

*Cautionary Signals.*—During the past month 163 Cautionary Signals have been displayed at 47 stations on the Gulf and Atlantic coasts, and on the Lakes, of which 94, or 58 per cent., were reported verified within 100 miles of the station. Thirty-one cases of high winds, where no signals were displayed, have also been reported from these stations.

## NAVIGATION.

*Stages of water in rivers.*—In the table, on Chart No. III, are given the highest and lowest readings on the river gauges for the month, from which it will be seen that the central Mississippi fell from the middle of the month steadily to the end, the fall at St. Louis and Keokuk being about four feet; similarly the Missouri also fell throughout the month by about one foot at Yankton, and two feet six inches at Leavenworth. The water has been at some stations remarkably low.

*Low Water*, detrimental to navigation, has been reported as follows: *Mississippi*, 16th, Keokuk, Iowa, river low, delaying light draft boats; 22d, river still falling, canal closed; reports of low water at St. Louis and Alton. 30th, Shreveport, steady fall in river during month, navigation obstructed; reports of low water also come in from the Ohio at Evansville and Louisville.

*Special Phenomena.*—On the 21st, just before day-break, a wave, two feet high, similar to the earthquake waves in the Atlantic and Pacific oceans, swept across Lake St. Clair, from west to east. On the 24th, at Marquette, Mich., between 10 a. m. and 3 p. m., the wind being light from the SE, the water in the Lake fell fifteen inches.

## TEMPERATURE OF WATER.

*In General.*—The temperatures of water, as observed in rivers and harbors, are shown in the table on Chart No. III.

*Maximum and Minimum Temperatures.*—The highest maxima have been 90° at Galveston, 88° at Wilmington, 86° at Mobile and Augusta, 85° at Montgomery, 84° at Charleston and Savannah, and lowest minima have been 45° at Duluth, 46° at Eastport, 55° at Portland, Me., 56° at Marquette, 58° at Alpena and Escanaba, 59° at San Francisco.

*Ranges of Temperature.*—The least ranges have been: 2° at San Francisco; 3°, Eastport; 4°, Marquette; 6°, Portland, Me., Wood's Holl, New London, Buffalo and La Crosse; and largest ranges have been 20°, Galveston and Wilmington; 21°, Duluth.

## ATMOSPHERIC ELECTRICITY.

*Thunder-storms* were reported at stations in the respective States as follows: 1st, Ala., Nev., Conn., Ill., Kan., Miss., Mo., N. J., N. C., Pa., Tex., Va., W. Va., Fla., Tenn., Ga., Ind. Ter. 2nd, Col., Wyo., Fla., Mich., Miss., N. Y., Tex., N. C. 3rd, Dak., Col., Kan., Me., N. Y., Tex., La., Ariz. 4th, Dak., Col., Mich., Miss., Tex., Wis. 5th, N. Y., Col., Iowa, Me., Miss., Neb., Tex., Vt. 6th, Ga., Iowa, Me., Miss., N. Y., N. C., Tex., Wash. Ter. 7th, Dak., Wyo., Fla., Iowa, Miss., S. C., N. C., Fla., Ga., Minn. 8th, Col., Dak., Kan., Mo., Neb., N. J., Tex., Ind. Ter., Ga. 9th, Ga., Ill., Miss., Mo., Tex., Fla. 10th, Fla., Ga., Ind., Mich., Miss., Ohio, Tenn. 11th, Cal., Fla., Ga., N. C., Pa., Tex., W. Va., Ariz. 12th, Dak., Wyo., Md., Miss., Mo., N. J., N. C., Ohio, Pa., Tex., Utah, Va., W. Va., N. Y., La., D. C. 13th, Dak., Wyo., Fla., Ill., Kan., Md., Miss., N. J., N. Y., N. C., Ohio, Tex., Va., W. Va., S. C., Ga., D. C., Minn. 14th, Dak., Ill., Iowa, Kan., Md., Miss., Mo., Neb., N. C., W. Va., Ga., Wis., Ind. Ter., Tex. 15th, Dak., Va., Ill., Iowa, Ky., Md., Miss., N. C., Pa., Tex., S. C., Ga., Ind. 16th, Ill., Ind., Me., Mass., N. Y., Tenn., Va., Ky. 17th, N. Y., Va., Ind., Me., Md., Miss., N. J., Ohio, Pa., Tex., Vt., W. Va., Ind. Ter., D. C. 18th, Iowa. 19th, Fla. 20th, N. Y., Ga., S. C., N. C., Fla. 21st, Col., Me., Mass., N. Y., Ga. 22nd, Dak., Ga., Me. 23rd, Dak., Neb., Col., Ga. 24th, Neb., Iowa, Wis., Mich., Dak., N. Mex. 25th, Tex., Ill., Iowa, Kan., Mich., Mo., Wis., Ind. Ter., Neb. 26th, Dak., Iowa, N. Y., Me., Mich., Neb., Ohio, Pa., Vt., Wis., Mo., Ga., Tex. 27th, Conn., N. Y., Wis., Tenn., Mich., Ala. 28th, N. Y., Pa., Vt., N. C., Mich. 29th, Mich., Wis. 30th, Iowa, Neb., Wis.

