

and the opening of navigation: Duluth, first boat left 29th. Chicago, 3rd, ice disappeared from harbor. Milwaukee, 25th, first vessel arrived from the Lower Lakes, being five days out from Cleveland. Marquette, 15th, ice in bay. Escanaba, 18th, ice moving out of Green Bay; 21st, ice moved from docks. Ice clearing out of the Straits of Mackinaw, 13th. Alpena, 20th, first vessel arrived. Northport, Mich., 20th, ice left harbor; 22nd, first boat. Port Huron, 23rd, first steamer arrived from Detroit, but much ice remained, and on the 30th forty vessels were still ice-bound. Detroit, 12th, navigation opened, first vessel arrived. Toledo, 19th, first boat arrived from Alpena; 22nd, first vessel left. Cleveland, 10th, navigation open to Detroit. Erie, 21st, navigation opened; Lake clear of ice 24th. Buffalo, 7th, harbor free from ice, and first vessel left 14th; on 27th, first vessel arrived from Toledo. Rochester, 6th, first vessel arrived. Oswego, 19th, first vessel arrived. Bismarck, 1st, ice-gorge; 10th, navigation opened. Omaha, 6th, floating ice. St. Paul, 2nd, ice moving down in large quantities; 16th, navigation opened. Moorhead, Minn., 7th, Red River of the North began rising; 15th, ice moving; 20th, first boat arrived. Pembina, 18th, ice breaking; 23rd, first steamer arrived. West Waterville, Me., 17th, ice cleared from Snow pond. Lake Village, N. H., 22nd, ice went out of Lake Winnepisscoogee. West Charlotte, Vt., 2nd, Lake Champlain clear of ice. Lunenburg, Vt., 10th, ice went out of Connecticut river. Geneva, Wis., 12th, Geneva Lake clear of ice. Neillsville, Wis., 3rd, ice broke up in Black river; 22nd, river clear. Norfolk, Va., 9th, highest water since 1846. Charleston and Savannah, 13th, were flooded by high tide. Indianola, 24th and 25th, town flooded by high tide.

TEMPERATURE OF WATER.

The temperature of the water is shown by the table on chart No. II. It will be noticed that along the *Atlantic coast* the temperatures have increased very uniformly from 34° to 31° at Eastport to 81° and 69° at Key West. On the *Gulf coast* they have ranged from 60° to 71°. On the *Lakes*, the somewhat abnormal maxima of 60° and 61° are reported at Grand Haven and Toledo, but for the rest of the Lake stations the range is from 33° to 51°. The average temperature for the Upper Lakes is apparently 1° or 2° lower than for the Lower Lakes.

River Temperatures.—In the Missouri, temperatures from 34° to 60°; in the Ohio, from 43° to 58°; in the Tennessee and Cumberland rivers, 53° to 61°; in the Mississippi, 33° to 61°.

Ocean Water, Temperatures and Densities.—According to the meteorological observations made on board of the Pacific Mail Steamship Alaska on her voyage from San Francisco to Yokohama, November 1st to 30th, 1876, the specific gravity, reduced to a uniform temperature of 60°, of the water observed at noon each day, at 18½ feet below the surface, was as follows: 4, from Nov. 1st at San Francisco to the 12th at long. 160° W. of Greenwich; 5, from Nov. 13th at long. 163° W. to Nov. 17th at long. 177¼° W.; 4.5, Nov. 19th long. 179° E. to Nov. 21st long. 174° E.; 5, Nov. 22nd long. 170° E. to Nov. 30 at Yokohama long. 140°.

ATMOSPHERIC ELECTRICITY.

Thunder-storms occurred as follows: 1st, Ala., Ill., Ind., La., Mich., Miss., Ohio, Penn., Tenn., Tex., Wis.; 2nd, Dak., N. C., Fla., Ga.; 3rd, Miss., Fla., Ala.; 4th, Ill., Ind.; 5th, Kan., Miss., Penn., Tex., Ind. Ty.; 6th, Ala., Ga., Ill., Kan., Minn., Miss., N. C., Ohio, Tenn., Tex., Ind. La.; 7th, Ala., Dak., Col., Fla., Ga., Kan., La., Miss., N. C., S. C., Tenn., Tex., Minn., Ind. Ty.; 8th, Fla., Ga., Miss., N. C., S. C.; 9th, Ga., N. C., Tex.; 11th, Tex.; 12th, Fla., Ga., La., Miss., Tex.; 13th, Ga., Ohio, S. C.; 14th, Dak., Kan., Minn.; 15th, Iowa, Kan., Wis., Ill.; 16th, Dak., Col., Ill., Ind., Iowa, Kan., Minn., Neb., Ohio, Penn., Ind. Ty., W. Va.; 17th, Dak., Conn., Ill., Iowa, Kan., Minn., Mo., Neb., N. J., N. Y., Ohio, Tenn., Tex., Va., Wis., Ind. Ty., W. Va., D. C.; 18th, Ala., Ill., Ind., Iowa, Kan., La., Neb., N. C., Ohio, Penn., Tenn., Tex., N. J., Ind. Ty., Ky.; 19th, Del., Ill., Ind., Md., Mo., N. J., N. Y., N. C., Ohio, Penn., Tenn., Va., S. C., Fla., Ky., W. Va., Ga., D. C.; 20th, Canada, Conn., Fla., Mass., N. J., N. Y., Va., Ohio, Ga.; 21st, Dak., Minn.; 22nd, Dak., Kan., Minn., Neb., Ohio, Ind. Ty.; 23rd, Ill., Iowa, Kan., La., Mich., Minn., Mo., Miss., Neb., Ohio, S. C., Tex., Wis., Ind. Ty.; 24th, Ind., Kan., Md., Ohio, Penn., Tex., N. Y., Ky., N. Mex., D. C., Canada; 25th, Tex.; 26th, Ala., Ind., Kan., Tenn., Tex., Ind. Ty.; 27th, Ala., Ill., Ind., La., Miss., N. C., Ohio, Tex., Iowa, Mo.; 28th, Ala., Fla., Ga., Ind., Ky., La., Md., Mich., N. J., N. Y., N. C., Ohio, Penn., W. Va., Canada; 29th, Conn., Del., Ga., Md., Mass., N. J., N. Y., N. C., Penn., S. C., Va., Fla., D. C.; 30th, Conn., Del., Fla., Me., N. Y., N. J., N. C., Mass.

Auroras are reported as follows: 5th, Duluth and Pembina; 7th, observed at 24 stations as follows: in Mich., 4; Mass., 3; Dak., 2; N. Y., 9; Conn., 1; Me., 2; N. H., 1; N. J., 1; Vt., 1; Canada, 1. 8th, Buffalo and Rochester, N. Y.; Port Huron, Mich. 9th, Gardiner, Me.; Canonsburg, Penn.; Mt. Forest, Canada. 12th, Boston, Mass. 13th, Lunenburg, Vt.; Wautoma, Wis. 14th, observed at 76 stations as follows: Mich., 7; N. J., 6; Me., 9; Mass., 8; N. Y., 15; Vt., 5; Penn., 3; Dak., 1; N. H., 4; W. Va., 1; Wis., 3; Conn., 3; D. C., 1; Ill., 2; Ind., 1; Iowa, 3; Ohio, 1; Va., 2; Canada, 1. 15th, Palermo and New York City, 16th, Fort Preble, Me.; Mystic, Conn. 28th, Vevay, Ind.; Monticello, Iowa.