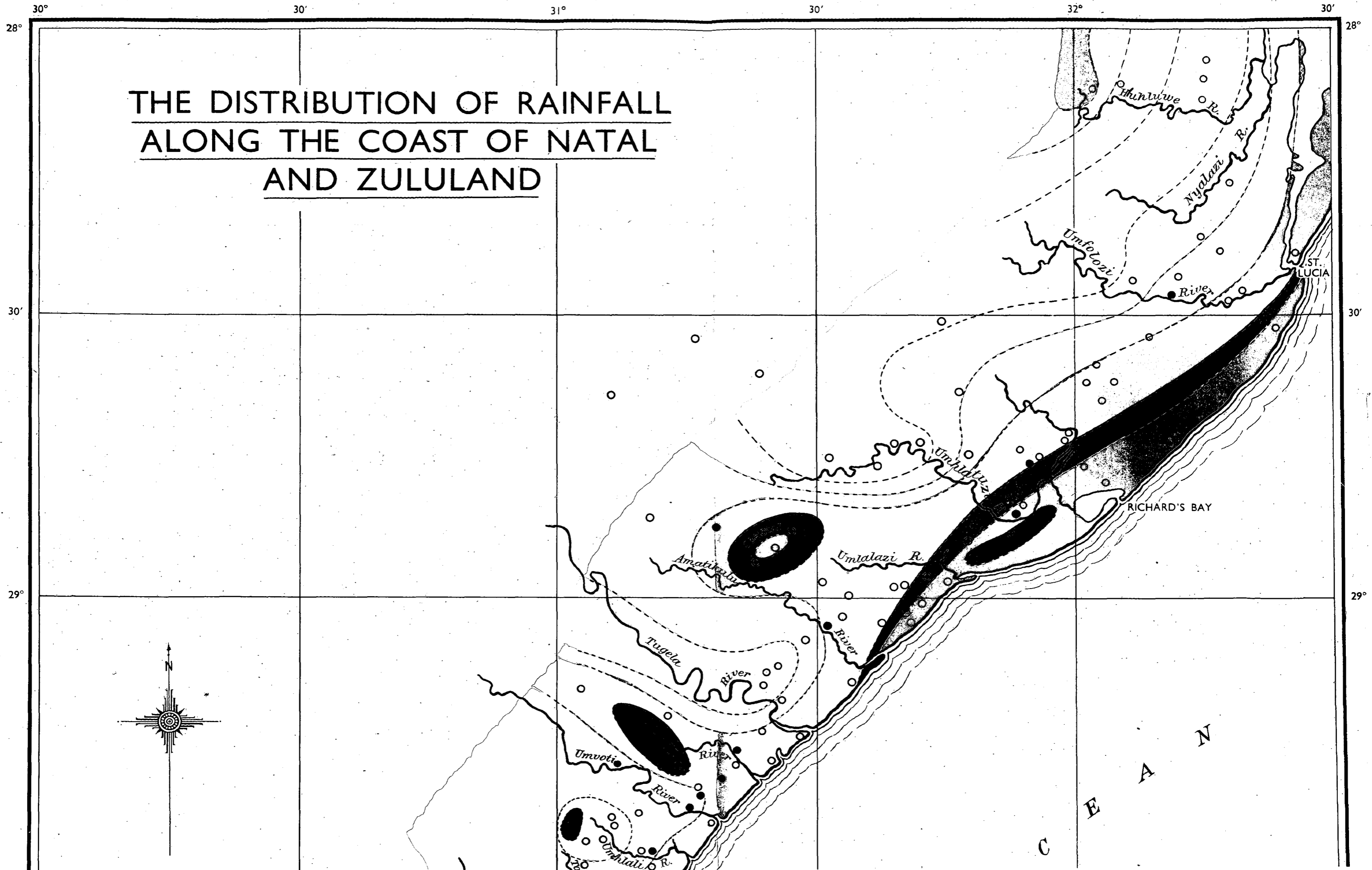


THE DISTRIBUTION OF RAINFALL
ALONG THE COAST OF NATAL
AND ZULULAND



THE DISTRIBUTION OF RAINFALL ALONG THE COAST OF NATAL AND ZULULAND.

By B. E. BEATER.

SEASONAL DISTRIBUTION.

Although the major portion of the area under review in this paper enjoys a moderately favourable mean annual rainfall, its correct seasonal distribution cannot always be relied upon. A dry summer is not uncommon. Likewise flood rains may occur in mid-winter, as was the case in June, 1935. There have often been years of good total annual rainfall, but with poor distribution.

In order to obtain a mean of the seasonal distribution of

rainfall, monthly totals of rainfall and rain days have been gathered from twenty-two centres along the coast, ranging from Umzimkulu in the south to Eteza in the north. As these records date back over the past twenty-one years, they may be taken to be a fairly true reflection of the mean seasonal distribution of rainfall, month by month. The returns from these twenty-two stations, representing most of the wet and dry areas, are the basis of the first six tables in this paper. A brief discussion of the findings in each table may be of some interest.