*Distant Thunder and Lightning* was reported from stations, in the respective states, as follows: 1st, Ga., Kan., Md., Mass., N. Y., Pa., S. C., Ind. Ter., La., Tex. 2nd, Md., Mass., N. C., Va., Ga., La., Tex. 3rd, Tex. 4th, Iowa, Neb., Wis., Dak., N. Mex., Minn. 5th, Me., Mass., Ga., Tex. 6th, Ga., Mich., N. C., La., Dak. 7th, Neb., S. C., Pa., Ga. 8th, Md., Tex. 9th, Tenn., La., Me., Tex. 10th, N. C., Ohio, Tex., Ind. 11th, N. C., Ohio, S. C., Ga., Ind. Ter., Tex. 12th, Md., N. C., S. C., Ga., Iowa, Tex. 13th, Iowa, Neb., Ohio, Ga., Dak., Minn. 14th, Md., Va., Iowa, Ind. Ter., Dak. 15th, Tenn., Wis., Ga. 16th, Ill., Ind., Kan., Mo., Tenn., Ohio, Iowa, Ind. Ter. 17th, Va., Ohio. 19th, Ga. 20th, Utah. 23rd, Fla. 24th, Wis., Wyo., Neb. 25th, Ill., Iowa, Kan., N. Y., Wis., Vt. 26th, Ill., Iowa, Kan., Wis. 27th, Mo., Ga. 28th, Md. 30th, Ill., Mich., Wis.

*Auroras* were observed as follows: 1st, Ft. Pembina, Dak.; 5th, Louisville, Ky.; 7th, (?) Cambridge, Mass.; 15th, Escanaba, Mich., Clarksville, Tenn., Gardiner, Me., Rowe, Mass.; 17th, Waltham, Mass., Burlington, Vt.; 18th, Rocky Run and Wautoma, Wis., Portland and Bangor, (very fine) Gardiner and Mechanics' Falls, Me., Plattsburg, N. Y., Contoocookville and Auburn, N. H., Woodstock, Vt., Boston, Mass.; 19th, Cambridge, Mass.; 21st, Wautoma, Wis.; 30th, Starkey, N. Y.

*Ground Currents*.—Disturbances on lines of telegraph have been reported as follows: 4th, Pike's Peak, Col., and Concho, Texas, (during thunder-storms.)

## OPTICAL PHENOMENA.

*Solar Halos* were observed as follows: 1st, Tex., Ky., Ind. Ter., Ga. 2d, Me., Neb., La., N. Mex. 3d, Ga., Iowa, Ky. 4th, Iowa, Ohio, Ky., La., Ill. 5th, Conn., Mass., N. H., N. Y., Ga., D. C. 6th, Ga. 8th, Ill. 10th, Conn., Mass., N. H., N. Y., R. I., Me. 11th, Conn., Miss., N. H., N. Y., Ga., Mo., La., Fla. 12th, Mo., R. I., Conn. 13th, Ill., Me., Conn. 14th, Ill., Ohio, Texas. 16th, Iowa, Wis., La., Tex. 17th, N. Y., La. 18th, Fla., Va., Ga., Ky. 19th, Conn., Ind., Iowa, Md., N. Y., Ohio, Va., Wis., Ky., N. J., Ill. 20th, Ky., Ohio, Mo. 22d, N. C. 23d, Neb., Ohio, Fla., Kan. 24th, Mo. 25th, Iowa. 26th, Conn., N. J., N. Y., Ohio, Va., R. I., Ky. 27th, Conn., Mass., Ohio, Vt., R. I., D. C., Fla. 28th, N. Y. 29th, Fla., Ga.

