

OPTICAL PHENOMENA.

SOLAR HALOS.

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

Alabama.—4th, 19th, 16th.
Arizona.—7th, 19th, 20th, 21st, 23d.
California.—5th, 6th, 7th, 15th, 16th, 19th, 21st, 23d.
Colorado.—17th.
Dakota.—13th, 15th, 17th, 20th, 25th, 26th.
Florida.—3d, 4th, 5th, 25th.
Georgia.—9th, 15th, 16th, 21st, 24th.
Illinois.—3d, 9th, 13th, 17th, 18th.
Indiana.—2d, 3d, 5th, 6th, 24th.
Iowa.—1st, 2d, 3d, 5th, 9th, 10th, 15th, 18th, 19th, 20th, 21st, 23d.
Kansas.—2d, 8th, 16th.
Kentucky.—24th.
Maine.—3d, 4th, 19th.
Maryland.—2d.
Massachusetts.—4th, 6th, 14th, 15th, 17th.
Michigan.—4th, 9th, 10th, 18th, 20th, 24th, 27th, 28th.
Minnesota.—5th, 13th, 14th, 15th.
Missouri.—18th.
Nebraska.—16th, 26th.
Nevada.—22d.
New Jersey.—2d, 9th, 15th.
New York.—3d, 4th, 6th, 9th, 10th, 16th, 17th, 18th, 22d, 24th.
North Carolina.—27th, 28th.
Ohio.—3d, 9th, 10th, 17th, 18th, 22d, 27th, 28th.
Oregon.—15th, 23d, 24th.
Pennsylvania.—4th, 10th, 14th, 24th, 25th.
South Carolina.—10th, 24th, 27th.
Tennessee.—1st, 6th, 9th, 13th, 16th, 21st, 24th.
Texas.—16th, 20th, 28th.
Vermont.—3d, 4th, 11th, 15th.
Virginia.—1st, 2d, 4th, 6th, 17th, 21st, 24th, 27th.
Washington Territory.—21st, 24th.
Wisconsin.—3d, 19th, 20th, 24th, 26th.
Wyoming.—4th, 7th, 17th, 23d, 26th, 27th.

LUNAR HALOS.

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

Alabama.—16th.
Arizona.—7th, 15th, 17th to 23d.
Arkansas.—13th.
California.—8th to 12th, 15th, 16th, 19th, 20th.
Colorado.—11th, 13th, 15th, 16th, 22d.
Connecticut.—17th, 18th.
Dakota.—9th, 11th to 16th, 18th, 21st, 22d.
District of Columbia.—16th, 17th, 18th, 20th, 21st.
Florida.—9th, 14th, 15th, 17th.
Georgia.—16th.
Illinois.—2d, 3d, 8th, 9th, 13th, 15th to 18th.
Indiana.—9th, 10th, 13th, 15th, 18th, 20th.
Iowa.—8th, 9th, 10th, 14th, 16th, 17th, 18th.
Kansas.—1st, 8th, 11th, 12th, 14th, 16th, 17th.
Kentucky.—13th, 14th, 16th.
Louisiana.—25th.
Maine.—14th, 17th, 18th, 19th.
Maryland.—16th, 17th.
Massachusetts.—14th, 17th, 18th, 19th.
Michigan.—9th, 10th, 12th, 14th, 15th, 17th, 18th.
Minnesota.—12th, 13th, 14th.
Missouri.—13th, 16th, 17th, 18th.
Montana.—15th.
Nebraska.—8th, 10th, 12th, 14th to 18th.
Nevada.—10th.
New Hampshire.—17th.
New Jersey.—14th, 16th, 17th, 20th.
New Mexico.—17th.
New York.—10th, 11th, 14th, 17th, 18th, 19th.

North Carolina.—16th, 17th.

Ohio.—8th, 9th, 11th, 13th, 17th, 18th, 19th, 21st, 24th.

Oregon.—11th, 12th, 13th, 16th.

Pennsylvania.—9th, 10th, 14th, 16th, 17th, 18th, 21st, 26th.

South Carolina.—9th, 16th, 21st, 26th.

Tennessee.—9th, 10th, 13th to 17th, 24th.

Texas.—1st to 16th, 19th, 20th, 21st, 25th.

Utah.—14th.

Vermont.—17th, 18th.

Virginia.—9th, 10th, 11th, 14th, 16th, 24th.

Washington Territory.—10th, 13th, 14th, 15th, 17th.

West Virginia.—9th, 14th.

Wisconsin.—14th, 16th, 17th.

Wyoming.—14th, 15th, 16th, 23d, 24th.

The phases of the moon during February were: new moon, 3d, 10.06 p. m.; first quarter, 11th, 9.38 p. m.; full moon, 18th, 1.06 p. m.; last quarter, 25th, 0.03 p. m.; apogee, 2d, 5.02 a. m.; perigee, 17th, 9.0 p. m.

MIRAGE.

Webster, Dakota, 8th.

Marquette, Nebraska, 1st, 8th, 10th to 14th.

Galveston, Texas, 7th.

Fort Grant, Arizona, 11th, 12th, 15th, 16th, 18th.

MISCELLANEOUS PHENOMENA.

SUN SPOTS.

Prof. David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for February, 1886:

Date— February, 1886. Standard time.	No. of new.		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 4 p. m.	0	5	0	0	0	0	1	10 [†]	One large spot. Do. Do.
5, 1 p. m.	1	3	0	0	0	0	2	13 [†]	
8, 8 a. m.	1	12 [†]	0	0	0	0	3	25 [†]	
9, 5 p. m.	1	10 [†]	0	5 [†]	0	0	4	30 [†]	
14, 10 a. m.	1	10 [†]	0	0	0	0	4	35 [†]	
15, 4 p. m.	0	0	0	10 [†]	0	0	2	15 [†]	
16, 3 p. m.	0	0	0	5 [†]	0	0	2	10 [†]	
17, 3 p. m.	1	3	2	10 [†]	1	3	1	3	
22, 12 m.	1	5 [†]	0	0	0	0	2	10 [†]	
24, 10 a. m.	0	0	0	0	0	0	0	0	
27, 11 a. m.	1	5 [†]	0	0	0	0	1	5 [†]	
28, 5 p. m.	3	35 [†]	0	0	2	20 [†]	4	40 [†]	

Faculae were seen at the time of every observation.

† Approximated.

Mr. H. D. Gowey, of North Lewisburg, Champaign county, Ohio, reports having observed sun spots on the following dates: 1st, 3d, 4th, 8th, 9th, 18th, 20th, 22d, 24th, 26th.

The Signal Service observer at Pittsburg reports, in reference to sun spots, as follows: About 7 a. m. of the 8th a large spot was noticed on the sun's disk, the smoke in the atmosphere acting in the place of smoked glass; on the morning of the 9th the spot had moved a little to the right; its position was then near the centre of the sun's disk. Prof. J. E. Keeler, of the Allegheny Observatory, also observed the spot on the 9th, and says in reference thereto: "The large sun spot is near the centre of the sun's disk; it is somewhat oval in shape, with a bridge projecting inward near one end; the largest diameter of the umbra is about 23'', corresponding to a linear distance of about ten-thousand miles on the surface of the sun." The spot was again observed at 8.30 a. m. of the 10th.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and sixty-six stations show 4,646 observations to have been made, of which five were reported doubtful; of the remainder, 4,641, there were 4,090, or 88.1 per cent., followed by the expected weather.

EARTHQUAKES.

The supposed earthquake shock reported to have occurred in the western part of Connecticut at 2.20 a. m. of the 3d was