

The following items regarding the remarkably severe snow-storms of the month will be found of interest: *Dakota*: Fort Bennett, 12th, snow-fall unprecedented; cattle suffering dreadfully; travel of all kinds almost impossible throughout month. Yankton, 7th, heavy blockade; business almost suspended; great suffering among people in interior towns for want of food and fuel; 25th, all roads again blockaded. *Illinois*: Morrison, month characterized by an unusual fall of snow and consequent heavy blockades. *Iowa*: Nora Springs, 4th to 7th, worst snow blockade experienced in this section for past 15 years. Logan, 5th, 6th, terrible snow-storm, worst in 20 years. Burlington, 12th, 18th, all roads blockaded; heaviest for many years. Keokuk, 12th, 14th, railroads blockaded; much damage to property. Dubuque, 7th to 13th, telegraph wires down in all directions; streets impassable; all travel ceased; the worst blockade for many years. *Kansas*: Creswell, 11th, snow blockade most severe for 10 years; travel of all kinds impossible. Wellington, 10th, 11th, heaviest snow-storm ever experienced. Dodge City, 11th, very severe "blizzard," stopping travel of all kinds; cattle suffering severely; 14th, trains blockaded; all travel ceased; thousands of starving and freezing cattle found along the railroad; large herd of antelopes forced into town in search of food. Leavenworth, 11th, heaviest snow-storm for many years; streets impassable. *Michigan*: Northport, 27th, 16 inches fell and drifted terribly; travel impossible; worst ever experienced. Marquette, 12th to 28th, heaviest storm for years; telegraph lines all down; blockade still continuing. *Minnesota*: New Ulm, 27th, heaviest snow blockade ever experienced; hundreds of families suffering for want of food and fuel; travel impossible. St. Paul, 1st, to 16th, one continuous and uninterrupted blockade; much damage and suffering; violent blizzards. *Nebraska*: North Platte, 14th, heaviest storm for years; cattle dying from cold and starvation. Omaha, 6th, most violent storm for many years; telegraph wires all down; trains blockaded; all travel ceased; much damage to buildings; 12th, all railroad travel blockaded by heavy drifts. *New York*: 3rd, railroads on Long Island blockaded; storm very violent. *Ohio*: Sandusky, 1st, trains blockaded and business entirely suspended for the day. *Wisconsin*: Embarrass, 27th, worst snow blockade ever experienced; no mail; no trains; no travel of any kind. La Crosse, 7th to 17th, all communication seriously obstructed; heaviest storm for many years; great suffering and much loss to property.

*Snow on Ground at End of Month.*—North of the 37th parallel the following depths in inches were reported in the various States and Territories: *Maine*, 3 to 18; *New Hampshire*, 8 to 24; *Vermont*, 1 to 20; *Massachusetts*, 3 to 18; *Connecticut* and *Rhode Island*, trace to 2; *New York*, trace to 22; *New Jersey*, trace to 28; *Pennsylvania*, 5 to 16; *West Virginia*, trace to 3; *Ohio*,  $\frac{1}{4}$  to 25; *Indiana*, trace to 4; *Michigan*, lower peninsula, 3 to 48, upper peninsula, 12 to 36; *Illinois*, 1 to 18; *Wisconsin*, 16 to 38; *Missouri*, trace to 5; *Iowa*,  $\frac{1}{4}$  to 26; *Minnesota*, 24 to 36; *Kansas*, drifts; *Nebraska*, trace to 12; *Dakota*, 3 to 33; *Colorado*, only 2 inches on summit of Pikes Peak, trace to 12 in lower surrounding country; *Montana*, 2 to 22; *Wyoming*, trace to 12; *California*, on mountain ranges.

