# REPORT ON WEATHER CONDITIONS FOR THE YEAR 1937

**Rainfall.**

On the whole the year's rainfall has been very unsatisfactory both because of the general deficiency of rainfall and the faulty distribution.

The total for the year, 33.21 ins., is not very much below the normal of the preceding 11 years at the Experiment Station, 36.71 ins., but is considerably below the rainfall of any of the past three years.

The annual rainfall since the beginning of our records is:—

| Year | Rainfall | Number of rain days |
|---|---|---|
| 1926 | 25.42 ins. | 116 |
| 1927 | 42.46 „ | 128 |
| 1928 | 27.56 „ | 114 |
| 1929 | 43.83 „ | 129 |
| 1930 | 30.03 „ | 123 |
| 1931 | 28.01 „ | 112 |
| 1932 | 41.36 „ | 126 |
| 1933 | 27.14 „ | 109 |
| 1934 | 39.42 „ | 127 |
| 1935 | 53.25 „ | 111 |
| 1936 | 45.36 „ | 110 |
| 1937 | 33.21 „ | 101 |
| Means | 36.42 „ | 118 |

A marked feature of the year was the small number of rain days which were fewer than in any previous year. This was especially the case during the five months May to September inclusive when there were only 20 days on which rain fell.

Another feature of the year was the lack of heavy and protracted rains. The highest fall for any single day was 2.19 ins. on December 21st. which was followed by 2.18 ins. on December 22nd; and besides these there were only six days having a rainfall of over 1 inch, four of which came in February, against 16 such days in 1936.

The rainfalls previous to October 1925 are calculated from those of Natal Estates Ltd., Mount Edgecombe, using the factor 0.932 which the ten-year period 1926-35 indicates as the ratio of the rainfall here to that of Natal Estates. It will be seen that although the rainfalls for February, April, June, August and December were above normal, the aggregates during the year were throughout below the normal for the corresponding periods.

The distribution of rain during the year was in some important respects very unsatisfactory.

Following is the rainfall for 1937 by months compared with normal for the preceding 51 years at Mount Edgecombe:—

| Month | 1937. Total ins. for month. | 1937. Total from January 1st. | Mean 1887—1937 (inclusive). Total ins. for month. | Mean 1887—1937 (inclusive). Total from January 1st. |
|---|---|---|---|---|
| January | 2.06 | 2.06 | 4.23 | 4.23 |
| February | 6.04 | 8.10 | 4.40 | 8.63 |
| March | 2.17 | 10.27 | 5.04 | 13.67 |
| April | 3.52 | 13.79 | 2.65 | 16.32 |
| May | 0.41 | 14.20 | 1.84 | 18.16 |
| June | 1.47 | 15.67 | 1.32 | 19.48 |
| July | 0.51 | 16.18 | 1.08 | 20.56 |
| August | 2.58 | 18.76 | 1.20 | 21.76 |
| September | 0.48 | 19.24 | 2.79 | 24.55 |
| October | 2.04 | 21.28 | 4.03 | 28.58 |
| November | 2.76 | 24.04 | 4.03 | 32.61 |
| December | 9.17 | 33.21 | 4.58 | 37.19 |
| Totals | 33.21 | | 37.19 | |

The combined rainfall for December 1936 and January 1937 was only 3.55 ins., causing one of the severest summer droughts ever known in Mount Edgecombe, and checking the growth of the cane during a very important period.

There were no unseasonable late rains as in 1935 and 1936; on the contrary the winter rains were much below normal, the total for the seven months ending October being 10.25 ins. or only 62 per cent of normal. However, these scanty winter rains were fairly well distributed so that it cannot be said that there was any very serious and widespread loss of cane due to the winter drought, although the usual drought effects of relatively high fibre content and low purity of juice of the cane were noticeable in some instances, and no doubt the yield had suffered considerably also in a few cases.

A more serious consequence arose from the lack of favourable planting weather during the normal planting months of September, October and November, greatly delaying planting in many cases and in others causing deficient germination and early growth of newly planted cane. The total rainfall for these three most important months was only 5.28 ins., or less than 48 per cent of normal.

At the end of November the total rainfall for the year was only 24.04 ins. so that it bid fair to be one of the driest years ever known here. However, a spell of abundant rains from December 20th to 26th. when it rained every day of that festive season, 6.41 ins. in all, saved the year from a very low total and the young cane from disaster.

Our scanty growing season, so early followed by the cool dry season beginning in May, when growth of the crop almost entirely ceases, makes it vitally important that there should be good rains before December if a good crop is to be obtained, so that the present outlook is not very promising.

**Rainfall by Districts.**

On page 166 is the rainfall for the past nine years at 35 representative points in the sugar growing area:—

The general mean average for 1937, 40.12 ins. is below the normal for the nine year period, 42.44 ins. and is the lowest average rainfall since 1933.