TABLE I.—MEAN MONTHLY RAINFALL IN INCHES OVER 21 YEARS, 1924/44 (INCLUSIVE) FROM 22 LOCALITIES ALONG THE SUGAR BELT.

Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1924	4.27	4.32	2.56	2.20	1.20	0.84	0.34	1.40	4.34	2.96	6.96	6.38
1925	5.65	5.51	24.25	2.02	3.17	0.42	2.14	0.35	5.09	3.73	3.25	2.44
1926	2.03	3.80	6.19	0.73	0.67	2.41	0.34	0.53	2.68	4.70	3.71	3.68
1927	3.14	5.05	11.44	0.60	1.58	0.14	1.38	1.73	1.39	3.50	1.99	5.04
1928	5.73	4.66	2.76	2.08	1.74	0.34	0.47	1.38	1.58	3.09	2.86	3.80
1929	5.82	3.01	10.38	1.88	1.10	5.32	2.77	1.44	4.66	4.79	4.15	2.00
1930	8.32	1.86	2.82	1.99	1.04	1.49	1.48	2.92	4.04	3.18	4.54	4.77
1931	4.05	2.33	4.16	2.06	0.56	0.58	3.09	0.39	1.90	2.25	2.51	4.85
1932	4.58	13.69	5.51	5.78	5.07	0.74	0.24	0.74	2.04	4.09	3.94	4.93
1933	3.74	2.97	3.52	1.81	0.88	0.43	1.53	0.64	1.40	2.29	7.00	6.40
1934	7.37	5.07	4.52	5.04	2.81	1.51	2.74	2.50	0.84	1.76	3.22	8.08
1935	4.52	4.02	4.38	1.72	5.82	11.93	0.93	2.97	0.76	2.08	1.71	2.99
1936	6.75	8.54	6.19	0.92	7.31	0.98	0.98	0.33	2.49	3.85	11.50	1.70
1937	3.95	7.20	2.60	2.97	0.18	1.76	1.32	1.54	1.02	2.60	3.56	10.71
1938	4.85	7.39	0.87	3.75	1.18	2.48	3.64	1.53	0.69	5.02	3.58	5.87
1939	3.07	8.36	5.86	1.88	3.93	0.76	1.95	1.18	5.63	2.17	7.45	5.27
1940	2.86	1.54	4.77	1.85	10.70	4.16	0.29	1.16	2.11	2.16	8.59	5.11
1941	1.94	1.72	4.13	3.29	0.55	1.07	0.63	0.58	3.00	2.24	4.45	2.89
1942	7.35	2.42	7.26	2.37	2.44	1.36	0.82	2.48	2.87	3.93	6.71	8.36
1943	2.51	4.95	8.71	7.46	2.54	1.41	4.26	4.46	1.08	6.80	5.41	3.57
1944	1.69	5.58	5.05	1.68	0.55	3.61	1.12	0.90	8.05	3.49	3.60	2.26
Mean	4.49	4.95	6.09	2.58	2.62	2.08	1.55	1.48	2.75	3.37	4.58	4.81

TABLE II.—MEAN NUMBER OF RAIN DAYS PER MONTH OVER 21 YEARS, 1924/44 (INCLUSIVE) FROM 22 LOCALITIES ALONG THE SUGAR BELT.

Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1924	10.1	10.5	9.6	6.8	5.0	2.8	2.2	1.6	8.4	12.5	14.7	11.5
1925	11.6	9.5	22.4	8.4	8.9	2.3	4.5	2.0	11.3	10.8	11.2	12.6
1926	9.9	10.2	13.1	3.8	4.7	5.3	2.3	4.3	8.0	10.9	10.8	11.7
1927	10.8	12.1	15.1	3.5	5.4	1.4	5.9	3.6	5.8	13.5	7.4	12.5
1928	10.5	10.8	6.6	7.0	3.8	1.6	2.5	5.4	7.6	10.2	10.0	12.5
1929	13.9	10.9	15.1	5.0	3.0	8.0	4.3	5.3	11.2	13.7	14.7	7.4
1930	10.4	8.4	8.7	7.0	4.4	5.8	4.0	6.3	10.2	8.7	13.3	10.9
1931	8.1	7.4	9.7	9.1	2.6	3.1	5.9	2.7	5.4	8.4	9.9	12.4
1932	12.0	12.7	12.2	7.9	6.7	2.1	1.8	2.7	5.8	11.1	10.0	14.0
1933	10.0	10.1	9.7	6.7	2.8	2.4	5.4	4.4	6.2	8.2	14.8	13.8
1934	15.3	10.3	9.7	9.6	6.4	5.7	7.8	5.6	3.7	8.7	15.3	12.4
1935	10.2	8.7	10.1	5.6	7.9	4.9	3.4	6.2	4.0	10.3	7.1	10.1
1936	13.8	13.1	8.8	4.8	6.0	2.8	3.7	2.3	8.0	11.9	16.9	7.7
1937	12.3	9.1	7.6	7.2	1.4	2.6	3.2	5.0	4.7	10.6	10.0	14.0
1938	13.6	12.5	3.8	9.1	4.8	4.8	3.8	6.7	4.0	14.0	10.5	11.6
1939	11.3	12.8	11.8	5.5	7.5	3.0	6.4	5.4	10.2	10.4	12.5	14.1
1940	8.7	5.5	9.8	6.3	3.7	6.4	1.8	3.6	8.4	8.2	13.4	12.0
1941	7.7	6.1	9.5	6.4	2.5	3.9	3.4	4.0	10.6	9.6	13.0	9.2
1942	12.3	8.4	11.7	6.6	4.2	4.1	2.8	6.8	8.2	9.5	10.9	11.3
1943	8.6	9.6	9.8	10.5	5.9	4.3	5.6	7.5	4.0	13.7	10.6	9.0
1944	6.8	11.4	8.5	5.5	3.4	7.0	2.4	3.6	7.9	10.7	12.1	9.3
Mean	10.9	10.0	10.6	6.8	4.8	4.0	3.9	4.5	7.3	10.7	11.9	11.4