*Lunar Halos*.—12th, Fla.; 13th, Conn., Tex.; 14th, Ill., Mo., Wis., Mo.; 15th, Miss., N. J., Mo., La., Tex.; 16th, Ohio, Minn., Tenn., La., Tex., Ala.; 17th, Fla., N. C., Va., Ga., Mass., Mo., Ala., Minn.; 18th, Fla., Ind., Ky., Md., N. J., Pa., Va., W. Va., Conn., Mo., Wis., Minn., N. C.; 19th, Conn., Ill., Ind., Iowa, Md., Mass., N. J., N. Y., Ohio, Pa., Va., R. I., W. Va., Ky., Mo., Minn., La.; 20th, Fla., Mass., R. I., N. C., Mo., Wis., Minn.; 21st, Md., N. J., Conn., Mo., Wis., Cal.; 22nd, Md., Mich., S. C., Mo., Minn., N. C.; 23rd, Mo., Conn., Minn., Cal.; 24th, Minn., Ohio, Ala., N. C.; 25th, Ind., Me., Md., Ohio, Tenn., W. Va., Mich., Ala., Minn., Idaho, Kan.; 26th, Del., Ind., Iowa., Md., Ohio, Pa., Utah., N. Y., W. Va., Me., Tex.; 27th, Iowa, W. Va., Va., Mo., N. J., D. C.; 28th, Fla., N. J., Ohio.

*Mirage*.—Tybee Island, Ga., 2nd, 3rd and 6th. New London, Conn., 5th, 9th, 10th, 19th, 22nd, 23rd and 30th.

## MISCELLANEOUS PHENOMENA.

*BIRDS*.—*Ducks*: 3d. Large flocks reported on Lower Fraser river, British Columbia, fully six weeks earlier than usual; Fort Pembina, Dak., S., 22nd; Clear Creek, Neb., and Portland, Or., S., 15th; St. Paul, Minn., S., 24th. *Wild geese*: Fort Randall, Dak., flying S., 18th, 20th; Fort Pembina, Dak., S., 24th; Sedgewick, Kan., SW., 28th; New Bedford, Mass., S., 26th; Fall River, Mass., SW., 23rd; Corning, Mo., S., 15th and 26th to 30th, moving in various directions from river to corn-fields; Clear Creek, Neb., S., 19th; Geneva, Neb., S., 11th; West Charlotte, Vt., S., 26th; Davenport, Iowa, S., 16th; Visalia, Cal., N., 16th; Bismarek, Dak., S., 14th. *Swallows*, Fall River, Mass., had departed, 22nd; Contoocookville, N. H., had left on the 2nd; Auburn, N. H., 10th, and Starkey, N. Y., 16th. *Martins*, Melissa, Tex., had all disappeared 12th. *Blackbirds* and *Robins*, congregating before migration on the 18th, at Wappinger's Falls, N. Y. *Wild Pigeons*, at Jacksonsburg, Ohio, S., 20th. *Whip poor-wills*, Fayette, Miss., flying S., 2nd, 15th and 18th; Auburn, N. H., had departed, 12th. *Pelicans*, Corning, Mo., appeared in large numbers 25th. *Blue-jays*, 24th, Sedgewick, Kan., flying S. *Black birds*, Clear Creek, Neb., flying S., 8th. *Cat birds*, Oregon, Mo., 7th. *Yellow birds*, Oregon, Mo., 20th. *Cranes*, Genoa, Neb., S., 17th; Wappinger's Falls, N. Y., were seen, 2nd; Oregon, Mo., S., 6th. *Heron*, Wappinger's Falls, N. Y., E., 27th. *Plover, quail and partridge*, Wappinger's Falls, N. Y., were seen 2nd to 8th. *Blue birds*, Wappinger's Falls, N. Y., seen flying S. 16th.

*INSECTS*.—*Grasshoppers*, Tabor, Iowa, none this fall; 11th, becoming numerous at Starkey, N. Y. *Colorado beetles*, Mendon, Mass., abundant during month.

*BOTANICAL*.—*Maize*, (*Indian Corn*).—5th, Guttenberg, large crop now ripe; 30th, Oregon, Mo., maturing rapidly. *Buckwheat*, ripe at Wappinger's Falls, N. Y., 18th. *Cotton*.—Leaves being eaten by worms at Melissa, Texas, 22nd; Clarksville, Texas, reports worms doing only little damage during early part of month. *Grass*—30th, Oregon, Mo., immense crop of prairie grass hay; great quantities of fodder. *Raspberries*, ripe at West Charlotte, Vt., 22nd.

*Polar Bands*.—Gardiner, Me., 2d, 20th and 23d. Tybee Island, Ga., 3d and 29th. Guttenburg, Iowa, 4th and 6th. Plattsburgh, Neb., 7th. Wytheville, Va., 9th and 18th. Brookhaven, Miss., 10th. Freehold, N. J., 13th and 26th. Milwaukee, Wis., 14th. Auburn, N. H., 16th. Louisville and Danville, Ky., and Vineland, N. J., 19th. Woodstock, Vt., 20th.

*Sunsets*.—The characteristics of the sky, as indicative of approaching fair or foul weather, have been observed daily at sunset at all regular Signal Service stations. Reports from 105 stations show 76 blank or doubtful cases, and that out of the remaining 3,074 cases, 2,551, or 83.0 per cent., were followed by the expected weather.