The rainfall was deficient at all points south of the Umhlatuzi river with the exception of Renishaw (due to exceptional local rains in August), Park Rynie, and Darnall (south). All the ten recording stations from Felixton northwards with the exception of Mtubatuba Forest show a rainfall above normal.

The 1937 mean for these ten stations is 46.60 ins. and the nine-year average 41.18 ins.

The deficiency was most marked on the lower South Coast at Port Shepstone, 7.81 ins., and at Illovo, 7.56 ins., and Umbogintwini 7.98 ins., while the inland North Coast stations of Sinembe and Riet Valley had deficits of 8.38 ins. and 8.83 ins. respectively.

The greatest excess rainfalls were recorded at Kulu, 12.30 ins., Mposa 10.99 ins., Eteza 9.88 ins., and Hluhluwe 8.76 ins.

The district with the highest rainfall for 1937 is the belt from Felixton northwards to Eteza, all within a few miles of the sea, with Kulu about the centre of this area showing a peak rainfall of 56.80 ins.

The district that has the highest normal rainfall, Eshowe—Felixton—Mtunzini, this year is not conspicuous, owing to the rainfalls for Eshowe (normally the highest of all, 52.13 ins.) and Mtunzini being considerably below normal.

The lowest rainfall, 30.79 ins. is recorded at Illovo, where the drought was severe during the winter. Other stations with a rainfall below 34 ins. are Chaka's Kraal, 32.87 ins.. and Mount Edgecombe (Experiment Station) 33.21 ins.; while this year as in general there appear to be no well-defined groups of adjacent stations with deficient rainfall like there are well-defined districts of excess rainfall.

**Temperatures.**

Contrary to 1935 and 1936, the mean annual shade temperatures for 1937 were somewhat above normal.

Following is the record by months:—

| Month. | 1937. | | | | 1928/37 inclusive. | | | |
|---|---|---|---|---|---|---|---|---|
| | Maximum. | Minimum. | Mean. | Daily range. | Maximum. | Minimum. | Mean. | Daily range. |
| January .. .. .. | 82.5 | 68.5 | 75.5 | 14.0 | 80.7 | 66.5 | 73.6 | 14.2 |
| February .. .. | 84.4 | 69.1 | 76.8 | 15.3 | 81.2 | 66.8 | 74.0 | 14.4 |
| March .. .. .. | 81.7 | 66.1 | 73.9 | 15.6 | 80.0 | 65.0 | 72.5 | 15.0 |
| April .. .. .. | 77.8 | 61.2 | 69.5 | 16.6 | 78.0 | 61.3 | 69.6 | 16.7 |
| May .. .. .. .. | 77.2 | 57.7 | 67.4 | 19.5 | 75.4 | 56.6 | 66.0 | 18.8 |
| June .. .. .. .. | 73.4 | 53.1 | 63.2 | 20.3 | 72.6 | 52.6 | 62.6 | 20.0 |
| July .. .. .. .. | 71.5 | 50.8 | 61.2 | 19.7 | 71.4 | 51.6 | 61.5 | 19.8 |
| August .. .. .. | 72.0 | 54.2 | 63.1 | 17.8 | 72.5 | 53.2 | 62.9 | 19.3 |
| September .. .. | 73.2 | 56.1 | 64.6 | 17.1 | 74.1 | 56.3 | 65.2 | 17.8 |
| October .. .. .. | 76.4 | 59.9 | 68.2 | 16.5 | 75.9 | 60.1 | 68.0 | 15.8 |
| November .. .. | 79.2 | 63.4 | 71.3 | 15.8 | 77.6 | 62.9 | 70.3 | 14.7 |
| December .. .. | 77.5 | 64.1 | 70.8 | 13.4 | 80.0 | 65.4 | 72.6 | 14.6 |
| Mean for year .. | 77.2 | 60.3 | 68.8 | 16.9 | 76.5 | 59.9 | 68.2 | 16.6 |

