

Pike's Peak, 1st to 4th; 6th, 7th, 12th, 18th, 19th, 20th, 23d, 26th, 29th, 30th, 31st; Colorado Springs, 17th, 18th, 19th; Carson City, Nev., 22d on mountains west of station; Otego, Nev., no date; Summit and Truckee, Cal., no date; on summit of Mt. Washington, 2d, 6th.

Snow on Ground at end of Month.—Pike's Peak, 16.50 inches.

Hail-storms were of frequent occurrence in various parts of the country, the most destructive being reported as follows: Newtown, Pa., 28th, between 5 and 6 p. m., very violent, thousands of panes of glass were broken, vegetable gardens and fields of grain entirely destroyed, fruit trees stripped of blossoms and leaves, and in several cases of bark. Path of storm very narrow, in some cases being so sharply defined as to follow the highway committing damages on but one side. In some portions of the track hailstones as large as walnuts fell, covering the ground to a depth of two to three inches. Direction of storm path, southwest to northeast, length about six miles. Terrific hailstorms visited this section about the middle of May, in 1860 and 1869. Belle County, Tex., 28th, p. m., very violent, destroying crops and damaging buildings; especial injury was inflicted upon corn, cotton, and wheat. New Hackensack, N. Y., 31st, during afternoon, terrific storm, extending from this point to Fishkill Plains. All grain along the storm's path entirely destroyed and corn and young fruit killed. Storm lasted about 45 minutes. Some hailstones were two inches in diameter, and on the following morning hail was found in some places a foot deep. St. Clair, Mich., 14th, 3.30 p. m., rain fell in almost incredible quantities, and hailstones were as large as hickory nuts; a large quantity of window glass was broken and great damage done to fruit trees. Bellville, Mo., 14th, about 1 p. m., very violent; fruit trees and garden truck suffered severely; large quantities of window glass broken; much damage to farm crops. Brockway Centre, Mich., 14th, about 3 p. m., terrific storm of hail and wind, hailstones largest ever known to have fallen here, some measured $1\frac{1}{2}$ inches in diameter. Hardly a house in the track of the storm but had all the glass in the north and west sides broken out. Several buildings were blown down and great damage done to grain crops and fruit trees. Length of storm path about six miles, direction from southwest to northeast. Bloomfield, N. J., 22d, hail fell in great quantities and of large size, doing terrible damage to greenhouses, tender plants and strawberries. This storm was equally severe at other points in New Jersey, viz, Paterson, Orange and Irvington. La Mesilla, 18th, half inch in diameter. Colorado Springs, 17th, 3.10 p. m., lasting 15 minutes; stones one inch in diameter. Spearville, Kans., 1st, stones size of walnuts; much property destroyed. Ft. Davis, 2d, 4th, 26th, stones as large as quails' eggs. Highland Station, Tex., 8th, doing considerable damage to crops and window glass. Corsicana, 24th, hailstones as large as hickory nuts, great damage to growing crops. Macon, N. C., 18th, 10.07 to 11.45 a. m., completely destroying gardens and farm crops in vicinity. Nora Springs, Ia., 30th, stones varying in size from peas to filberts.

RELATIVE HUMIDITY.

The percentage of mean relative humidity for the month ranges as follows: New England, 71 to 89; Middle Atlantic States, 58 to 90; South Atlantic States, 59 to 81; Eastern Gulf States, 59 to 81; Western Gulf States, 66 to 77; Ohio Valley and Tennessee, 55 to 69; Lower Lake region, 62 to 75; Upper Lake region, 65 to 75; Upper Mississippi valley, 57 to 69; Missouri valley, 66 to 70; Red River of the North valley, 67 to 69; Texas, 31 to 76; Middle Plateau, 26 to 34; Southern Plateau, 24 to 39; California, 39 to 75; Oregon, 44 to 57; Washington Territory, Olympia, 68. *High stations* report the following percentages not corrected for altitude: Pike's Peak, 65.4; Santa Fe, 35.8; Cheyenne, 52.8; Denver, 52.2; Mt. Washington, 82.1.

WINDS.

The prevailing winds during May, 1881, at Signal Service stations, are shown on chart No. II by arrows which fly with the wind. Along the New England and South Atlantic coasts, and from the Ohio valley southeastward to the ocean, they were from the *northeast*; along the Middle Atlantic coast, from *southeast* to *southwest*; throughout the Mississippi valley and in Texas, *southeast* and *south*; in the Lake region, *variable*; in the Rocky Mountain region, *southerly*; over the Middle and Northern Plateaux and Northern Pacific coast region, *north* to *west*.

Total Movements of the Air.—The following are the largest total movements at Signal Service stations: Mt. Washington, 20,133; North Platte, 11,418; Pikes Peak, 11,269; Portsmouth, N. C., 10,870; Dodge City, 10,576; Hatteras, 10,526; Kittyhawk, 10,430; Chincoteague, 10,318; Delaware Breakwater, 9,665; Ft. Elliott, 9,206; Thatcher's Island, 9,196; New Shoreham, 9,007; San Francisco, 8,776; Cape Henry, 8,763; Bismarck and Stockton, 8,662; Moorhead, 8,659; Sandusky, 8,459; Eagle Rock, 8,026. The *smallest* are: Phoenix, 1,721; Memphis, 1,860; La Mesilla, 1,981; Florence, 2,164; Silver City, 2,324; San Antonio, 2,595; Uvalde, 2,611; Nashville, 2,663; Deadwood, 2,771; Indianapolis, 2,803.

