

Unusually heavy snow for November occurred on the 8th and 9th in portions of central-southern Michigan, where in the area of heaviest fall amounts up to nearly 20 inches were measured, the greatest depths ever reported in that section so early in the month. Also about the 18th to 20th unusually heavy snow occurred over portions of northern Oregon east of the Cascade Mountains and the adjacent sections of Washington and Idaho, the falls in some cases being the greatest of record for November, and nearly equaling the average annual fall.

RELATIVE HUMIDITY.

The relative amount of moisture in the atmosphere was above the normal over the greater part of the country from the Missouri and Mississippi Valleys eastward, the excess being large in portions of the Appalachian Mountains and the adjoining districts where there was much cloudy, rainy weather. From Texas and the Middle Plains westward to the Pacific the relative humidity was usually much below normal.

Severe local storms.

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the Annual Report of the Chief of Bureau.]

Place.	Date.	Time.	Width of path.	Loss of life.	Value of property destroyed.	Character of storm.	Remarks.	Authority.
Northern Ohio.....	1		Yards.	3		Gale and rain.	Wires and trees down, cellars flooded, and transportation services interrupted; velocity of wind 54 miles.	Plain Dealer (Cleveland, Ohio).
New Orleans, La.....	13					Wind and thunder.	Some damage to roofs and buildings; electric and telephone systems out of commission in various parts of the city; 2 persons injured.	New Orleans Item (New Orleans, La.).
Reform, Ala., and vicinity...	16				\$5,000	Hail.	Severe damage to roofs, and windows; stones weighing 1 pound fell.	The Advertiser (Montgomery, Ala.).
Arkansas (Polk, Clark and Garland Counties).	17	P. m.	(1)	11		Tornadoes.	Homes and barns demolished, live stock killed, wire communication interrupted and much timber destroyed; 39 persons injured; damage estimated at thousands of dollars.	United States Weather Bureau official. Commercial Appeal (Memphis, Tenn.).
Rockport, Ind. (near).....	18	P. m.	1,700			Cyclone.	30 barns and 3 houses destroyed; damage estimated at from \$100,000 to \$150,000.	Evansville Courier (Evansville, Ind.).
Marshall, Tex. (few miles N. E. of)	18					Tornado.	Some property damage.	Official United States Weather Bureau.
Portland, Oreg.....	19, 20					Ice.	Train service blocked, lines, poles and trees down; thousands of phones out of service.	Do.
Boston and vicinity.....	27, 28, 29					do.	Telephone and electric companies sustain heavy losses; shade and ornamental trees destroyed or greatly damaged; damage to orchards is estimated at well over \$1,000,000.	Do.

<sup>1</sup> One hundred yards to one-half mile. 551, 515 (73)

STORMS AND WEATHER WARNINGS.

EDWARD H. BOWIE, Supervising Forecaster.

WASHINGTON FORECAST DISTRICT.

The month was a notable one for the number of areas of high and of low pressure to cross the Washington forecast district. For the country at large, 25 separate and distinct areas of low barometer appeared during the month, while as to areas of high barometer there were 14. Many of the Lows had their origin in and were offshoots from the subpermanent LOW of the North Pacific, and have been classed as Lows of either the Alberta or North Pacific type, from which there developed a considerable number of secondaries. There was but one LOW of tropical origin, and it was only of moderate intensity. It had its origin over the ocean somewhere east of the Bahamas and it disappeared over the southeastern portion of the Gulf of Mexico. The HIGHS of the month did not bring unseasonable cold weather to the Washington forecast district, and the cold waves which occurred were confined to the northern border states.

A storm of considerable intensity was central the morning of the first day of the month over the central Ohio Valley, with the lowest barometer at its center 29.46 inches; moving eastward this disturbance passed off the middle Atlantic coast during the night of the 1st and thence followed a path east-northeastward toward the Grand Banks of Newfoundland. This disturbance was attended by strong northeast winds and gales on the lower Lakes and the North Atlantic coast, warnings of which were disseminated. On the 3d a disturbance made its appearance over the western Canadian provinces, ad-

vanced rapidly eastward along the northern border and reached the New England States on the 5th. On the 4th when this disturbance was crossing the Great Lakes, southwest storm warnings were displayed on Lakes Erie, Ontario, and southern Huron; the evening of the same day northwest storm warnings were displayed on the Atlantic coast at and north of Delaware Breakwater. This disturbance was attended by shifting gales in the regions where storm warnings were displayed, and it gained great intensity while moving from New England to Newfoundland. The highest velocity reported during the prevalence of this storm was 66 m. p. h. from the northwest on the 5th at New York City.

At 6 p. m. of the 7th, the following advisory information was sent to ports on the Great Lakes:

Western disturbance central at 4 p. m. over western Kansas will move eastward and probably gain in intensity, attended by fresh easterly winds becoming strong by Tuesday morning with rain and snow. Caution advised. Later information will be sent you to-night if any change indicated.

The 8 p. m. reports showed this storm to have moved to eastern Kansas; and as the pressure gradient was considerable in its northeast quadrant, northeast storm warnings were ordered displayed on southern Lake Michigan, and on the morning of the 8th the display of northeast storm warnings was extended to Lakes Erie, Ontario, and extreme southern Huron. The storm center passed south of the Great Lakes during the 8th, attended by winds of gale force at a number of Weather Bureau stations in the area where warnings were displayed. On the morning of the 9th its center was over Kentucky, and at the same time there were indications of the development of a secondary disturbance off the North Caro-