TABLE III.—MEAN AVERAGE RAINFALL IN INCHES PER DAY OVER 21 YEARS, 1924/44 (INCLUSIVE) FROM 22 LOCALITIES ALONG THE SUGAR BELT.

Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1924	0.138	0.153	0.071	0.073	0.039	0.028	0.011	0.045	0.145	0.095	0.232	0.206
1925	0.182	0.195	0.782	0.067	0.102	0.014	0.069	0.011	0.170	0.120	0.108	0.079
1926	0.065	0.134	0.200	0.024	0.022	0.080	0.011	0.017	0.089	0.152	0.124	0.119
1927	0.101	0.178	0.369	0.020	0.051	0.005	0.044	0.056	0.046	0.113	0.066	0.162
1928	0.185	0.165	0.089	0.069	0.056	0.011	0.015	0.044	0.053	0.100	0.095	0.123
1929	0.188	0.106	0.335	0.063	0.035	0.177	0.089	0.046	0.155	0.154	0.138	0.064
1930	0.268	0.066	0.091	0.066	0.034	0.050	0.048	0.094	0.134	0.102	0.151	0.154
1931	0.131	0.082	0.134	0.069	0.018	0.019	0.100	0.012	0.063	0.073	0.084	0.156
1932	0.148	0.484	0.178	0.193	0.164	0.025	0.008	0.024	0.068	0.132	0.131	0.159
1933	0.121	0.105	0.114	0.060	0.284	0.014	0.049	0.021	0.047	0.074	0.233	0.206
1934	0.238	0.179	0.146	0.168	0.091	0.050	0.088	0.081	0.028	0.057	0.107	0.261
1935	0.146	0.142	0.141	0.057	0.188	0.398	0.030	0.096	0.025	0.067	0.057	0.096
1936	0.218	0.302	0.200	0.031	0.236	0.033	0.032	0.011	0.083	0.124	0.383	0.055
1937	0.127	0.254	0.084	0.099	0.006	0.059	0.042	0.050	0.034	0.084	0.119	0.345
1938	0.157	0.261	0.028	0.125	0.038	0.083	0.117	0.049	0.023	0.162	0.119	0.189
1939	0.099	0.296	0.189	0.063	0.127	0.025	0.063	0.038	0.188	0.070	0.248	0.170
1940	0.092	0.054	0.154	0.062	0.345	0.139	0.009	0.037	0.070	0.070	0.286	0.165
1941	0.062	0.061	0.133	0.110	0.018	0.036	0.020	0.019	0.100	0.072	0.148	0.093
1942	0.237	0.086	0.234	0.079	0.079	0.045	0.026	0.080	0.096	0.127	0.224	0.270
1943	0.081	0.175	0.281	0.249	0.082	0.047	0.137	0.144	0.036	0.219	0.180	0.115
1944	0.054	0.197	0.163	0.056	0.018	0.120	0.036	0.029	0.268	0.112	0.120	0.073
Mean	0.145	0.175	0.196	0.086	0.097	0.069	0.050	0.048	0.091	0.109	0.160	0.155

TABLE IV.—MEAN PER CENT. OF WET DAYS OVER 21 YEARS, 1924/44 (INCLUSIVE) FROM 22 LOCALITIES ALONG THE SUGAR BELT.

Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1924	33	37	31	23	16	9	7	5	28	40	49	37
1925	37	34	72	28	29	8	14	6	38	35	37	41
1926	32	36	42	13	15	18	7	14	27	35	36	38
1927	35	43	49	12	17	5	19	12	19	44	25	40
1928	34	38	21	23	12	5	8	17	25	33	33	40
1929	45	39	49	17	10	27	14	17	37	44	49	24
1930	34	30	28	23	14	19	13	20	34	28	44	35
1931	26	26	31	30	8	10	19	9	18	27	33	40
1932	39	45	39	26	22	7	6	9	19	36	33	45
1933	32	36	31	22	9	8	17	14	21	26	49	45
1934	49	36	31	32	21	19	25	18	12	28	51	40
1935	33	31	33	19	25	16	11	20	13	33	24	32
1936	45	46	28	16	19	9	12	7	27	38	56	25
1937	40	32	24	24	4	9	10	16	16	34	33	45
1938	44	44	12	30	15	16	12	22	13	45	35	37
1939	36	45	38	18	24	10	21	17	34	34	42	45
1940	28	19	32	21	12	21	6	12	28	26	45	39
1941	25	22	31	21	8	13	11	13	35	31	43	30
1942	40	30	38	22	14	14	9	22	27	31	36	36
1943	28	34	32	35	19	14	18	24	13	44	35	29
1944	22	40	27	18	11	23	8	12	26	34	40	30
Mean	35.1	35.4	34.2	22.5	15.4	13.3	12.7	14.6	24.3	34.6	39.4	36.8

TABLE V.—MEAN AVERAGE RAINFALL IN INCHES PER RAIN DAY OVER 21 YEARS, 1924/44 (INCLUSIVE) FROM 22 LOCALITIES ALONG THE SUGAR BELT.

Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1924	0.422	0.411	0.267	0.323	0.240	0.300	0.154	0.875	0.517	0.237	0.474	0.555
1925	0.487	0.580	1.083	0.240	0.356	0.182	0.475	0.175	0.463	0.345	0.290	0.194
1926	0.205	0.372	0.472	0.192	0.143	0.455	0.148	0.123	0.335	0.431	0.344	0.314
1927	0.290	0.417	0.758	0.171	0.293	0.100	0.234	0.481	0.240	0.259	0.269	0.403
1928	0.545	0.431	0.418	0.297	0.458	0.212	0.188	0.256	0.208	0.303	0.286	0.304
1929	0.419	0.276	0.687	0.376	0.367	0.665	0.644	0.272	0.416	0.350	0.282	0.270
1930	0.800	0.221	0.324	0.284	0.237	0.257	0.370	0.463	0.396	0.366	0.341	0.438
1931	0.500	0.315	0.429	0.226	0.215	0.187	0.524	0.144	0.352	0.268	0.254	0.391
1932	0.382	1.078	0.451	0.732	0.757	0.352	0.133	0.274	0.351	0.368	0.394	0.352
1933	0.374	0.294	0.363	0.270	0.314	0.179	0.283	0.145	0.226	0.279	0.473	0.464
1934	0.482	0.492	0.466	0.525	0.439	0.265	0.351	0.446	0.227	0.202	0.210	0.652
1935	0.443	0.462	0.433	0.307	0.737	2.435	0.274	0.479	0.190	0.202	0.241	0.296
1936	0.489	0.652	0.703	0.192	1.218	0.350	0.265	0.143	0.311	0.323	0.680	0.221
1937	0.321	0.791	0.342	0.413	0.129	0.677	0.412	0.308	0.217	0.245	0.356	0.765
1938	0.357	0.591	0.229	0.412	0.246	0.517	0.958	0.228	0.172	0.358	0.341	0.506
1939	0.272	0.653	0.497	0.342	0.524	0.253	0.305	0.219	0.552	0.209	0.596	0.374
1940	0.329	0.280	0.487	0.294	0.289	0.650	0.161	0.322	0.251	0.263	0.641	0.426
1941	0.252	0.282	0.435	0.514	0.220	0.275	0.185	0.145	0.283	0.233	0.342	0.314
1942	0.597	0.288	0.620	0.359	0.581	0.332	0.293	0.365	0.350	0.414	0.615	0.740
1943	0.292	0.516	0.889	0.710	0.431	0.328	0.761	0.595	0.270	0.496	0.510	0.397
1944	0.249	0.489	0.594	0.305	0.162	0.516	0.466	0.250	0.102	0.326	0.298	0.243
Mean	0.405	0.471	0.521	0.356	0.398	0.452	0.361	0.319	0.306	0.308	0.392	0.410

TABLE VI.

SUMMARY OF MONTHLY RAINFALL STATISTICS OVER 21 YEARS, 1924/44 (INCLUSIVE) FROM 22 LOCALITIES ALONG THE SUGAR BELT.