| Station. | Recorder. | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | Avr. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Port Shepstone .. | Lightkeeper: S.A.R. & H. .. .. .. | 61.89 | 42.82 | 51.06 | 49.71 | 40.58 | 38.55 | 42.01 | 49.63 | 38.25 | 46.06 |
| Esperanza .. .. .. | Hawksworth & Sons, Ltd. .. .. .. | 57.47 | 42.10 | 36.13 | 38.36 | 32.81 | 46.13 | 43.70 | 44.74 | 36.14 | 41.95 |
| Renishaw .. .. .. | Crookes Bros., Ltd. .. .. .. .. | 58.24 | 37.22 | 31.86 | 41.56 | 34.43 | 42.17 | 42.69 | 46.10 | 44.40 | 42.08 |
| Park Rynie .. .. .. | V. J. S. Crookes .. .. .. .. .. | 58.84 | 39.25 | 38.94 | 44.14 | 37.71 | 46.53 | 47.89 | 52.85 | 46.10 | 45.81 |
| Illovo .. .. .. .. | Illovo Sugar Estates, Ltd. .. .. .. | 49.22 | 38.12 | 31.54 | 36.89 | 26.94 | 41.00 | 39.03 | 51.65 | 30.79 | 38.35 |
| Umbogintwini .. .. | African Explosives & Industries, Ltd. | 47.88 | 42.10 | 32.42 | 39.67 | 36.43 | 45.59 | 52.87 | 53.09 | 34.78 | 42.76 |
| Durban (Berea) .. | M. Cruickshank .. .. .. .. .. | 46.87 | 38.93 | 31.51 | 44.74 | 31.61 | 42.28 | 58.08 | 46.71 | 36.09 | 41.87 |
| Durban (Point) .. | South African Railways & Harbours | 59.97 | 38.92 | 43.68 | 49.45 | 34.42 | 47.45 | 60.93 | 56.85 | 45.84 | 48.61 |
| Mount Edgecombe . | Natal Estates, Ltd. .. .. .. .. | 47.04 | 34.52 | 32.98 | 43.51 | 30.94 | 40.03 | 57.41 | 49.60 | 36.65 | 41.41 |
| Mount Edgecombe . | S.A.S.A. Experiment Station .. .. | 43.83 | 30.03 | 28.01 | 41.36 | 27.14 | 39.42 | 53.25 | 45.36 | 33.21 | 37.96 |
| La Mercy .. .. .. | Gersigny Bros. .. .. .. .. .. | 53.37 | 36.40 | 29.26 | 56.65 | 31.16 | 37.64 | 56.27 | 45.65 | 35.17 | 42.40 |
| Tongaat .. .. .. | Tongaat Sugar Co., Ltd. .. .. .. | 50.55 | 34.26 | 29.88 | 48.79 | 26.59 | 38.44 | 47.54 | 50.87 | 35.61 | 40.28 |
| Sinembe .. .. .. | H. C. Heenan .. .. .. .. .. | 49.78 | 37.02 | 30.36 | 52.71 | 38.64 | 49.99 | 41.48 | 56.80 | 35.17 | 43.55 |
| Umhlali .. .. .. | G. P. Ladlau .. .. .. .. .. | 50.38 | 40.07 | 29.09 | 49.85 | 35.13 | 41.20 | 53.61 | 56.57 | 40.29 | 44.02 |
| Chaka's Kraal .. .. | Waldene Sugar Estate .. .. .. | 42.78 | 33.06 | 22.25 | 43.09 | 30.14 | 35.09 | 43.38 | 46.74 | 32.87 | 36.60 |
| Tinley Manor .. .. | Sir J. L. Hulett & Sons, Ltd. .. .. | 51.36 | 33.22 | 30.97 | 47.44 | 35.44 | 41.20 | 50.97 | 56.83 | 38.38 | 42.87 |
| Riet Valley .. .. .. | H. E. Essery .. .. .. .. .. | 50.07 | 35.65 | 25.38 | 54.64 | 37.98 | 47.70 | 44.33 | 65.99 | 35.28 | 44.11 |
| Kearsney .. .. .. | Sir J. L. Hulett & Sons, Ltd. .. .. | 49.20 | 43.36 | 26.31 | 55.49 | 37.45 | 53.57 | 38.42 | 64.34 | 39.73 | 45.32 |
| Darnall .. .. .. | Mrs. M. C. Rouillard .. .. .. | 40.75 | 37.36 | 23.03 | 44.14 | 25.45 | 49.91 | 44.04 | 56.32 | 40.68 | 40.19 |
| Darnall .. .. .. | Sir J. L. Hulett & Sons, Ltd. .. .. | 42.38 | 40.63 | 24.31 | 52.27 | 29.22 | 48.24 | 40.23 | 52.09 | 39.75 | 41.01 |
| Sitebe .. .. .. | J. W. H. Morris .. .. .. .. | 42.05 | 40.41 | 24.40 | 51.27 | 28.10 | 53.33 | 42.57 | 50.10 | 34.50 | 40.75 |
| Amatikulu .. .. .. | Sir J. L. Hulett & Sons, Ltd. .. .. | 42.23 | 40.80 | 21.09 | 47.16 | 29.86 | 47.66 | 43.41 | 47.86 | 35.38 | 39.49 |
| Gingindhlovu .. .. | P. C. Lilburn .. .. .. .. .. | 42.42 | 47.72 | 24.60 | 53.85 | 33.08 | 50.91 | 53.16 | 52.68 | 39.62 | 44.23 |
| Mtunzini .. .. .. | R. D. Shaw .. .. .. .. .. | 42.57 | 48.99 | 32.92 | 61.97 | 40.03 | 59.28 | 53.02 | 55.62 | 43.57 | 49.77 |
| Eshowe .. .. .. .. | District Forest Officer .. .. .. | 49.97 | 44.26 | 30.36 | 65.05 | 47.31 | 71.85 | 46.18 | 66.61 | 47.56 | 52.13 |
| Felixton .. .. .. | Sir J. L. Hulett & Sons, Ltd. .. .. | 59.39 | 44.57 | 38.03 | 69.08 | 31.43 | 58.82 | 50.16 | 58.71 | 51.96 | 51.35 |
| Empangeni West .. | W. H. Simpson .. .. .. .. .. | 51.61 | 36.82 | 20.56 | 48.32 | 22.92 | 41.08 | 36.40 | 36.62 | 39.10 | 37.05 |
| Empangeni .. .. .. | Morris Bros. .. .. .. .. .. | 46.05 | 33.56 | 30.35 | 49.58 | 27.72 | 45.60 | 37.28 | 47.54 | 45.31 | 40.33 |
| Empangeni .. .. .. | Zululand Sugar Millers & Planters, Ltd. .. .. .. .. .. .. | 48.95 | 33.80 | 31.98 | 55.34 | 29.55 | 48.72 | 38.18 | 49.48 | 47.87 | 42.65 |
| Kulu Halt .. .. .. | S. B. Forrest .. .. .. .. .. | 51.94 | 37.44 | 25.96 | 66.55 | 30.15 | 48.26 | 35.03 | 48.39 | 56.80 | 44.50 |
| Mposa .. .. .. .. | W. Springorum .. .. .. .. .. | 45.80 | 37.83 | 24.29 | 59.33 | 25.43 | 46.45 | 29.59 | 46.81 | 51.80 | 40.81 |
| Kwambonambi .. | A. E. Larsen .. .. .. .. .. | 55.97 | 42.99 | 28.14 | 64.34 | 29.35 | 64.21 | 34.27 | 41.64 | 49.37 | 45.59 |
| Eteza .. .. .. .. | Haworth Bros. .. .. .. .. .. | 41.27 | 36.86 | 31.27 | 59.48 | 29.85 | 44.05 | 25.73 | 42.21 | 49.95 | 40.07 |
| Mtubatuba .. .. .. | Dukuduku Forester .. .. .. .. | 42.96 | 36.14 | 36.87 | 61.35 | 23.99 | 49.23 | 24.70 | 57.27 | 36.60 | 41.01 |
| Hluhluwe .. .. .. | Government Experiment Station .. .. | 27.76 | 38.52 | 15.43 | 40.36 | 27.24 | 30.15 | 11.34 | 27.97 | 37.20 | 28.44 |
| | | 48.94 | 38.74 | 29.86 | 51.07 | 31.89 | 46.62 | 43.40 | 50.81 | 40.62 | 42.44 |