### RELATIVE HUMIDITY.

The percentage of mean relative humidity for the month ranges, as follows: New England, 65 to 78; Middle States, 66 to 84; South Atlantic States, 58 to 81; Eastern Gulf States 51 to 75; Western Gulf States, 62 to 79; Ohio Valley and Tennessee, 64 to 74; Lower Lake region, 72 to 79; Upper Lake region, 66 to 83; Upper Mississippi valley, 71 to 78; Missouri valley, 66 to 87; Valley of the Red River of the North, 75 to 91; Texas, 61 to 72; Middle Plateau, 43 to 74; Southern Plateau, 30 to 47; California, 62 to 82; Oregon, 80 to 82. *High stations* report the following percentages not corrected for altitude: Mt. Washington, 78.9; Pike's Peak, 62.3; Denver, 56.0; Cheyenne, 50.4; Eagle Rock, 78.5; Santa Fe, 56.8.

### WINDS.

The prevailing winds during the month of February, 1881, at Signal Service Stations, are shown on chart No. II, by arrows which fly with the wind. Along the Atlantic coast, from Maine to North Carolina, in the interior of the Middle Atlantic States, throughout the Upper Mississippi and Missouri valleys and in the Middle Eastern Rocky Mountain slope they were *northwesterly*. In the South Atlantic and Gulf States and in the interior of Texas and New Mexico, *north to east*. In the Lake region, Tennessee and the Ohio valley, *south to east*. In the Pacific coast and Plateau regions, *southeast to southwest*.

*Total Movements of the Air.*—The following are the largest total movements at Signal Service stations: Mt. Washington, 27,190 miles; Pike's Peak, 18,109; Cape May, 13,118; Portsmouth, N. C., 13,041; Kittyhawk, 12,464; Cape Hatteras, 12,158; Delaware Breakwater, 12,046; New Shoreham, 11,056; Chincoteague, Va., 10,963; Thatcher's Island, 10,782; Cape Henry, 10,459; Wood's Holl, 9,981; Indianola, 9,912; Sandusky, 9,873; Barnegat, 9,784; Ft. Macon, N. C., 9,783; Milwaukee, 9,172; Champaign, Ill., 9,109; Cheyenne, 9,061. The *smallest* are: Roseburg, Or., 1,722 miles; Silver City, N. M., 1,980; Visalia, Cal., 2,011; Phoenix, Ariz., 2,066; Salt Lake City, 2,072; Memphis, 2,092; Florence, Ariz., 2,115; Ft. Missoula, Mont., 2,240; Deadwood, 2,348; La Mesilla, 2,400; Lewiston, Idaho, 2,493; Lynchburg, 2,588; Helena, 2,843; Laredo, Tex., 2,932; Uvalde, Tex., 3,017; Spokane, Wash. Ty., 3,254; Olympia, 3,261.

**High Winds.**—Winds of 50 miles and over were reported as follows: On summit of Mt. Washington, 1st to 3rd, 8th to 28th; on five of these dates the wind reached a velocity of 100 miles per hour; maximum wind velocity of 110 miles SE. on the 12th. On summit of Pike's Peak, 1st, 2nd, 4th, 11th, 12th, 15th, 16th, 20th, 21st, 26th to 28th; maximum wind velocity 80 miles W. on the 21st. Umatilla, 55 W., 25th. Ft. Shaw, Mont., 50 SW., 1st. Moorehead, Minn., 62 SE., 4th. Sandusky, 64 NE., 1st. Indianola, 51 N., 11th. New Orleans, 52 SE., 6th. Mobile, 60 SE., 6th. Portsmouth, N. C., 52 NW., 1st. Kitty Hawk, 52 N., 1st. Delaware Breakwater, 58 S., 12th. Cape May, 55 NW., 16th. Wood's Holl, 52 SE., 28th.

**Local Storms.**—During the passage of low-area No. VI northeastward over Tennessee and the Ohio valley on the 18th, opposing northerly and southerly winds, accompanied by high contrasts of temperature, prevailed in the southwest quadrant; the latter ranging from 35° to 45° between southern Illinois and the central portion of Alabama and Mississippi. Under these peculiar atmospheric conditions there occurred, quite late in the day and within the central portion of Alabama, a terrific tornado, which passed over a part of Tuscaloosa county. Its path extended from southwest to northeast, a distance of about 15 miles, and was characteristically narrow. The storm cloud, as usual, was accompanied by a loud roaring noise and a rotary motion from right to left. Several persons reported in connection with the passage of the cloud the presence of large balls of fire which sparkled and flashed in the belt of the wind, and seemed to be of all sizes, from the dimensions of an egg up to that of a half-bushel measure. Hail and rain followed in the track of the storm. The largest trees were twisted off near the stump or violently uprooted, and over twenty buildings were either unroofed or demolished. Heavy objects were conveyed long distances and the debris of buildings and fences was invariably carried from the east around by the north to the west, and thence by the south to the east. This storm passed but a little south and east of the track of many previous tornadoes which have traveled across this portion of the State in the same general direction.

