regions of clouds and rain. See the accompanying chart of May 22, 1913 (fig. 1, XLIV—22).

Studies of this kind render it evident that a condition to be considered in forecasting rainfall is that of converging winds.

In figure 1 the areas of converging winds exceeding 1 on the scale are inclosed with blue lines and the areas of rain are indicated by the symbol R. Since the convergence of the wind on which the rainfall depends is determined by the distribution of pressure, it is possible from a chart showing the anticipated distribution of pressure to forecast both wind and rain.

Plotting wind arrows along the lines of equal pressure according to the relation known to exist in the Northern Hemisphere (not considering speed), the region of converging winds can be easily selected and indicated by shaded areas. In this way the shaded area becomes the predicted area for rainfall.

The method used by me in the Argentine weather service is to predict the pressure distribution for the succeeding day and then draw in the winds and areas of rain. Experience teaches, however, that rain will not result from converging winds in areas where the [relative] humidity is low (60 per cent or less) and the rain area is omitted in such areas. Doubtless such forecasts will increase in accuracy with increasing knowledge and improvement in the method.

Plotting the divergence of the wind in red and the convergence in blue discloses the fact that diverging winds are the usual condition around centers of high pressure and converging winds around centers of low pressure. But this condition is frequently reversed. In the case of reversal there is rain within the area of high pressure where there exist converging winds, and fine weather in the low pressure where there exist diverging winds. Another example of the relation of rainfall to converging winds is shown in the accompanying figure 2 (XLIV—23) for May 3, 1913.

It is not meant to be understood that converging winds are the only factor in rain production. Temperature and humidity are also important factors. It will perhaps be possible to illustrate the effect of temperature distribution at some later date.

The effect of topography appears evident in figure 3 (XLIV—24). Here a broad stream of air is being drawn from the ocean up the gentle slopes of the Appalachian Mountains by a storm of unusual violence and extent, resulting in a long strip of rain along the eastern slope while on the western side of the mountain range where the air is descending the slopes, the sky remains clear notwithstanding the convergence of the wind. On the other hand with a well-defined low pressure over the ocean it frequently clears on the eastern slopes of the mountain while it is still raining or snowing on the western.

LONG-RANGE FORECAST OF THE WINTER MINIMUM TEMPERATURE FOR HAMADA, JAPAN.[1]

By M. ISIDA.

In western Japan there is a well-tried weather proverb current among laymen, to the effect that a severe winter is preceded by an abnormally hot summer.

The author of the paper here abstracted, has for his object the testing of this piece of weather lore by means of the data from instrumental observations, and he has arrived at the striking result that the minimum temperature of the coming winter [at least for the locality studied] can be calculated with great accuracy from the mean temperature of the past summer.

TABLE 1.—*Observed and computed winter minimum temperatures at Hamada, Japan, 1893–1913.*

Year.	Mean summer temperature, T.	Winter minimum temperature.		$t_o - t_c$.
		Observed t_o.	Calculated t_c.	
	°C.	°C.	°C.	°C.
1893	21.8	−3.7	−3.2	−0.5
1894	23.5	−8.7	−7.7	−1.0
1895	22.1	−4.3	−4.0	−0.3
1896	22.5	−5.3	−5.1	−0.2
1897	21.3	−2.1	−1.8	−0.3
1898	21.9	−3.6	−3.5	−0.1
1899	22.2	−4.2	−4.2	0.0
1900	22.2	−3.2	−4.2	1.0
1901	21.5	−2.0	−2.3	0.3
1902	21.5	−3.2	−1.9	−1.3
1903	22.3	−3.6	−4.5	0.9
1904	21.6	−2.3	−2.6	0.3
1905	22.3	−4.6	−4.6	0.0
1906	21.6	−2.0	−2.6	0.6
1907	21.8	−3.7	−3.2	−0.7
1908	21.8	−2.1	−3.1	−1.0
1909	22.4	−4.6	[1] [−4.8]	[−0.2]
1910	22.0	−3.8	−3.8	0.0
1911	21.3	−2.8	−1.9	−0.9
1912	22.0	−2.9	−3.6	0.7
1913	21.0	−0.9	−1.1	0.2
1914	22.9	....	....	....

[1] Figures in brackets were recomputed.—C. A., jr.

Table 1 gives in its second column the mean air temperature (T) at Hamada, on the west coast of Japan [long. 132¼° E.; lat. 35° N.], for its warm season or about May 11 to September 20. In the 3d, 4th, and 5th columns are given, respectively, the observed minimum temperature, t_o, of the following winter, the calculated minimum temperature, t_c, as obtained by means of the author's equation $t = 55.44 - 2.69\,T$, and the difference $t_o - t_c$.—*T. O[kada]*.

CIRRUS DIRECTIONS AT MELBOURNE AND STORMS AFFECTING VICTORIA.[1]

By E. T. QUAYLE, B. A., Assistant.

[Commonwealth Bureau of Meteorology, Melbourne, Victoria.]

(Abstracted for the REVIEW, by A. J. Henry.)

Systematic observations of the direction of movement of cirrus clouds have been made in Melbourne for many years. The results of these observations for the period 1895 to 1912 have been correlated with the various cyclonic systems which affect the weather of extreme southeastern Australia.

Mr. Quayle groups the cyclones of Australia under eight types, of which by far the greater number belong to the type Antarctic V-depressions. These are first observed as they round Cape Leeuwin, distant from Melbourne about 1,800 miles. Cirrus observations at Melbourne are evidently made with considerable precision and probably by means of a nephoscope. The manner of grouping the data, as explained by the author, was about as follows:

[1] Slightly rearranged and reprinted from the English abstract in Journal of the Meteorological Society of Japan, Feb., 1916, 35, 9-10.

[1] *Quayle, E. T.* Relation between cirrus directions as observed in Melbourne and the approach of the various storm systems affecting Victoria. Melbourne. May, 1915. 1 pl., 40 figs., 27 p. 4°. (Commonwealth Bureau of Meteorology, Bulletin No. 10.)