0,79	6,91	2,93	0,50	4,53	1,48	0,08	2,83
Co. 331	—	—	—	—	0,05	0,18	0,03	0,32	5,29	0,41	0,03
N. Co. 339	—	0,01	0,92	—	0,57	0,17	—	0,01	0,02	0,15	0,19
N. Co. 292	—	—	0,52	—	0,09	—	0,10	0,15	—	—	0,04
N. Co. 334	3,31	—	—	—	0,02	0,05	—	1,20	—	—	0,17
Co. 301	0,08	0,16	0,65	—	—	—	0,06	—	—	—	—
UBA	I	—	—	—	—	—	—	—	—	—	—
Co. 281	—	—	—	—	—	—	—	—	—	—	—
N51/539	0,13	0,04	—	0,04	0,08	—	—	—	—	0,02	0,55
N51/168	0,62	—	—	0,45	1,98	—	0,21	0,04	0,79	0,11	1,06
POJ	—	0,01	—	—	—	—	—	—	0,02	—	—
N53/216	—	—	—	0,05	1,77	0,54	0,17	2,52	2,06	0,18	1,54
N52/219	—	—	—		0,01	—	—	—	—	—	—
CB 36/14	0,35	0,69	—	0,18	1,01	0,73	0,07	0,27	0,06	0,35	0,63
CB 38/22	0,17	0,22	—	0,04	0,04	0,01	—	0,01	0,01	0,01	0,05
N55/805	0,02	0,95	—	1,39	6,73	2,36	2,18	3,50	11,37	5,84	8,20
N/6	—	—	—	—	0,18	0,03	0,08	0,22	0,04	0,09	0,03
Mixed Varieties	8,86	0,96	—	62,06	1,54	—	67,77	0,01	10,30	7,58	10,61
RAINFALL DURING 1971	—	656	1 688	1 640	1 887	1 320	1 155	1 256	1 092	1 277	988

TABLE H

TRANSPORT SUMMARY

PER CENT OF CANE

(SEASON 1971 — 1972)

	ML	PG	EM	FX	EN	AK	DK
South African Railways	23,25	—	36,44	51,38	—	12,32	—
Bogey Trucks (Narrow Gauge)	—	—	—	—	0,06	—	—
Tram	—	99,99	33,13	48,62	—	—	40,14
Hilo	76,75	—	11,65	—	0,03	62,93	0,09
Lorry	—	—	—	—	99,90	2,16	22,11
Tractor	—	—	18,78	—	—	22,59	37,66
Other	—	—	—	—	—	—	—