This excess temperature was particularly noticeable during each of the three summer months, January, February and March which had a general mean temperature of 75.4° or 2° above normal. It was the warmest January ever recorded here being 1.9° above normal. There was a marked heat wave from the 17th to the 20th when the mean daily maximum was 89.6° and the minimum 73.2°. February was also unusually warm with a mean temperature of 76.8° which is 2.8° above normal but it was not a record, having been exceeded by February 1931, when it was 77.0°.

There was a heat wave of unusual length and intensity for this station during the week ending February 16th. The mean maximum shade temperature during this week was 89.3° and the mean minimum 74.6° corresponding to a mean temperature of 82.0°. The average humidity of this period was 76 per cent of saturation, and the mean wet bulb temperature 77°.

Other months that were warmer than usual were May, June, August, October and November, the others being below normal especially December which was 1.8° below normal and showed a slight fall in temperature from November instead of the usual seasonal rise.

As usual February was the warmest month and July the coolest.

| | 1 foot. | 2 feet. | 4 feet |
|---|---|---|---|
| Highest .. .. .. .. | 81.1° (February) | 81.0° (February and March) | 79.9° (March) |
| Lowest .. .. .. .. | 62.8° (July) | 65.3° (July) | 67.3° (August) |
| Mean for year .. .. | 72.5° | 73.4° | 73.5° |

The average earth thermometer readings were below 70° for the months of June to September inclusive, and this temperature, 70°, is supposed to be the limiting range below which sugar cane will not make appreciable growth.

**Atmospheric Conditions.**

The mean true barometric pressure for the year was 29.75 ins. which is very slightly lower than the mean of the past ten years, 29.77 ins.

The monthly average peak of pressure was in August, 29.94 ins. and the monthly minimum 29.63 ins. in January. The other months showed the regular sequence of rise or fall except that December, 29.69 ins. was very slightly higher than November.

The absolute minimum for the year was 29.26 ins. on December 17th and the maximum 30.45 ins. on July 15th. This is the absolute maximum for this station, the previous highest being 30.39 ins. on August 3rd, 1935.

The mean humidity of atmosphere per cent of saturation was 72.9 at 8.30 a.m. and 61.8 at 1 p.m. which are only slightly lower than those of the past three rainy years. The most humid month was February when the humidity was 79.8 per cent of saturation at 8.30 a.m. and 66.5 per cent at 1 p.m. The driest month was July with an average humidity of 66.4 per cent at 8.30 a.m. and 53.0 at 1 p.m.

1937 had the most sunshine of any year since 1933, the total being 2,401.3 hours corresponding to 54.8 per cent of total hours of daylight.

