

STORMS AND WEATHER WARNINGS.

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WASHINGTON FORECAST DISTRICT.

At the beginning of the year a disturbance of considerable intensity moved eastward across the northern States and passed to Newfoundland, followed by strong west and northwest winds and gales along the middle Atlantic and New England coasts and by a cold wave on the 2d in the North Atlantic States. Storm warnings in connection with this disturbance were ordered on the last day of the preceding month and on the same day cold-wave warnings were ordered along the extreme northeast border. On the 3d the pressure was low over the far west and southwest and on the morning of the 4th a disturbance of marked intensity had its center over northwest Missouri. Moving thence this disturbance crossed the Great Lakes and moved down the St. Lawrence Valley, attended by gales and snow and rain in the region of the Great Lakes, snows and rain in New York and New England, and general rains elsewhere east of the Mississippi River. This disturbance was followed by much colder weather over the western half of the Washington Forecast District, warning of which was issued well in advance of its occurrence. Also on the night of the 4th southwest storm warnings were ordered for the Atlantic coast at and north of the Virginia Capes, but as the storm diminished in intensity after passing the region of the Great Lakes the winds on the Atlantic coast did not exceed in speed the scale of "strong."

On the morning of the 9th a disturbance made its appearance over northwestern Mexico, the lowest reading being to the southward of El Paso at this time. This disturbance was evidently already well organized, for at the following observation it was over Texas with a marked depression of the barometer at its center. Moving thence in an east-northeast direction the center of this storm advanced rapidly and the evening of the 10th it was over northern Alabama. When over the West Gulf States, storm warnings were displayed on the middle Gulf coast and forecasts of general rains and snows over the States east of the Mississippi River, and at the time the storm was central over northern Alabama storm warnings were extended to the southwest Florida coast and on the Atlantic coast from Key West, Fla., to Boston, Mass. During the night of the 10th the course of the storm was more to the northeast and on the morning of the 11th the center of the storm was over southeastern Virginia with the lowest barometer reading 28.98 inches at Cape Henry. Then the center passed directly north-northeastward and the evening of the 11th its center was in the vicinity of New York City. Whole-gale warnings were displayed the morning of the 11th on the Atlantic coast at and north of the Virginia Capes and warnings of heavy snows were issued for the Atlantic States north of Maryland. This disturbance was the severest thus far of the season along the Atlantic coast, but fortunately the destruction of shipping was minimized because of the timeliness of the warnings. There were heavy snows during the 11th generally throughout the New England and Middle Atlantic States, except on the immediate middle Atlantic and southern New England coasts, where snow changed to rain.

There was much delay in communication and transportation in the area of heavy snow and heavy snow and rain. Following this disturbance much colder weather over-

spread the Middle West and the Eastern and Southern States with frosts as far south as Miami, Fla., and a cold wave in extreme northern New York and northern New England. A feature of the weather during the first half of January was the persistence of the winter HIGH over the western Plateau region. This continued until the 16th when after a pronounced rise in pressure over the Alaska area the HIGH gradually gave way and was followed by an extensive area of low pressure on this date, which gave rains and snows on the Pacific Slope. At the same time, an extensive area of high pressure and much colder weather appeared over the western Canadian Provinces. The low over the western Plateau was central the morning of the 17th over southeastern Idaho and at that time general snows were falling over the northern Plateau and northern Rocky Mountain regions and rains on the Pacific coast. Moving southeastward, this disturbance was central the morning of the 18th over Arizona, and during the 18th the pressure fell over the Mississippi Valley and the western Canadian Provinces. Nothing important in the way of cyclonic developments took place during the 19th to 20th, but on the 21st a disturbance advanced rapidly out of the far Northwest and passed thence along the northern border, followed by a pronounced cold wave, warnings of which were issued well in advance of its occurrence. As this disturbance passed eastward from the Great Lakes it gained greatly in intensity and required the display of storm warnings on the north Atlantic coast. The pressure remained high over the eastern half of the country several days following, nevertheless, conditions remained unsettled in the South and rain, sleet and snow fell in the South Atlantic and Gulf States, and on the 26th a disturbance was indicated over southern Florida. This disturbance moved northward along the coast and the evening of that date storm warnings were displayed on the Virginia and North Carolina coasts. On the morning of the 27th when the center of this disturbance was off the South Carolina coast the display of storm warnings was extended northward and eventually to the whole of the New England coast and forecasts of snow made the previous day were repeated for the Middle Atlantic and New England States. The storm under consideration gave severe gales on the middle Atlantic and southern New England coasts and heavy falls of snow in the Middle Atlantic States and extreme southern New England, and heavy falls of rain, sleet, and snow in the Carolinas and Georgia. The fall of snow was exceptionally heavy in Virginia, the District of Columbia, Maryland, Delaware, eastern Pennsylvania, New Jersey, and extreme southern New York.

Warnings of frosts for the Southern States and of cold waves were issued on a number of days during the month.

CHICAGO FORECAST DISTRICT.

The first cold wave warnings of the month were issued during the period from the 2d to the 4th, inclusive, for that portion of the district from eastern Montana eastward to Minnesota, thence southward and southeastward over the western Lake region and the middle Mississippi and lower Missouri Valleys. No warnings were then necessary until the 17th when a depression centered that morning over the Plateau region, in its eastward movement, was followed by

an area of high pressure, bringing much colder weather progressively over most of the district during the 18th and 19th. In connection with this disturbance stock warnings were issued on the 17th for South Dakota, Nebraska, and Wyoming, and on the 18th for Kansas.

