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INTRODUCTION.

This REVIEW is based on reports for July, 1890, from 2,320 regular and voluntary observers. These reports are classified as follows: 168 reports from Signal Service stations; 126 reports from United States Army post surgeons; 5 reports of rainfall observations of the United States Geological Survey in Arizona, Colorado, and New Mexico; 1,463 monthly reports from state weather service and voluntary observers; 24 reports from Canadian stations; 171 reports through the Central Pacific Railway Company; 363 marine reports through the cooperation of the Hydrographic Office, Navy Department;

marine reports through the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, Iowa, Weather and Crop Service, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Meteorological Report of the Missouri State Board of Agriculture, Nebraska, Nevada, New England, New Jersey, New York, North and South Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, and Texas, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

CHARACTERISTICS OF THE WEATHER FOR JULY, 1890.

The month was warmer than the average July over the interior of the country, on the south Pacific coast, and in the Canadian Maritime Provinces; elsewhere it was cooler than usual. The greatest departures above the average temperature were noted in Kansas and Nebraska, on the northeast slope of the Rocky Mountains, and in the lower valley of the Red River of the North, where they exceeded 3°; and the most marked departures below the average temperature were reported along the middle and south Atlantic coasts, and in northwest Oregon, where they exceeded 2°. At stations in the Missouri Valley and on the eastern slope of the Rocky Mountains the month was the warmest, and at stations along the Atlantic coast south of Massachusetts, and on the west Gulf and north Pacific coasts it was the coolest July on record. The highest temperature reported by a regular station of the Signal Service was 115°, at Yuma, Ariz., and by a voluntary observer, 126°, at Volcano Springs, Cal. The lowest temperature reported by a regular station of the Signal Service was 36°, at Tatoosh Island, Wash., and by a voluntary observer, 26°, at Breckenridge, Colo. (9,670 feet). At Albany, N. Y., and at stations in the lower Mississippi valley, the lower lake region, the extreme northwest, the Missouri and upper Mississippi valleys, and the northern plateau region, the maximum temperature was as high or higher, and at New Haven, Conn., at stations in the middle and south Atlantic states, northern Florida, the lower Mississippi valley, western Arkansas, the Ohio Valley, and the lower lake region the minimum temperature was as low or lower than previously reported for July. On the 7th a warm wave was central in the middle Mississippi valley, with temperature rising to 102° in Iowa, 94° to 96° in Illinois, the Ohio Valley, and Tennessee, and to 96° in the lower Mississippi valley. On the 8th the warm wave had extended eastward, and maximum temperature, 98°, occurred at Washington City, and Albany, N. Y., 96° at New York City, and Philadelphia, Pa., and 92° at Boston, Mass. The 13th was an unusually hot day, except in the northeast part of the country, and at a number of stations in the central valleys the temperature rose above 100°. On the 16th a warm wave extended over the middle Missouri valley,

where the temperature rose to 100°. In the middle Atlantic states from Washington City northward to Albany and Rochester, N. Y., and in portions of New England the mornings of the 20th and 21st were the coolest on record for July. Heavy frost was reported on one date only, the 21st, at Youngstown, Ohio, near which place considerable damage was caused to corn and potatoes.

The precipitation was in excess of the average for July in the south Atlantic and east Gulf states, in the lower Rio Grande valley, the east part of the southern plateau region, in southeast Wyoming, northern Nebraska, and south South Dakota, on the north Pacific coast, and at Canadian stations from Manitoba to Quebec; elsewhere it was deficient. The greatest excess occurred in the south Atlantic and east Gulf states, where it was more than 5.00 inches at Charleston, S. C., and more than 7.00 at Pensacola, Fla., and the greatest deficiency occurred within an area extending from the Ohio Valley over Kansas, in the upper part of the Mississippi Valley, and in northeast South Dakota, where it exceeded 3.00 inches. In the lower Rio Grande valley the monthly rainfall was about $\frac{1}{2}$ greater, and in the south Atlantic and east Gulf states it was about $\frac{1}{3}$ greater than the average amount for July, while on the middle-eastern slope of the Rocky Mountains about $\frac{1}{4}$, in the upper Mississippi valley about $\frac{1}{5}$, and in the northern and middle plateau region, the lower lake region, the Ohio Valley and Tennessee, the northeast slope of the Rocky Mountains, and in the west Gulf states about $\frac{1}{5}$ the usual amount of rain fell. At stations in the south Atlantic and east Gulf states the rainfall was the heaviest, and at stations in the Ohio Valley and Tennessee, the upper Mississippi and upper Missouri valleys, Kansas, and Nebraska it was the least ever reported for July. Trace of snow was reported at Mount Washington, N. H., on the 19th, and at Calais, Me., on the 20th.

Tornadoes destructive to life and property occurred in Ramsey and Wabasha counties, Minn., on the 13th; at Wesley, Ill., on the 17th; at Marshall, Minn., on the 22d, and at Lawrence, Mass., on the 26th. Tornadoes without an attendant loss of life occurred at Marshall, Ill., on the 17th; near Fort Bennett, S. Dak., on the 21st; and near Galesburg, N. Dak.,