NOTES, ABSTRACTS, AND REVIEWS

CLASSIFICATION OF MONTHLY CHARTS OF PRESSURE ANOMALY OVER THE NORTHERN HEMISPHERE [1]

By C. E. P. BROOKS, M. Sc., and WINNIFRED QUINNELL

For a long time I have had a very lively interest in the study of weather abnormalities in various parts of the world, not only by reason of the importance of such a study of weather phenomena, but also because eventually such studies may form the approach to the solution of the larger problem of seasonal weather forecasting. If, and when, weather abnormalities can be forecast the problem of seasonal forecasts will easily follow. I therefore, welcome the memoir here abstracted. The authors selected the period 1873 to 1900 and 114 stations, mostly in the Northern Hemisphere, as the groundwork for their study. They have used departures from normal pressure rather than charts of monthly isobars.—*Ed.*

The 336 charts for the years 1873 to 1900 were divided into two groups, according to whether pressure at Thorshavn was above or below the normal for the month. When the pressure at that station in any month was very nearly normal the chart for that month was allocated to the positive group if the oceanic region between Iceland and the British Isles was dominated by a positive anomaly of pressure (center of excess) and to the negative group if it was dominated by a negative anomaly (center of deficit).

These two groups were next divided into five types according to the position of the center of the anomaly as shown in the scheme below:

GROUP I. PRESSURE AT THORSHAVN ABOVE NORMAL	GROUP II. PRESSURE AT THORSHAVN BELOW NORMAL
IA. Center of excess over or near Scandinavia.	IIA. Center of deficit over or near Scandinavia.
IB. Belt of excess from British Isles across Europe.	IIB. Belt of deficit from British Isles across Europe.
IC. Center of excess over British Isles.	IIC. Center of deficit over British Isles.
ID. Center of excess over Iceland or southern Greenland.	IID. Center of deficit over Iceland or southern Greenland.
IE. Pressure above normal over the Arctic generally; belt of deficit across the Atlantic and southern Europe in 40–50 N.	IIE. Pressure below normal over the Arctic generally; belt of excess across the Atlantic and Mediterranean in about 40 N.

The sequence of types in successive months which, parenthetically is the most important part of the discussion, is given in Table 4, and this table also gives in italics the frequency which would be expected if the distribution were due purely to chance, the actual occurrences being in roman. The figures are further divided into seasons, winter, October to March, and summer, April to September. The authors comment on these figures as follows:

A comparison of the roman and italic figures shows very little indication of any ordered sequence. There is a slight tendency for the persistence of types from one month to the next, the same type occurring in two successive months in 44 cases in winter and 41 in summer, compared with an expectancy of 35 and 36, respectively; type IC (center of excess over British Isles) is especially persistent in winter. Type ID in summer tends to be followed by either ID or IC. Type IIC (center of deficit over British Isles) in winter tends to be followed by Group I (pressure above normal at Thorshavn), this sequence occurring on 25 occasions out of 31.

The tendency of certain weather types to persist as mentioned in the above paragraph is in all probability a world-wide phenomenon and is more highly developed in high than in low latitudes. The British Isles and Scandinavia are examples of a maximum development of this tendency. In the United States a single type of cyclonic movement occasionally dominates the weather for a period as long as two months in the cold season. Marked abnormalities in temperature in the same sense may be experienced over a period as long as three to four months.

The 10 types as above outlined were next divided into a number of subtypes. This process was initially empirical, the charts of each type being sorted and arranged until a number of sets were obtained, the members of each set being characterized by a certain family likeness. When this was done each set was examined to find points in common that could be used as a basis of classification, and the final allocation was made on the basis of classification thus obtained.

The number of charts that was allocated to each subtype naturally varied somewhat. Types IID, ID, and IC occur most frequently, these types accounting for half of the months.

Subtype IID, as already shown, consists of a center of pressure deficit over Iceland or south Greenland, and subtype ID the reverse, that is, a center of pressure excess instead of deficit; subtype IC has the excess of pressure anomaly over the British Isles.

The authors remark: "In view of the great variability of pressure in the Icelandic region, the frequency of subtypes IID and ID deficit or excess of pressure centered near Iceland is to be expected, the frequency of subtype IC (excess centered over British Isles) is more surprising."

The type of pressure anomaly for each month of the period 1873 to 1918 is given in tabular form with the months of uncertain classification given in parentheses and the months with an anomaly exceeding 10 millibars in bold faced type. Concerning the latter it is rather surprising to find that the pressure anomaly is greater than 10 millibars in the Icelandic region 77 per cent of the time in February, 65 in January, 63 in March, and 56 in December.

The memoir contains a series of 36 greatly reduced Northern Hemisphere charts showing typical cases of pressure anomalies.

The impression that one gets from these charts is that the large fluctuations of pressure are confined, in the main, to high latitudes and that there is need of much more data both from continental and oceanic areas before the delimitation of regions of pressure abnormalities can be accurately fixed.—*A. J. H.*

[1] Meteorological Office, Geophysical Memoirs No. 31 (first number of Volume IV),

SHORT-WAVE ECHOES AND THE AURORA BOREALIS [1]

By CARL STORMER

On February 29 of this year I received a letter from Engineer Jørgen Hals, Bygdø, Oslo, in which he says:

I herewith have the honor to advise you that at the end of the summer 1927, I repeatedly heard signals from the Dutch short-wave transmitter station PCJJ (Eindhoven). At the same time as I heard the telegraph signals I also heard echoes. I heard the usual echo, which goes round the earth with an interval of about one-seventh second, as well as a weaker echo about 3 seconds after the principal signal had gone. When the principal signal was especially strong, I suppose that the amplitude for the last echo 3 seconds after, lay between one-tenth and one-twentieth of the principal signal in strength. From where this echo comes I can not say for the present. I will only herewith confirm that I really heard this echo.

[1] Reprinted from Nature, London, November 3, 1928, p. 681.