Month.	Mean total for month. Inches.	Aggregate from 1st January. Inches.	Number of rain days.	Mean average rainfall per day. Inches.	Mean per cent. of wet days.	Mean average rainfall per rain day.
January ...	4.49	4.49	10.9	0.145	35.1	0.405
February ...	4.95	9.44	10.0	0.175	35.4	0.471
March... ..	6.09	15.53	10.6	0.196	34.2	0.521
April	2.58	18.11	6.8	0.086	22.5	0.356
May.	2.62	20.73	4.8	0.097	15.4	0.398
June	2.08	22.81	4.0	0.069	13.3	0.452
July	1.55	24.36	3.9	0.050	12.7	0.361
August	1.48	25.84	4.5	0.048	14.6	0.319
September...	2.75	28.59	7.3	0.091	24.3	0.306
October	3.37	31.96	10.7	0.109	34.6	0.308
November ...	4.58	36.54	11.9	0.160	39.4	0.392
December ...	4.81	41.35	11.4	0.155	36.8	0.410
Mean	—	41.35	96.8	0.115	26.5	0.427

Table I illustrates the well-known fact that the heaviest rainfall occurs over the summer months of October to March. During these six months a mean of 68.4 per cent. of the total annual rainfall occurs. During the three winter months of June, July and August precipitation is only 12.4 per cent. of the annual, a figure which is exceeded by the mean March rainfall in itself alone. Figure 1 shows the mean monthly rainfall to rise from January through February to its peak in March. Thereafter it drops off very sharply, remaining low until it reaches its minimum in August. The rise from August to December is a regular one. During the period 1924 to 1944, abnormal rains fell in March, 1925, with a mean of 24.25 inches for the sugar belt, and in June, 1935, with a mean of 11.93 inches. Other high rainfall months with a mean of 10 inches and over were March, 1927 (11.44 inches), March, 1929 (10.38 inches), February, 1932 (13.69 inches), November, 1936 (11.50 inches), December, 1937 (10.71 inches), and May, 1940 (10.70 inches). Without the abnormal rainfall in March, 1925, the mean for that month would have become 5.19 inches, still giving March the lead; while June without the floods of 1935 would have become 1.59 inches, still, however, not interrupting the sequence of decreasing fall from April to August. The unexpected rise in mean rainfall in May over April, despite a decrease of 29 per cent. in the number of rain days from April to May, would not have occurred but for the heavy rains of May, 1940, when 10.70 inches fell.

Table II shows that November has on an average the highest number of rain days for any month of the year. This is closely followed by December. The least number of rain days occurs in July, August running it a close second. The increase from August to the spring month of September is very sharp. This sequence of rain days is illustrated in Figure 2.

Table III reveals that the highest mean average rainfall per day goes to March with 0.196 inch, and the lowest to August with only 0.048 inch. The interrupted sequence of mean average rainfall per rain day is a result of the heavy rains of May, 1940.

A glance at Table IV, which is not affected by abnormally heavy rainfalls, shows that the highest per cent. of wet days takes place in November. The mean of the percentage of wet days over the six months October to March inclusive is 35.9, while from April to September inclusive it is only 17.1 per cent., less than half for this second six-month period. The sequence of per cent. of wet days per month is shown in Figure 3.

Table V shows the amount of rainfall which occurred on an average over each month each time it rained. Rainfalls in March were of the highest order, even excluding the floods of March, 1925. The lightest rains occurred on an average each time it rained during the month of September.

Table VI summarises the foregoing five tables. On an average there were 97 rainy days in the year. In other words, rain falls

in the sugar belt on an average 26.5 per cent. of the days of the year, the mean rainfall on each occasion being 0.427 inch.

As regards the mean rainfall given in Table VI, namely, 41.35 inches, this is only represented by twenty-two localities. Results obtained from one hundred and eighty localities for the rainfall map, over a mean period of approximately seventeen years, show the mean rainfall for the coastal area to be 40.46 inches.

REGIONAL DISTRIBUTION.

The sugar belt extends along the coast from 30° 45' S. latitude at Umzimkulu to approximately 28° 15' S. latitude at Hluhluwe, a distance of 2.5 degrees of latitude or approximately 200 miles in a direct line along the coast. It has not been found practicable to restrict the study of regional distribution of rainfall to the sugarcane areas alone. The mean distance inland to which consideration is given is approximately 20 miles, a distance which very adequately covers sugar-growing areas.

An examination of rainfall returns from all points within this area of some 4,000 square miles, reveals that there are quite definite tendencies for rainfall to distribute itself regionally in a regular manner throughout the years. This distribution, which can be quite distinctly separated into zones, has persisted as far as records go in the sugar belt. Most of the so-called dry and wet areas are well known, but in this paper an attempt has been made to follow out the zones in some detail. The rainfall map produced in this paper is based on records (no one of less than nine years' duration) from about 200 localities, shaded in the case of factories. These localities are marked by small circles on the map. Where rainfall returns are not available, or it has not been possible to obtain them, local knowledge, and in some respects topography, have been the sole measure of judgment.

