

from the Rio Grande Valley caused gales along the middle Atlantic and New England coasts.

Three disturbances that first appeared over the west part of the Gulf of Mexico moved northeastward to the Great Lakes, and one of these was the storm before referred to as having moved eastward over Newfoundland on the 23d.

Several vessels were lost on the Great Lakes during the third decade of the month. On the night of the 23d the steamer *Sylvanus J. Macy* sprung a leak off Point Burwell, Ontario, and sank. On the 25th the steamer *Quito* ran ashore in a northeast gale, while trying to make the harbor at Lorain, Ohio. During the night of the 29th the steamer *Charles Hebard* was wrecked at Point Mamainse, Lake Superior.

A number of barometric depressions appeared on the north Pacific coast, notable among which were those of the 8-10th, and 16-18th. The storm of the 16-17th was particularly severe, and a number of expressions of appreciation have been received regarding the value to shipping interests of the warnings issued in connection therewith.

Ample warnings were issued of all storms that visited the Atlantic, Pacific, and Gulf coasts and the Lake region.

The first important cold wave of the season swept southward and eastward from the British Northwest Territory over the interior of the country from the 26th to the 28th, carrying the line of freezing temperature almost to the coast line of the Gulf of Mexico. Timely warning was given to all interests that were subject to damage or loss by frost and cold. The following comment is made by the New Orleans press on the warnings issued for the Gulf district, the only section east of the Pacific coast States in which agricultural products were endangered by frost:

The Times-Democrat of November 28, 1902:

The warnings sent out by Dr. Cline Wednesday morning were timely for all parts of this extensive district. Freezing weather occurred over Arkansas, Oklahoma, and northwest Texas. Heavy frosts occurred over the interior of Texas, and frost occurred generally over southern Texas and all of Louisiana. Frost was in evidence in New Orleans, and on the outskirts was quite heavy. The warnings of these severe conditions were issued by the Weather Bureau well in advance, and all business interests were prepared for the frosts and freezing.

The Daily Picayune of November 29, 1902:

This season's special forecasts were inaugurated Wednesday by the forwarding of frost warnings to every station in the west Gulf district, with the result that planters and farmers, relying implicitly upon Dr. Cline's forecasts, which were so accurate in past seasons, had time to protect their crops from the low temperatures. This warning, in ample time, was a thanksgiving offering to southern industrial and agricultural interests, and its value can hardly be estimated in cold cash.

From the 25th to the 30th frost was general in California. The frosts of this period, and also the rains of the month were covered by forecasts and special warnings issued from San Francisco.

During the third decade of the month heavy rains caused destructive freshets in eastern Texas, and large areas of bottom lands along the Red River above Shreveport were inundated. The floods in the Red River continued into December, and will be referred to in the MONTHLY WEATHER REVIEW for that month.

BOSTON FORECAST DISTRICT.

The weather was remarkable for unusual mildness and light precipitation. The storms of the 8-9th and 25-26th were of marked severity, with heavy easterly gales. The latter storm was the most severe of the season. All warnings were timely, and called forth most favorable comment.—*J. W. Smith, Forecast Official.*

NEW ORLEANS FORECAST DISTRICT.

Warnings for cooler, brisk to high northerly winds over eastern Mexico, and northwest storm warnings for the west

Gulf coast were issued on the 26th, and cold, high winds followed. Warnings were issued on the 26th for freezing weather in northern part of the district and frost to the coast line, and the first general frost (killing throughout the interior) occurred on the morning of the 27th. Press comments regarding the warnings have been forwarded.—*I. M. Cline, Forecast Official.*

CHICAGO FORECAST DISTRICT.

Storm warnings were displayed on the upper Lakes at frequent intervals during the month, and evidently vessel masters took necessary precautions. No very severe storms occurred, but there were some casualties. The Canadian steamer *Bannockburn* left Port Arthur, Ont., on November 21, and no trace of her has yet been found. She undoubtedly foundered in one of the storms that followed soon after sailing. It is probable, however, that at no time the steamer came within range of the storm warning stations of this service. The other important casualties were the loss of the steamer *Hebard*, and one of her consorts, on Lake Superior the night of the 29th. During the storm the steamer had parted from her consorts, and in the high wind and snow the captain lost his bearings and found himself on the breakers near Point Mamainse. The crew were rescued the next day, but the boat went to pieces on the rocks. The *Hebard* was a wooden steamer and her business of towing barges during the stormy season was extremely hazardous. It would seem that the captain of such craft should pay particular attention to the daily forecasts and storm warnings. All vesselmen that could be reached were fully advised as to the approach of the storm in which these boats were wrecked.—*H. J. Cor, Professor.*

DENVER FORECAST DISTRICT.

Unsettled weather characterized November, but cold waves were notably few, unimportant, and local in character. A feature of the month was the heavy precipitation that occurred in Arizona, especially in connection with the low area, central in Wyoming on the morning of the 19th, which took a south-westward course to Arizona where it remained for several days. The snowfall was very heavy in northern Arizona.—*F. H. Brandenburg, Forecast Official.*

SAN FRANCISCO FORECAST DISTRICT.

Unusually heavy rainfalls occurred in the northern portion of California on November 8 and 9. At Eureka the 24-hour rainfall was 3.16 inches, and at Red Bluff, 2.26 inches. At the latter point the rainfall in forty-eight hours amounted to 4.46 inches. The forecasts of rain throughout California were handsomely verified, and wherever fruit was injured the loss was due to causes beyond the control of the orchardists. Ample warning was given at nearly all points. A second stormy period began November 13, but did not cause unusual weather conditions south of San Francisco. Southwest storm warnings were ordered from San Francisco to Eureka at noon November 18, and a few hours later the warnings were extended southward to Santa Barbara, and advisory messages were sent to Los Angeles and San Diego. By the evening of the 19th rain had fallen as far south as San Diego. A peculiar feature of the disturbance was the excessive rainfall in southeastern California, the valley of the Colorado, and Arizona. In the latter territory rain or snow fell several days, the snowfall in the northern portion being unusually heavy. Light to heavy frosts occurred generally in California on November 25, and subsequent mornings.—*A. G. McAdie, Professor.*

PORTLAND, OREG., FORECAST DISTRICT.

Although wet and stormy the month was not unseasonably