

road track and the river; crevasse 50 feet wide and several feet deep; no change at East St. Louis. 6th, Madison levee broke about 4 a. m.; crevasse 50 feet wide; the settlements of Canteen and Indian creeks flooded; about 15,000 acres of farming land under water. Hannibal, 6th, the break in the Sny levee stopped during the night; water in the submerged districts receded ten inches within an hour. *Nebraska*: Omaha, 13th, very heavy rains; streets and cellars flooded. *Wisconsin*: La Crosse, 2d, river 11 feet 7 inches above low-water mark, and rising slowly; both railroad tracks covered with water; all traffic stopped; river filled with old snags, piles of brush, logs and driftwood; current very rapid.

## 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. III. Owing to breakage of instruments, observations are wanting of follows: Savannah, 1st to 12th; San Francisco, 1st to 31st.

## ATMOSPHERIC ELECTRICITY.

*Thunder-storms.*—In the various districts they were reported on the following dates: New England, 2d, 5th, 6th, 8th to 13th, 15th to 18th, 22d to 24th, 25th, 27th, 29th, 30th, 31st. Middle Atlantic States, 2d, 9th, 10th to 16th, 20th, 21st, 22d, 26th to 31st. South Atlantic States, 2d to 4th, 6th, 10th, 13th to 17th, 19th, 22d to 25th, 28th to 31st. Florida, 2d, 5th, 6th, 14th, 15th, 20th, 22d, 26th to 31st. Eastern Gulf States, 1st to 11th, 14th, 15th, 21st to 26th, 29th, 30th, 31st. Western Gulf States (including Texas), 1st to 12th, 16th to 31st. Ohio valley and Tennessee, 1st to 10th, 12th to 14th, 22d to 24th, 26th to 31st. Lower Lake region, 5th, 8th to 14th, 28th, 31st. Upper Lake region, 7th to 9th, 11th to 14th, 26th, 27th, 29th, 31st. Upper Mississippi valley, 1st, 2d, 4th, 7th to 14th, 16th, 19th, 21st to 31st. Lower Missouri valley, 1st to 23d, 26th to 31st. Southern Slope, 1st to 3d, 12th to 15th, 17th, 18th, 22d, 24th, 25th. Middle Slope, 1st, 6th, 8th, 9th, 10th, 15th, 16th, 23d to 26th, 28th to 30th. Northern Slope, 3rd, 4th, 6th, 8th, 9th, 10th, 15th, 22nd, 24th to 31st. Southern Plateau, 14th, 15th. Middle Plateau, 9th, 10th, 15th. Northern Plateau, 3rd, 4th, 8th, 12th, 20th, 22nd, 27th, 30th. Southern Pacific Coast region, 14th, 15th, 16th, 17th. Middle Pacific Coast region, 1st, 15th, 21st to 24th. Northern Pacific Coast region, 27th.

