

# MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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## INTRODUCTION.

The MONTHLY WEATHER REVIEW for November, 1900, is based on reports from about 3,099 stations furnished by employees and voluntary observers, classified as follows: regular stations of the Weather Bureau, 159; West Indian service stations, 13; special river stations, 132; special rainfall stations, 48; voluntary observers of the Weather Bureau, 2,562; Army post hospital reports, 18; United States Life-Saving Service, 9; Southern Pacific Railway Company, 96; Canadian Meteorological Service, 32; Mexican Telegraph Service, 20; Mexican voluntary stations, 7; Mexican Telegraph Company, 3. International simultaneous observations are received from a few stations and used, together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Meteorologist to the Hawaiian Government Survey, Honolulu; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Mr. Maxwell Hall, Govern-

ment Meteorologist, Kingston, Jamaica; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; and Commander Chapman C. Todd, Hydrographer, United States Navy.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the REVIEW, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is  $157^{\circ} 30'$  or  $10^{\text{h}} 30^{\text{m}}$  west of Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local standard is mentioned.

## FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

On the morning of November 9 the following special bulletin was issued by the Chief of the Weather Bureau:

The first well-marked cold wave of the season covers the middle-western and northwestern States with a reported minimum temperature of  $12^{\circ}$  below zero at Huron, S. Dak. Freezing weather is reported to southern Kansas and southern Missouri, and snow has fallen as far south as the Ohio River. To-night the line of freezing temperature will extend over Arkansas and Tennessee, and heavy frost will occur in central and north parts of the middle and east Gulf and South Atlantic States, excepting Florida.

On the morning of the 9th heavy frost was reported in the middle and east Gulf and South Atlantic States as far south as Meridian, Miss., Montgomery, Ala., and Macon and Savannah, Ga. Light frost occurred in extreme northern Florida the morning of the 10th, and generally along the Gulf coast from Corpus Christi, Tex., to Tampa, Fla., the morning of the 13th. In each instance warnings were distributed the day before the occurrence of frost in the districts visited.

The extreme northwest was visited by several periods of severe cold, which failed, however, to extend over considerable areas. The lowest temperature of the month in that section was reached the morning of the 20th, when a minimum of  $30^{\circ}$  below zero was noted at Havre, Mont., and the line of zero temperature was traced over western South Dakota. The occurrence of these low temperatures was covered by the daily forecasts.

The Great Lakes were visited by four general storms. The first of these crossed the upper lakes on the 1st and caused wind velocities of 40 to 50 miles an hour on the lower lakes.

From the 7th to the 9th the weather was stormy over the Lake region, but this period was not marked by gales of exceptional severity. During the 12th and 13th high winds and snow prevailed over the lakes. A storm which developed great intensity swept the Lake region on the 20th and 21st; over the lower lakes the maximum wind velocities on the 21st ranged from 60 to 80 miles an hour. During the 27th a storm moved northeastward over the Atlantic coast States, causing violent gales over the lower lakes and along the Atlantic coast.

Notwithstanding the ample warnings that were issued the lake storms of the month resulted in a number of casualties.

The storm of the 12-13th passed eastward to the St. Lawrence Valley and was followed on the 14th by snow from northern New York over the Lake region and the Northwest. In western New York the snowfall of the 14th and 15th was sufficiently heavy to delay railway traffic.

The period from the 17th to the 20th was one of unusual cold and heavy snow in the northern Rocky Mountain districts, and during the 20th and 21st the snow area extended over the middle Plateau region. The Atlantic coast and lower lake storm of the 26th and 27th was attended by freshets in the streams of New York, and by heavy snow in the northern part of that State.

On the Pacific coast the first important storm of the month appeared on the 16th, and this storm inaugurated a week of rain and high winds along the entire Pacific coast. In parts of California the heavy rains resulted in damaging floods.

In the north Pacific coast States gales were attended by snow and severe cold. At Vancouver, B. C., an unprecedented fall of snow for the season was reported. The gales, the snow and rain, and the temperature conditions were accurately forecast by the Weather Bureau.

An unusual and notable feature of the month was the occurrence of tornadic storms on the 20th in northern Arkansas, northern Mississippi, and eastern and middle Tennessee. These storms developed in the south quadrants of a general storm, the center of which moved during the 20th from Oklahoma to central Illinois, and passed thence over the Lake region during the 21st. The rain and the lake gales which attended this storm were forecast. As regards the tornadic storms referred to it is not possible, even in the presence of conditions which are recognized as being most favorable to their origin, to determine whether storms of this class will actually develop; and if it were possible to arrive at this determination the area, in any part of which their development is equally favored, is so great that the locality or even the State in which the tornadoes will occur can not be defined.

#### SPECIAL FORECASTS.

The only long-range forecasts of the month were made for election day, November 6. The first of these was issued November 3, and was worded as follows:

Present conditions point to fair weather and moderate temperature on Tuesday, November 6, over all districts east of the Mississippi River. From the Mississippi River to the Pacific coast present conditions are also favorable for fair weather, except on the middle and north Pacific coasts, where there may be rain.

