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## FORECASTS AND WARNINGS.

By Prof. A. J. HENRY, temporarily in charge of Forecast Division.

Over and near the British coasts barometric pressure fluctuated during the first half and continued high during the latter half of the month. In the vicinity of the Azores pressure was high until the 15th, fell from the 16th to the 21st, rose rapidly from the 22d to 27th, and during the last four days of the month was remarkably high. Over the western Atlantic the barometer fell to a minimum of 28.80 inches over Newfoundland on the 4th, fluctuated from the 5th to 12th, was high from the 13th to 21st, began falling on the 22d, and reached 29.80 inches at Bermuda on the 25th. During the 26th and 27th the barometer rose near the American coast and continued high in that region during the balance of the month.

In the United States December was unseasonably warm in the Southwestern States and the middle and southern Rocky Mountain districts, and was colder than usual over the northern portions of the country east of the Rocky Mountains. During the third decade of the month a cold wave visited the eastern half of the country. In Florida the duration and intensity of this cold wave was remarkable. During the period, December 23-27, freezing temperatures occurred over practically the entire peninsula, and on one or more nights the cold was more intense in south-central than in northern districts of the State. This with other Florida cold waves will be made a subject of future discussion.

Precipitation was deficient in the Atlantic and Gulf States, on the north Pacific coast, and in an area extending from the western Lake region to northwestern Texas. Precipitation was in excess of the December average from the lower Lake region to the interior of Texas, generally in the Northwest, and in New Mexico, Arizona, and California.

The first important storm of the month in the United States advanced from the southern California coast to the Canadian Maritime Provinces from the 2d to the 7th, attended during the 5th and 6th by strong gales on the Great Lakes, and on the 6th and 7th by high southerly shifting to northwesterly winds on the middle Atlantic and New England coasts. The passage of this disturbance was followed by a cold wave that covered the Northwestern States on the 6th and extended thence over the Middle Atlantic and New England States during the 7th, with temperatures below zero generally in New England and the interior of New York on the morning of the 8th. During the 6th a storm of marked strength passed inland from the North Pacific, attended by heavy gales in the North Pacific coast States, and by high winds and rain in California. The second cold wave of the month appeared over Manitoba on the morning of the 10th, and sweeping eastward over Canada produced extremely low temperature in northwestern New England on the 12th. On the 10th a storm of exceptional severity appeared on the north Pacific coast and advanced thence over the continent. From the 16th to 19th a cold wave advanced from the Northwest eastward over Canada, with very low temperatures in the interior of New England.

The display of storm warnings on Lakes Superior, Michigan, Huron, and St. Clair was discontinued for the season at the termination of December 18, and on Lakes Erie and Ontario at the termination of December 20. The display of storm warnings on Lake Pepin was discontinued at the termination of December 10, 1906.

BOSTON FORECAST DISTRICT.

The marked features of the weather were the large amount

of cloudiness and the deficiency in temperature. From the 2d to the 21st the temperature was generally below normal, with several well-defined cold waves, the most marked of which were those of the 8th, the 12th, and the 19th. The lowest temperature during the month in the three southern States occurred with the cold wave of the 8th. The greatest severity of the cold of the 12th was confined to Maine and Vermont, with temperatures ranging from 22° to 25° below zero. These figures were nearly paralleled on the 19th. During the last decade of the month the temperatures were decidedly higher, generally above normal, and without zero readings. The precipitation of the month was somewhat above normal, and occurred on an average of eleven days, but there was no day without a trace or more at some stations. There were no severe storms of either snow or wind. Gales of moderate force occurred on several dates, resulting in considerable delay and inconvenience to shipping, but without wrecks or loss of life. No gales occurred without warnings.—*J. W. Smith, District Forecaster.*

#### NEW ORLEANS FORECAST DISTRICT.

The month, as a whole, was unseasonably warm. Exceptionally high temperatures prevailed during the first half of the month. The precipitation was excessive in western Texas and Arkansas and at a few points in northwestern Louisiana and eastern Texas. No cold waves of any extent nor storm winds occurred during the month, and no warnings were issued. Frost or freezing temperature warnings were issued on six dates. A general freeze occurred over Arkansas, Oklahoma, the interior of Texas, and northwestern Louisiana on December 18, for which warnings were issued. Warnings were issued in advance of all frosts.—*I. M. Cline, District Forecaster.*

#### LOUISVILLE FORECAST DISTRICT.

The month was remarkable for the unusually large number of pressure areas that past across the central valleys, influencing the weather conditions over this district. The depressions were mostly large in area but rather weak in gradient, hence there were a great many cloudy, rainy days, but no destructive storms. The center of most of the disturbances past to the north of the Ohio River, keeping this district in southern quadrants, with the result that unusually mild temperatures prevailed. There was practically but one cold period, the 22d–26th, inclusive, which was also the only clear period. Light, moist snow fell at intervals during the period 19th–23d, but there was little or no snow on the ground at any time.