The following items of interest connected with the peculiar manifestations of electricity during the progress of thunder-storms were obtained from various sources: Manhattan Beach, Coney Island, N. Y., 12th, late in the afternoon a thunderbolt descended among a gang of 15 laborers, killing one of them instantly, seriously injuring another, whose hair was almost entirely burned off, and severely stunning the remainder. Hartford, Conn., 12th, six barns and one house struck and burned; loss about \$12,000. Columbia, S. C., 31st, atmosphere appeared to be unusually charged with electricity. One explosion after another followed in quick succession, and at times the heavens seemed to be on fire. One residence was struck, the electricity making quite a hole in the roof and scattering the shingles in the street. The wainscoting and cornices in the parlor were knocked from their places and broken and the papering was scorched and smoked. The ceiling above was perforated at two points on opposite sides of the room. The current descended the lightning-rod, tore up the pavement in the yard scattering the bricks about and bursted the water pipe in the basement. The water main in the middle of the adjoining street, and over 30 feet from the house, was broken in three places, causing the water to rush out in great force. Several persons were more or less stunned. Fort Stockton, Tex., 17th, infantry quarters struck, tearing the plaster from the walls and slightly injuring one man; 18th, the lightning knocked a gun from the hands of one of the men, throwing it several yards away; an officer, while crossing the parade ground at the same time, received a slight shock and was obliged to cast away his sabre to prevent the electricity from playing around him. Boston Mountain, Ark., 14th, two men killed while plowing in a field, the stroke fracturing every bone in their bodies. Springfield, Dak., 26th, two buildings struck; in the first, the electricity passed down one of the chimneys, forcing out the gable end of the building; it then proceeded through the floor into the kitchen, tearing the plastering off the ceiling and turning a large cook stove completely around. The second building was struck upon the ridge, the electricity passing downward through the centre of the house, carrying away the whole front end. The occupants of both houses received but slight shocks. San Antonio, Tex., 5th, switch boards damaged by lightning; stable and horses burned. Galveston, 8th, several persons severely shocked. St. Paul, 14th, barn struck, killing 25 horses, several other buildings damaged. La Crosse, 28th, church spire entirely demolished. Memphis, 22d, struck iron foundry, completely destroying new lightning-rod. Albany, 25th, several buildings shattered. Boston, 30th, barn struck, several persons killed and injured. Fallston, Md., 31st, two miles northeast of station, barn struck and burned. horses and cattle killed in the field. Cincinnati, 11th, several buildings struck. Columbia, S. C., 28th, two women struck, tearing the shoes from the feet of one of them, but neither were killed.

*Atmospheric Electricity Interfering with Telegraphic Communication.*—Ft. Keogh, 31st, lighting very vivid and almost continuous, but no audible thunder, had to cut out instruments. Deadwood, 24th, 25th, 26th; Ft. Griffin, 24th, 25th; Jacksboro, 3d, 4th, 11th, 26th to 28th; Eagle Pass, 4th, 5th, 7th, Castroville, 5th to 7th, 17th, 18th, 28th, 29th; San Antonio, 28th, 29th; Ft. McKavett, 3d, 17th, 18th; Brackettville, 3d, 4th, 5th, 7th, 18th; Ft. Elliott, 12th; Mt. Washington, 10th.

*Ground Currents.*—Dayton, Wash. Ty., 30th; Deadwood, 23d.

*Auroras.*—No auroral manifestation of particular importance was observed during the month, save, perhaps, that of the 15th, which extended from northern Michigan to southwestern Dakota, and northward to Manitoba, five intervening stations reporting. The display began about 9 p. m. and ended between 10.30 and 11 p. m. The following were local displays: Woodstock, Vt., 9th, 3 a. m., seen through broken clouds. New Haven, 24th, 7.30 to 9 p. m., was seen in the northeast, altitude 30°. Rochester, 12th, 11.40 p. m. to 2 a. m. of the 2d, at times flashes of light would illumine the heavens, alternating with heavy darkness, produced by the interference of clouds; no segment visible. Alpena, 4th, from 8.10 to 8.50 p. m., diffuse light, without streamers; 16th, 8.15 to 10.30 p. m., faint beams, altitude from 15° to 40°, width about 1°, apparently moving from west to east; 18th; 8 to 9.15 p. m., diffuse light, without streamers. Cresco, Ia., 16th, 9.25 to 10 p. m., faint beams between north and northeast. Mission House, Wis., 15th, 24th and 28th, very dim, altitude about 30°, no cloud below arch.

*Zodiacal Light.*—Wabash, Ind., 16th; Cresco, Ia., 15th and 16th; Clinton, Ia., 14th, 15th, 16th and 17th; Monticello, Ia., 15th, 17th, 19th and 22d; Clear Creek, Neb., 16th and 24th; Atco, N. J., 15th, 26th, 28th and 29th; Nashville, 15th, 17th, 19th, 20th, 26th, 27th and 28th.

