

APPENDIX—SUGARCANE STATISTICS, 1943/44 CROP

As in the past few years the "Special Census of Sugarcane Plantations (European Planters only)" issued annually by the Union Government Office of Census and Statistics did not arrive in time for the original compilation of this annual summary.

It has now been received, however, and shows that the 1943/44 crop was a record for this country in output of European-owned cane, 4,845,373 tons in all, narrowly surpassing the previous record of 4,844,268 tons in 1939/40. Since the total area harvested, 156,982 acres was the lowest for many years excepting only the 1938/39 season it follows that the average yield of cane, 30.87 tons of cane per acre, was the highest recorded in this country.

The total quantity of cane actually milled during the 1943/44 season was 5,278,914 tons, so that the difference of 433,641 tons, or 8.21 per cent. of the total, represents the cane supplied by Indian and Native planters. There is no record of the area of land harvested that this represents, but assuming the yield of cane per acre to be the same as for the European planters (probably it is somewhat less) this would be 14,047 acres, bringing the total area harvested up to 171,029.

The total of cane actually milled, 5,346,006 tons, was highest in the 1939/40 season, due to a somewhat larger contribution of cane from Indian and Native growers, 501,738 tons, or 9.39 per cent. of the total.

Since the total output of sugar for the 1943/44 season was 585,392 tons, the yield of sugar per acre was 3.42 tons, a figure only surpassed regularly by Hawaii and formerly by Java.

This record crop was, of course, largely due to the favourable rainfalls for 1942 and 1943, which were 49.41 ins., and 53.31 ins. respectively.

The area harvested was only 46.18 per cent. of the acreage actually under cane, 339,977 for European planters, which is in turn only 43.75 per cent. of the total area of the 708 sugar farms in European occupation, 777,064 acres, or an average of 1,098 acres each.

The area under plant cane was 96,286 acres, having receded slightly from the peak of 110,180 acres of the previous season, 1942/43.

58,185 acres of old cane lands of an average of 7 years under cane were ploughed out in 1943/44, of which 19,014 acres, or 32.7 per cent., were planted the same season, which fortunately shows a slight decrease on recent years, but is still much higher than it should be. The Umzinto district is the worst offender in this respect, as much as 52.5 per cent. of their old cane lands being replanted the same season, while the two other South Coast divisions, Port Shepstone and Durban, together with Hlabisa in Zululand, have the best records, only from 12 to 14 per cent. being replanted the same season.

As usual the Lower Tugela division produced the greatest quantity of cane, 1,331,681 tons, or 27.5 per cent. of the whole crop, Inanda coming next with 812,986 tons, or 16.8 per cent.,

then Lower Umfolozi with 758,217 tons, or 15.6 per cent., and Umzinto with 682,713 tons, or 14.1 per cent.

The Lower Tugela division increased its lead in the proportion of the crop produced over recent years, while the Inanda proportion slightly diminished its proportion; otherwise there was very little relative change among the various districts.

The cane crop in the Port Shepstone, Lower Tugela, Mtunzini, Eshowe and Hlabisa districts was the greatest on record, also for the North Coast and Zululand areas as a whole.

The South Coast produced 975,749 tons, or 20.1 per cent. of the total crop, the North Coast 2,144,667 tons, or 44.3 per cent., and Zululand 1,724,957 tons, or 35.6 per cent.

There is an idea prevalent that the South Coast is a declining area in respect of sugar production, especially in comparison with Zululand. This does not appear from our records of recent seasons, nor is it confirmed by data from factories reporting to us for the season just closed, as the following table shows:—

| | South Coast. | North Coast. | Zululand. |
|-------------------------------|--------------|--------------|-----------|
| Number of reporting factories | 5 | 9 | 5 |
| Total cane crop in tons . . . | 936,724 | 2,723,278 | 1,535,292 |
| Sucrose content of cane . . . | 13.78 | 13.16 | 13.04 |
| Total output of sugar in tons | 108,816 | 304,560 | 165,168 |
| Ratio of cane to sugar . . . | 8.61 | 8.94 | 9.30 |
| Tons cane per acre | 25.07 | 34.09 | 31.28 |
| Tons sugar per acre | 2.91 | 3.81 | 3.36 |

The yield of cane per acre for Zululand is higher than for the South Coast as might be expected from the more recently developed land and the higher rainfall, but this is largely compensated for by the higher sucrose content and lower ratio of cane to sugar at the South Coast factories.

The proportion of the total output of sugar, 18.81 per cent., produced in 1943/44 by the South Coast factories is not materially lower than the average for recent seasons, and increased to 19.39 per cent. last season.

Inanda district has the best yield of cane per acre for the fifth successive year with 40.45 tons, the highest ever obtained in any district in South Africa. Lower Umfolozi takes second place as usual with 33.45 tons per acre, and Port Shepstone third with 31.32 tons. Durban was the lowest with 24.01 tons per acre and Umzinto the next with 24.68.

The average yield per acre for the South Coast was 25.07 tons, for the North Coast 34.09 tons and Zululand 31.28 tons.

Port Shepstone and Durban lead in the greatest proportion of the new varieties, 99.3 per cent. each, closely followed by Mtunzini and Hlabisa with 98.7 per cent. each, and Eshowe with 98.5 per cent. Umzinto has the lowest proportion, 92.2, followed by Inanda with 93.0 per cent. of new varieties.