AND RAINFALL

MV	JB	UC	TS	ME	IL	RN	SZ	UK	Average	MH	UR	LB	MR	MA	NH
52,41	11,07	0,39	68,65	36,36	48,13	79,20	81,89	90,60	50,49	71,22	60,72	53,10	53,03	—	23,54
1,76	0,20	0,19	3,20	3,80	5,67	4,52	2,07	2,78	13,79	24,33	23,93	25,00	30,09	100,00	75,21
0,01	57,45	67,77	0,75	3,51	30,10	—	1,40	4,23	5,50	—	—	—	—	—	—
0,49	0,24	0,76	5,41	3,65	1,40	3,49	1,01	0,14	1,96	—	0,27	—	0,31	—	—
0,17	23,90	25,11	3,58	0,89	11,35	6,46	2,71	0,23	4,17	—	—	17,50	16,41	—	—
0,01	4,10	2,17	0,11	0,40	0,19	0,01	0,05	0,17	0,37	—	—	—	—	—	—
0,04	0,01	—	0,45	0,20	0,64	—	0,12	0,02	0,21	—	—	—	—	—	—
0,01	0,02	—	—	0,01	0,34	0,81	0,01	0,01	0,09	—	—	—	—	—	—
0,49	—	—	0,15	—	—	—	0,38	—	0,27	—	—	—	—	—	—
0,01	—	—	—	—	—	0,02	—	—	0,06	—	—	—	—	—	—
—	—	—	—	—	0,04	—	—	—	—	—	—	—	—	—	—
—	—	—	0,03	—		—	—	—	—	—	—	—	—	—	—
0,30	0,04	0,070,17	0,17	0,06	0,07	0,08	—	0,24	0,12	—	—	—	—	—	—
0,01	0,03	0,16	0,60	0,45	0,07	—	0,56	0,01	0,44	—	—	—	—	—	—
—	0,01	—	—	0,01	0,01	—	—	—	—	—	—	—	—	—	—
0,02	0,42	0,22	0,94	0,70	0,57	0,45	2,53	0,20	0,73	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0,72	0,35	0,01	0,96	0,15	0,57	0,08	2,24	0,46	0,56	—	—	—	—	—	—
—	—	0,01	0,02	0,01	0,06	0,02	0,01	0,01	0,03	—	—	—	—	—	—
2,24	—	0,03	9,33	10,62	0,44	3,92	0,72	0,66	3,91	—	4,48	—	—	—	—
—	—	0,03	0,08	0,07	0,01	0,07	0,04	0,13	0,05	—	—	—	—	—	—
41,32	2,17	—	5,55	39,06	0,50	0,87	4,28	0,11	17,24	—	—	—	—	—	—
1 056	918	921	1 297	1 577	1 167	1 082	1 195	1 124	—	753	572	811	795	1 018	—

SOUTH AFRICAN MILLS

TRANSPORTED

GD	DL	GH	MV	JB	TS	ME	IL	RN	SZ	UK	Average
0,01	—	13,58	—	16,80	0,03	19,01	6,46	17,24	21,10	—	13,86
—	—	—	—	—	—	—	22,93	—	—	—	0,78
0,01	—	6,84	—	—	—	—	1,34	—	—	—	11,34
16,84	74,52	68,76	43,16	83,20	89,10	65,09	69,27	55,68	73,66	55,39	55,57
34,75	11,79	10,59	41,95	—	4,77	14,75	—	0,51	4,99	39,59	9,57
48,40	13,69	—	14,88	—	6,06	—	—	26,58	0,25	0,02	8,30
—	—	0,22	—	—	0,04	1,15	—	—	—	—	0,58

