AN EIGHT-YEAR CYCLE IN RAINFALL.

By HENRY LUDWELL MOORE.

[Columbia University, August 4, 1922.]

The table on *Rainfall departures, United States (as a unit)* that appeared in an article by Prof. A. J. Henry in the March number of this REVIEW [1] supplies invaluable data for the theory of rainfall cycles. In Table 1 Professor Henry's figures relating to the smoothed rainfall departures are tabulated. The method of smoothing the data that was followed by Professor Henry is given by "the formula $b=\frac{1}{4}(a+2b+c)$ where b is the middle year in any consecutive series of three years."

TABLE 1.—*Rainfall departures, United States (as a unit).*

Years.	Smoothed departures.	Years.	Smoothed departures.
1881	+0.4	1901	−2.1
1882	+0.2	1902	−2.0
1883	±0.0	1903	−2.5
1884	+0.4	1904	−2.[illegible]
1885	−0.4	1905	−1.0
1886	−2.7	1906	−0.4
1887	−3.2	1907	−1.[illegible]
1888	−2.1	1908	−1.8
1889	−2.0	1909	−2.4
1890	−2.4	1910	−3.8
1891	−1.3	1911	−2.[illegible]
1892	−2.5	1912	−1.1
1893	−3.1	1913	−1.8
1894	−3.5	1914	−1.9
1895	−3.2	1915	−1.5
1896	−2.1	1916	−3.2
1897	−1.6	1917	−4.7
1898	−2.1	1918	−3.4
1899	−2.2	1919	−1.5
1900	−2.0	1920	−0.9

In Figure 1 the smoothed departures are plotted together with a graph of an eight-year cycle that was derived from the smoothed departures by the Method of Least Squares. The substantial agreement of the computed cycles with Professor Henry's smoothed departures *saute aux yeux*.

According to the equation of the computed cycles the theoretical maxima occurred at about 1882, 1890, 1898, 1906, 1914, and I was about to add 1922, so nearly certain does it seem that the present year will be characterized by an unusually large rainfall. In other places [2] I have shown that eight-year cycles with approximately these same dates for maxima occur in the rainfall of the Ohio Valley, the rainfall of Illinois, the May and June rainfall of the Dakotas, the barometric pressure in the United States, the winter barometric pressure in Central Europe,

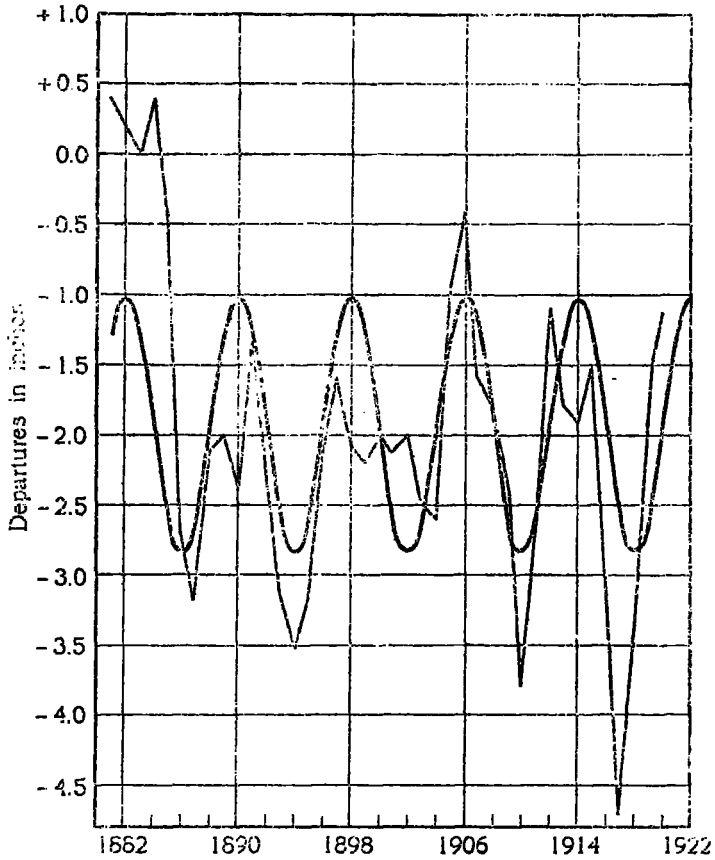

FIG. 1.—Smoothed departures of rainfall in the United States (as a unit). Equation to the eight-year cycle: $y=-1.95+0.90 \sin(45°t+45°37')$, origin at 1881.

the yield of crops in the United States, the yield of crops in the United Kingdom, the yield of crops in France, and the index number of general wholesale prices throughout a century.

[1] MO. WEATHER REV., March, 1922, p. 130.

[2] Particularly "The Origin of the Eight-Year Generating Cycle." *Quarterly Journal of Economics*, November, 1921.

BROOKS AND GLASSPOOLE ON THE DROUGHT OF 1921.[1]

By A. J. HENRY.

The first section of this paper is devoted to a discussion of the 1921 and other dry periods in the British Isles. The second section takes up the causes of droughts and it is with this section that readers of the REVIEW will be particularly interested.

It is recognized that the establishment and maintenance of local anticyclonic conditions is closely associated with dry weather; the immediate concern, therefore, is to discover, if practicable, how the local abnormalities of pressure distribution are related to others in the general circulation in different parts of the world.

Charts were constructed showing the deviation of pressure from the normal over a considerable portion of the Northern Hemisphere for the 1921 and other severe droughts. The periods are as follows:

April to August, 1864.
May to July, 1868.
October to January, 1880.
February to October, 1887.
March to June, 1893.
February to June 1895.
January to May, 1896.
July to October, 1911.
February to October, 1921.

The pressure distribution for the above periods fell clearly into two types which were designated the A and the B types. The A type, however, comprised but two droughts—February to June, 1895, and August to October, 1911. This type is characterized by high pressure to the north of the British Isles. The Icelandic minimum is shifted toward West Greenland and the Azores maximum is feebly developed. In this case

[1] C. E. P. Brooks and J. Glasspoole: The Drought of 1921, *Quart. Jour. XLVII*, p. 139–166.