Following is an analysis of the crop by age of ratoons differentiated into Uba and non-Uba varieties:—

| | Total area under cane 30th April, 1944. | Per cent. of Uba. | Area harvested. | | Yield. | | | Tons per acre. | | |
|-----------------------------|---|-------------------|-----------------|------------|------------------|------------|--------------|----------------|----------------|----------------|
| | | | Acres. | Uba. | Tons cane. | % Uba. | Uba. | Non-Uba. | All Varieties. | Non-Uba % Uba. |
| Plant cane | 96,286 | 0.2 | 51,698 | 0.3 | 1,914,940 | 0.2 | 27.35 | 37.07 | 37.04 | 135.5 |
| First ratoons | 92,316 | 0.4 | 30,824 | 1.1 | 987,299 | 1.0 | 28.56 | 32.07 | 32.03 | 112.3 |
| Second ratoons | 64,774 | 1.2 | 35,415 | 2.9 | 999,453 | 2.3 | 22.62 | 28.39 | 28.22 | 125.5 |
| Third ratoons | 52,878 | 5.5 | 22,217 | 9.1 | 571,009 | 7.4 | 21.05 | 26.17 | 25.70 | 124.3 |
| Fourth ratoons | 19,309 | 12.6 | 9,987 | 35.4 | 228,202 | 30.3 | 19.58 | 24.64 | 22.85 | 125.8 |
| Other ratoons | 14,414 | 42.0 | 6,841 | 57.8 | 144,470 | 46.4 | 16.94 | 26.83 | 21.12 | 158.4 |
| Total crop | 339,977 | 3.8 | 156,982 | 7.0 | 4,845,373 | 4.5 | 19.57 | 31.72 | 30.87 | 162.08 |

Uba yielded 19.57 tons of cane per acre whereas the non-Uba yield was 31.72 tons per acre, or 162 per cent. of the Uba yield. This is, however, an unfair comparison as Uba is mainly represented by fourth ratoons (32 per cent.) and older ratoons (31 per cent.), while the non-Uba figures are only 3.4 and 1.7 per cent. A better comparison can be obtained by comparing Uba and non-Uba plant cane and individual ratoons, and this shows that the new varieties yield on the average 30 per cent. more cane per acre than Uba.

The average yield of cane per acre, 30.87 tons, is the best

ever recorded in this country and with an average sucrose per cent. cane of 13.14, the yield of sucrose per acre, 4.056, is also a record being just better than the yield of sucrose per acre in 1939 when it was 4.053. The sucrose in 1939 was, however, better, 13.41 per cent. cane, but the average yield of cane per acre, 30.22 tons, was lower, although 1939 was actually a better growing season. The yield of Uba and non-Uba respectively for 1939 was 23.34 and 33.53 tons per acre compared with 19.57 and 31.72 tons per acre in 1943, but the proportion of Uba was of course higher in 1939 than in 1943.

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

COMPILED FROM UNION DEPARTMENT OF CENSUS RETURNS.

| DISTRICT. | YIELD OF CANE IN TONS. | | | | | | | | | | |
|---|------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | 1933. | 1934. | 1935. | 1936. | 1937. | 1938. | 1939. | 1940. | 1941. | 1942. | 1943. |
| PORT SHEPSTONE | 64,018 | 67,974 | 59,259 | 56,685 | 75,028 | 74,856 | 89,585 | 81,811 | 43,704 | 84,444 | 97,113 |
| UMZINTO | 598,308 | 611,231 | 553,401 | 564,427 | 692,159 | 663,609 | 744,981 | 733,332 | 457,518 | 582,516 | 682,713 |
| DURBAN AND PINETOWN | 138,096 | 185,118 | 137,805 | 146,676 | 124,109 | 188,183 | 213,958 | 193,938 | 167,970 | 191,737 | 195,923 |
| Total South of Umgeni River | 800,422 | 864,323 | 750,465 | 767,788 | 891,296 | 926,648 | 1,048,524 | 1,009,081 | 669,192 | 858,697 | 975,749 |
| Ratio to 1926 (= 100) | 179.54 | 193.9 | 168.3 | 172.2 | 199.9 | 207.9 | 235.2 | 226.3 | 150.1 | 192.6 | 218.9 |
| INANDA | 504,540 | 618,853 | 672,954 | 629,945 | 615,227 | 683,261 | 807,094 | 816,215 | 627,454 | 774,840 | 812,986 |
| LOWER TUGELA | 829,067 | 1,012,784 | 1,033,633 | 1,184,839 | 1,138,342 | 1,122,528 | 1,285,888 | 1,299,769 | 921,709 | 1,120,740 | 1,331,681 |
| Total for North Coast between Umgeni and Tugela Rivers | 1,333,607 | 1,631,637 | 1,706,587 | 1,814,784 | 1,753,569 | 1,805,789 | 2,092,982 | 2,115,984 | 1,549,163 | 1,895,580 | 2,144,667 |
| Ratio to 1926 (= 100) | 161.00 | 197.0 | 206.1 | 219.1 | 211.7 | 218.0 | 252.7 | 255.5 | 187.1 | 228.9 | 259.0 |
| Total for Natal South of the Tugela (excluding Zululand) | 2,134,029 | 2,495,960 | 2,457,052 | 2,582,572 | 2,644,865 | 2,732,437 | 3,141,506 | 3,125,065 | 2,218,355 | 2,754,277 | 3,120,416 |
| Ratio to 1926 (= 100) | 167.51 | 195.9 | 192.9 | 202.7 | 207.6 | 214.5 | 246.6 | 245.3 | 174.1 | 216.2 | 244.9 |
| MTUNZINI | 353,287 | 414,821 | 403,121 | 413,802 | 435,154 | 462,271 | 525,787 | 507,644 | 426,608 | 457,698 | 533,560 |
| ESHOWE | 120,099 | 130,104 | 128,191 | 120,935 | 151,020 | 193,847 | 243,829 | 240,962 | 217,695 | 243,392 | 264,198 |
| LOWER UMFOLOZI | 582,636 | 489,547 | 496,591 | 616,326 | 713,675 | 703,527 | 777,371 | 765,381 | 601,315 | 655,366 | 758,217 |
| HLABISA | 80,552 | 63,866 | 50,529 | 74,276 | 136,249 | 140,794 | 155,775 | 158,176 | 138,416 | 154,945 | 168,982 |
| Total North of the Tugela (Zululand) | 1,136,574 | 1,098,338 | 1,078,432 | 1,225,339 | 1,436,098 | 1,500,439 | 1,702,762 | 1,672,163 | 1,384,034 | 1,511,401 | 1,724,957 |
| Ratio to 1926 (= 100) | 125.08 | 120.9 | 118.7 | 134.8 | 158.0 | 165.1 | 187.4 | 184.0 | 152.3 | 166.3 | 189.8 |
| GRAND TOTAL FOR NATAL (including Zululand) | 3,270,603 | 3,594,298 | 3,535,484 | 3,807,911 | 4,080,963 | 4,232,876 | 4,844,268 | 4,797,228 | 3,602,389 | 4,265,678 | 4,845,373 |
| Ratio to 1926 (= 100) | 149.85 | 164.7 | 162.0 | 174.5 | 187.0 | 193.9 | 221.9 | 219.8 | 165.0 | 195.4 | 222.0 |

