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INTRODUCTION.

This REVIEW is based on reports for September, 1889, from 2,297 regular and voluntary observers in the United States and Canada. These reports are classified as follows: 178 reports from Signal Service stations; 120 monthly registers from United States Army post surgeons; 1,460 monthly registers from state weather service and voluntary observers; 24 reports from Canadian stations; 168 reports through the Central Pacific Railway Company; 347 marine reports through the co-operation 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, Dakota, Illinois, Indiana, Iowa, the Iowa Weather Crop Bulletin 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 Carolina, Ohio, 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 SEPTEMBER, 1889.

For a limited portion of the Atlantic coast the most prominent meteorological feature of the month was the storm which advanced from the Windward Islands, West Indies, to the middle Atlantic coast from the 3d to the 12th, inclusive. The course of this storm, together with the high tides attending it, caused a considerable amount of damage along the New Jersey and the western part of the Long Island coasts. The proximity of this storm to the great commercial centres of the country, together with the prostration of telegraph lines and interruption of railway travel, gave rise to the belief and statement that this storm was one of the great hurricanes of the century. The collated observations, however, whether considered with reference to the low point reached by the barometer, to the steepness of the barometric gradient, to the violence of attending winds or their sudden and changing direction, or whether from the more important points of damage to maritime interests by delays of vessels or other losses, or finally with reference to the loss of human life, this storm presents in all these characteristics conditions less marked and fatal than have frequently occurred in connection with other West India storms. The data on this point will be found with the detailed description of the storm. The passage of this cyclone was forecast by this office in a manner so successful as to indicate not only the value of this service, but the degree of accuracy which can often be attained in the display of cautionary and storm signals. The storm failed at Wood's Holl, Massachusetts, to even reach a half gale, while at Cape Hatteras the wind velocity was barely half that which has been before reached and the gale was by no means severe. During this time the Signal Service warnings specifically indicated dangerous winds between Nantucket and Cape Hatteras, and ship owners were informed that vessels could sail to the northward from Nantucket, but not to the southward, and on the North Carolina coast could sail to the southward, but not to the northward.

Acknowledgments of the material value from warnings of this office appear in the description of the storm. This storm was not particularly destructive over the West Indies, and the track of the centre of this disturbance can only be approximately located from the 4th to the 8th, owing to the absence of reports over an area ranging from four to six hundred miles in diameter covering the region of lowest pressure. After passing to the north of the thirtieth parallel it doubtless increased in energy, and was apparently forced to the westward by an area of high pressure to the northward, and this abnormal movement of the storm-centre was attended by gales of hurricane force, which caused considerable loss to shipping, and unusually high and destructive tides from New England to the Carolinas. Severe storms also prevailed over mid-ocean during the presence of this storm off the American coast. An important West Indian hurricane moved westward over the Caribbean Sea from the 13th to 17th, inclusive, and thence apparently passed over Yucatan and recurved to the north-central coast of the Gulf of Mexico by the 22d. Attending the passage of this hurricane, a storm, commencing during the afternoon of the 18th, devastated the coast of Campeche. On the morning of the 19th a storm which had suddenly developed great energy was central off the coast of Maine, whence it moved northward with a rapid decrease in energy. Severe local storms were most frequently reported in Texas and Indian Territory, where they were noted for five dates. The Arctic ice reported near Newfoundland corresponded in distribution with, but in quantity was somewhat in excess of, the average for the month.

The month was generally cooler than the average September, except in the Saint Lawrence Valley, the Canadian Maritime Provinces, northeastern New York, the north-central and northeastern parts of the upper lake region, at Jacksonville, Fla., over the southern plateau region, and on the Pacific coast south of the Columbia River. The greatest departures below the average temperature occurred in north-central Texas and Indian Territory, where they were more than five degrees. The departures above the average temperature were less than four degrees. The highest mean temperature reported for the month was 91°.3, at Cactus, Cal., and the lowest was 31°.7, at Pike's Peak, Colo. At New Ulm, Tex., seventeen years record, the mean temperature, 74.6, was one degree below the lowest September mean previously reported, noted in 1876. The highest absolute temperature reported was 116°, at Mojave, Cal., and the lowest minimum temperature, exclusive of Pike's Peak, Colo., where 2° was registered, was