

PRECIPITATION.

Upon chart No. III is represented the amount of rain-fall and melted snow. At Jacksboro, in northern Texas, several sprinkles were reported, but not sufficient to measure; same from Ft. McKavett, northwest of San Antonio, Texas. Stations reporting less than one-tenth of an inch: Wickenburg, A. T., 0.01; Muri-copa, A. T., 0.08; Yuma, Cal., 0.09; Ft. Larned, Ks., 0.08; Breckenridge, 0.03; Pembina, 0.06.

Total snow-fall during the month: For northern New England it varies from 14 to 31 inches; southern New England, 9 to 24; New York, 11 to 48; Middle Atlantic States, 1 to 26; Lower Lake region, 9 to 35; Upper Lake region, 4 to 37; Ohio valley, 4 to 21; Tenn., 5 to 17; N. Car., 1.5 to 22; Miss. and La., 2 to 15; Arkansas, 1 to 4; Upper Miss. valley, 4 to 17; Lower Mo. valley, 4 to 21. *Depth of snow at close of month*: northern New Eng., 24 to 44 inches; southern New Eng., 4 to 20; Middle States, 0 in southern portion to 32 in northern New York; Lower Lake region, 0 in western portion to 32 in eastern portion; lower Ohio valley, none; the Northwest, none in southern portions, 4 in southern Minn. and southeastern Dakota.

Cloudy Days.—The number of days on which the cloudiness has averaged eight-tenths or more, as reported by the Voluntary Observers, ranges for New England from 5 to 13; Middle States, 5 to 17; South Atlantic States, 4 to 13; Gulf States, 5 to 17; Ohio valley to the Upper Lake region, 5 to 20; the Northwest, 2 to 15.

The number of days on which *rain* or *snow* has fallen, ranges as follows for the Signal Service stations: New England, 7 to 18; Middle Atlantic States, 10 to 16; South Atlantic States, 6 to 16; Eastern Gulf States, 9 to 16; Western Gulf States, 8 to 18; Ohio valley and Tennessee, 12 to 17; Lower Lake region, 14 to 23; Upper Lake region, 4 to 23; Northwest, 4 to 12; Rocky Mountains stations, 5 to 14; California coast, 6 to 9. Along the Lakes the precipitation in the form of snow has frequently been very light, and at times not sufficient to measure. During severe snow storms it is a difficult task to measure the precipitation, therefore Chart No. III is only an approximation for the northern sections of the country.

Droughts.—Scarcity of water at Keokuk on the 4th. Dumbarton and Contoocookville, N. H., water very scarce, some farmers being compelled to melt snow to get water for stock. Pennville, Pa., during first half of month, streams very low. West Charlotte, Vt., drought continued all the month; no rain until February 1st. North Argyle, N. Y., drought not allayed 18th.

RELATIVE HUMIDITY.

The average relative humidity for the month, as reported from the Signal Service stations, ranges as follows: in New England, 69 to 79 per cent; Middle Atlantic States, 73 to 84; South Atlantic States, 72 to 83; Gulf States, 70 to 80; Indian Territory, Arkansas, Tennessee and the Ohio valley, 67 to 76; Lower Lake region, 72 to 80; Upper Lake region, 67 to 82; Northwest, 66 to 79; plains of Kansas and Nebraska, 74 to 81; Rocky Mountain stations, 47 to 75; San Diego and San Francisco, 66; Portland, Or., 74; Mt. Washington, 87.

WINDS.

Prevailing Winds.—These are shown upon Chart No. II, the arrows flying with the wind. At Fort Sully they have blown most frequently from the NW.; Portland, Or., S. The *maximum* hourly velocities have been given in the description of the movements of high and low pressure-areas.