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

COMPILED FROM UNION DEPARTMENT OF CENSUS RETURNS.

| DISTRICT. | PER CENT. OF TOTAL TONNAGE. | | | | | | | | | | | | |
|---|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1931. | 1932. | 1933. | 1934. | 1935. | 1936. | 1937. | 1938. | 1939. | 1940. | 1941. | 1942. | 1943. |
| PORT SHEPSTONE | 2.3 | 2.6 | 2.0 | 1.9 | 1.7 | 1.5 | 1.8 | 1.8 | 1.8 | 1.7 | 1.2 | 2.0 | 2.0 |
| UMZINTO | 18.5 | 20.2 | 18.3 | 17.0 | 15.6 | 14.8 | 17.0 | 15.7 | 15.4 | 15.3 | 12.7 | 13.7 | 14.1 |
| DURBAN AND PINETOWN | 5.2 | 5.0 | 4.2 | 5.1 | 3.9 | 3.9 | 3.0 | 4.4 | 4.4 | 4.0 | 4.7 | 4.5 | 4.0 |
| Total South of Umgeni River | 26.0 | 27.9 | 24.5 | 24.0 | 21.2 | 20.2 | 21.8 | 21.9 | 21.6 | 21.0 | 18.6 | 20.1 | 20.1 |
| INANDA | 14.3 | 14.4 | 15.4 | 17.2 | 19.0 | 16.5 | 15.1 | 16.2 | 16.7 | 17.0 | 17.4 | 18.2 | 16.8 |
| LOWER TUGELA | 24.6 | 23.9 | 25.3 | 28.2 | 29.2 | 31.1 | 27.9 | 26.5 | 26.5 | 27.1 | 25.6 | 26.3 | 27.5 |
| Total for North Coast between Umgeni and Tugela Rivers .. | 38.9 | 38.3 | 40.8 | 45.4 | 48.3 | 47.6 | 43.0 | 42.7 | 43.2 | 44.1 | 43.0 | 44.4 | 44.3 |
| Total for Natal South of the Tugela (excluding Zululand) | 64.8 | 66.2 | 65.2 | 69.4 | 69.5 | 67.8 | 64.8 | 64.6 | 64.8 | 65.1 | 61.6 | 64.6 | 64.4 |
| MTUNZINI | 12.6 | 11.4 | 10.8 | 11.6 | 11.4 | 10.9 | 10.7 | 10.9 | 10.9 | 10.6 | 11.8 | 10.7 | 11.0 |
| ESHOWE | 4.2 | 3.4 | 3.7 | 3.6 | 3.6 | 3.2 | 3.7 | 4.6 | 5.0 | 5.0 | 6.0 | 5.7 | 5.5 |
| LOWER UMFOLOZI | 16.2 | 16.7 | 17.8 | 13.6 | 14.1 | 16.2 | 17.5 | 16.6 | 16.0 | 16.0 | 16.7 | 15.4 | 15.6 |
| HLABISA | 2.3 | 2.4 | 2.5 | 1.8 | 1.4 | 1.9 | 3.3 | 3.3 | 3.2 | 3.3 | 3.8 | 3.6 | 3.5 |
| Total North of the Tugela (Zululand) | 35.2 | 33.8 | 34.8 | 30.6 | 30.5 | 32.2 | 35.2 | 35.4 | 35.1 | 34.9 | 38.4 | 35.4 | 35.6 |
| GRAND TOTAL FOR NATAL (including Zululand) | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

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

COMPILED FROM UNION DEPARTMENT OF CENSUS RETURNS.

