

MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for October, 1899, is based on reports from about 3,024 stations furnished by paid and voluntary observers, classified as follows: regular stations of the Weather Bureau, 170; West Indian service stations, 10; cotton region stations, 127; corn and wheat region stations, 133; special river stations, 132; special rainfall stations, 48; voluntary observers of the Weather Bureau, 2,238; Army post hospital reports, 27; United States Life-Saving Service, 14; Southern Pacific Railway Company, 96; Canadian Meteorological Service, 32; Mexican Telegraphic Service, 20; Mexican voluntary stations, 7. 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; Senor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Señor A. M. Chaves, Director-General of Mexican Telegraphs; Mr. Maxwell Hall,

Government Meteorologist, Kingston, Jamaica; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; and Capt. J. E. Craig, Hydrographer, United States Navy.

The REVIEW is prepared under the general editorial supervision of Prof. Cleveland Abbe.

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. 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 meridian is mentioned.

FORECASTS AND WARNINGS.

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

The most important storm of October, 1899, advanced from the west part of the Caribbean Sea along the Atlantic coast of the United States from the 28th to the 31st. For several days preceding the 28th unsettled weather had prevailed over the Greater Antilles and the western Caribbean Sea, and a marked barometric gradient between that region and an area of high barometer over the southeastern part of the United States caused high northeasterly winds over southern Florida, western Cuba, and adjacent waters. During this period Gulf and Atlantic coast shipping interests were advised of the conditions which prevailed, and careful watch was kept for a storm development which, at this season, these conditions favored. The evening reports of the 27th showed the looked-for storm development south of central Cuba, and storm signals were ordered at Key West and Miami, Fla., with the information that the center of the disturbance would probably move northward during the next twenty-four hours and cause high northeast winds over southern Florida and western Cuba. Similar advices were telegraphed to all Florida ports. During the 28th the storm signals were extended along the Atlantic coast to Jupiter, Fla., and the Bureau of Navigation, Navy Department, the Philadelphia and New York Maritime Exchanges, and Atlantic and eastern Gulf shipping interests, and also the Colonial Government of the Bahamas, were advised that the Caribbean Sea disturbance was approaching the south coast of central Cuba and that dangerous northeast

gales were indicated for the southern Florida and west Cuban coasts, and southeast gales for the east Cuban coasts. The morning of the 29th south Atlantic and east Gulf ports were notified that the storm was moving northward over central Cuba, and in the evening of that day storm signals were ordered as far north as Norfolk, Va., with the information that the storm had advanced to a position east of Key West, Fla., and that during the following day northeast gales would prevail from Virginia southward, and that northeast gales would shift to northwest over the Florida Peninsula. During the 30th the center of disturbance moved northward, and in the evening was central off the Carolina coast. On the morning of the 30th the display of storm signals was extended to Sandy Hook, N. J., and advisory messages regarding the character and course of the storm were sent northward to Boston, Mass. The morning reports of the 31st showed a marked increase in the intensity of this storm, and coast interests along the middle Atlantic and south New England coasts were notified that dangerous northeast gales might be expected. During the northward passage of this storm severe gales were encountered along the south and middle Atlantic and south New England coasts.

In Cuba and Jamaica the feature of the storm was the exceptionally heavy rainfall. In Florida, Georgia, and South Carolina no special damage was caused, although dangerous gales prevailed off the coasts. At Charleston, S. C., the wind

reached a velocity of 58 miles an hour from the northwest at 10:05 p. m. of the 30th. The night of the 30th the storm was one of the severest on record along the North Carolina coast near Wilmington, and an enormous amount of damage was caused by exceptionally heavy seas and high tides. The total loss of property in that section was placed at a quarter of a million dollars. A number of coasting vessels were lost, and the steamer *Catherine Whiting* was wrecked on Goss Beach, Brunswick County. The value of sailing vessels and their cargoes, which were lost along the North Carolina coast, was placed at \$144,000. The ravages of the storm along the Virginia coast the night of the 30th, and during the 31st represented losses of thousands of dollars. The tide was the highest noted in years, and the high wind caused the water to overflow lowlands. At Cape Henry the wind reached a velocity of 60 miles an hour from the northeast at 6:55 p. m. of the 30th. On the New Jersey coast thousands of dollars worth of fishing property was saved by fishermen who profited by the Weather Bureau warnings, and nets to the value of thousands of dollars were lost by fishermen who did not heed the warnings. Severe gales were reported at the more exposed points along the south New England coast, but as shipping had been warned more than twenty-four hours before the storm arrived no damage was caused.

The break in the period of unseasonable high temperature over the interior of the country was accurately covered by forecasts from the 24th to the 27th.