The sunniest month was June with 73.1 per cent of total hours of daylight, and the cloudiest December with a sunshine record of only 31 per cent of total hours of daylight.

As usual the rate of evaporation from a free water surface was least during the cool months of June and July when the average daily rate of evaporation was 0.08 ins. The highest rate of evaporation was during the warm months of January and February when it was 0.18 ins. per day.

The total average daily rate for the year was 0.13 ins. corresponding to a total evaporation for the year of 47 inches.

1937 was very free from extreme occasional temperatures. The absolute maximum temperature for the year was 97° on October 17th., and there were only two other days, October 13th (96°) and January 19th (96°), with a temperature of over 95° in the shade.

The absolute minimum was 44° on July 17th which was the only day with a temperature less than 45°.

There was again freedom from ground frosts the lowest thermometer reading on the grass being 37° on July 17th and October 23rd.

The absolute maximum reading in the sun was recorded by the solar radiation thermometer at 154° on February 8th. The mean for the year was 128.6°.

The earth thermometer average readings were higher than for 1935 and 1936, but showed similar relative differences between themselves, that is, the one-foot thermometer about a degree lower than the two-foot thermometer, which was only very slightly lower than the four-foot reading.

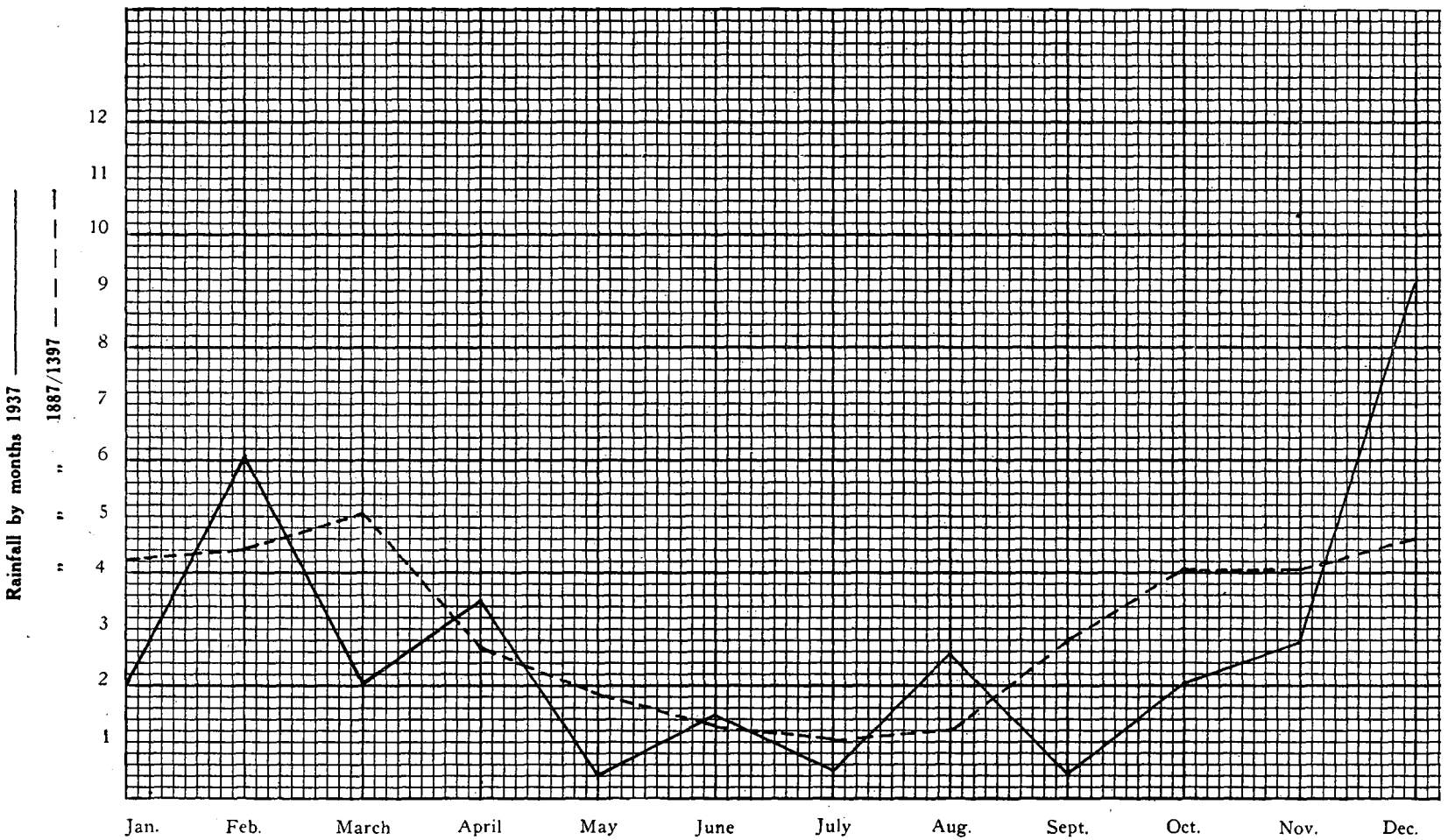
The average maximum and minimum readings were in February or March and July or August respectively and were:—

