

p. m. until 10 p. m.; Lansing, Michigan, at 9 p. m.; Ann Arbor, Michigan, at 7 p. m., still visible at 10 p. m.; Manistique, Mottville, and Swartz Creek, Michigan; Northfield and Chester, Minnesota; North Volney, Ithaca, and Mountainville, New York; Statesville, North Carolina, from 7.30 to 8.30 p. m.; North Lewisburg and Wauseon, Ohio; Albany, Oregon, 8 p. m.; Dyberry and Catawissa, Pennsylvania; Dale Enterprise, Virginia, at 7 p. m.; Moorestown, New Jersey, 1 a. m.; Bainbridge Island, Washington Territory; North Colebrook, Connecticut, from midnight until morning; Norfolk, Connecticut, 2 a. m.; Webster, Dakota; Vevay and Spiceland, Indiana; Independence, Manchester, West Union, Humboldt, Oskaloosa, and Fort Madison, Iowa; Embarras, Sussex, and Prairie du Chien, Wisconsin, 8.45 p. m., 9 p. m., and 11 p. m., respectively.

The following is taken from "Nature" of April 9, 1885:

There was a considerable disturbance of the magnetograph recorded here on March 15, and had the photographic curves been developed on that day we should probably have predicted the occurrence of the aurora seen during the evening. The earth currents, which are necessary concomitants of magnetic disturbances, were probably intense enough to cause the disarrangement of the cable tests referred to by Mr. Willoughby Smith.

G. M. WHIPPLE.

Kew Observatory, Richmond, Surrey, April 7.

Auroras were also reported on the following dates:

5th.—New River Inlet, North Carolina, suspected; Sterling, Kansas.

6th.—New River Inlet, Portsmouth, Fort Macon, Smithville, and Cape Lookout, North Carolina; Mackinaw City, Michigan.

The observer at Fort Macon, North Carolina reports as follows: "At 7.35 p. m. horizontal beams of whitish color, turning to crimson, were observed in the sky from nw. to wnw., and, possibly, indicated the presence of an aurora; these bands of light continued until 8.10 p. m."

At Portsmouth, North Carolina, the observer reported that a faint display of auroral clouds was observed in the nnw. between 7.35 and 11.20 p. m. These clouds extended about 45° above the horizon and were about 12° degrees in width and of a pale yellow color; the bands of light extended horizontally and were very wide in the centre, tapering to a point at each end, with dark spaces between them. The bands of light had the appearance of luminous cirrus clouds.

7th.—Mackinaw City, Michigan, continuation of 6th.

13th.—Escanaba and Mackinaw City, Michigan.

14th.—Mackinaw City, Michigan, continuation of 13th; Portland, Maine; Point Judith, Rhode Island; Austin, Tennessee; Chester and Saint Vincent, Minnesota; Birmingham, Michigan.

16th.—Eastport, Maine; Independence, Iowa; Mackinaw City and Thornville, Michigan; Saint Vincent, Minnesota; Burlington, Vermont; Wytleville, Virginia.

17th.—Mackinaw City, Michigan, continuation of 16th; Wytleville, Virginia.

18th.—Wytleville, Virginia; Cedar Rapids, Iowa.

19th.—Bangor, Maine.

20th.—Marquette, Mackinaw City, Swartz Creek, and Alpena, Michigan; Humboldt, and Cresco, Iowa; Riley, Illinois; Prairie du Chien, Wisconsin; Saint Vincent, Minnesota; Westborough and Cambridge, Massachusetts; Eastport, Maine.

21st.—Eastport, Maine, continuation of 20th; Mackinaw City, Michigan, continuation of 20th; Saint Vincent, Minnesota, continuation of 20th; Riley, Illinois, suspected.

26th.—Mackinaw City, Michigan.

31st.—Birmingham, Michigan.

THUNDER-STORMS.

Thunder-storms are reported to have occurred in the various states and territories as follows:

Alabama.—Montgomery, 12th, 13th, 28th; Birmingham, 12th, 27th, 28th; Greensboro, 12th, 25th, 28th; Mobile, 26th.

