

DETAILS OF THE WEATHER OF THE MONTH IN THE UNITED STATES.

CYCLONES AND ANTICYCLONES.

By E. H. BOWIE, Supervising Forecaster.

In respect to the movements of systems of low pressure across the North American Continent, the first of these made its appearance in the vicinity of southeastern Alaska July 31 and was 8 days in reaching the Atlantic coast; the 2d appeared in the same region on the 4th and reached the Atlantic States on the 11th to 13th; the 3d was from the 10th to the 16th in crossing; the 4th was from the 16th to 23d in crossing; and the 5th was from the 26th to August 1 in crossing. These systems of low pressure referred to are general depressions of the barometer of considerable geographic areas within which cyclonic storms usually have their origin. One of these low pressure systems may cross the Continent without any well-defined cyclonic development, or one may cross the Continent and have one or more distinct cyclones from within it. Moreover, the system of low pressure may be traced over a longer period of time than the average cyclone.

LOWS.

	Alberta.	North Pacific.	South Pacific.	Northern Rocky Mountains.	Colorado.	Texas.	East Gulf.	South Atlantic.	Central.	Total.
August, 1920.....	7.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	2.0	11.0
Average number, 1892-1912.....	4.2	0.6	0.3	0.9	1.0	0.2	0.0	0.1	1.0	8.3

*Anticyclones.*—The number of HIGHS was slightly above the average. The table shows the number of HIGHS by types.

HIGHS.

	North Pacific.	South Pacific.	Alberta.	Plateau and Rocky Mountain region.	Hudson Bay.	Total.
August, 1920.....	3.0	0.0	4.0	0.0	1.0	8.0
Average number, 1892-1912.....	1.9	0.2	3.0	0.9	0.8	6.8

THE WEATHER ELEMENTS.

By P. C. DAY, Climatologist and Chief of Division.

[Weather Bureau, Washington, Oct. 1, 1920.]

PRESSURE AND WINDS.

Barometric pressure during August, 1920, exhibited no marked fluctuations, and the movements of the high and low areas, usually but poorly defined during this month, were frequently uncertain. In fact, no well-

defined storm areas showed continuous movements over extended tracks, and high-pressure areas remained stagnant for long periods without material change.

Despite almost continuous precipitation over much of the country east of the Mississippi Valley during long periods, the average pressure for the month was well above the normal, and it was above in practically all other portions of the country as well as over most districts of Canada. The highest pressures were, as usual, observed along the Atlantic and Pacific coasts, but the departures from normal were generally no greater than over the interior districts. As compared with the normal, pressure was highest over the Canadian Maritime Provinces and lowest along the immediate Pacific coast and over the Canadian Northwest.

Thunderstorms were of frequent occurrence and some local high winds attended their development and movement, but otherwise the winds were light, and velocities of 50 miles or more per hour were reported mainly from coast districts. As usual for a summer month, the winds were from southerly points over the Plains region and thence eastward, except in portions of the Lake region and upper Mississippi Valley, where they were locally from northerly points. In the Plateau and Pacific Coast States, winds were mostly from westerly points, although frequently modified by local topography

TEMPERATURE.

Over the territory from the Rocky Mountains eastward the month was notably free from sharp changes in temperature, and periods of decided warmth, usually experienced in August, were the exception. In fact, from the standpoint of temperature the month was almost wholly pleasant over all eastern and central districts. To westward of the Rocky Mountains temperature changes were more pronounced, particularly so in the Great Valley of California, where the first half of the month was markedly warm, the maximum temperatures at certain points rising to 100° or more daily. At Sacramento excessive heat continued from July 29 to August 18, a period not equaled in the previous history of the station. The latter part of the month, however, had more moderate temperatures, and in some localities, notably at Fresno, Calif., and in portions of Arizona, the temperatures were unusually low for August.

For the month as a whole the average temperature was below normal over all interior portions of the country and over the greater part of the South as well. Along portions of the middle Atlantic coast the temperatures were almost continuously below the normal throughout the month. At Atlantic City, N. J., only the last three days of the month were warmer than the normal. This condition was probably due largely to the low temperature of the adjacent ocean waters, referred to in the July REVIEW.<sup>1</sup> The temperature of the ocean water at this

<sup>1</sup> P. 424.

place during August was nearly 10° below the normal. In connection with this the observer states that northeast to southeast winds for the first five days of the month failed to cause any increase in the surface-water temperature, but that prevailing southwest winds from the 7th to 17th were accompanied by lower water temperatures, notably on the 16th and 17th, when the abnormally low temperature of 56° was reached.