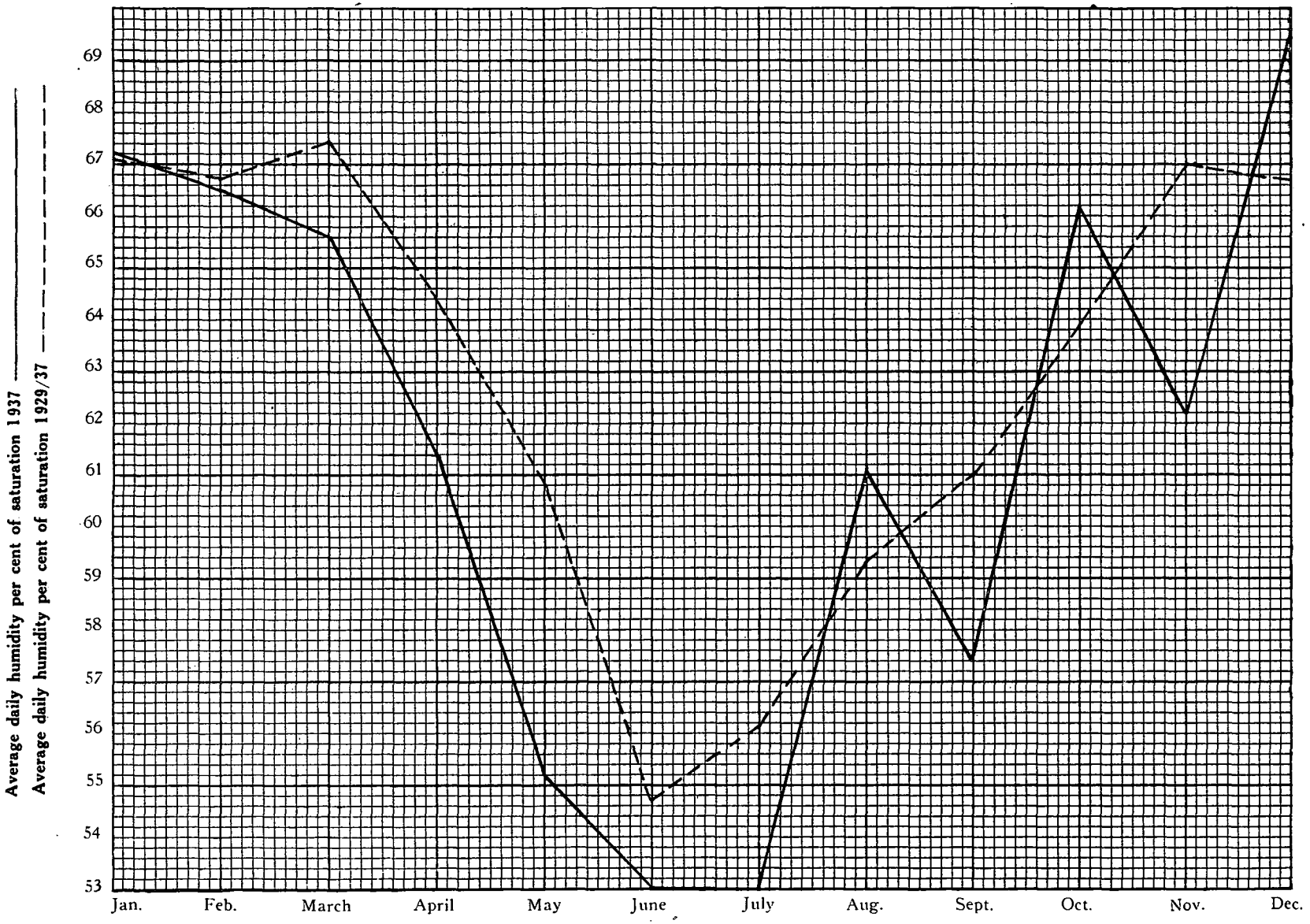
There was only one slight hailstorm recorded during the year, on November 24th.

