was relatively much greater than can be accounted for by the "temperature indices" alone. The agreement in this regard, between the data from the two very different stations included in these studies, seems to suggest that this feature may be general for a considerable range of conditions, at least for the plant form here considered.

With the given soil and soil moisture content the intensities of evaporation experienced by these soy bean plants were apparently not sufficiently high seriously to overtax the process of water absorption or that of water conduction. Had the possible rate of water supply to the roots been sufficiently diminished, had the rate of evaporation into the air been sufficiently increased, or had both of these alterations occurred together, then the water relation should have had a more pronounced influence upon the growth rate. It might, indeed, have obscured the effects of the temperature relation. As the experiments were carried out, however, the seasonal changes in temperature were apparently much more important in the control of growth than were the changes in any other measured condition or conditional complex.

A comparison of the seasonal march of the growth rate for Oakland with the corresponding march for Easton brings out three important considerations. (1) Neglecting an unexplained and temporary fall in the rate, shown for the fourth and fifth periods at Easton, the graphs representing these two seasonal marches have much the same general form, but the top of the Easton graph appears flat, while that for Oakland rises to a definite maximum, and then rapidly falls. (2) As is clearly depicted in figure 3, the growth rates of the Oakland series are markedly less than the corresponding ones of the Easton series, these quantities being rendered strictly comparable by stating all of them in terms of the growth rate for the sixth period at Easton considered as unity. In general, the Oakland rates are found to be from about 10 to about 20 per cent or more (on the basis of the assumed unit) lower than the corresponding rates for the other station. (3) The early occurrence of frost at Oakland brought the season to a close earlier than was the case at Easton, and the last growth rate for the latter station is shown as markedly lower than any encountered at Oakland. The principle here brought out is worthy of considerable emphasis. For a short frostless season, characterized by a great daily range of temperature, the lowest growth rate may be generally expected to be higher in value than the lowest rate for a longer frostless season, with more equable temperatures.

NEW ZEALAND RAINFALL IN 1914.

By Rev. D. C. BATES, Director.

[Dated: Dominion Meteorological Office, Wellington, New Zealand, Feb. 17, 1915.]

The year 1914 will long be remembered as one of the most trying ever experienced by the farmers and pastoralists of New Zealand. The winter months (June, July, and August), proved mild, and the rainfall, compared with the averages for previous years, was generally deficient. This dry season was followed by an exceptionally dry spring, but added to this was a summer in which greater quantities of rain were much needed. Though "absolute droughts," in a technical sense, were rare, and absolute minimum monthly rainfalls were not made in any long records of stations, such a continuation of dry conditions was distressing, and such a succession of dry seasons had not previously been regarded as possible in the Dominion. Month after month the total rainfalls were below the averages for the month in previous years in most parts of the Dominion, but it is remarkable that in Southland conditions were almost reversed, and heavy and frequent rains were there experienced during the year. In the South Island the monthly means for previous years show a fairly even distribution of rainfall throughout the whole year; but winter is the rainy season of the North Island. Such was not the experience in 1914, and the leading meteorological feature which accounts for it is the absence of ex-tropical disturbances of a cyclonic character and a counterbalancing prevalence of "brave" westerly winds which held sway during the greater part of the dry period.

Occasionally while Australia has a "dry time" New Zealand has abundant rainfalls, but both suffered in 1914, and it is noticeable that reports from England and France indicate that a somewhat similar and remarkable succession of months of deficient rainfall was experienced in other parts—in England and France at least. Other regions may also disclose irregularities in the precipitation of the world, and when these can be properly compared and studied it is possible that men may recognize reciprocal relationships and trace common cosmical causes which are as yet unknown.

Scattered over the globe are thousands of observers who carefully and patiently, and in the vast majority of cases voluntarily, record the rainfall of their neighborhoods. The cumulative results of their humble devotion to science must undoubtedly prove of great value to their own immediate localities and the countries they inhabit, but the fruits of their observations may, it is hoped, reach a much higher appreciation in the future when more is known of the laws governing precipitation. Rainfall, it may be remarked, is now the least certain element, although the most important item in weather forecasting.

The following table has been computed to show the percentages of rainfall compared with the monthly averages at select stations during the several months of the year in various parts of New Zealand.

TABLE 1.—*Monthly percentages of average monthly rainfalls at selected stations in New Zealand during 1914; number of months having falls above (+) and below (−) their respective averages; and the total annual falls for 1914.*

Place.	January.	February.	March.	April.	May.	Winter. June.	Winter. July.	Winter. August.	September.	October.	November.	December.	Months above or below average. +	Months above or below average. −	Total rainfall for year 1914.
NORTH ISLAND.															*Inches.*
Auckland	51	56	77	124	106	71	81	28	40	32	44	61	2	10	28.42
Te Aroha	39	35	137	149	59	45	55	29	25	25	37	69	2	10	31.98
Rotorua	22	56	69	145	49	62	70	18	44	27	24	53	1	11	29.70
Tauranga	28	26	110	188	42	35	42	9	31	23	16	48	2	10	30.66
Gisborne	22	59	176	90	236	56	14	80	19	23	36	9	2	10	38.71
Greenmeadows, Napier	14	62	111	101	137	6	4	38	14	8	56	21	3	9	22.12
New Plymouth	80	75	43	128	74	33	50	28	29	46	120	122	3	9	39.79
Moumahaki, Waverley	53	133	23	131	154	81	66	45	45	64	80	94	3	9	38.38
Palmerston North	120	78	31	140	130	63	54	57	34	51	95	124	4	8	33.22
Taihape	65	145	65	86	136	63	81	30	33	34	58	71	2	10	31.71
Masterton	56	91	67	133	151	76	26	33	41	18	62	78	3	10	28.17
Wellington	70	56	68	64	166	76	43	25	36	37	59	60	1	11	31.90
SOUTH ISLAND.															
Hokitika	141	78	33	134	96	56	86	66	88	58	191	134	4	8	112.32
Nelson	36	112	54	171	110	75	91	18	9	17	*100	64	3	9	26.01
Christchurch	65	57	44	125	162	99	18	44	37	61	108	110	4	8	19.90
Lincoln	104	86	57	124	189	82	18	25	30	81	98	106	4	8	20.95
Timaru	119	159	107	90	125	28	13	54	8	33	113	65	5	7	17.99
Waimate	178	192	132	166	93	70	18	35	17	53	90	76	4	8	23.14
Dunedin	106	114	59	124	81	88	69	24	62	60	107	111	5	7	31.31
Gore	166	172	36	128	151	163	169	116	123	99	215	114	10	2	38.89
Invercargill	132	85	17	126	91	141	97	144	152	101	116	117	8	4	49.58

* Was a fraction below the mean.