| DISTRICT. | TONS CANE PER ACRE. | | | | | | | | | | | | |
|--|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 1931. | 1932. | 1933. | 1934. | 1935. | 1936. | 1937. | 1938. | 1939. | 1940. | 1941. | 1942. | 1943. |
| PORT SHEPSTONE.. | 18.80 | 19.57 | 20.47 | 16.34 | 14.78 | 13.51 | 21.53 | 29.33 | 26.52 | 18.15 | 13.73 | 23.08 | 31.32 |
| UMZINTO | 20.80 | 22.24 | 21.68 | 20.69 | 18.20 | 18.22 | 22.41 | 23.50 | 25.94 | 23.02 | 16.47 | 20.20 | 24.68 |
| DURBAN AND PINETOWN | 22.90 | 21.75 | 23.00 | 23.34 | 20.27 | 19.77 | 20.42 | 27.65 | 31.76 | 24.74 | 20.28 | 25.63 | 24.01 |
| Total South of Umgeni River | 21.00 | 21.87 | 21.79 | 20.76 | 18.21 | 18.02 | 22.04 | 24.65 | 27.00 | 22.83 | 17.05 | 21.48 | 25.07 |
| Ratio to 1926 (= 100).. | 114.10 | 118.60 | 118.17 | 112.58 | 98.75 | 97.72 | 119.52 | 133.68 | 146.42 | 123.81 | 92.46 | 116.49 | 135.95 |
| INANDA | 19.20 | 20.14 | 22.80 | 25.90 | 26.76 | 25.95 | 26.19 | 31.27 | 36.57 | 33.24 | 28.20 | 32.94 | 40.45 |
| LOWER TUGELA | 18.20 | 18.36 | 19.45 | 21.62 | 20.83 | 22.61 | 22.90 | 25.19 | 29.51 | 27.35 | 21.30 | 24.42 | 31.10 |
| Total for North Coast between Umgeni and Tugela Rivers | 18.60 | 18.99 | 20.59 | 23.07 | 22.83 | 23.67 | 23.96 | 27.19 | 31.89 | 29.35 | 23.64 | 27.31 | 34.09 |
| Ratio to 1926 (= 100).. | 100.00 | 102.00 | 110.64 | 123.97 | 122.68 | 127.19 | 128.75 | 146.10 | 171.36 | 157.71 | 127.03 | 146.75 | 183.18 |
| Total for Natal South of the Tugela (excluding Zululand) | 19.40 | 20.11 | 21.03 | 22.21 | 21.19 | 21.65 | 23.27 | 26.27 | 30.07 | 26.87 | 21.18 | 25.18 | 30.64 |
| Ratio to 1926 (= 100).. | 104.60 | 108.40 | 113.37 | 119.73 | 114.23 | 116.71 | 125.44 | 141.62 | 162.10 | 144.85 | 114.18 | 135.74 | 165.18 |
| MTUNZINI | 18.10 | 17.55 | 18.40 | 19.56 | 18.75 | 18.85 | 20.97 | 24.67 | 27.86 | 27.06 | 22.67 | 24.96 | 30.71 |
| ESHOWE | 18.90 | 16.69 | 17.47 | 17.95 | 17.64 | 17.26 | 20.69 | 28.03 | 29.89 | 26.62 | 23.53 | 25.11 | 27.46 |
| LOWER UMFOLOZI | 18.00 | 18.63 | 19.84 | 17.93 | 18.28 | 23.04 | 28.81 | 34.40 | 33.25 | 31.00 | 26.10 | 26.51 | 33.45 |
| HLABISA | 14.60 | 16.17 | 17.31 | 14.79 | 12.72 | 18.60 | 25.36 | 30.91 | 28.81 | 29.60 | 26.31 | 29.84 | 30.79 |
| Total North of the Tugela (Zululand) | 17.90 | 17.86 | 18.91 | 18.28 | 18.00 | 20.52 | 24.68 | 29.62 | 30.51 | 28.91 | 24.55 | 26.09 | 31.28 |
| Ratio to 1926 (= 100).. | 75.20 | 74.95 | 79.35 | 76.71 | 75.54 | 86.11 | 103.57 | 124.30 | 128.03 | 121.32 | 103.02 | 109.48 | 131.26 |
| GRAND TOTAL FOR NATAL (Including Zululand) | 18.90 | 19.29 | 20.24 | 20.84 | 20.10 | 21.27 | 23.75 | 27.37 | 30.22 | 27.55 | 22.36 | 25.49 | 30.87 |
| Ratio to 1926 (= 100).. | 92.60 | 94.40 | 99.02 | 101.96 | 98.34 | 104.06 | 116.19 | 133.90 | 147.85 | 134.78 | 109.38 | 124.71 | 151.03 |
| Rainfall of all Districts (inches) <i>(Average from 44 centres).</i> | 29.39 | 48.20 | 31.12 | 44.60 | 46.12 | 50.10 | 39.48 | 40.38 | 47.63 | 43.37 | 26.18 | 49.41 | 53.31 |

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

COMPILED FROM UNION DEPARTMENT OF CENSUS RETURNS.