TABLE J

COMPARATIVE DATA OF REPORTING S.A. MILLS FROM 1925 ONWARDS

PERIOD (Season)	Per Cent Cane		Cane/Sugar Ratio		Extraction	Lost Absol. Juice % Fibre	Per Cent Bagasse		Imbibition per cent		Mixed Juice		Final Molasses Purity	Boiling House Recovery	Overall Recovery
	Sucrose	Fibre	Tel. Quel	96 Sugar			Sucrose	Moisture	Cane	Fibre	Purity	Reducing Sugar Ratio			
Average 1925–1934	13,19	15,78	9,86	9,64	89,83	58,4	3,88	50,57	27,6	175	85,09	3,65	45,3	83,67	75,12
Average 1935–1944	13,53	15,30	8,96	8,73	92,05	48,9	3,11	51,60	32,6	213	86,01	3,22	43,3	88,36	81,34
1945	**14,28**	15,99	**8,29**	**8,08**	93,28	39,3	2,77	**50,19**	35,0	219	86,23	3,38	42,0	89,29	83,30
1946	14,21	16,21	8,36	8,14	93,07	40,5	2,79	50,32	35,2	217	85,86	3,30	41,8	89,12	82,94
1947	13,32	15,80	8,84	8,60	93,94	39,8	2,54	50,46	34,4	218	86,24	2,95	41,1	89,61	83,73
1948	13,89	15,90	8,55	8,31	93,32	39,8	2,67	50,53	34,1	214	85,92	3,67	41,5	89,14	83,19
1949	13,52	16,19	8,76	8,52	92,94	41,0	2,66	50,84	33,7	208	86,22	3,11	41,4	89,68	83,35
1950	14,19	15,80	8,32	8,09	93,33	39,3	2,72	51,22	32,8	206	**86,40**	3,12	40,5	89,63	83,65
1951	13,33	16,29	8,98	8,73	92,98	40,2	2,57	51,71	35,0	215	84,92	3,52	40,3	88,72	82,50
1952	13,87	16,10	8,50	8,27	93,00	40,8	2,65	52,53	34,9	217	86,25	2,92	39,3	89,96	83,66
1953	13,93	16,31	8,55	8,32	92,67	41,7	2,75	52,47	32,7	200	85,61	3,66	39,5	89,36	82,81
1954	13,34	16,03	8,87	8,65	92,40	44,1	2,75	52,92	30,7	191	85,86	3,28	39,3	90,04	83,20
Average 1945–1954	13,79	16,06	8,60	8,36	93,04	40,6	2,69	51,32	33,8	210	85,95	3,29	40,7	89,46	83,23
1955	13,87	15,74	8,51	8,28	92,32	45,5	2,91	53,18	32,1	204	85,96	3,40	39,6	**90,51**	83,56
1956	13,35	15,81	8,87	8,62	92,93	42,1	2,60	53,12	35,2	222	85,49	3,32	39,9	89,79	83,44
1957	13,11	15,38	8,93	8,67	93,36	40,9	2,47	53,06	34,5	224	85,10	3,69	38,5	90,43	84,42
1958	13,12	15,92	9,09	8,82	92,87	42,3	2,55	52,38	32,9	207	84,46	4,30	39,1	89,49	83,11
1959	13,66	15,92	8,74	8,44	92,86	43,0	2,66	53,26	34,6	218	85,52	3,51	40,3	89,42	83,04
1960	13,69	15,22	8,70	8,41	93,35	42,0	2,60	53,01	36,2	238	85,63	3,31	40,3	89,40	83,45
1961	13,75	**14,52**	8,51	8,26	94,21	39,0	2,43	52,54	36,7	253	86,04	3,31	39,5	89,72	84,53
1962	13,29	15,49	8,97	8,73	94,15	37,4	2,24	52,17	41,2	266	83,36	**5,11**	39,6	87,81	82,67
1963	13,55	15,50	8,66	8,42	94,08	37,5	2,29	52,46	39,8	258	85,30	3,44	39,4	89,60	84,30
1964	13,90	15,38	8,42	8,20	94,16	37,0	2,34	52,64	39,4	256	85,52	3,32	39,9	89,65	84,42
Average 1955–1964	13,53	15,49	8,75	8,49	93,43	40,7	2,51	52,78	36,3	235	85,24	3,67	39,6	89,58	83,69
1965	12,99	15,57	9,20	8,97	93,99	37,6	2,20	52,98	40,6	261	84,22	3,73	39,9	87,67	82,40
1966	13,72	15,09	8,63	8,40	94,22	37,9	2,29	53,52	39,6	262	85,06	3,63	40,6	88,38	83,27
1967	12,92	15,01	9,28	9,06	94,15	38,3	2,19	53,47	39,2	261	83,41	3,81	38,8	87,52	82,33
1968	13,11	15,32	9,06	8,83	94,74	34,4	1,98	53,32	41,1	268	83,60	4,23	39,4	87,40	82,72
1969	12,88	15,03	9,10	8,86	94,98	34,2	1,89	53,30	41,2	274	84,25	4,17	**38,4**	88,58	84,13
1970	13,61	15,34	8,64	8,34	**95,41**	30,9	1,80	53,07	**43,2**	**285**	84,99	3,80	38,9	88,57	84,51
1971	12,97	14,82	8,93	8,63	**95,91**	**29,2**	**1,61**	52,66	**41,1**	277	**85,14**	4,20	39,4	89,41	85,76