Total Movements of the Air.—The following are the largest total movements, as recorded at the Signal Service stations: Pike's Peak, 19,663 miles; Thatcher's Island, 12,084; Sandy Hook, 11,372; Cape May, 11,213; Cape Lookout, 10,960; Kitty Hawk, 10,720; Grand Haven, 10,096; Cheyenne, 10,052. The smallest movements have occurred at the following stations: Nashville, 1,889 miles; Lynchburg, 2,031; Augusta, 2,153; Shreveport, 2,741; San Diego, 2,816; Baltimore, 2,903; Knoxville, 2,929. On Mt. Washington it has been impossible to obtain a continuous record.

VERIFICATIONS.

Indications.—As worked up three times daily, and issued to the public, they have been carefully compared with the actual conditions during the succeeding twenty-four hours, and the following result obtained, viz: the percentage verified averages 91.8 for New England; 89.0, Middle States; 85.4, South Atl. States; 84.8, Eastern Gulf States; 85.5, Western Gulf States; 88.0, Ohio valley and Tennessee; 90.5, Lower Lake region; 88.1, Upper Lake region; 89.0, Upper Miss. valley; 89.0, Lower Mo. valley. For the whole country the average verified is 88.2 per cent. There were 7 omissions to predict out of 3,721, or 0.18 per cent.

Cautionary Signals.—Grand Haven and Milwaukee are the only stations along the Lakes at which signals were displayed, owing to the suspension of navigation. Out of 229 ordered to be displayed along Lake Michigan, the Atlantic and Gulf coasts, 172 were justified, 13 were lowered too soon, 1 was ordered late, and 57 were reported not justified. From scattered stations 27 cases were reported, in which the hourly wind velocity reached 25 miles and over, without the display of signals, except on the 24th from the Middle Atl.

and New England coasts, when high westerly winds prevailed at nearly all of them, while signals had been ordered for the exposed stations alone.

NAVIGATION.

Height of Rivers.—Upon chart No. III is a table giving the highest and lowest water-marks, with the dates upon which they occurred. The *Red river* rose slowly, but steadily, at Shreveport, from 4 ft. 5 in., 1st, to 11 ft. 8 in., 31st. In the *Arkansas*, at Little Rock, the fluctuations were very slight, and the water continued low; it was frozen over the 8th. The *Missouri* and *Upper Mississippi* continued frozen over and low the entire month. *Lower Mississippi.*—Navigation suspended between Memphis and Cairo till the 14th, when the ice-gorges passed off. Below Cairo the rise continued to the close of the month, due to the water from the Ohio, Cumberland and Tennessee rivers. From Cairo to St. Louis the ice blockade continued at the end of the month. *Cumberland.*—The ice-gorges below Nashville moved down on the 10th and 11th, after which navigation was resumed. *Tennessee.*—At Paducah the ice-gorge moved out into the Ohio the 15th. *Alleghany.*—Closed during the month. *Monongahela.*—Ice-gorges passed off on the 13th and 14th, with great destruction. *Ohio.*—At Cairo the river was clear on the 12th. The ice-gorges moved some on the 9th at Ironton, O.; 12th and 13th, at Cincinnati. On the 14th there was a general movement of the ice from Pittsburgh to Paducah, which commenced passing Cairo the 15th, after which the resumption of navigation took place. The loss of property above Louisville was very heavy in the shape of steamers, barges, coal, &c. *Potomac.*—At Georgetown, D. C., the ice-gorge gave way the 18th, damaging vessels and property along the banks. *Hudson.*—At Garrison's, opposite West Point, has remained open, but above and below teams cross on the ice.

TEMPERATURE OF WATER.

As heretofore, the maximum and minimum temperatures alone, with the average depth of the water, are given in the table on chart No. II.

ATMOSPHERIC ELECTRICITY.