| DISTRICT. | TONS CANE PER ACRE, 1943/44 | | PERCENTAGE (AREA) OF NON-UBA CANES UNDER CULTIVATION. APRIL 30TH. | | | | | | | ACREAGE UNDER CULTIVATION. APRIL 30TH. PLANT CANE. | | Total Plant Cane, 1944, per cent. Total Plant Cane, 1943. |
|---|-----------------------------|----------|---|-------|-------|-------|-------|-------|-------|--|--------|---|
| | Uba. | Non-Uba. | 1938. | 1939. | 1940. | 1941. | 1942. | 1943. | 1944. | 1943. | 1944. | |
| PORT SHEPSTONE | 12.01 | 31.82 | 48.8 | 56.4 | 70.6 | 86.6 | 93.5 | 98.2 | 99.3 | 2,103 | 1,485 | 70.6 |
| UMZINTO | 18.36 | 25.66 | 50.3 | 56.4 | 59.9 | 70.3 | 80.1 | 88.2 | 92.2 | 17,777 | 14,299 | 80.4 |
| DURBAN AND PINETOWN | 20.31 | 24.25 | 67.4 | 76.5 | 81.7 | 85.4 | 88.5 | 95.6 | 99.3 | 5,612 | 5,813 | 103.6 |
| Total South of Umgeni River.. | 18.47 | 25.89 | 53.0 | 60.0 | 64.7 | 74.7 | 82.8 | 90.4 | 94.2 | 25,492 | 21,597 | 84.7 |
| Ratio to 1926 (= 100).. .. . | 100.16 | 140.40 | — | — | — | — | — | — | — | — | — | — |
| INANDA | 24.26 | 42.03 | 49.4 | 59.8 | 69.7 | 77.7 | 86.4 | 90.6 | 93.0 | 13,551 | 12,710 | 93.8 |
| LOWER TUGELA | 18.93 | 32.20 | 55.3 | 64.1 | 71.0 | 77.5 | 85.9 | 93.5 | 96.9 | 32,058 | 29,162 | 91.0 |
| Total for North Coast between Umgeni and Tugela Rivers.. | 20.73 | 35.33 | 53.4 | 62.7 | 70.6 | 77.6 | 86.1 | 92.5 | 95.6 | 45,609 | 41,872 | 91.8 |
| Ratio to 1926 (= 100).. .. . | 111.39 | 189.84 | — | — | — | — | — | — | — | — | — | — |
| Total for Natal South of the Tugela (excluding Zululand) | 19.72 | 31.78 | 53.2 | 61.7 | 68.4 | 76.5 | 84.9 | 91.7 | 95.0 | 71,101 | 63,469 | 89.3 |
| Ratio to 1926 (= 100).. .. . | 106.31 | 171.32 | — | — | — | — | — | — | — | — | — | — |
| MTÜNZINI | 18.45 | 31.16 | 66.6 | 77.1 | 83.8 | 90.9 | 95.5 | 97.3 | 98.7 | 13,383 | 11,968 | 89.4 |
| ESHOWE | 17.80 | 27.67 | 67.5 | 79.3 | 89.0 | 93.8 | 96.6 | 98.2 | 98.5 | 6,644 | 6,038 | 90.9 |
| LOWER UMFOLOZI | 19.82 | 33.77 | 73.1 | 83.0 | 89.3 | 94.0 | 96.4 | 97.6 | 97.9 | 16,297 | 13,042 | 80.0 |
| HLABISA | 12.16 | 31.03 | 70.2 | 80.0 | 90.6 | 92.5 | 96.5 | 97.5 | 98.7 | 2,755 | 1,769 | 64.2 |
| Total North of the Tugela (Zululand) | 18.55 | 31.61 | 69.9 | 80.2 | 87.5 | 92.8 | 96.1 | 97.6 | 98.4 | 39,079 | 32,817 | 84.0 |
| Ratio to 1926 (= 100).. .. . | 77.84 | 132.65 | — | — | — | — | — | — | — | — | — | — |
| GRAND TOTAL FOR NATAL (including Zululand) | 19.57 | 31.72 | 58.8 | 67.9 | 74.8 | 82.1 | 88.8 | 93.8 | 96.2 | 110,180 | 96,286 | 87.4 |
| Ratio to 1926 (= 100).. .. . | 95.74 | 155.19 | — | — | — | — | — | — | — | — | — | — |

ABSTRACTS FROM REPORTS SUBMITTED BY FACTORIES ON THE SEASON'S WORK.

EMPANGENI SUGAR FACTORY.

Report by W. Buchanan.

Length of Season.—Crushing operations commenced on the 23rd May, 1944, and finished on the 22nd January, 1945, an overall period of eight months. Seasons have tended to become longer during the war period. If measured in terms of crushing days of 24 hours' duration, the average length of one season, for the five years' pre-war period, was 170 days, whereas during the war period to date, the average length has been 195 days.

The Mechanical Efficiency of the Milling Train.—This was well maintained throughout the season, finishing with an average value of 97.04 per cent. It is of interest to note that, in this matter of mechanical efficiency of the milling train, the mill has not suffered from war conditions, as the following comparison will demonstrate :—

| | |
|--|-----------------|
| Average Mechanical Efficiency of 5 years' pre-war period... .. | 96.27 per cent. |
| Average Mechanical Efficiency of war period to date | 96.72 per cent. |

The Cane Supply.—Notable among the qualities of an otherwise average cane supply was the high fibre content of 16.27 per cent. This condition should not be attributed to the dying or dead state of some very old Co.281 variety, for most of the dead cane was supplied in July and August, whereas the fibre content rose steadily throughout the season, *e.g.*—

| | | | | | |
|-----------------------------|--------------|-------------|-------------|-------------|-------------|
| <i>Period.</i> | <i>May.</i> | <i>June</i> | <i>July</i> | <i>Aug.</i> | |
| Fibre per cent. Cane | 14.33 | 15.49 | 15.79 | 15.91 | |
| <i>Period.</i> | <i>Sept.</i> | <i>Oct.</i> | <i>Nov.</i> | <i>Dec.</i> | <i>Jan.</i> |
| Fibre per cent. Cane | 16.29 | 16.65 | 16.83 | 16.89 | 17.27 |

A feature of the cane supply which deserves mention is the inordinate amount of trash delivered with the cane.

Sucrose Extraction.—When a comparison is made with the work of previous seasons, it is seen that the extraction of sucrose was not adversely affected in the 1944 season by the high fibre content of the cane. At this mill 85 per cent. of the total cane crushed is Co.281 variety, and by reason of this percentage the mill is not subjected to great variations in the milling qualities of the raw product. If careful and continuous adjustments are made, the extraction of the sucrose becomes, to some extent, independent of the fibre content of the cane. That is to say, a rise in fibre is not necessarily followed by a fall in extraction. Compare :—

| | | |
|--------------------|-------------------|--------------------|
| | <i>Extraction</i> | <i>Fibre per</i> |
| | <i>per cent.</i> | <i>cent. Cane.</i> |
| 1943 Season | 92.58 | 15.26 |
| 1944 Season | 93.13 | 16.27 |

For day to day consideration of the efficiency of milling, and for checking alterations to mill settings, use is made of the daily Mill-Brix diagram together with the Extraction Ratio. The two form useful criteria for reflecting the daily work of the milling train.

