

MONTHLY WEATHER REVIEW.

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The MONTHLY WEATHER REVIEW summarizes the current manuscript data received from about 3,500 land stations in the United States and about 1,250 ocean vessels; it also gives the general results of the study of daily weather maps based on telegrams or cablegrams from about 200 North American and 40 European, Asiatic, and oceanic stations.

The hearty interest shown by all observers and correspondents is gratefully recognized.

Acknowledgment is also made of the specific cooperation of the following chiefs of independent, local, or governmental services: R. F. Stupart, Esq., Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Director Meteorological Office, London; Maxwell Hall, Esq., Govern-

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As far as practicable the time of the seventy-fifth meridian is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

FORECASTS AND WARNINGS.

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

IN GENERAL.

Winter barometric pressure was not maintained in the continental high areas. Over the interior of Asia the barometer was highest on the 4-5th and 15-16th, when it rose above 31.00 inches, and was low the 1st, 10th, 18th, and 28th. Accompanying periods of high pressure in the Asiatic area the barometer was low over Bering Sea, and closely following periods of low pressure over Asia the barometer rose above normal over Bering Sea and fell below normal over the Hawaiian Islands. These alternations in pressure had a relation to the order and succession of weather changes over the North American Continent. In the United States and Canada periods of cold, fair weather followed marked rises in pressure over Bering Sea, and depressions of the barometer over Bering Sea were closely followed over the North American Continent by periods of warm, rainy weather. Falls in the barometer over the Hawaiian Islands occurred about two days later than the rises over Bering Sea, and vice versa, depressions over Bering Sea were attended by high barometric pressure over the Hawaiian Islands. A similar association was shown between Atlantic and European pressures and weather changes. Over the Atlantic Ocean there was usually a reversal of barometric changes in northern as compared with southern latitudes, and at times when the pressure was high in the Iceland area the barometer ranged low over the middle and southern European continental area. From the 1st to 4th and 9th to 14th pressure was low over southwestern Europe and wintry weather prevailed over western and northwestern Europe.

Two severe storms occurred during the first decade of the month. The first of these advanced from British Columbia to the region of the White Sea from the 1st to 12th. This storm acquired marked intensity over the eastern portion of the United States on the 4th and 5th, and reached the British Isles on the 8th, with reported pressure below 29.00 inches. During the next two days the center of disturbance moved southeastward to the neighborhood of the Black Sea and, recurving thence northward, disappeared in the direction of the

White Sea after the 11th. The storms that attended this depression from the 4th to the 9th, on land and sea, were very severe. The second storm of this decade was exceptionally severe over the eastern portion of the United States. It apparently advanced from the Pacific over lower California during the 2d and 3d. From the 4th to the 7th a barometric depression that was probably a continuation of this storm moved eastward, passing along the Gulf coast on the 6th, and reaching the south Atlantic coast the morning of the 7th. During the succeeding twenty-four hours the storm center moved northward, with pressure below 29.00 inches, and united over the St. Lawrence Valley with a depression that had moved eastward over British America. During the 7th and 8th heavy gales prevailed on the Atlantic coast and over the eastern Lake region. From the 9th to 12th this storm moved over the Atlantic north of the trans-Atlantic steamer tracks and disappeared beyond the region of observation north of the British Isles.

From the 9th to 13th a depression moved from the southern Rocky Mountain region northeastward over the lower Lakes and Canadian Maritime Provinces, attended by heavy rain in the south and east, by a severe storm of snow and sleet in parts of the Lake region, and by gales on the Gulf, western Cuban, and Atlantic coasts, and on the Great Lakes. During the next three days this depression moved northeastward over the Atlantic and disappeared in the direction of the Norwegian coast. From the 18th to the 22d a depression that may have been a continuation of the one just noted occupied northern European Russia.

From the 13th to the 17th a disturbance of moderate strength past from the north Pacific coast to Newfoundland. Following this disturbance the first cold wave of the month visited the country generally east of the Rocky Mountains, and carried the line of heavy frost into central Florida.

On the 19th the severest storm of the present season visited the north Pacific coast. At North Head and Tatoosh, Wash., wind velocities of 84 and 76 miles, respectively, were regis-

tered. The Oregonian, Portland, Oreg., of January 20, 1908, refers to storm warnings issued for this section as follows:

The season to date has been one of the stormiest on record, but the list of casualties so far is light. To the Weather Bureau this is largely due, as storm warnings have been sent out in advance of every storm. Shipowners and masters have been advised of the approach of heavy weather, and saving of life and property has been great.