No cold wave or special warnings were issued and none were required, altho very decided falls in temperature were featured in the forecasts several times.—*F. J. Walz, District Forecaster.*

#### CHICAGO FORECAST DISTRICT.

The temperature was generally above normal over central and eastern portions of the district. Several periods of cold weather, with temperatures near zero, or below, marked the conditions over the western and northern portions. Cold-wave warnings were issued on several dates: 5th, 6th, 8th, 10th, 13th, 14th, 16th, 17th, and 31st, when the morning charts indicated the advance of the cold areas in the Northwest. The southern movement of these cold areas, however, was generally not extensive, the advance being usually well to the north. One of the most marked areas was that following the warnings issued on the 6th, and zero temperatures were recorded over Minnesota, Wisconsin, upper Michigan, and portions of northeastern Iowa. Temperatures of from 10° to 20° below zero were present in the valley of the Red River of the North on the morning of the 10th, but the intensity of the cold area was rapidly broken, and rising rather than falling temperatures occurred during its progress eastward. The warnings of the 14th applied to the middle Mississippi Valley, and altho zero temperatures were not reached decided falls of more than 20° occurred at nearly all stations to which warnings were sent.

The season for the display of storm warnings on the upper Lakes closed on the 18th. Only one display had been ordered up to that time. Warnings were issued on the morning of the 5th in advance of the storm which moved from the middle Rockies eastward and northeastward, passing across the Lake region during the night of the 5–6th and disappearing from the St. Lawrence Valley by the morning of the 8th. Northeast warnings were hoisted on Lake Superior and southeast on Lakes Michigan and Huron, and high winds with snow were reported from many of the display stations. No conditions warranting the issuance of advisory messages occurred after the close of the season.—*Frank H. Bigelow, Professor of Meteorology.*

#### DENVER FORECAST DISTRICT.

The month was unusually mild thruout the district. A deficiency of precipitation was noted on the middle-eastern slope and in southern Utah; elsewhere there was an excess, notably in northern and central Arizona, where the amounts were the greatest of record for December. There were no cold waves.—*Frederick H. Brandenburg, District Forecaster.*

#### SAN FRANCISCO FORECAST DISTRICT.

The month was marked by several severe storms. On December 3 a moderate disturbance developed over southern California and moved slowly eastward, causing rain south of the Tehachapi for several days. On the 6th a disturbance of great depth appeared on the Washington coast and caused rain and high southerly winds south of the Tehachapi. Another disturbance forty-eight hours later moved rapidly southeastward, also causing general rain. The most severe storm of the winter occurred on the 10th, covering the entire coast. At San Francisco a maximum wind velocity of 53 miles occurred; at Southeast Farallon, 72 miles, and at Point Reyes Light, 92 miles from the south. The storm did considerable damage thruout the southern portion of the State, and especially in the San Francisco Bay district. Warnings were given a few hours in advance of the storm. A period of comparatively quiet weather followed, lasting until the 22d. The last week of the year was marked by showery weather, with heavy rain on the 25th and 26th.—*Alexander G. McAdie, Professor and District Forecaster.*

#### PORTLAND, OREG., FORECAST DISTRICT.

Two severe storms swept this district during the month of December. The first was noted as approaching the Washington coast the morning of the 6th and warnings were at once sent to all seaports and inland stations were at once notified of the expected high winds. Fifteen hours later the winds had increased to a whole gale along the coast, and within twenty-four hours high winds were blowing at inland stations. The Oregonian editorially commended the work of the Weather Bureau in connection with this warning, saying that "with a warning so well in advance of the storm, there was plenty of time to make everything snug, and as a result, very little damage was reported".

The second storm was first noted as approaching the Oregon coast the morning of the 10th at which time there was some doubt as to whether it would move directly east or advance northeastward. It was finally decided that it would move northeastward and warnings were promptly issued. This storm proved to be as severe as the former one and the warnings were just as timely.

With the exception of these two storms the month was featureless, with no severe cold spells and with precipitation below normal west of the Cascade Mountains and generally slightly above normal to the east of this range of mountains.—*Edward A. Beals, District Forecaster.*

#### RIVERS AND FLOODS.

There were no floods of great consequence during the month. Stages were high for the season in the Ohio River