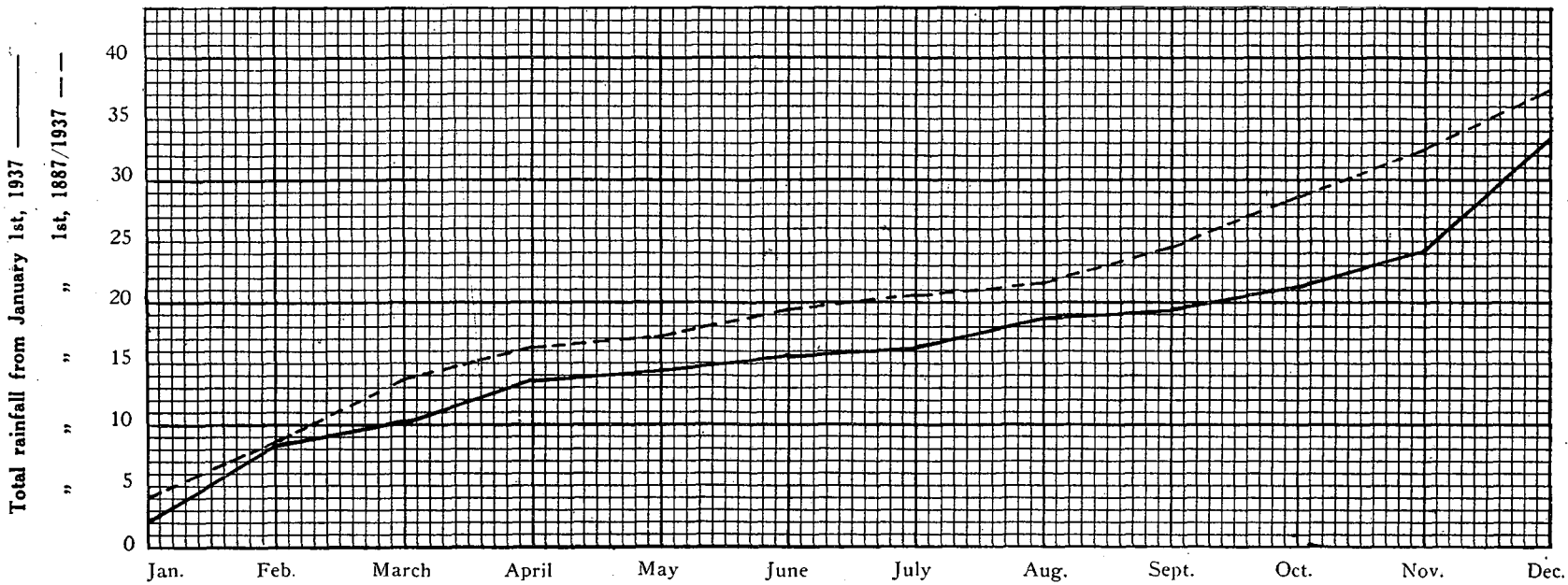
As usual the prevalent winds were from the north-east and south-west quarters, varying occasionally in the winter months to south-east breezes. There were 20 days during the year on which high winds were recorded and only 12 days on which there was no wind at all. Occasionally hot dry winds from a north-western direction are recorded here, but there were no such winds during 1937.

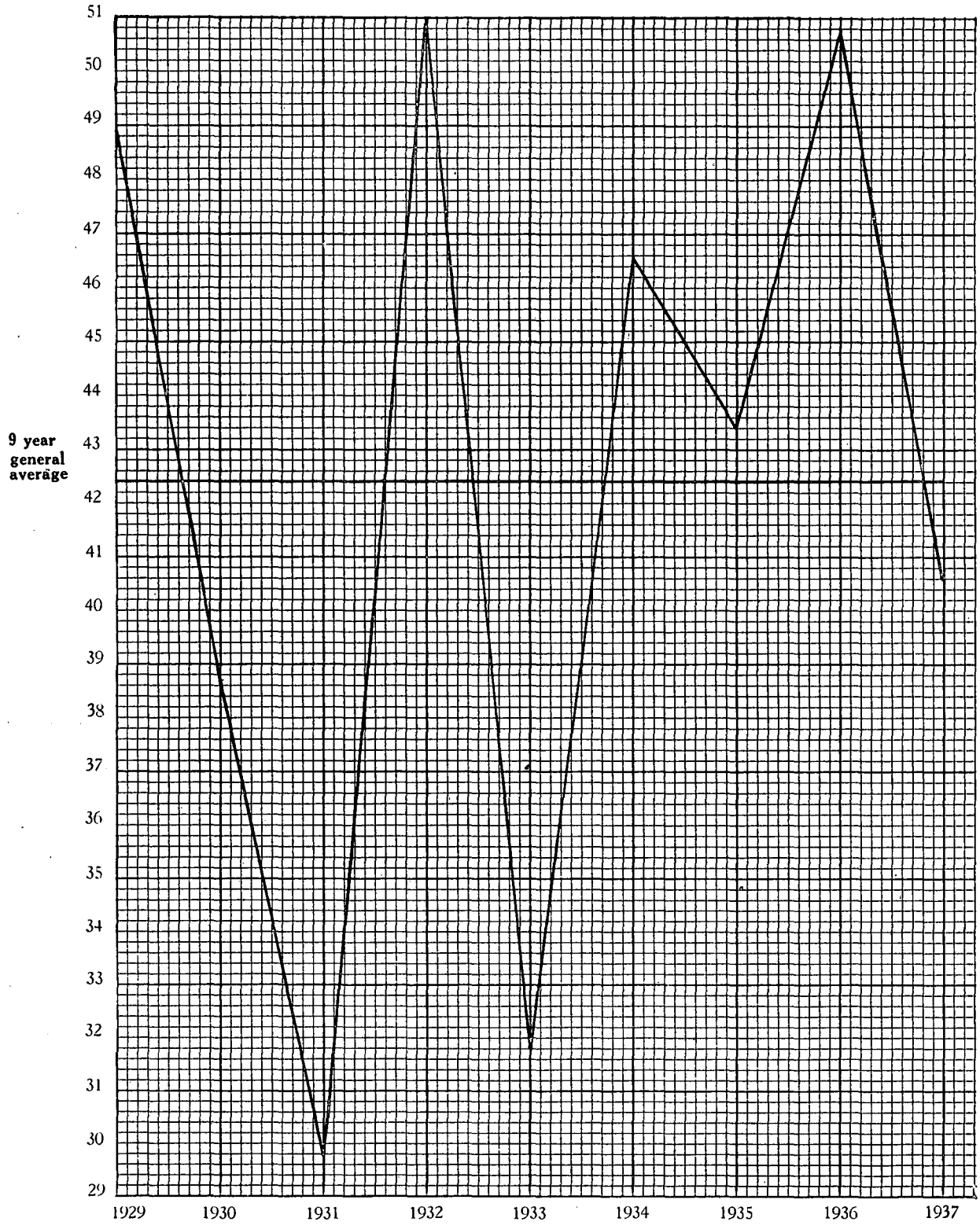
South African Sugar Association,
Experiment Station,
Mount Edgecombe,

