

occurred with a rising river, while in the flood of the present year the Mississippi had begun to fall from Cairo to Vicksburg before the most disastrous crevasses occurred. The Pointe Coupee levees protected the sugar belt and were the most important in the state of Louisiana, or in the entire Mississippi system. The principal of these was the great Morganza levee, which was the first to go along the Pointe Coupee front; it was closely followed by numerous other breaks, and practically the entire parish was flooded, save sections protected by interior levees. The vast volume of water which escaped through the Pointe Coupee breaks caused a marked fall in the river below. The flooded area in Louisiana was probably not less than 5,000 square miles. The Austin crevasse overflowed about 10,000 acres of cleared land in Mississippi, and on the Arkansas side of the river about 10,000 acres were inundated.

The Ohio River fell below the danger line at Louisville, Ky., during the 1st, and by the 23d it was again confined to its banks at Paducah, Ky. On the 9th a large part of Johnstown, Pa., was flooded. The excessive rainfall of the latter part of the month caused disastrous floods in north-central Texas, more especially along the Trinity River.

OPENING OF NAVIGATION.

Lake Superior.—Boats arrived and departed from Duluth, Minn., and Marquette, Mich., during the latter part of the month, and Mackinaw Straits, which were closed by ice on the 1st, were open to navigation on the 11th.

Green Bay.—On the 11th the bay was free of ice as far as could be seen from Green Bay, Wis., and on the night of this date the lights at Grassy Island and Long Tail Point were lighted for the first time this season.

Sault de Ste. Marie River.—A steam barge arrived at Sault de Ste. Marie, Mich., 20th; this was the first arrival of the season.

Mississippi River.—The first through boat of the season from the south arrived at Saint Paul, Minn., 24th. The first boat of the season passed up the river at Dubuque, Iowa, on the 1st.

Missouri River.—At Fort Buford, N. Dak., the ice began to break up on the 5th, and by the 8th the river was clear of ice. At Fort Yates, N. Dak., the ice broke up on the morning of the 4th, and the river was clear of ice on the 10th. At Fort Sully, S. Dak., the river was clear of ice on the 6th, but the water was so low as to seriously interfere with navigation.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras were observed during the month as follows: 7th, South Canisteo, N. Y. 8th, Fort Custer, Mont., and Greenville, Pa. 11th, South Canisteo, N. Y. 14th, Clinton, Iowa; Glasgow, Wis., and Rolling Green, Minn. 15th, Saint Vincent, Minn. 16th, Boston, Mass., and Eastport, Me. 17th, Fort Custer, Mont., and Glasgow, Wis. 22d, Lyons, N. Y. 24th, Berrien Springs, Mich. 26th, Middleburgh, N. Y. 27th, Oskaloosa, Iowa.

Fort Custer, Mont., 8th: a faint auroral light was observed at 10.45 p. m., and lasted until 11.10 p. m. It was in the form of a diffused light located 20° west of north. Another aurora was observed between 10.15 p. m. and 11.15 p. m., 17th. It consisted of an irregular pale arch of light in the northern sky, and rose to about altitude 45°.

Saint Vincent, Minn.: an auroral display, consisting of a pale diffused light, was observed from 9.40 p. m. to 11.45 p. m., 15th; it extended from azimuth 195° to 240° and to altitude 10°.

THUNDER-STORMS.

The more severe thunder-storms of the month are described under "Local storms." East of the Rocky Mountains thunder-storms were reported in the greatest number of states and territories, twenty-four, on the 9th; in eighteen on the 27th; in seventeen on the 8th, 14th, 26th, and 30th; in from eleven

to sixteen, inclusive, on the 2d, 3d, 4th, 7th, 13th, 22d to 25th, 28th, and 29th; in from five to ten, inclusive, on the 1st, 6th, 10th, 12th, and 15th to 21st; and in two on the 5th and 11th. There were no dates on which thunder-storms did not occur east of the Rocky Mountains.

East of the Rocky Mountains thunder-storms were reported on the greatest number of dates, twenty-four, in Texas; on nineteen in Michigan; on sixteen in Kansas; on from eleven to fifteen, inclusive, in Arkansas, Florida, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, New York, North Carolina, Ohio, and Tennessee; and on from one to ten, inclusive, in Alabama, Connecticut, North Dakota, District of Columbia, Georgia, Indiana, Indian Territory, Kentucky, Maryland, Massachusetts, Montana, Nebraska, New Hampshire, New Jersey, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Vermont, Virginia, West Virginia, and Wisconsin. Delaware and Maine were the only states in which thunder-storms were not reported during the month. West of the Rocky Mountains thunder-storms were reported as follows: Arizona, 1st, 10th, 11th, 15th, 22d, and 23d; California, 18th and 23d; Colorado, 1st, 19th to 24th, 26th and 30th; Idaho, 30th; Nevada, 26th, 29th, and 30th; New Mexico, 15th, 16th, 18th to 21st, 24th, 27th, and 29th; Utah, 22d, 23d, and 24th; Washington, 11th and 25th; Wyoming, 19th, 21st, 22d, and 30th. There were no states or territories west of the Rocky Mountains in which thunder-storms were not reported.

MISCELLANEOUS PHENOMENA.

DROUGHT.

Rain on the 28th broke the drought which had prevailed in the vicinity of Savannah, Ga., during the last three months. The long drought in the Rio Grande Valley was broken by heavy rain on the 17th. The prevailing drought in the vicinity of Key West, Fla., was beginning to be severely felt at the close of the month. Reports from Huron, S. Dak., state that the continued drought was damaging sprouting grain, and that rain was badly needed in that section.

HALOS.

Solar and lunar halos were reported in New England and the middle Atlantic states on twenty-four dates; 75 per cent. of the halos were attended on the first day, 71 per cent. were followed on the second day, and 67 per cent. were followed on

the third day by rain or snow. In the south Atlantic states halos were reported on thirteen dates; 62 per cent. of the halos were attended on the first day, 70 per cent. were followed on the second day, and 46 per cent. were followed on the third day by rain. In the Gulf States halos were reported on thirteen dates; 62 per cent. of the halos were attended on the first day, 54 per cent. were followed on the second day, and 46 per cent. were followed on the third day by rain. In the Mississippi and Ohio valleys halos were reported on twenty-three dates; 74 per cent. of the halos were attended on the first day, 74 per cent. were followed on the second day, and 65 per cent. were followed on the third day by rain or snow. In the Lake region halos were reported on twenty-one dates; 67 per cent. of the halos were attended on the first day, 62 per cent. were followed on the second day, and 67 per cent. were followed on