In the rainfall map provision has been made for mean annual rainfalls varying from 25 inches to 60 inches. Both these extremes have, of course, been exceeded in individual years, as when 94.20 inches fell at Eteza in 1925 and only 11.34 at Hluhluwe in 1935. Since, however, the mean annual rainfall used in the preparation of the map is an average of usually more than ten years, such abnormal rainfalls do not appreciably affect the final figure.

Below are tabulated the approximate areas in square miles falling within each rainfall zone. The areas are computed from the rainfall map.

Relation between Land Areas and Rainfall Zones along the entire Coastal Region.

Rainfall in inches.	Area in square miles.	Percentage of total area.
25—30	300	7.5
30—35	400	10.0
35—40	1,700	42.5
40—45	1,200	30.0
45—50	200	5.0
50—55	180	4.5
55—60	20	0.5

The coastal area is conveniently divided into:—

Sec. 1. The South Coast (Umzimkulu to Umgeni Rivers).

Sec. 2. The North Coast (Umgeni to Tugela Rivers).

Sec. 3. Zululand (Tugela to Hluhluwe Rivers).

Amplifying the above tabulated results, a rough estimate of the areas falling within the various rainfall zones can likewise be computed from the rainfall map. The results are given below:—

Relation between Land Areas and Rainfall Zones on the South Coast, North Coast and Zululand respectively.

Rainfall in inches.	Area in square miles.			Per cent. of total area.		
	Sec. 1	Sec. 2	Sec. 3	Sec. 1	Sec. 2	Sec. 3
25—30	100	20	180	2.5	0.5	4.5
30—35	200	40	160	5.0	1.0	4.0
35—40	800	300	600	20.0	7.5	15.0
40—45	200	300	700	5.0	7.5	17.5
45—50	20	80	100	0.5	2.0	2.5
50—55	Nil	Nil	180	Nil	Nil	4.5
55—60	Nil	Nil	20	Nil	Nil	0.5
	1,320	740	1,940	33.0	18.5	48.5

From the above, it would appear that 20 per cent. of the area in Zululand receives a rainfall of 40 to 50 inches, while 9.5 per cent. obtains for the coastal areas of Victoria County, and only 5.5 per cent. for the South Coast. Much of the favourable rainfall zones in Zululand, namely, along the immediate coast from Mtunzini to Umfolozi, is occupied by reserves, the soil itself there, furthermore, being rather poor and sandy.

The area given over to sugarcane culture in the three sections is roughly: Section 1, 120 square miles, section 2, 210 square miles, and section 3, 170 square miles. Unfortunately for our purpose, it is not possible to compute the regional distribution of rainfall on the sugarcane lands alone. A large degree of selection has taken place in sugarcane farming, the most suitable areas, climatically, being of course most in demand—that is, where they are available. In general, sugarcane farming takes place mostly in localities where the mean rainfall varies from 35 to 45 inches per annum. A quite considerable area with rainfall below 35 inches is nevertheless given over to the commodity.

It is noteworthy that in areas of low rainfall, as at Nkwalini and Hluhluwe, there occur from time to time years of exceedingly low rainfall. It is these very dry seasons in the drier areas which have so crippling an effect on agriculture, particularly as the rainfall in the succeeding years seldom becomes more than is barely required by such a vigorous growing crop as sugarcane.

On the South Coast there do not appear to be any pockets of rainfall exceeding 45 inches. Such pockets occur very frequently along the remainder of the coast from Kloof northwards. Examples of these are at Upper Tongaat, Kearsney and Eshowe. That these high rainfall localities are not solely due to topography is illustrated by the fact that there are many high regions on

the coast south and north of Durban which do not enjoy the expected high rainfalls. Dumisa and Melmoth may be quoted as examples. It is of interest to observe how the wet pockets are invariably followed by dry zones. The dry Umgeni valley succeeds Kloof, and the wet area of Kearsney is succeeded by the dry zone of the Tugela valley. Nkwalini valley likewise succeeds the wet Eshowe area. It would appear that the notion of rains drifting up the large valleys is purely a fanciful one as far as the coast of Natal and Zululand is concerned.

Of particular interest is the high rainfall of the Lower Umhlatuzi River area. This wet zone is not succeeded immediately by a dry area, as in the above instances. Rather does the rainfall diminish north-westwards in gradual zones almost parallel with the sea coast. The somewhat even topography from Empangeni northwards no doubt has given rise to these smooth zones. Along the remainder of the coast there is certainly no such regular succession in the regional distribution of rainfall.

The subject of rainfall distribution has been one of great interest to the writer. He is indebted to many for assistance in making this paper possible. To the pages of the South African Sugar Journal special thanks must be given for enabling him to abstract, month by month, most of the rainfall returns of the past twenty-one years, which went into the preparation of the first six tables of this paper. The rainfall statistics published by the Department of Irrigation have also been consulted in establishing the rainfall zones. Above all, the writer is indebted to those who, in answer to circulars and personal requests, gladly made available to him such rainfall records as they had. It is hoped that the rainfall map reproduced in this paper will be of particular interest to all who have so kindly contributed towards its preparation.