Thunder-storms.—1st, Daytona, Fla.; St. Mary's, Ga. 7th, Howard, Neb. 8th and 12th, Fayette, Miss. 14th, Santa Fe; Sedgewick, Kan. 15th, St. Louis; Anna, Ill.; Brookhaven, Miss.; Weldon, N. C.; Jackson, Tenn. 17th, Mobile; Fayette, Miss. 18th, Montgomery. 20th, Galveston. 21st, Charleston; Galveston; Tybee Island, Ga.; New Orleans. 22nd, Tybee Island; New Orleans; Fayette, Miss. 23rd, Aiken, S. C. 25th, Melissa, Tex. 28th, San Bernardino, Cal. 30th, Stanley, Kan.; Starkey, N. Y.; Oregon, Mo.

Distant Lightning.—13th, Fayette, Miss. 17th, Montgomery. 19th, Jackson, Tenn. 20th, Atlanta. Ga. 21st, Savannah. 27th, Portsmouth, N. C.

Auroras.—6th, Cornish, West Waterville, Surry, Gardiner, Standish and Orono, Me; St. Paul, Duluth, Breckenridge and Minneapolis, Minn.; Malone, N. Y.; Fort Pembina and Bismarck, Dak.; West Charlotte, Vt. 7th, Gardiner, Me.; Minneapolis, St. Paul and Duluth, Minn.; Escanaba; St. John's, N. F. 8th, Escanaba. 13th, Wappinger's Falls, N. Y. 14th, Gardiner, Me.; Waltham, Mass.; North Argyle, N. Y.; Fort Pembina, Dak. 15th, Duluth; Fort Pembina, Dak. 16th, Fort Brady, Mich. 19th, Denver. 20th, Hillsboro, Ohio.

Electric Ground Currents.—The observer at Barnegat, N. J., reports strong electric currents on the 17th; the telegraph line was working at 6 p. m., although grounded north and south.

OPTICAL PHENOMENA.

Solar Halos.—1st, Iowa, Minn., N. H., N. Y., Penn. 2nd, Iowa, N. Y., Penn. 3rd, Ill., N. Y. 4th, Me., Neb., Vt. 5th, Dak., Ill., Ind., Mich., Minn., Neb., N. Y., Ohio. 6th, Cal., Ill., Mass., Mich., N. Y., Ohio, Vt. 7th, Iowa, La., Minn., Miss., Neb. 8th, Dak., Ill., Mass., Minn., N. H., R. I. 9th, Conn., Ind., Mich., Minn., Neb., Ohio, Penn. 10th, Mass., Minn., R. I., Tenn. 11th, Iowa, Me., Mass., Neb., N. H., N. J., N. Y., Penn. 12th, Me., Neb., N. J., N. Y., Vt. 13th, N. H., Vt. 14th, Dak., Ill. 15th, Col., Dak., Ga., Iowa, Neb., S. C. 16th, Dak., Ga., Ill., Mich., S. C. 17th, Me., Minn., Neb., N. H., N. Y., R. I. 18th, Minn., Neb. 19th, Col., Dak., N. Y., Va. 20th, Dak., Ga., Iowa, Minn., Neb. 21st, Iowa, Kan., Minn., Neb., N. Y., Ohio, S. C. 22nd, Col., Ind., Ohio. 23rd, Can., Iowa, Minn., Penn. 24th, Iowa, N. Y. 25th, N. J., N. C., Ohio, S. C., Vt. 26th, Me., N. H., Vt. 27th, Ill., Texas. 28th, Ill., Me., N. H., N. Y., Tenn., Vt. 29th, Ill., Mich., Minn., N. Y., Tenn. 30th, Ill., Ind., Mich., Ohio. 31st, Ala., Me., Minn., Miss., N. H., N. Y., Tenn.

Lunar Halos.—1st, Dak., Iowa, Penn., Tenn., Va. 2nd, Ill., Iowa, Minn., N. Y., N. C., Tenn., Wis. 3rd, Dak., Iowa, Ohio, Tenn. 4th, Vt. 5th, Ind., Mo., Neb., N. J., Ohio, Tex. 6th, Cal., Mass., N. H.,