Recovery of Sugar from the Mixed Juices.—It was evident, early in the season, that recovery of the sugar would be no easy matter, and would not reach the figure of the previous season. Actually there has been a fall in recovery of more than 1 per cent. At this mill it appears necessary to prepare juice of a relatively high pH reaction to counteract the tendency towards highly viscous after-products. Alteration of temperatures or of pH reactions has, in trial runs, had the effect of retarding operations. Experiments have usually had to be abandoned on this account. It is an important matter to maintain rate of sugar output.

Mention might be made of the fact that at this mill there is a considerable quantity of cane which is not received for crushing until a week after it has been cut in the fields. There are occasions when consignments have been delivered with a fungoid growth adhering to the outside of the cane. This latter condition does not appear to lower the sucrose content of the consignment, but it does have a very marked and adverse effect on the boiling qualities of the juice.

If a comparison is made between the 1943 and 1944 seasons, it will be noted that there are well defined differences in the

qualities of the juices which are not assessable by purity quotients. These differences are indicated by the amounts of chemicals used in manufacture and the resulting recoveries obtained. Whereas, in the 1943 season, a relatively high recovery resulted from a small amount of chemicals used, in the 1944 season, with similar purity of raw juice, the opposite condition prevailed, that is, more chemicals had to be used while a lower recovery was obtained.

Notwithstanding the fall in recovery, this factory has, in the season under review, crushed a maximum amount of cane, and reached its peak in raw sugar produced.

DOORKOP SUGAR FACTORY.

Report by G. Booth.

In common with all factories, the job for 1944 was to maintain the highest possible rate of throughput, and consequently the year's figures are records of weekly and final tonnages.

Harvesting conditions were good, the supply of cane being regular until the end of September.

The rainfall for the year was 48 ins., of which half fell from the end of August.

The crop started at 13.3 per cent sucrose per cent cane which rose to 15.5 per cent in mid-September. Thereafter the sucrose fell away with the advent of the rains, the final average being 14.1 per cent. as compared with 13.6 per cent. last year.

Purities were not quite so high as last year's but nevertheless were good.

Practically the same proportion of Co.281 cane was crushed as last season. The Co.290 dropped to 8 per cent. of the whole with general advantage to mills, boilers and factory. We are anxious to see what Co.331 has to offer. What tonnage has been crushed does not supply high hopes that it can be tipped as a winner, although it is too early to come to any definite conclusion. With us as probably with others, Co.281 possesses most of the points which factory men look for, the other varieties being not so good.

Referring to last year's notes from Maidstone Factory it would be interesting to learn whether any more factories have tried out the higher temperature at the first heating of the juice so that the throughput and general cleanliness of the evaporator might be improved. As the bulk of this factory's output is white sugar, the alteration could not be tried out over a sufficiently long period to permit of decisive opinions. Preliminary observations were that the sulphur tower objected to the higher temperature and blew back the gas, to the general discomfort of the operators, and any higher alkalinity in primary tanks unduly fouled the tower. Nevertheless we are proceeding with the idea whilst manufacturing cargo sugar.

Mr. Viger's comments on the process, and his reference to the proportion of sulphur to phosphoric paste were interesting and are worthy of close examination. There can be no gainsaying the fact that the behaviour of the evaporator is of the utmost importance.

There was nothing of outstanding importance to report in the milling and manufacturing work. Extraction shows a slightly higher figure, with the same fibre and somewhat higher tonnage crushed per hour. The juice recovery jumped by 1.7 per cent. to 91.5 per cent., a rise which has also been experienced in some other factories this year.

It is possible that this figure could have been higher had the load on the vacuum pans and crystallizers been not so great.

The average time allowed in the low grade crystallizers was only 48 hours and frequently was as little as 36 hours.

The storage and cooling of massecuites, especially low grade massecuites, is, of course, a very debatable subject upon which little if any real light has been shed in this country.

Exact knowledge is wanting presumably because the fundamental of good results from crystallizers lies in good pan boiling—a fact that the many inventors of variations in crystallizers seem to forget.

No extra machinery was installed for the 1944 crop, but attention was paid to the cutting out of hindrances to rapid and speedy output, of which no doubt many factories have their fair share.

ESPERANZA SUGAR FACTORY.

Report by W. G. Galbraith.

Weather.—The season under review has been a very dry one in contrast to 1943 when a very wet season was experienced. During the entire crushing period only 23.18 ins. of rain fell, whereas in 1943 for the corresponding period 30.81 ins. were recorded. The total rainfall for 1944 was 39.09 ins. compared with 63.64 ins. in 1943. Our highest rainfall in this district for the past 28 years was in 1917, when 66.13 ins. fell, and the lowest rainfall was 22.76 ins., recorded in 1941.

Quality of Cane.—The quality of the cane was very good. The sucrose averaged 15.00 per cent. for the year, a figure which has only been exceeded in the record dry year of 1941, when it was 15.17 per cent. The fibre per cent. cane 15.80 was higher than it has been for some years and almost the same as in 1934, when we crushed 100 per cent. Uba, and had 15.81 fibre per cent. cane. We now crush only 3.21 per cent. Uba. The purity of the mixed juice was 89.13, which is not quite as good as in 1943 when it was 89.60. The average ratio of cane to sugar was 7.53.

There is a general impression that the high sucrose content of cane crushed here is due to the fact that a large portion of our cane comes from high altitudes, and that the sucrose per cent. cane from these areas is particularly high. We cannot agree with this explanation, as only about one-third of our cane supply comes from high altitudes and the sucrose content of this cane does not really differ very much from cane grown on the lower areas. The following table will illustrate this:—

| | Tons Cane. | Tons Sucrose. | Sucrose % Cane. |
|---------------------------|---------------|------------------|--------------------|
| Cane from high altitudes. | 74,815 | 11,280.8 | 15.08 |
| Cane from low altitudes . | 130,187 | 19,472.3 | 14.96 |
| Total and Average... | 205,002 | 30,753.1 | 15.00 |

It will be seen from the above that for 1944 at any rate, there has been very little difference between the sucrose content of the cane grown on high or low lying areas in this district.