## OPTICAL PHENOMENA.

*Solar halos* have been observed in the various districts on the following dates: New England, 1st to 5th, 12th to 14th and 29th. Middle Atlantic States, 1st to 5th, 11th and 12th. South Atlantic States, 11th, 25th and 30th. Florida, 20th and 31st. Eastern Gulf States, 4th, 7th and 19th. Texas, 15th. Ohio valley and Tennessee, 1st, 3d to 6th, 10th, 12th, 13th, 20th, 21st and 24th. Upper Lake region, 1st to 4th, 6th, 9th, 11th and 12th. Lower Lake region, 1st, 2d and 5th. Upper Mississippi valley, 3d, 5th, 10th, 20th, 21st, 24th and 26th. Middle Slope, 3d to 6th, 9th, 13th, 24th and 27th. Middle Plateau district, 4th to 8th, 14th, 24th and 29th to 31st. Northern Plateau district, 1st to 3d, 7th, 10th to 12th, 20th, 23d, 29th and 31st. Northern Pacific Coast region, 2d, 6th, 10th, 11th, 17th, 18th, 20th and 29th, 30th. California, 2d, 4th, 7th, 11th, 15th, 19th, 20th, 23d, 26th, 29th and 30th.

*Lunar halos* have been observed in the various districts on the following dates: New England, 5th, 8th and 11th. Middle Atlantic States, 3d, 4th, 7th, 8th, 10th to 13th, 29th and 31st. South Atlantic States, 12th and 13th. Eastern Gulf States, 3rd, 4th, 6th, 7th and 10th. Western Gulf States and Texas, 3d to 9th, 11th to 13th and 31st. Ohio valley and Tennessee, 3d to 6th, 8th, 12th and 13th. Lower Lake region, 1st, 4th, 6th, 8th, 10th and 31st. Upper Lake region, 1st to 4th, 12th. Upper Mississippi valley, 5th, 6th, 7th, 10th, 13th and 14th. Lower Missouri valley, 6th and 16th. Southern Plateau, 3d, 4th, 5th, 7th, 8th and 9th. Northern Pacific Coast region, 3d, 6th and 22d. California, 4th, 7th, 11th and 15th.

*Polar Bands.*—New Corydon, Ind., 3d; Gardiner, Me., 1st; Fayette, Miss., 12th; Almota, Wash. Ty., 17th; Memphis, 12th.

*Mirage.*—Indianola, 14th, 15th, 17th, 19th and 31st. Milwaukee, 18th, very beautiful, was witnessed over Lake Michigan; ships could be seen, apparently sailing in the sky with masts pointed downward. The distance of the vessels must have been great, but the reflection showed them as plainly as if they had been in close proximity. New Haven, 12th, very beautiful, magnifying the vessels at anchor: the hull of an incoming brig appeared in the distance 40 feet high.

## MISCELLANEOUS PHENOMENA.

*Meteors.*—Almota, Wash. Ty., 18th. Boise City, 3rd. Ft. Stevenson, 2d, very brilliant observed about 8 p. m. in the southern heavens; first appeared about 5° above the horizon and inclined south and downward; its flight lasted about 5 seconds, leaving a faint train; in size, it was apparently, nearly equal to that of the full moon. Fredericksburg, Tex., 22d, 10:10 p. m., altitude 45°, direction from northwest to southeast; as it passed along it gave a light much brighter than the stars, leaving a trail of dark blue color and exploded apparently into three balls of fire. Davenport, 22d. Washington, D. C., 9th, 9:45 p. m., appeared 45° above southeastern horizon, pursued a northwesterly course through zenith; extent of its visible path was about 20°. Wood's Holl, 3d, 2:10 a. m., from east to west. Woodstock, Md., 17th, 9 p. m.; 23d, 9 p. m., from southeast to northwest; 24th, 8:35 p. m., from west to east. Williams-town and Fall River, Mass., 13th. Thornville, Mich., 27th. Fayette, Miss., 1st. Atco, N. J., 22d, 24th. North Volney, N. Y., 23d. Waterburg, N. Y., 2d. Little Mountain, Ohio, 7th. Mission House, Wis., 2d.

*Earthquakes.*—La Salle, Ill., 25th, during the night a slight shock was distinctly felt in the manufacturing area, between the bluffs and the canal, in the southwestern part of the city. Six fissures, measur-