Warnings of the beginning and ending of the first autumnal rains in California were of great value to raisin growers, fruit driers, and shipping interests.

Ample warnings were sent of the first heavy frosts of the season to the various sections which were visited by heavy frost.

On the 14th and 15th an exceptionally severe snowstorm for the season visited the foothills of the main range of the Rocky Mountains in northern Montana, causing the death of a number of men and the loss of several thousand sheep.

CHICAGO FORECAST DISTRICT.

The Lake region was remarkably free from dangerous storms during October, no storm being sufficiently severe to require the general display of signals at all upper lake ports.

The break in the heated period and the general showers which occurred from the 24th to the 27th were almost accurately forecast.—*H. J. Cox, Professor.*

PORTLAND, OREG., FORECAST DISTRICT.

No wind signals were ordered, and there were no dangerous winds.

Frost warnings were issued and verified. No damage was caused by frost, except to grapes in exposed places.—*B. S. Pague, Forecast Official.*

SAN FRANCISCO FORECAST DISTRICT.

On the 10th a storm which was noticed first on the Mexican frontier (one of the Sonora type) was central over the San Joaquin and Sacramento valleys. A fall in pressure along the north coast occurring at the same time the forecaster felt certain in forecasting showers for northern California. No rain had fallen for some months, except a trace, and the forecast was merely a statement of the approach of the winter season. It was so regarded by the community. On the 11th

forecasts of showers were continued and were sent for Nevada, Utah, and the mountains of Arizona. It was also stated that the snow in the mountains would probably be heavy. All of these forecasts were verified. Ample warnings were given to raisin growers, fruit driers, and the shipping interests. Rain was again forecast for the district named on the 12th, and on the 13th forecasts of clearing weather by Saturday were made, which were also verified. Extensive forest fires were raging at many places in California, and a forecast of the rain which came the night of the 10th and extinguished them was of special interest to those engaged in fighting the fires.

The following, from an editorial in the San Francisco Chronicle of November 14, 1899, is one of many similar comments made by the California press regarding the rain warnings:

Nowhere are weather predictions more uncertain than in California, although every device known to meteorologists has been enlisted to wrest the secrets of the atmosphere from it, but the weather observer is always handicapped here because information regarding the atmospheric conditions far out at sea is inaccessible at the critical time. Still, with all its imperfections and drawbacks, meteorology has occasionally been very serviceable here. The foreknowledge acquired through it of the approach of the October rainstorm and the timely warning given to agriculturists enabled them to save much property from damage and destruction. In a large section of the State over which these early storms swept there was nothing to indicate their coming at the time the warning was given. Faith in the meteorological forecast of the storm saved one Hanford, Kings County, vineyardist 56,800 trays of rasins, worth about \$2 per tray, or a total money value of \$113,600. It is thus science demonstrates that it has a money value when applied to industry. If other farmers and raisin growers in the interior of the State had placed similar faith in the deductions of the professional meteorologist they would not now be mourning the loss of their unprotected crops. The mariner respects the storm flag in whatever port he may be when that signal of danger to his floating craft is raised, and he makes everything snug to meet the coming blow, of which it gives him timely warning. Thus meteorology has become an invaluable aid to maritime interests.

A. G. McAdie, Forecast Official.

HAVANA FORECAST DISTRICT.

From the 22d to the morning of the 30th unusually stormy weather prevailed over Cuba, Jamaica, and the western Caribbean Sea. The only serious damage done by the storm was the sinking of the small schooner *Helen E. Russell*, and the loss of four lives at 4 a. m. of the 23d, 8 miles northwest of Juraco; the following is extracted from local newspapers:

Evening of 28th 13 houses blown down and tobacco seed plants and banana plants destroyed; night of 28th considerable damage done by inundation of a portion of Camajuani and the blowing down of several houses at Sancti Spiritus; damage and loss of one life at Santiago, and damage by the overflowing of the Canti River.

All necessary action was taken to acquaint commercial and shipping and other interests of the development, character, and course of this storm.—*W. B. Stockman, Forecast Official.*

AREAS OF HIGH AND LOW PRESSURE.

During the month six highs and ten lows have been sufficiently well defined to be traced on Charts I and II. The accompanying table shows some of the facts regarding the date and place of origin and last appearance, with the velocity of their movements, and the following description is added:

Highs.—No. I was first seen off the middle Pacific coast. Its trajectory was a little south of east, and after five days it disappeared in north Texas. No. II was first noted to the north of Minnesota. The remaining four were first noted in the middle or northern Plateau regions. All of these five had a path in a general easterly direction and disappeared off the north Atlantic or Nova Scotia coasts.