Effects of a Cane Fire.—A big cane fire burned approximately 12,000 tons of cane on the 10th September, 1944. The fire was, owing to the dry conditions prevailing at the time, an intense one and some cane was badly charred. On the eighth day after the fire rain set in and continued for six days, during which period 8½ ins. of rain were recorded. This caused the cane to deteriorate rapidly. The effect of the fire on the sucrose per cent. cane was to increase it distinctly for the first five days; after that, however, there was a rapid decline. The first day after the fire the average sucrose per cent. cane on one section was 15.4 per cent., and it increased up to 17.7 per cent. and then dropped day by day to 12.5 per cent. on the eleventh day, rising again to 13.4 per cent. on the fourteenth day.

The average crusher juice purity was 92.4 on the first day, but in this case an immediate drop started, and by the fourteenth day it was only 81.0. The glucose ratio rose from the first day when it was 2.2, and continued up to the fourteenth day, when it was 7.4. In some samples a brix as high as 26.8 was recorded with a corresponding pol of 24.2 per cent. The sucrose per cent. cane reached the high figure of 19.38 per cent.

Although at times the juice was smelling badly, no trouble was experienced in clarification, and filtration proceeded normally. During the second and third week, however, graining in the pans was affected and the massecuites became very gummy and difficult to cure.

The boiling house recovery and efficiency for the four weeks were as follows:—

| | B.H. Recovery. | B.H. Efficiency. |
|------------------------------|-------------------|---------------------|
| 1st week burnt cane | 93.08 | 104.1 |
| 2nd week burnt cane | 87.18 | 103.2 |
| 3rd week fresh cane | 91.10 | 100.6 |
| 4th week fresh cane | 93.76 | 103.7 |

All the "C" massecuites cured during the third week were very sticky and gummy and cured badly, which accounts for the drop in efficiency during that week.

The mill extraction averaged 96.07 for the second week after the fire. The fibre per cent. cane was 15.36.

Factory Recovery.—The average boiling house recovery for the year was 92.67, the highest ever recorded at this factory for any season, and the overall recovery was 87.86 as compared with 86.61 for the 1943 season.

To illustrate the reduction in the sucrose losses in the factory, the following table in which the sucrose losses are expressed as percentages of the sucrose in mixed juice is given:—

| | Undetermined. | Molasses. | Total. |
|-----------------|---------------|-----------|--------|
| 1934 | 5.60 | 10.71 | 16.31 |
| 1935 | 5.45 | 8.88 | 14.33 |
| 1936 | 4.36 | 9.80 | 14.16 |
| 1937 | 3.15 | 9.84 | 12.99 |
| 1938 | 2.27 | 8.56 | 10.83 |
| 1939 | 2.51 | 8.26 | 10.77 |
| *1940 | 2.27 | 8.06 | 10.33 |
| 1941 | 2.33 | 7.74 | 10.07 |
| †1942 | 1.66 | 8.19 | 9.85 |
| 1943 | 1.70 | 6.43 | 8.13 |
| 1944 | 1.06 | 6.25 | 7.31 |

* Oliver Filter installed.

† Entrainment baffle in quad installed.

The following table shews the drop in purity of final molasses:

| | Molasses Purity. |
|-------------|------------------|
| 1935 | 48.1 |
| 1936 | 47.9 |
| 1937 | 44.8 |
| 1938 | 44.9 |
| 1939 | 45.4 |
| 1940 | 44.4 |
| 1941 | 43.9 |
| 1942 | 43.8 |
| 1943 | 40.97 |
| 1944 | 40.12 |

During the season under review we made 75 per cent. white sugar and the following amounts of chemicals per ton of sugar were used:—

| | |
|-------------------|-----------|
| Lime | 49.1 lbs. |
| Sulphur | 20.8 lbs. |
| Phos. Acid | 2.63 lbs. |

Mr. NELSON said that during the past season they had increased the temperature of the juice prior to sulphuring from 140°C to 160°C and later in the season up to 170°C. This resulted in less scale formation in the evaporators and they were able to reduce considerably their overtime expenses for cleaning evaporators during week-ends. No trouble was experienced in the sulphur tower, but though scaling was reduced in the evaporators some scale seemed to have passed through to the pans, although in practice this was not so objectionable. They intended to keep their primary temperature as high as 170°C to 180°C for the coming season.

Dr. DODDS was interested to see that Mr. Galbraith did not attribute to any extent the high sucrose content of the cane at his factory to the fact that a large quantity of it was grown at high altitudes. Certainly as far as other factories were concerned high sucrose content of cane was associated with higher altitudes. Factories such as Doornkop and Entumeni which drew all, and factories such as Amatikulu and Gledhow which drew a good deal of their cane supplies from high altitudes, shewed sucrose contents well above the average, whereas cane from low-lying areas generally had low sucroses.

The results obtained after the cane fire at Esperanza were of special interest and confirmed experiments carried out at the

Experiment Station with burned cane, which shewed that there was a considerable period after burning in which an increase in sucrose per cent. cane was obtained. After that a definite fall in sucrose content was of course experienced.

Mr. BOOTH questioned the correctness of certain very high sucrose per cent. cane figures at Esperanza some days after the fire, as these figures were obtained from a Java Ratio. He could not accept them as they were presented.

Mr. GALBRAITH admitted the fact that the Java Ratio was used for finding the sucrose per cent. cane of individual samples. They were crushing about 100 per cent. burnt cane at the time and the figures were given because though individual samples might not necessarily be strictly correct, it still served a very useful purpose for comparisons.

