

MONTHLY WEATHER REVIEW.

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INTRODUCTION.

This REVIEW for September, 1893, is based on reports from 3,021 regular and voluntary observers. These reports are classified as follows: 160 reports from Weather Bureau stations; 40 reports from United States Army post surgeons; 2,016 monthly reports from state weather service and voluntary observers; 60 lake marine reports from navigators on the Great Lakes; 32 reports from Canadian stations; 222 reports through the Southern Pacific Railway Company; 491

marine reports through the co-operation of the Hydrographic Office, Navy Department; marine reports through the "New York Herald Weather Service"; monthly reports from local services established in all states and territories; and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

The WEATHER REVIEW for this month has been prepared under the general editorial supervision of Prof. Cleveland Abbe.

CHARACTERISTICS OF THE WEATHER FOR SEPTEMBER, 1893.

TEMPERATURE.

The month was warmer than normal throughout the interior of the country and especially in the Northwest and Southwest; the temperature was below the normal on the Pacific coast. It was the warmest September on record at Columbia, S. C., Springfield, Mo., Topeka, Wichita, and Dodge City, Kans., Abilene, San Antonio, and Corpus Christi, Tex. It was the coldest September at Portland, Me., Northfield, Vt., Oswego, N. Y., Nantucket, Mass., Narragansett Pier, R. I., Fort Canby, Wash., Roseburg, Oregon, Winnemucca and Carson City, Nev., and Fresno and Keeler, Cal.

PRECIPITATION.

The rainfall was in excess in Maine, the interior of North Carolina, northern Georgia, western Tennessee and Kentucky, southeastern Louisiana, and southwestern Alabama. The rains in Greene County, Va., from the 9th to 18th were the heaviest known for 70 years.

DROUGHT.

A protracted drought prevailed over all sections of Nebraska from the 1st to the 26th of September. On the latter date light rains were general in the southeastern portion of the state, and a few scattered showers fell in the central section. On the 29th the drought was thoroughly broken, all sections experiencing refreshing showers. The rains were uniformly heavy in all sections except the west and northwest, where only light showers, ranging from trace to 0.20 of an inch, were reported. In Ohio the drought was reported as damaging pastures and crops.

LOCAL WINDSTORMS.

The local windstorms of September have been almost exclusively so-called thunderstorms and squalls. The principal exceptions were the severe gales that passed over Chicago, Lake

Michigan, and Lake Huron on the 21st; the highest wind on record at Marquette occurred this day (61 miles per hour). The only tornado reported occurred on the 7th, at Lockport, La., in connection with the hurricane that was at that time passing northward through that state.

HOT WINDS.

A hot wind extended north and south through portions of Kansas, Oklahoma, and Texas on the afternoon of the 13th. At Oklahoma this hot wind was first felt about 1 p. m. and continued until sundown, when the weather grew gradually cooler. The maximum temperatures of the month in all this portion of the country frequently exceeded 100°, and occurred in connection with this hot wind.

HAIL.

Hailstones a half-inch in diameter fell at Virginia City, Nev., about 5 p. m. of the 6th. It is reported that a hailstone 9¼ inches long was found on the 7th in Bath, N. Y.; the attending storm was remarkable for the darkness.

FOREST FIRES.

Great damage and dense smoke were caused by forest fires throughout the latter half of the month in Wisconsin. Navigation on Lake Michigan was sometimes interfered with.

HURRICANES.

The only hurricane that entered the United States was that which passed from the Gulf of Mexico northeastward into Louisiana on the 7th; it was entirely dissipated before it reached Tennessee. Only one hurricane appears to have passed over the western portion of the Atlantic Ocean; it did not affect the United States, and its track was quite uncertain.

SNOWFALL.

Heavy snowfall has been reported at a few stations in Colorado, Nevada, and Montana.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for September, 1893, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on Chart II by isobars.

Chart V exhibits the normal distribution of atmospheric pressure and normal wind movement by Lambert's formula over the United States for September, and has been prepared by Prof. H. A. Hazen, who has also prepared all the others of