High Winds.—Winds of 50 miles per hour and over were reported as follows: On summit of Pikes Peak, 10th, a violent hurricane prevailed, reaching a maximum velocity of 112 miles per hour at 12.15 a. m. of the 11th, when the anemometer cups were blown away. From this time

until 2.30 a. m. the wind increased in violence, reaching an estimated velocity of 150 miles per hour. On summit of Mt. Washington, 1st, 2d, 6th, 9th, 10th to 12th, 15th to 19th, 27th, 29th, 30th. Maximum velocity, 78 miles, NW. 2d. Ft. Keogh, 62, NW. 21st; North Platte, 56, S. 16th; Ft. Elliott, 52, NW. 7th, 8th; Ft. Sill, 60, SE. 8th; Decatur, 64, NE. 25th; Indianola, 56, N. 29th; Eastport, 55, NE. 17th.

Local Storms.—Near Pensacola, Fla., 24th, very violent, buildings blown down and many trees up-rooted; rain-fall excessively heavy; Carpenter's Creek overflowed and the ford on the Ferry Pass route was completely changed. McLenan Co., Texas, 28th, p. m., in southern part, several farm houses demolished and two persons killed; storm passed from SW. to NE.; in the northern part of the county, near Crawford, another violent wind storm passed from SW. to NE., unroofing and destroying buildings, and seriously damaging crops. Dallas, Tex., 30th, very violent, unroofing buildings; rain fell in torrents. Taylor, Williamson Co., Tex., 28th, p. m., very violent, lasting forty minutes; every building in the town more or less damaged, many were totally wrecked; in the county along the path of the storm fences were blown down and trees uprooted. Anna, Ill., 14th, heavy wind storm; portion of the Insane Hospital building blown down, and much other property damaged. Chester, Ill., 14th, terrific wind storm, much damage to property in lower part of town; roofs torn off and buildings demolished; considerable loss of property in surrounding country. Laurens Co., Ga., 14th, during the evening, tornado passed from NW. to SE. over the county, destroying everything in its path; the destruction of timber was almost unprecedented; where the storm cloud passed over an oat field, it literally tore up by the roots and carried away the grain over an area 125 yards wide, leaving the standing grain on either side unruflled; the storm was accompanied at many places by heavy hail. North Platte, 9th, twenty miles east of station, demolishing houses, windmills, and the U. P. R. depot. Laredo, 8th, unroofing buildings, blowing down signs, trees, &c. Gainesville, Tex., 28th, 7 p. m., blowing down houses, trees and fences. Montgomery, Ala., 31st, blowing down trees, signs and fences. Columbus, Ohio, 14th, 5 to 5.30 p. m., air filled with debris, buildings unroofed, trees, fences and signs demolished. Charlotte, N. C., 15th, 2.50 p. m., unroofing and blowing down large number of buildings, and committing other damage. Clay Center, Kan., 13th, six miles SE. of station tornado passed from SW. to NE., several buildings demolished. Yates Center, Kan., 16th, small tornado passed over Owl Creek Township, nine miles NE. of station, destroying two frame houses; direction of storm centre, SW. to NE. Westerville, Ohio, 14th, centre passed about one mile south of station in a northeasterly direction, blowing down trees, fences and buildings. North Lewisburg, Ohio, 14th, very violent; blowing down trees, buildings and fences; storm passed from SW. to NE. Milton, Pa., 10th, 6.30 p. m., unroofing buildings, up-rooting trees, and blowing down fences.

Water Spouts.—Mobile, 31st, observed in Mobile Bay at 4.30 p. m.; trunk was large and well-defined; moved from southwest to northeast; was visible for 10 minutes. Clay Centre, Kan., 17th, 18th, 19th.

Sand Storms.—Ft. Grant, 14th; Ft. Verde, 10th, 22d; Tucson, 6th to 10th; Camp Thomas, 5th, 6th, 10th, 14th, 19th, 22d, 24th, 25th, 30th; Ft. Yuma, Cal., 9th, 10th, 18th, 21st.

VERIFICATIONS.

Indications.—The detailed comparison of the tri-daily indications for May, with the telegraphic reports for the succeeding twenty-four hours, shows the general percentage of verifications to be 81.66 per cent. The percentages for the four elements are: Weather, 83.86; Direction of the Wind, 76.16; Temperature, 83.86; Barometer, 82.67 per cent. By geographical districts they are: For New England, 79.79; Middle States, 83.55; South Atlantic States, 87.33; Eastern Gulf States, 82.57; Western Gulf States, 88.08; Lower Lake region, 81.68; Upper Lake region, 75.84; Tennessee and the Ohio valley, 80.36; Upper Mississippi valley, 79.98; Lower Missouri valley, 79.90; Northern Pacific coast region, 75.00; Central Pacific coast region, 93.42; Southern Pacific coast region, 73.62. There were 85 omissions to predict (37 being due to the absence of reports from the Pacific coast) out of 3,813, or 2.28 per cent. Of the 3,728 predictions that have been made, 203, or 5.44 per cent, are considered to have entirely failed; 156, or 4.17 per cent, were one fourth verified; 501, or 13.47 per cent, were one-half verified; 421, or 11.29 per cent, were three-fourths verified; 2,447, or 65.63 per cent, were fully verified, so far as can be ascertained from the tri-daily reports.

Cautionary Signals.—24 Cautionary Signals were displayed during the month, of which 21, or 87.5 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. One Off-shore Signal was displayed, which was justified both as to direction and velocity. No Off-shore Signals were changed from Cautionary. 25 Signals of all kinds were displayed, of which 22, or 88.0 per cent, were fully justified. The above does not include signals ordered at display stations where the velocity is only estimated. 114 winds, of 25 miles or over, were reported, for which no signals were ordered. 7 signals were ordered late.