Arizona.—Wickenburg, 9th, 11th to 14th, 19th, 25th; Prescott, 10th to 13th, 19th, 20th; Fort Grant, 9th, 10th, 12th, 13th; Fort Bowie, 8th, 14th, 19th; Fort Apache, 9th, 20th;

San Carlos, 10th, 19th, 20th; Fort Thomas, 9th; Yuma, 13th; Fort Verde, 21st; Tucson, 19th.

Arkansas.—Fort Smith, 11th, 12th; Little Rock, 12th, 26th, 27th.

California.—San Diego, 12th, 13th; Poway, 12th.

Colorado.—West Las Animas, 11th, 13th, 26th; Montrose, 21st.

Florida.—Jacksonville, 13th, 21st, 28th; Cedar Keys and Newport, 21st; Sanford, 21st, 22d; Pensacola, 26th, 28th; Key West, 4th to 7th, 22d; Fort Barrancas and Tallahassee, 21st, 28th; Limona, 22d.

Georgia.—Augusta and Milledgeville, 12th, 28th; Savannah, 28th; Atlanta, Forsyth and Athens, 12th, 27th, 28th.

Idaho.—Boisé City, 15th; Cœur d'Alene, 16th.

Illinois.—Wilton Centre, 11th; Anna, Cairo, and Sandwich, 14th.

Indiana.—Indianapolis, Spiceland, and Vevay, 11th, 14th; Greencastle, Jeffersonville, and Sunman, 14th; Laconia, 14th, 31st; Fort Wayne, 13th, 16th; Guilford, 12th, 14th; Lafayette, 16th.

Indian Territory.—Fort Reno, 11th, 26th.

Iowa.—Manchester and Muscatine, 12th; Oskaloosa, 14th.

Kansas.—Leavenworth and Manhattan, 29th, 31st; Independence, 14th, 26th, 31st; Topeka, 6th, 29th, 31st; Clay Centre, 6th, 29th; Fort Scott, 14th, 31st; Wellington, 26th; Allison and Sherlock, 12th; Atchison and Salina, 29th; Wyandotte and Yates Centre, 31st.

Kentucky.—Louisville, 14th.

Louisiana.—New Orleans, 21st, 28th; Liberty Hill, 11th, 12th; Point Pleasant, 11th, 12th, 27th, 28th; Grand Coteau, 21st, 26th, 28th.

Maine.—Eastport, 1st.

Maryland.—Cumberland, 11th.

Michigan.—Lansing, 11th; Mottville, 11th, 14th.

Missouri.—Pierce City, 20th, 21st, 28th.

Nebraska.—Harvard and Red Willow, 12th; Stockham, 29th.

Nevada.—Carson City, 18th.

New Mexico.—Santa Fé, 13th; Fort Union, 13th, 21st.

New York.—Humphrey, 14th.

North Carolina.—New River Inlet, 5th; Wash Woods, 16th, 17th, 19th, 20th; Kitty Hawk, 18th; Chapel Hill, 27th; Smithville, 28th.

Ohio.—Columbus, Jacksonborough, North Lewisburg, and Westerville, 11th; Garrettsville, 11th, 30th; Cincinnati, Cleveland, and Portsmouth, 14th; Hiram and Ruggles, 30th.

Oregon.—Lakeview, 10th.

Pennsylvania.—Grampian Hills and Leetsdale, 11th; Fallington, 16th.

Rhode Island.—Block Island, 4th.

South Carolina.—Statesburg, 27th, 28th; Aiken and Pacolet, 28th.

Tennessee.—Ashwood, 12th; Chattanooga, 12th, 27th; Nashville, 12th, 14th; Milan, 12th, 14th, 26th; Knoxville and Memphis, 12th, 27th, 28th.

Texas.—San Antonio, 12th, 13th, 15th, 20th; Palestine, 11th, 14th, 27th; Indianola, 11th, 14th, 15th, 20th; Galveston, 20th; Rio Grande City, 11th; Fort Stockton, 13th, 14th, 20th; Fort Davis, 10th, 20th; Fort Concho, 14th, 15th; Fort Elliot, 11th, 11th, 12th; El Paso, 10th; New Ulm, 12th, 14th, 15th, 20th, 21st, 22d; Cleburne, 7th, 11th, 14th; Huntsville, 12th, 14th, 25th.