Over the more northeastern States the average temperature for the month was above normal, and the month was distinctly warm as a whole along the northern border from Lake Superior westward and generally over the Pacific Coast States.

High temperatures were the exception over central and eastern districts, and in only a few sections did the maximum values reach 100°. Over the Plateau and Pacific States high temperatures were observed on frequent dates, but mostly during the first half of the month. In Oregon a maximum temperature of 110° was observed, in Idaho 111°, in Nevada 113°, in Arizona 116°, and California reported a temperature of 124°.

Minimum temperatures were in a few instances as low as, or lower than, previously reported in August, and in the far western districts they occurred mostly during the last decade. In the region of the Great Lakes they were below freezing at exposed points on the 22d, and temperatures near freezing, with light frost, were reported at exposed points in the western Plains region on the 13th. In the mountain districts temperatures below freezing were reported in all the States, the lowest, 14°, occurring in Montana.

#### PRECIPITATION.

August was distinctly a rainy month from the middle and southern Plains region eastward to the Atlantic coast. In portions of the East Gulf States and generally over the Atlantic coast districts as far north as New York, the month was almost continually cloudy or rainy. At some reporting stations not a single clear day was observed during the entire month. The number of cloudy days was far above normal—in some cases greater than ever before observed in any month—and rain continued daily for periods of 10 to 15 days or more. In the Rocky Mountain States and thence west to the Pacific coast precipitation was likewise more frequent than usual, and the monthly totals were generally above normal.

From the Dakotas eastward to the Great Lakes, including portions of Iowa, Illinois, Indiana, and generally over New York and New England, precipitation was less frequent during the month, and the total falls were in most sections less than normal.

The distribution was uniformly heavy, 6 to 8 or 10 inches, from central Texas eastward to the south Atlantic coast and over the Appalachian Mountain districts and thence to the coast as far north as eastern Pennsylvania and New Jersey. In portions of this region rain was of almost daily occurrence and the total falls frequently

exceeded 10 inches, the maximum amount for the month, 25 inches, occurring in western North Carolina. Heavy falls were likewise recorded in many other districts east of the Rocky Mountains, but the distribution was less uniform than in the area previously mentioned. West of the Rocky Mountains precipitation was quite unevenly distributed, as is usual for this month, but in favored localities considerable rain occurred, some unusual falls being reported from central California, where rain rarely occurs in August.

#### RELATIVE HUMIDITY.

The cloudy, rainy conditions existing throughout the month over southern and eastern districts are reflected in the humidity values of the same regions, which were everywhere in excess of normal, and decidedly so in the west Gulf and southern Plains States. From the Dakotas eastward to the Great Lakes, where precipitation was generally deficient, the relative humidity was likewise less than normal, and it was more or less deficient in the Pacific Coast States.

#### SEVERE STORMS.

The damaging storms of the month were confined to those of the thunderstorm type, and the areas of damage were usually not extensive.

A severe thunderstorm, with exceptionally heavy rain, occurred on the 10th in the vicinity of Sand Lake, Averell Park, and Snyders Corners, N. Y. Some estimates of the amount of rainfall were in excess of 10 inches, but no estimates of damage are at hand.

In the vicinity of Providence, R. I., a severe windstorm on the 15th caused considerable damage.

In the vicinity of Springer, N. Mex., on the 27th a small tornado is reported to have caused considerable damage to buildings over a path several miles long.

In the vicinity of Hartford, Conn., a severe hail and windstorm on the 31st caused damage to growing crops, mostly tobacco, and to other property, estimated at \$2,000,000. This storm also extended into Massachusetts and Rhode Island, doing considerable damage to crops and buildings. Concerning this storm in eastern Massachusetts, the following note was received from Cooperative Observer H. W. Cushing:

This storm was not as severe in Hingham as in Weymouth. The effects in Hingham were confined to the blowing down of one barn and uprooting of trees in the village cemetery at Liberty Plain, South Hingham, about 1½ miles from my house. Also, marble gravestones were broken off and blown over, and the cemetery tool house was carried into the next field. In the adjoining town of Weymouth the damage was much greater, as several buildings and trees were blown over or moved from their foundations. The path of destruction was very narrow, hardly more than 100 feet, and therefore difficult to decide whether cyclonic in character, or direct blow from the course of the storm, although buildings and trees were blown flat in the storm's direction.

I was not an observer of the destructive part of the storm, as my house was at quite a distance.