This was followed on the 4th by the following:

For the first time in ten days the weather map shows a clear sky over the whole region from the Pacific to the Atlantic, except over a small area on the middle Atlantic coast, where some rain is falling as a result of a severe storm, the center of which is off Hatteras. The pressure is high over the western half of the country. These conditions will surely give clear, fine weather and pleasant temperature in all States on Monday, except possibly showers on the immediate Atlantic coast line. While it is possible for a storm to develop somewhere in this broad area by Tuesday, the conditions are unusually favorable for the continuation of fine weather for Monday over and throughout Tuesday.

On the morning of the 6th the prevailing weather conditions of the country were summarized as follows:

It is seldom that any day opens without a drop of rain falling anywhere within the area of the United States. Such is the remarkable condition this morning. With the exception of cloudiness over southern Wisconsin, northern Illinois, and eastern Iowa, the sky is clear with pleasant temperature everywhere. The showery condition which yesterday covered New York and New England has moved away as was expected, and all portions of New York and New England are certain to have fine weather during the day. The cloudiness previously referred to as being in Iowa and contiguous States is the result of a storm forming over western Iowa, which will probably result in the beginning of precipitation late to-night or to-morrow in Iowa, the central Mississippi valley and upper Lake region, but the weather will doubtless remain fair until after the closing of the polls.

On the morning of the 9th the following special forecast was telegraphed to Portland, Me., Boston, New York, Philadelphia, Baltimore, and Norfolk:

Severe gales setting in from southeast and going to west and northwest will be encountered along the steamer tracks west of Newfoundland to-night, and over and near the Grand Banks Saturday.

During the 9th heavy gales prevailed along the middle Atlantic and New England coasts, and the wind increased to a strong gale off the Nova Scotia coast during the night of the 9th. Unusually severe south shifting to west gales continued over Nova Scotia during the 10th, and south gales set in over Newfoundland and the Grand Banks, shifting to west-erly by night.

The Yarmouth Steamship Company's side-wheel steamer *City of Monticello* struck on a reef at the entrance of the Bay of Fundy the morning of the 10th and sank. The passengers and crew numbered 37, and all except 4 were drowned. The steamer left St. John, N. B., at 11 a. m. of the 9th bound for Halifax, N. S. During the day and night the wind increased in force. When off Chegoggin Point she struck a reef and was soon completely wrecked on the rocks.

On the morning of the 26th, when a storm of marked intensity was central over the interior of the Middle Atlantic States, the following special forecast was telegraphed to Portland, Me., Boston, New York, Philadelphia, Baltimore, and Norfolk, and published on the daily weather maps issued at those places:

Severe gales will shift to northwest off the middle Atlantic coast to-day and off the New England coast to-night. Dangerous southeast gales will shift to westerly over the Banks of Newfoundland Tuesday.

By the morning of the 27th the storm center had advanced to the south Nova Scotia coast, and by the following morning had passed to the east of Newfoundland.

On the whole the month was marked by exceptionally severe weather along the transatlantic steamship tracks.

On the 25th and 26th the streams of the Ohio Valley were swollen by heavy rains.

At Pittsburg, Pa., the Weather Bureau issued a flood warning at 2 p. m. of the 26th, announcing a 25-foot stage, or higher, by midnight. The night of the 26th a second warning was issued for a 28-foot stage by noon of the 27th. The maximum stage, 27.7 feet, was reached at 10 a. m., of the 27th.

General attention was given to the warnings, and property to the estimated value of at least \$1,000,000, was saved by removal to places of safety before the crest of the flood reached Pittsburg.

#### CHICAGO FORECAST DISTRICT.

No very severe storms occurred in the upper Lake region. Storm warnings were ordered in advance of the upper lake disturbances of 1st, 3d, 8th, 11th, and 12th, the warnings of the 12th being continued forty-eight hours, and at some stations for a longer period. The stormy weather which continued from the 17th to the 20th was amply covered by warnings, and on the morning of the 24th warnings were issued for the greater part of Lakes Michigan and Huron on account of a storm in the lower Mississippi Valley which moved eastward and northward, causing high winds over the southern parts of the lakes.

No cold waves swept the entire district. Warnings were, however, issued generally in advance of marked falls in temperature.—*H. J. Cox, Professor.*

#### SAN FRANCISCO FORECAST DISTRICT.

On November 14 conditions were such as to warrant the forecast of rain for northern California and threatening weather in southern California, which forecast was continued on the 15th. By November 16 the storm, which was destined to be noteworthy, was fairly in upon the north Pacific coast, and heavy rain was reported from San Francisco northward. On the morning of the 16th storm warnings were displayed from San Francisco to Eureka and all southern seaports were advised of a storm off the Washington coast. Rain was forecast for southern California the morning of the 16th. By November 17 heavy rains had fallen from San Diego to Neah Bay. The value of this rain was almost beyond estimation. Rain forecasts were continued Sunday and Monday, and north and east bound travelers were specially warned of