On the morning of the 21st a low pressure area of moderate intensity was centered over southern North Dakota and, during the ensuing 24 hours, moved rapidly eastward, followed by the coldest weather of the present winter thus far. Minima of 40° to 50° below zero were registered on the 22d in Manitoba and Saskatchewan and 30° to 40° below in North Dakota and northern Minnesota, the line of zero temperature reaching southward as far as central Illinois and the northern portions of Kansas and Missouri. This severe cold was preceded by warnings issued on the 21st for most of the district from the Rockies eastward to Lake Michigan and Illinois. Stock advices were also sent to South Dakota.

On the evening of the 27th, as it was apparent that an area of high pressure would soon appear over the northwest, cold-wave warnings were issued for Montana, northern Wyoming, North Dakota, and western South Dakota, these warnings being repeated on the morning of the 28th. During the 28th the high-pressure area developed and moved slowly southward, being blocked in its advance by an immense field of high barometer over Ontario. On the 29th and 30th the warnings were extended eastward to include western Minnesota, Nebraska, eastern Kansas, western Iowa, and northwest Missouri. On the 28th and 31st stock advices were telegraphed to points in the Dakotas, Wyoming, and Nebraska.

Cold-wave warnings were ordered from the evening map of the 31st for eastern and central South Dakota, western Nebraska and extreme southeastern Wyoming.—*E. H. Haines.*

NEW ORLEANS FORECAST DISTRICT.

Northwest storm warnings were ordered displayed on the Texas coast at 1 p. m. on the 10th because of an eastward-moving disturbance over the lower Mississippi Valley, which was followed by moderate gales that afternoon and night. Small-craft warnings were displayed on the Louisiana coast. The wind continued strong at Galveston, Tex., throughout the 11th. The area of high pressure in the rear of the disturbance extended well to the southward over the Rio Grande Valley and northeastern Mexico on the morning of the 12th and was attended by gales on the coast of Mexico. "Norther" warnings were issued at 8 p. m. on the 11th for Tampico and Progreso, Mexico.

Small-craft warnings were displayed on the Texas coast on the 16th and were justified.

Northwest storm warnings were ordered displayed from Morgan City, La., to Brownsville, Tex., at 8:20 p. m. on the 18th and were extended over the Louisiana coast east of Morgan City the following morning. The warnings were justified on the Texas coast; but the "norther" lost its force before reaching the Louisiana coast and the warnings were lowered at night on the 19th.

The pressure conditions showed considerable and rapid fluctuations along the middle Gulf coast on the 29th, the fluctuations at New Orleans being most evident in the early part of the night. Small-craft warnings were issued at 9:30 a. m. for the Louisiana coast and the eastern coast of Texas, and northeast storm warnings at 8:30 p. m. on the Louisiana coast east of Morgan City. Mod-

erate easterly gales occurred at New Orleans and fresh to strong easterly gales at Burrwood, La., during the early part of the night. However, the wind diminished greatly by 7 a. m. of the 30th and the warnings were lowered at 9 a. m.

A cold-wave warning was issued for Oklahoma and extreme northwestern Arkansas on the morning of the 4th and was extended in the early afternoon over northeastern Texas, northern Louisiana, and the remainder of Arkansas. The warning was verified in a considerable portion of the area named and the temperature fall was large in all portions.

The temperature fall which overspread the district on the 11th-12th was generally somewhat less than a true cold wave and the warnings issued for much of the northwestern portion of the district on the 10th failed of verification.

During the 18th, 19th, and 20th, a cold wave moved slowly southward over the district to the Texas coast but did not reach the Louisiana coast. Ample warnings were issued well in advance of the cold wave.

A cold-wave warning was issued at night on the 22d for Oklahoma and the Texas Panhandle and was verified. Because of the threatening position of the area of high pressure and a rapid rise in pressure at Oklahoma City, with temperature fall from 30° to 16° between 7 a. m. and 11 a. m., the cold-wave warnings were extended on the 23d over Arkansas, northern Louisiana, and northeastern Texas, but were not generally verified, though sleet occurred with temperatures below freezing.

A cold-wave warning issued on the morning of the 29th for the extreme northwestern portion of the district was justified. Cold-wave warnings were issued for the remainder of the northwestern portion of the district on the morning of the 30th, but the rapid movement of an area of low pressure from the Pacific coast prevented the cold wave from extending farther.

Warnings of frost or freezing temperature were issued on the 1st, 5th, 10th, 11th, 12th, 13th, 16th, 19th, 21st, 24th, 27th, and 28th. Conditions as forecast prevailed in most instances.

Fire-weather warnings were issued for forested areas in Oklahoma and Arkansas on the 2d and conditions occurred as forecast.—*R. A. Dyke.*

DENVER FORECAST DISTRICT.

Precipitation in all portions of this district between the 1st and 4th resulted from a storm which moved from the coast of southern California to the middle Mississippi Valley during that period. The disturbance was followed by much colder weather, with temperatures below zero in southwestern Utah. Occasional light snow or rain in southern Arizona, New Mexico, and southeastern Colorado attended a moderate disturbance which advanced from southern California to central Texas from the 7th to the 9th. High pressures prevailed on the middle Plateau from the 7th to the 16th, on which latter date a storm appeared on the north Pacific coast and moved, with increasing intensity, to New Mexico by the 18th, where it remained, slowly filling up, until the 20th, when it advanced to western Texas. Snow fell in Utah and Colorado on the 17th and 18th and in southwestern Colorado and northeastern Arizona on the 19th and 20th, with a cold wave in eastern Colorado on the 18th and in southwestern Utah and most of New Mexico on the 19th. On the last-named date the temperatures were below zero in central and eastern Colorado and western Utah. High