This storm reached Lake Superior, with greatly diminished strength, on the morning of the 21st, and by the morning of 23d had past over Newfoundland. Moving northeastward the center of disturbance reached the vicinity of Iceland on the 25th, crossed the Scandinavian Peninsula during the 28th and 29th, and disappeared in the region of the White Sea after the 30th. From the 22d to the 25th a disturbance that apparently originated over the north-central portion of the West Indies moved northward off the Atlantic coast, with increasing intensity, attended by northerly gales and heavy snow in the Northeastern States. The Weather Bureau Observer, Mr. George E. Grimes, at Nantucket, Mass., has reported as follows regarding this storm:

This island was visited January 24 by the most severe storm in the history of the station. The storm began at 9:15 p. m., 23d, and continued until 3:41 a. m., 25th. The wind attained hurricane force at intervals from 2:37 a. m. to 4:46 p. m., of the 24th, and was accompanied by blinding snow. At 7:36 a. m., 24th, a maximum velocity of 83 miles an hour from the northeast was reached. The warnings were timely and no marine disasters have been reported in this vicinity. The greatest damage was to wharves and to fishing boats tied alongside, and was due mainly to the unusual high tide, that was 7.6 feet above mean low water. No lives were lost.

Following the passage of these depressions a cold wave swept the country east of the Rocky Mountains, carrying the line of freezing temperature to the middle and east Gulf coast and into the interior of central Florida. The following from Mr. A. H. Brown, manager of the Atwood Grapefruit Grove at Manavista, on the north bank of the Manatee River and opposite Manatee, Fla., to the Weather Bureau observer at Tampa indicates the value of the cold-wave and frost warnings and methods of protection employed in the citrus fruit districts of Florida. The Atwood Grove is one of the most valuable groves in the State, and its manager depends on the Weather Bureau predictions for action to protect his grove from freezes. The preparation for firing, and the materials used for protection at this grove cost, during the past year, upward of ten thousand dollars.

January 25, 1908.—We had a pretty close call last night. The temperature fell to 27° in our grove at 2 a. m., and as we had all arrangements made for firing we thought it time to get busy. We had forty men, and in forty minutes from the time we started firing the entire 200 acres were fired, with the result that we pushed the thermometer up to 37° in less than a half hour and held it there until daylight; and not a leaf was injured.

We depend greatly upon your reports and they mean a great deal to us, because we are prepared to fight the cold when it comes.

From the 23d to the close of the month four additional depressions of marked strength appeared over the North American Continent. The first of these advanced from the British Northwest Territory on the 24th, to the Great Lakes and thence northeastward to a position off the Scandinavian coast by the close of the month, with reported readings below 29.00 in the St. Lawrence Valley on the 27th. From the 23d to 31st a disturbance advanced from the Pacific Ocean to Newfoundland, crossing California on the 25th and 26th, reaching the south Atlantic coast on the 29th, and passing thence northeastward. From the 26th to 31st a depression moved from the British Northwest Territory to Newfoundland, and from the 28th to the 31st a storm that acquired marked strength moved from the north Pacific coast southeastward over the Rocky Mountain districts, and thence northeastward to northern Illinois by the close of the month.

The coldest periods of the present winter followed these disturbances. On the 29th the temperature was 42° below zero

in Manitoba, and the line of zero temperature was traced over central Illinois. On the 30th zero temperatures were reported in the interior of New York and New England, and a minimum of 28° below zero was registered at Canton, N. Y.

BOSTON FORECAST DISTRICT.*

[New England.]

The month was mild and precipitation was below the average. There was an unusual number of severe gales, and shipping was delayed, endangered, and in a few instances damaged. Storm warning displays were timely and doubtless resulted in a great saving of property and probably of human life. There were no storms without warnings.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.*

[Louisiana, Texas, Oklahoma, and Arkansas.]

The month was abnormally warm and precipitation was deficient. Warnings for freezing temperature and frost and for high winds on the coast were timely, and all were practically verified.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.*

[Kentucky and Tennessee.]

As a whole the month was mild and unusually pleasant, and the cold periods were confined to the third decade. Precipitation was deficient and snowfall light. The cold-wave warnings of the latter portion of the month were of general and decided benefit.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.*

[Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, and Montana.]

The month was comparatively mild. There were two severe snow and wind storms during the second decade of the month. The severest storm occurred at the close of the month. The storms were followed by moderate cold waves. Timely warnings were issued in advance of the storms and it is thought that great benefit resulted.—*H. J. Cox, Professor and District Forecaster.*

DENVER FORECAST DISTRICT.*

[Wyoming, Colorado, Utah, New Mexico, and Arizona.]

The month was mild and dry. On the 16th, 29th, and 31st cold waves visited portions of the district. The usual warnings had been issued for the cold waves of the last two dates.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.†

[California and Nevada.]

Rainfall and temperature were nearly normal. Generous rains at the middle and close of the month afforded desired relief in the southern portion of California. The most important storm occurred on the 23d, and moderately high southerly winds were reported on the entire coast.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.†

[Oregon, Washington, and Idaho.]

The first two decades of the month were stormy and unusually high winds occurred on the 5th and 19th. Timely warnings were issued for all storms. The month closed with a cold wave, for which warnings were issued.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

The great rivers of the country maintained their usual early winter repose. While the month of January was far from being a cold one, there were no heavy warm rains to bring about a rapid melting of the comparatively small amount of snow

* Morning forecasts made at district center; night forecasts made at Washington, D. C.

† Morning and night forecasts made at district center.