Utah.—Salt Lake City, 21st.

Virginia.—Bird's Nest, 15th; Wytleville, 27th; Norfolk, 29th.

Washington Territory.—Spokane Falls, 15th.

West Virginia.—Helvetia, 11th.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos were observed in the various states and territories as follows:

Arizona.—1st, 5th, 6th, 24th, 26th.

Arkansas.—3d to 6th, 18th, 19th, 20th, 31st.
California.—1st, 2d, 6th, 7th, 8th, 11th, 16th, 18th, 22d, 23d, 26th, 27th, 29th, 30th.
Colorado.—10th, 18th.
Connecticut.—1st, 6th, 9th, 11th, 18th, 23d, 24th, 25th.
Dakota.—1st, 4th, 8th, 10th, 30th, 31st.
District of Columbia.—4th, 5th, 23d, 24th, 30th.
Florida.—14th, 16th, 18th, 24th.
Georgia.—3d.
Idaho.—1st, 2d, 10th, 13th, 15th, 28th.
Illinois.—2d to 5th, 11th, 17th, 25th, 27th.
Indiana.—2d, 17th, 22d.
Iowa.—5th, 7th to 11th, 14th to 17th, 19th, 21st, 22d, 24th to 28th, 30th, 31st.
Kansas.—2d, 5th, 6th, 7th, 16th, 20th, 21st, 22d.
Louisiana.—30th.
Maine.—10th, 23d.
Massachusetts.—6th, 13th, 22d, 23d.
Michigan.—6th, 7th, 8th, 13th, 17th, 18th, 23d, 25th, 27th to 30th.
Minnesota.—5th.
Missouri.—5th, 16th, 18th, 20th, 24th, 28th.
Nebraska.—2d, 3d, 8th, 9th, 10th, 17th, 18th, 21st, 24th, 25th, 31st.
Nevada.—8th, 17th, 22d, 29th.
New Hampshire.—3d, 6th, 9th, 22d, 23d.
New Jersey.—23d.
New York.—3d, 7th, 9th, 11th, 22d, 25th, 28th.
North Carolina.—1st, 3d, 4th, 6th, 16th, 20th, 23d.
Ohio.—2d, 3d, 5th, 6th, 8th to 11th, 21st, 22d, 23d, 25th to 29th, 31st.
Oregon.—8th, 13th, 17th, 28th.
Pennsylvania.—6th, 11th, 17th, 21st, 28th.
Rhode Island.—11th, 24th.
South Carolina.—29th.
Tennessee.—3d, 14th, 23d, 24th, 30th, 31st.
Texas.—2d, 9th, 18th, 28th, 31st.
Utah.—9th, 17th, 23d, 30th, 31st.
Virginia.—4th, 5th, 23d, 24th, 28th, 30th, 31st.
Washington Territory.—3d, 14th.
Wisconsin.—5th, 16th, 17th, 21st, 23d, 27th, 30th.

LUNAR HALOS.

Lunar halos were observed in the various states and territories as follows:

Alabama.—24th, 27th.
Arizona.—3d, 8th, 22d, 23d, 26th, 27th, 29th, 30th.
California.—1st, 2d, 5th, 7th, 8th, 22d, 23d, 24th, 26th, 28th, 29th, 30th.
Colorado.—23d.
Connecticut.—22d, 24th, 25th, 28th.
Dakota.—1st, 23d, 26th, 30th, 31st.
Florida.—24th, 27th, 30th.
Georgia.—27th, 30th.
Idaho.—6th, 28th.
Illinois.—2d, 24th, 26th, 27th, 28th, 30th.
Indiana.—2d, 21st, 22d, 25th, 27th, 29th, 30th.
Iowa.—24th to 29th, 31st.
Kansas.—1st, 22d to 28th.
Kentucky.—22d.
Louisiana.—27th.
Maine.—22d, 23d, 24th, 26th, 29th.
Maryland.—23d.
Massachusetts.—22d, 24th, 25th, 26th.
Michigan.—19th, 23d, 24th, 26th, 27th, 29th, 31st.
Minnesota.—25th, 29th.
Missouri.—22d, 24th.
Montana.—26th.
Nebraska.—1st, 3d, 21st, 22d, 23d, 26th, 27th, 29th.
Nevada.—1st, 22d, 23d, 24th, 29th.
New Hampshire.—3d.
New Jersey.—22d, 24th, 25th, 26th, 28th, 30th.