## VERIFICATIONS.

**Indications.**—The detailed comparison of the tri-daily indications for February, with the telegraphic reports for the succeeding twenty-four hours, shows the general percentage of verification to be 88.2 per cent. The percentages for the four elements are: Weather, 90.2; Direction of the Wind, 85.5; Temperature, 89.9; Barometer, 87.1 per cent. By geographical districts they are: for New England, 87.9; Middle States, 90.9; South Atlantic States, 92.2; Eastern Gulf States, 87.9; Western Gulf States, 91.1; Lower Lake region, 84.7; Upper Lake region, 87.5; Tennessee and the Ohio valley, 88.8; Upper Mississippi valley, 84.9; Lower Missouri valley, 84.0; Northern Pacific coast region, 85.4; Central Pacific coast region, 86.8; Southern Pacific coast region, 100.0. There were 117 omissions to predict (35 being due to the absence of reports from the Pacific coast) out of 3,444 or 3.40 per cent. Of the 3,327 predictions that have been made, 61, or 1.83 per cent, are considered to have entirely failed; 59, or 1.77 per cent, were one-fourth verified; 342, or 10.28 per cent, were one-half verified; 464, or 13.95 per cent, were three-fourths verified; 2,401, or 72.17 per cent, were fully verified, so far as can be ascertained from the tri-daily reports.

**Cautionary Signals**—113 Cautionary Signals were displayed during the month, of which 107, or 94.7 per cent, were fully justified by winds of 25 miles per hour or over at, or within a radius of 100 miles of, the station. 73 Off-shore Signals were displayed, of which 69, or 94.5 per cent, were fully justified; 72, or 98.6 per cent, justified as to direction and 70, or 95.9 per cent, justified as to velocity. Forty-three of the Off-Shore were changed from Cautionary. 6 "Northwest" Signals displayed on the Lakes were all justified. 192 Signals of all kinds were displayed, of which 182, or 94.8 per cent, were fully justified. The above does not include signals ordered at display stations where the velocity is only estimated. Thirteen signals were ordered late.

The Northwest Signal referred to above was instituted by the following order:

WAR DEPARTMENT,  
OFFICE OF THE CHIEF SIGNAL OFFICER,  
WASHINGTON, D. C. November 18, 1880.

### CIRCULAR.

On and after January 1, 1881, an additional Cautionary Storm Signal will be displayed, as occasion may require, at all active Signal and Display stations of the Signal Service on the Lakes. This signal will be displayed at and on the regular place and staff, and will consist of a white flag with a black square in the centre, shown above a red flag with a black square in the centre by day, or a white light shown above a red light by night. This signal will be known as the "CAUTIONARY NORTHWEST SIGNAL," and will indicate, when shown, that at the port or place where displayed it is anticipated that the winds will be dangerous, and will blow from the north or west or from a direction between these points. The display of this signal will generally follow, and must be distinguished from the display of the usual "Cautionary Signal," *i. e.*, a red flag with a black square in the centre by day, or a red light shown at night, which retains, whenever shown, its usual meaning. *The display of either signal is always cautionary.* The "CAUTIONARY SIGNAL, *i. e.*, a red flag with a black square in the centre by day, or a red light at night, calls for caution in view of an approaching storm, and is "CAUTIONARY" WITH REFERENCE TO WINDS BLOWING FROM ANY DIRECTION.

The "CAUTIONARY NORTHWEST SIGNAL," *i. e.*, a white flag with a black square in the centre, shown above a red flag with a black square in the centre, by day, or a white light shown above a red light, by night, will indicate, when shown, that the storm disturbance is not considered as yet passed for the port or place where it is displayed, and that the winds