Experiment Station,
South African Sugar Association,
Mount Edgecombe.
March, 1945.

Fig. 1.

MEAN MONTHLY RAINFALL OVER 21 YEARS (1924/44 INCLUSIVE) FROM 22 LOCALITIES ALONG THE SUGAR BELT.

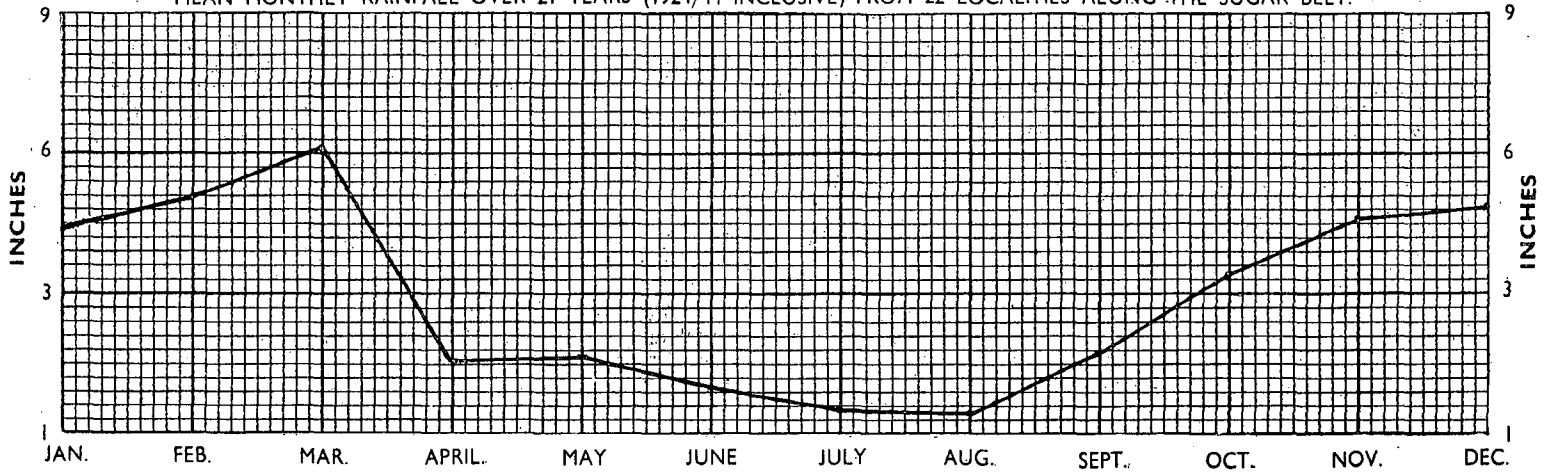


Fig. 2.

MEAN NUMBER OF RAIN DAYS PER MONTH OVER 21 YEARS (1924/44 INCLUSIVE) FROM 22 LOCALITIES ALONG THE SUGAR BELT.