New Mexico.—29th.
New York.—3d, 6th, 22d to 25th, 28th.
North Carolina.—3d, 24th, 26th to 29th, 31st.
Ohio.—2d, 22d, 27th, 28th, 30th.
Oregon.—3d, 28th.
Pennsylvania.—1st, 22d, 25th.
Rhode Island.—4th, 5th, 24th, 30th.
South Carolina.—26th.
Tennessee.—2d, 3d, 24th.
Texas.—21st, 22d, 27th to 31st.
Utah.—1st, 7th.
Vermont.—28th.
Virginia.—1st, 3d, 29th, 30th, 31st.
Wisconsin.—23d, 27th, 28th, 30th, 31st.
Wyoming.—23d, 24th, 27th.

The phases of the moon during March were: last quarter, 8th, 1.48 p. m.; new moon, 16th, 12.31 p. m.; first quarter, 23d, 12.17 p. m.; full moon, 30th, 11.34 a. m.; apogee, 9th, 3.12 p. m.; perigee, 23d, 3.54 p. m.

MIRAGE.

Cedar Keys, Florida, 11th: the mainland and vessels appeared very near and distinct in the east and northeast.

Mackinaw City, Michigan, 8th: a very distinct mirage was observed at 9.30 a. m., the outlines of an island, seven miles east of station, being plainly visible; the phenomenon faded away about 10 a. m. On the 18th the image of islands reflected from the snow was much more distinctly observed than the outlines of the islands themselves, which could be seen beyond. On the 20th a mirage was also observed, and on the 23d a very distinct mirage was seen from 8 a. m. to 10.30 a. m.; it was first observed in the northeast. Islands which are ordinarily below the horizon, at a distance estimated at from eighteen to twenty miles, were distinctly seen, apparently within eight miles of this station. The phenomenon gradually extended to the east and southeast as the sun rose higher in the heavens. People crossing the straits report that the reflection of this shore from lake surface was at first taken for a strip of open water. All islands and coast lines were much elevated, while their reflection from the lake surface was very distinct. Another mirage was observed on the 29th.

Saint Vincent, Minnesota, 28th: a fine mirage was observed during the morning. The "Ridge," eighteen miles distant, and other objects not ordinarily visible, were plainly seen.

The following stations also report mirage:

Webster, Dakota, 7th, 19th, 21st, 22d, 24th, 27th, 28th, 31st
 New London, Connecticut, 18th.
 Sherlock, Kansas, 3d, 16th.
 Salina, Kansas, 5th, 13th, 14th, 19th.
 San Diego, California, 25th.

MISCELLANEOUS PHENOMENA.

DROUGHT.

Swanwick, Perry county, Illinois: at the close of March, many cisterns were dry, necessitating hauling of water for household uses. The continued cold and dry weather has seriously injured the wheat crop.

Cahuenga Valley, Los Angeles county, California, 31st: the past three months have been very warm and dry; at the close of March the crops were suffering and the farmers were cutting their wheat to be used as hay.

Salina, Saline county, Kansas: the cold and dry weather during March seriously injured the wheat crop in this section.

Mattoon, Coles county, Illinois, 31st: the weather was very dry during the whole month; very little rain has fallen in this vicinity during the last seventy-five days.

Ashland, Oregon; at the close of the month the weather was very dry and rain much needed.

The observer at San Diego, California, reported on the 5th that in Spring Valley and vicinity, ten miles east of that place, the wheat crop was much damaged in consequence of drought, no rain having fallen since the early part of January.