

ing same depression, very severe storms occurred over New York and New England, which were most destructive in a belt of country including the Mohawk and upper Hudson valleys, Massachusetts and Connecticut. They appear to have commenced in the Mohawk valley, about 1 p. m., where "a violent hurricane," seemingly about fifteen miles wide, passed over Herkimer, Fuller, Montgomery, Schenectady, Albany (2 p. m.) and Rensselaer counties, devastating orchards and leveling grain crops: a "violent storm" commenced at Coxsackie, Greene county, at 2:30 p. m.; Kingston and Saugerties, Ulster county, 4 p. m., "tornado," crops ruined, barns demolished, ice fell in large chunks." In *Connecticut*, at Shelton, "heavy storm," two men killed and two injured by lightning; off Long Island, boat capsized and two men drowned. *Massachusetts*—Pittsfield, 2:30 p. m., "tornado from west, three persons killed and four injured, buildings unroofed and blown down, storm took a course from NW. to SE., following along the valley, track not over sixty rods wide, in which hundreds of trees were leveled and buildings demolished;" Lanesboro', immense hail-stones, seven inches in circumference, great damage to crops, one person killed; West Stockbridge, one person killed; Springfield, 3:15 p. m., heavy storm; Northampton, 3 p. m., terrible storm, buildings and trees demolished, fearful wind, followed by heavy rain; Fitchburg, 3:35, "tornado, lasting three minutes," much damage to buildings and trees; Boston and vicinity, 4:17 p. m., severe wind and hail-storm, houses unroofed and one man killed; at Hull, captain of schooner washed overboard and drowned; off Baker's Island, sloop capsized and all on board drowned; off Salem, boy washed overboard and drowned; at Paddock's Island, man drowned; at Dover, town hall demolished and one man killed; at Brookline, church and town hall badly damaged; on Bird's Island flats, yacht capsized and six persons drowned; off Scituate, two boats capsized and three persons drowned; at Newton, trees uprooted and houses badly damaged; South Braintree, houses demolished and two persons injured; Lawrence, Essex county, storm began at 4 p. m., NW. gale for fifteen minutes. Taunton, Bristol co., 5:30 p. m., storm lasting five minutes, followed by two hours severe NW. gale. Nantasket, Norfolk co., "hurricane struck here at 5:30 p. m.," buildings demolished and six persons injured; near Governor's Island, two yachts capsized and five persons were drowned. In all thirty persons were drowned on that day in and around Massachusetts bay. Woods Holl, "tornado" or squall from 5 to 5:30 p. m. *Rhode Island*—Newport, between 5 and 6 p. m. "terrible storm of wind, rain and hail." Off Montauk Point, L. I., schooner Annie and Millard struck by lightning during heavy thunder-shower during Wednesday night. Schooner Agnes parted chains in Hamstead Harbor, L. I. Schooner Harriet Lewis, parted chains in Dutch Island Harbor, and several vessels lost sails and topmasts in Long Island Sound. On the 17th terrific thunder-storms, with heavy rains were reported in northeastern part of Texas, near Jefferson two horses were killed by lightning, and at Kildare a house was struck and one person killed; Chattanooga, Tenn., heavy storm, houses blown down; Portsmouth, Va., one person killed by lightning. On the 18th, off Point aux Trembles, 21 miles from Quebec, shortly before 9 p. m., yacht capsized and eight persons drowned. On the 23rd, accompanying low-area No. VI., at Smith Falls, Ontario, terrific thunder-storm, one person killed; Oakland, Ky., destructive wind-storm over northern section of county. On the 20th, accompanying low area No. VII., at Pittsburgh, Pa., a very violent storm of wind, with heavy rains, producing floods in the Youghiogheny, Monongahela and Alleghany valleys; at Philadelphia, Pa., heavy storm, houses unroofed. On the 28th, at Ft. Wallace, Kansas, a "violent NW. wind," and at McKinney, Tex., evening, "tornado" from the N., demolishing a church. 29th, Corsicana, Tex., "tornado" from west to east. 30th, Syracuse co., N. Y., "tornado" in southwestern part of county at 3 p. m., track three miles wide and ten miles long, lasting twenty minutes, deluge of water, crops much damaged.

VERIFICATIONS.

Indications.—The detailed comparison of the tri-daily weather indications for June with the telegraphic reports for the succeeding twenty-four hours, shows the general percentage of omissions to be 1.41 per cent, and of verifications to be 85.1 per cent. The percentages for the four elements have been, Weather, 97.3; Direction of the Wind, 87.0; Temperature, 82.4; Barometer, 87.3. The percentages of verifications by geographical districts have been: New England, 83.9; Middle States, 89.1; South Atlantic States, 82.3; East Gulf States, 80.8; West Gulf States, 82.5; Lower Lake region, 87.7; Upper Lake region, 86.3; Tennessee and the Ohio valley, 82.4; Upper Mississippi valley, 87.6; Lower Missouri valley, 85.0; Northern Pacific coast region, 91.7; Central Pacific coast region, 100; Southern Pacific coast region, 100. Of the 3,813 predictions that have been made, 149, or 3.91 per cent, are considered to have entirely failed; 116, or 3.04 per cent, were one-fourth verified; 423, or 11.09 per cent, were one-half verified; 457, or 11.99 per cent, were three-fourths verified; 2,614, or 68.55 per cent, were fully verified, so far as can be judged from the tri-daily weather maps.