Mean monthly temperatures 1937 ———
" " 1928/37 — — —
77
76
75
74
73
72
71
70
69
68
67
66
65
64
63
62
61
Jan.
Feb.
March
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.


Rainfall by months 1937 ——————
" " 1887/1397 — — — —
12
11
10
9
8
7
6
5
4
3
2
1
Jan.
Feb.
March
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.


Average daily humidity per cent of saturation 1937
Average daily humidity per cent of saturation 1929/37
69
68
67
66
65
64
63
62
61
60
59
58
57
56
55
54
53
Jan.
Feb.
March
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.


Total rainfall from January 1st, 1937 ———
" " " 1st, 1887/1937 — —
40
35
30
25
20
15
10
5
0
Jan.
Feb.
March
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.




**Average rainfall of 35 stations in the sugar belt for 9 years 1929—37 inclusive.**

Mr. DODDS: While reading his paper digressed for a moment on the fact that Natal Estates factory had gained the best efficiency figures. He pointed out that it was perhaps more than mere coincidence that these results should have been obtained by a factory whose Managing Director, Mr. William Campbell, and staff so regularly attended the Congress. Mr. Campbell was one of the most regular attendants of all the milling companies at our Congress, and he and his staff took the greatest interest in the affairs of this Association. There was no doubt that the enterprising attitude of that firm towards all matters concerning the Industry had largely accounted for their very successful results.

The PRESIDENT: In declaring the paper open for discussion drew attention to the amount of work entailed every year at the Experiment Station by this Report.

Mr. MOBERLY: Repeated his suggestion of last year that a rainfall year, starting from say September, should be drawn up in addition to the normal year.

The PRESIDENT: Asked if anyone could tell him whether August had been a particularly dry month.

Mr. DODDS: Said that there had been one or two complaints that month about drought-stricken cane.

As regards the rainfall year he wished to say that two years ago Mr. Beater had contributed a paper relating to this subject, and he had also shown there that there was no important difference between the two sets of figures.

Mr. MOBERLY: Referred to the main summary on pages 148 and 149. He said that he had drawn attention as a footnote in the proofs that since the figure 3.37% for the average sucrose in filter cake was a weighted average Natal Estates filter cake would have a large influence on that figure. The printer had omitted this footnote. He would like to say that a very useful figure that could be added to the main table was the pol of the first crusher juice which could be calculated from the sucrose % cane and the Java Ratio.

Mr. BECHARD: Referring to the reduction in sugar yield due to harvesting cane in January instead of in the peak months of the year, said that one point was apparently lost sight of, and that was that the cane reaped during January would probably have been of very much lower tonnage if reaped earlier. He made reference to the use of shredders. Natal Estates again had set a good example by the installation of a shredder many years ago, and recently factories Nos. 20, 14, and 5 had followed suit with marked increase in extraction.

Mr. WOUTERS: Suggested that the annual summary should include boiler house efficiency and various data from the steam-raising department of the factory.

Mr. DODDS: Said that while he agreed with Mr. Bechard about the January figures he was still of the opinion that such cane should be left over until the following season if possible.

Referring to Mr. Wouters' statement he said he would like to see more made of this summary. Whereas the present summary amounted to only 21 pages the corresponding report in Java amounted to 130 pages. They went into far greater detail than we ever contemplated. Nevertheless, each year we were increasing the scope of this summary and hoped one day to have a real outline of the work of the season at every factory.

The PRESIDENT: Concluded by moving a vote of thanks for the Report.