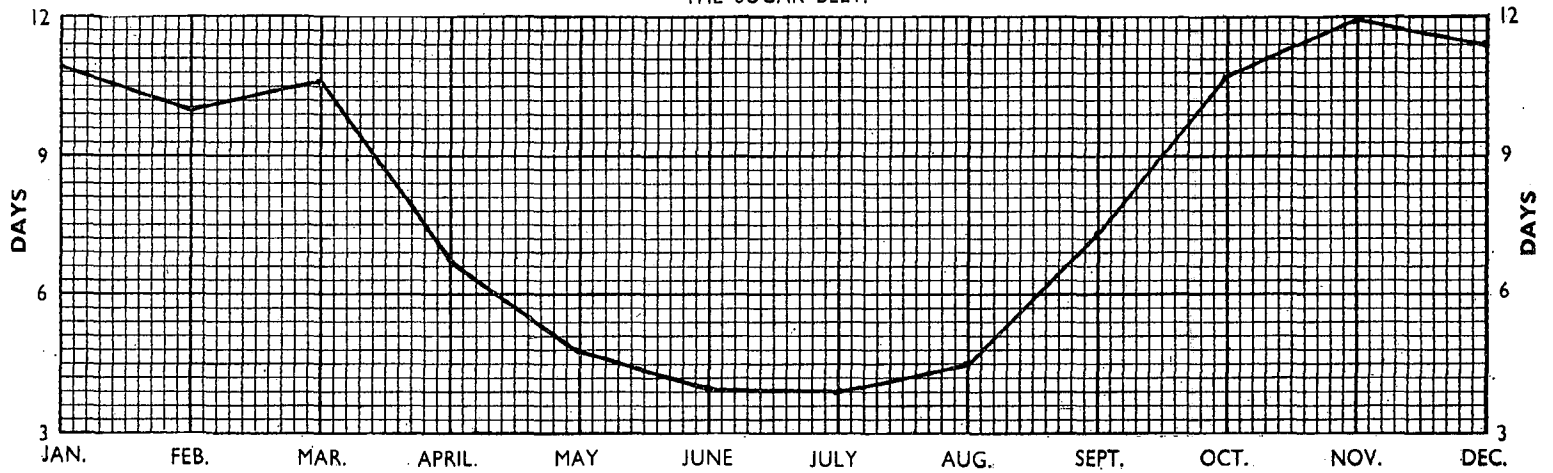
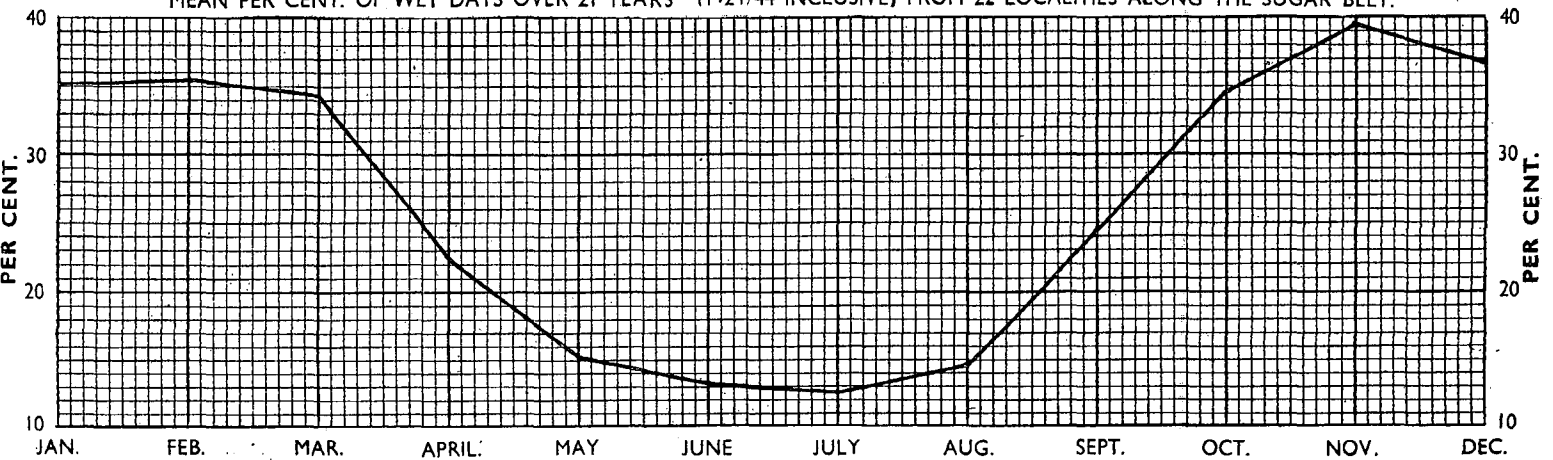


Fig. 3.

MEAN PER CENT. OF WET DAYS OVER 21 YEARS (1924/44 INCLUSIVE) FROM 22 LOCALITIES ALONG THE SUGAR BELT.



The PRESIDENT said that this paper was apparently the result of co-ordinating a large number of observations. He suggested, however, that a rainfall coefficient which would discount flood rains, give a premium to rains occurring during suitable growing periods and discount to some extent rain falling during the harvesting season, could be worked out and that it would prove of great practical value. Such a figure would give us a better basis for judgment of the suitability of any land for cane growing than the mere annual rainfall, part of which might be superfluous rains.

Dr. DODDS pointed out that for the successful cultivation of sugarcane a study of the various aspects of environment was necessary, and climatic variations were most important. The Department of Irrigation had published a rainfall map of the Union in 1925, but for our purposes it was not sufficiently detailed. The cane growing areas had developed and we now had more rainfall data available. He hoped that the map would be printed in colour as it was most important that the various rainfall zones should be accurately and clearly defined.

Topography had a remarkable effect on rainfall. The Experiment Station was less than a mile from Natal Estates sugar factory and not very much higher, yet the former only had 92 per cent. of the rainfall of the latter. This ratio had been remarkably constant over twenty years and he believed the reason was that a hill known as Mount Moriah was immediately to the south-west of the Experiment Station in direct line from where the rain usually came. It affected the rainfall at the Experiment Station, but not at the mill. Another interesting feature was that the 35 to 40-inch rainfall zone came down to the coast from Durban North to the Umhlanga River and included, of course, the Experiment Station. That was consequently one of the driest areas bordering the sea in the sugar belt.

Mr. BEATER drew attention to the relationship between rainfall and certain types of vegetation. Mixed acacias and scrub, for example, were always associated with the driest localities, whereas mixed hygrophilous bush, as its name implies, occurred mostly in the higher rainfall zones.