Cautionary Signals.—98 Cautionary Signals were displayed during the month, of which 82, or 83.7 per cent., were justified. No Cautionary Off-shore Signals were displayed. The above does not include signals ordered at 47 display stations where the velocity is only estimated and not measured.

NAVIGATION.

Stage of Water in Rivers.—In the table on the right-hand side of chart No. III are given the highest and lowest readings of the Signal Corps river gauges for the month, with the dates. With one exception (Omaha from the 1st to the 4th) the rivers at the Signal Corps stations have not reached the danger line during the month. The Red River at Shreveport and the Missouri at Yankton, Omaha and Leavenworth have continued to fall slowly throughout. The Mississippi has fluctuated considerably but continued in a good

navigable state throughout. The Ohio at Pittsburgh continued low (between 1 foot 0 inches and 2 ft. 6 in.) from the 1st to the 12th, when it rose to 4 ft. 8 in. by the afternoon of the 13th, it then gradually fell to 0 ft. 7 in. on the 23d, (lowest of the month) but rose to 7 feet 6 in. (highest of month) on the 27th; at Cincinnati and Louisville the river continued quite low, and without much change, throughout month. The Cumberland at Nashville, the Tennessee at Chattanooga, and the Monongahela at Morgantown, remained low throughout month, except the flood in latter on the 26th, which is noted under its appropriate heading. The Savannah continued below 4½ ft., except on the 19th and 20th, when it rose to 5 ft. 9 in., and on the 30th, when it rose to 9 ft. 6 in. The observer at Fayetteville, N. C., reported the Cape Fear river lower this season than at any time for the past ten years, the water at one time being so low that steamers could not get within nine miles of the city. The heavy rains during latter part of month caused a rise of about 15 feet. The observer at New Westminster, B. C., reported the Frazier river very high on the 25th, when it was 11 ft. 1 in. above low water.

TEMPERATURE OF WATER.

The *temperatures of water*, as observed in rivers and harbors, with average depth at which the observations were taken, are given on chart No. II. The observations at San Francisco were interrupted from the 19th to the 31st on account of breakage of thermometer.

ATMOSPHERIC ELECTRICITY.

Thunder-storms.—Thunder-storms have occurred in too large numbers during the month to allow of their being enumerated in detail. An examination of the storms, after being charted, shows that the greatest average number prevailed in the Middle Rocky Mountain slope, where from five stations an average of eight storms is reported. The Middle Atlantic and Lower Missouri valley and Lower Lakes average five, while New England, Upper Missouri valley, Upper Lakes and Eastern Gulf range from an average of four to four-and-a-half. Very few of these storms were reported from the Western Gulf, the Plateau districts and the Northwest, and none are reported from the Pacific coast.

Auroras.—The most extensive aurora of the month occurred on the 24th, being reported from New England as far south as Westborough, Mass., New York and several points in Dakota. Cloudy weather from Lake Erie to Lake Superior, occurring at that time, prevented observations in those districts. Its appearance and disappearance must have been nearly simultaneous from New England to Dakota, it being noted at 10 p. m. in both sections, and disappeared only at dawn. At Burlington, Vt., it was reported to have an arch of emerald green, with a few very brilliant streamers; its color was noticeably green at both Burlington and East port, and no rose spots seen. Mt. Washington observer, however, reported it as pale yellow, with streamers of deeper hue. At Buffalo its color was faint white. An aurora is reported from Milton, and Wills borough, Penn., on the 25th. On the 16th at Vevay, Ind., maximum brilliancy at 11:45 p. m.; on the 17th at Vevay and New Corydon, Ind., and Mt. Solon, Va.; on the 19th at New Corydon, Ind., at 10 p. m., and at Monticello, Iowa.

Magnetic Variation.—Prof. F. Hess reports the variation of the magnetic needle near Pagosa Springs, Col., July 2nd, as 14° 24' east, and on the 18th, near the Blanco river, Col., 14° 32'.

Atmospheric Electricity Interfering with Telegraphic Communication at Santa Fe, N. M., from the 7th to the 11th, and from the 18th, excepting the 21st, daily to the 28th inclusive; 10th, violent electrical storm on the summit of Pikes Peak, causing hair to stand out; for a considerable time buzzing noises emitted from all metallic substances; 12th, at Sloop Point, N. C.

OPTICAL PHENOMENA.

Solar halos.—Solar halos are reported in very considerable numbers from New England, the Lower Lakes, Ohio valley, and Upper Mississippi; but three are reported from the South Atlantic States, three in the Gulf States and one in the Northwest. Elsewhere none prevailed or have not been deemed worthy of report. A remarkable solar halo, a report of which was received too late for the JUNE REVIEW, occurred on June 4th, at Port Blakely, Wash. Ter. The sun was surrounded by four distinctly marked rings, the two inner, which were perfectly round, displayed rain-bow colors, the third oval, and the fourth round in form, were white. A huge circle, also of rain-bow hues, passing through the sun's centre, intersected the rings described. A mock sun of blinding brilliancy appeared at the intersection of this outside circle with the lower half of the oval ring. The phenomenon continued for more than an hour.

Lunar halos.—These were reported in considerable numbers, especially in the sections south of 38° north and east of 100° west, where, however, only eight solar halos were reported. But two were reported west of the hundredth meridian, one at San Diego, and one at Santa Fé, and but four in the entire Lake region and Northwest.

MISCELLANEOUS PHENOMENA.

Polar Bands.—10th, at Tabor, Ia.; 7th, 11th, 16th, 27th, at Gardner, Me.; Cape Vincent, N. Y., on 24th; Jacksonsburg, O., on the 12th.