age to buildings and telegraphic communication interrupted. Madison, Wis., 16th, west 44 miles, much damage to property. Breckenridge, northwest 56 miles, 1:30 p. m. Duluth, 16th, northeast and northwest 30 miles, very heavy sea on lake and much damage to shipping and wharfs. St. Vincent, Minn., 16th, violent storm from the north, highest velocity 40 miles per hour. St. Paul, violent gale ffom north-northwest, considerable damage in country and city, all telegraphic communication interrupted. Yankton, Dak., 16th, 70 miles northeast at 1 a. m.; roads blocked with snow and communication of all kinds suspended. Snow-drifts east of station reported to be from 10 to 15 feet high. Reports from different points estimate loss of cattle and crops in Yankton county at $5,000. Ft. Bennet, Dak., 16th, north 40 miles. Memphis, Tenn., 15th, 32 miles west, much damage to buildings in city. Little Rock, Ark., 15th, west 32 miles, considerable damage to bridges, fences and buildings.

Sand-storms.—Umatilla, Or., 13th; Winnemucca, Nev., 7th, 8th, 14th, 28th; Fort Yuma, Cal., 8th, 15th; Fort Garland, Col., 22nd.

VERIFICATIONS.

Indications.—The detailed comparison of the tri-daily indications for October, with the telegraphic reports for the succeeding twenty-four hours, shows the general percentage of verifications to be 88.9 per cent. The percentages for the four elements are: Weather, 90.2; Direction of the Wind, 87.3; Temperature, 90.2; Barometer, 87.8 per cent. By geographical districts they are: for New England, 89.3; Middle States, 90.1; South Atlantic States, 90.4; Eastern Gulf States, 87.4; Western Gulf States, 87.3; Lower Lake region, 89.9; Upper Lake region, 87.0; Tennessee and the Ohio valley, 89.4; Upper Mississippi valley, 88.6; Lower Missouri valley, 88.7; Northern Pacific coast region, 84.1; Central Pacific coast region, 99.1; Southern Pacific coast region, 94.6. There were 43 omissions to predict out of 3,813, or 1.13 per cent. Of the 3,770 predictions that have been made, 103, or 2.73 per cent. are considered to have entirely failed; 97, or 2.57 per cent. were one-fourth verified; 318, or 8.44 per cent. were one-half verified; 335, or 8.89 per cent. were three-fourths verified; 2,917, or 77.37 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

Cautionary Signals—242 Cautionary Signals were displayed during the month, of which 191, or 78.9 per cent., were justified by winds of 25 miles per hour or over at, or within a radius of 100 miles of, the station. 87 Off-shore Signals were displayed, of which 78 or 89.7 per cent, were fully justified, and 85 or 97.7 per cent, justified as to direction. Sixty-three of the Off-Shore were changed from Cautionary. 329 Signals of both kinds were displayed, of which 269 or 81.8 per cent, were fully justified. 47 cases of winds of 25 miles and over per hour, from scattered stations, were reported, for which signals had not been ordered. The above does not include signals ordered for 49 display stations, where the velocity is only estimated. Two signals were ordered late.

NAVIGATION.

In the table on the right-hand side of chart No. III are given the highest and lowest stages of water, as recorded on the Signal Service river gauges, during October, 1880. The rivers have in general been lower than during the past month and higher than during October of 1879. The *Mississippi* above the mouth of the Missouri fell steadily throughout the month, with the exception of a slight rise at St Paul, from the 15th to the 18th, and at Keokuk, where a temporary rise of 10 inches took place on the 17th, followed on the 18th by a fall of 12 inches. On the 9th, navigation above St. Paul was suspended. From St. Louis to Cairo there was generally a rise to the 8th, then a fall to the 18th, which, with slight exceptions, continued to the end of the month. At Memphis a constant rise to the 12th, then a steady fall to the 19th, afterwards fluctuating slightly to the end of the month. At New Orleans there was an alternate rise and fall every three or four days, the range for the month being but one foot. Excepting a rise at Omaha on the 25th of 14 inches, and at Leavenworth from the 14th to the 19th, the *Missouri* fell throughout the month. The *Tennessee* at Chattanooga fell steadily to the 16th, then rose slightly to the 19th, after which its tendency was downward. The *Ohio* remained at a low stage of water during the month; at Pittsburg there was a steady fall to the 25th, interrupted by a rise of 3 inches on the 17th, from the 21st to the end of the month there was a gradual rise; at Cincinnati, gradual rise to 9th, fall to the 29th, with slight exceptions. The *Cumberland* at Nashville remained almost stationary to the 14th, rising to the 17th, stationary to the 23rd, falling to the 26th, then rapidly rising to the end of the month. The *Red River* at Shreveport fluctuated alternately between 7 feet, 3 inches, its highest point and 4 feet, 6 inches, its lowest. The *Arkansas* at Little Rock fell gradually to the 25th, excepting a slight rise from the 15th to the 18th; from the 26th to the 31st the rise was gradual. The *Savannah* at Augusta fell and rose alternately throughout the month; on the 8th, during a violent northeast gale, it overflowed its banks injuring the rice crop. The *Penobscot* at Bangor, on the 6th, was so low as to cause the stoppage of mills; on the 20th it reached the lowest point in many years.

TEMPERATURE OF WATER.

The temperature of water, as observed in rivers and harbors at Signal Service Stations, with the average depth at which observations were taken, is given in the table on the left hand side of chart No. II. Owing to the breaking of the thermometer, no observations were made at Burlington, Vt., from the 17th to the 25th inclusive.