Mr. du TOIT said the report by Mr. Galbraith was of extraordinary interest as it contained very useful data on the effect of an extensive fire, followed after some days by heavy rain, on the quality of cane. It provided a unique opportunity for studying the changes that took place in the cane and the effects they had on the milling and recovery processes in the factory. He would be very glad if Mr. Galbraith could give further details of recoveries, sucroses, purities, etc., say day by day, as these would be of permanent value if recorded.

It had often been debated that in spite of the introduction of new varieties with a higher sucrose content than Uba there did not appear to have been any increase in average sucrose per cent. cane. The speaker admitted that that was the case for the industry as a whole, but as far as Esperanza factory was concerned there was a very marked and progressive increase in sucrose content of cane, and that was also true to a lesser extent for the whole of the South Coast. Before 1934 the sucrose content of cane at Esperanza was much the same as for the whole industry, and often lower. Since then, however, a very marked change had taken place and for the last number of years the Esperanza factory shewed a content of 1 to 1½ per cent. sucrose higher than the whole industry. If altitude and locality were responsible for the high sucrose results obtained at Esperanza now, then it was difficult to account why these factors did not make themselves felt more prior to 1934. With the introduction of new varieties it was confidently expected that there would be an increase in the yield of cane per acre. That increase did take place and had even exceeded what could be anticipated from the change over. In his opinion the new varieties outyielded Uba on the average by not more than 30 per cent., but the average yield per acre had gone up 50 per cent., and in certain areas 100 per cent. There were, therefore, some factors other than the introduction of new varieties that had also tended to increase production per acre, and it was just possible that they might have had the effect of lowering the average sucrose per cent. cane. It would be of interest if Mr. Galbraith could give us some cane yields over a number of years for Esperanza.

The boiling house recovery of Esperanza for 1944 was not only a record for South Africa, but was only surpassed by one factory in Hawaii in 1943.

Mr. DYMOND suggested that the low sucrose content of Uba cane was due to the fact that this variety was now cut and tested early in the season and as such it was not a fair comparison with other varieties. Examining the table of cane cut during the July to November period, he could see no evidence that the new varieties were having a better sucrose content than Uba used to.

Mr. MURRAY did not think that altitudes, as such, affected sucrose content, but thought that temperature played an important part.

Dr. DODDS said that the cane grown on high altitudes was subjected to periods of lower temperatures, that range of temperatures was greater and this and the low temperatures apparently promoted sucrose production.

Mr. BECHARD agreed that the differences in temperatures due to high altitudes must have something to do with the high sucrose content of cane from these areas, but trash also had a very pronounced effect. He could remember Uba cane at Esperanza with high percentages of trash adhering to it. What the position was now with self-trashing cane he could not say. He agreed with Mr. Booth that the application of a common Java Ratio to old burnt cane and to fresh cane might result in allocating sucrose far in excess of the actual to the former.

Mr. NELSON said they had some rather extremes in altitudes and their experience had been that the new varieties did not give as high sucrose contents on the high lands as did Uba. In the days of Uba, cane from high altitudes often had a sucrose content of 2 to 2.5 per cent. higher than those from the low-lying areas, but since the replacement of Uba by the new varieties these big differences had ceased to exist.

Mr. GALBRAITH, in reply to a question, said he was often asked to account for the improvement in recovery at Esperanza. There was no doubt that the quality of all cane had improved, but, at the same time, chemical control in the factory had been improved as well as the mechanical efficiency of the plant and undetermined losses had been cut down considerably. For example, at one time there were very high losses as a result of entrainment at the fourth vessel of the quadruple. This was eliminated by the installation of a cone type of baffle. Boiling house technique had been improved and pan cycles had been changed, resulting in a lower exhaust molasses purity. One new calandria pan had been installed in place of a coil pan, but the advantage of this had been considerably offset by the slow rate of discharge from the pans to the crystallizers. Replacing of the filter press station by a rotary filter had brought about great savings both in the filter cake and undetermined losses.

The steam position had been greatly improved in 1939 by the installation of a new boiler plant. Dr. Hedley carried out some valuable work in this connection at Esperanza in 1933 for the Committee on Boilers and Boiler Practice. The injection water cooling system was greatly improved by the installation of a spray cooling system in place of the old cooling tower. It had been a long process actually, and the work had improved year by year, and in the aggregate it had amounted to quite a considerable saving of sucrose.

Mr. Galbraith submitted the following details about cane harvested at Esperanza:—

| Year. | Rainfall. | Sucrose Per cent. Cane. | Fibre Per cent. Cane. | Tons Cane per Acre. | Tons Sucrose per Acre. | Per cent. Non- Uba. |
|------------|-----------|-------------------------------|-----------------------------|---------------------------|------------------------------|---------------------------|
| 1936 . . . | 51.04 | 13.71 | 15.72 | 20.5 | 2.810 | 9.70 |
| 1937 . . . | 37.41 | 14.51 | 15.19 | 24.0 | 3.482 | 53.13 |
| 1938 . . . | 41.40 | 14.36 | 15.01 | 25.5 | 3.661 | 78.15 |
| 1939 . . . | 47.99 | 13.87 | 14.88 | 28.0 | 3.884 | 77.64 |
| 1940 . . . | 35.00 | 13.99 | 15.17 | 25.0 | 3.498 | 79.30 |
| 1941 . . . | 22.76 | 15.01 | 15.42 | 17.0 | 2.552 | 84.15 |
| 1942 . . . | 53.10 | 14.23 | 15.40 | 18.6 | 2.647 | 88.62 |
| 1943 . . . | 63.64 | 14.14 | 15.06 | 25.9 | 3.662 | 96.85 |
| 1944 . . . | 39.09 | 14.96 | 15.80 | 24.7 | 3.712 | 96.79 |