

*Lower lake region*: 11th, 24th.  
*Upper lake region*: 10th, 11th.  
*Upper Mississippi valley*: 1st, 4th, 5th, 8th to 11th.  
*Missouri valley*: 1st, 4th, 5th, 7th to 11th, 16th, 25th, 26th.  
 Thunder-storms were also reported from the following stations, not included in the districts named above: Burlington, Vermont, 11th; Bangor, Maine, 24th; Brackettville, Texas, 26th; Brownsville, Texas, 12th; Cheyenne, Wyoming, 10th, 11th, 15th, 16th; Fort Supply, Indian Territory, 8th, 10th; West Las Animas, Colorado, 10th; Coleman City, Texas, 16th; Fort Davis, Texas, 15th, 16th; Fort Cummings, New Mexico, 7th, 8th; Santa Fé, New Mexico, 8th, 9th; Wellington, Kansas, 8th, 11th; Yates Centre, Kansas, 1st, 4th, 7th to 10th; Pretty Prairie, Kansas, 8th, 10th; Orono, Maine, 24th; Johnsonstown, Virginia, 1st.

During thunder-storms, the following instances of damage by lightning have occurred:  
 Buffalo, New York, 11th: An extensive malt house at Black Rock, was struck by lightning and damaged.  
 Ironton, Missouri, 10th: A tramp who had taken shelter under a sand-shed in Arcadia, was injured by lightning; his coat-tail was torn into shreds and his trousers were ripped to the bottom. A large red mark was left on his thigh, and a red streak down his leg.

Lewiston, Maine, 24th: During a hail storm on the afternoon of this date, a barn in Webster county, containing hay, was struck by lightning and set on fire.  
 Humboldt, Iowa, 11th: A span of horses were struck by lightning, eight miles south of station.

**OPTICAL PHENOMENA.**

**SOLAR HALOS.**

Solar halos have been observed in the various districts, on the following dates:

- New England*: 3d, 7th, 20th, 21st, 25th, 26th, 28th.
- Middle Atlantic States*: 9th, 15th, 21st, 26th, 27th, 28th.
- South Atlantic States*: 12th, 13th, 19th, 20th, 25th, 27th.
- East Gulf States*: 5th, 6th, 9th, 16th, 17th, 18th, 22d, 23d.
- West Gulf States*: 14th, 18th, 21st, 22d, 23d.
- Ohio Valley and Tennessee*: 5th, 8th, 9th, 11th, 16th, 18th, 19th, 20th, 22d to 25th, 27th, 30th.
- Upper Mississippi Valley*: 4th, 8th, 15th, 24th, 27th to 29th.
- Missouri Valley*: 4th, 7th, 8th, 9th, 11th, 13th, 15th, 21st, 23d, 24th, 26th, 30th.

Solar halos were also reported from the following stations, not included in the districts named above: Manitowoc, Wisconsin, 8th; Alpena, Michigan, 1st; New Riegel, Ohio, 15th; Detroit, Michigan, 25th; Toledo, Ohio, 5th; Prescott, Arizona, 21st, 23d; Salt Lake City, Utah, 2d, 23d, 29th, 30th; Colfax, Washington Territory, 8th; Lewiston, Idaho, 2d, 28th; Albany, Oregon, 6th, 7th; San Diego, California, 2d, 3d, 12th; San Francisco, California, 6th, 11th, 14th, 22d, 27th; Carson City, Nevada, 6th, 22d, 25th.

A very remarkable solar halo was observed at 10.00 a. m. of the 7th, on board the s. s. "Ptolemy," in latitude N. 19° 51', longitude W. 37° 21'. The phenomenon preceded a period of tempestuous weather and contrary winds.

**LUNAR HALOS.**

Lunar halos have been observed in the various districts on the following dates:

- New England*: 20th to 23d, 25th to 28th.
- Middle Atlantic states*: 16th, 18th to 25th, 28th.
- South Atlantic states*: 19th, 22d, 23d, 27th.
- East Gulf states*: 2d, 18th, 21st to 24th.
- West Gulf states*: 15th, 17th, 20th to 24th.
- Rio Grande valley*: 14th, 22d, 23d.
- Ohio valley and Tennessee*: 17th to 21st, 23d to 29th.
- Lower lake region*: 3d, 24th to 28th.
- Upper lake region*: 17th, 19th, 20th, 23d, 25th, 29th, 30th.
- Extreme northwest*: 8th, 21st, 22d, 24th, 29th.
- Upper Mississippi valley*: 15th, 20th, 21st, 22d, 24th to 28th, 30th.
- Missouri valley*: 1st, 3d, 18th to 27th, 30th.

*Northern slope*: 17th, 18th, 20th, 25th, 26th, 28th.  
*Southern plateau*: 3d, 5th, 20th to 23d, 26th, 28th, 30th.  
*Middle plateau*: 2d, 7th, 19th, 23d, 25th, 26th, 28th, 29th, 30th.  
*Northern plateau*: 1st, 17th, 20th to 22d, 24th, 26th to 28th.  
*North Pacific coast region*: 18th, 19th, 22d to 24th, 26th, 27th, 29th.

*California*: 1st, 5th, 18th, 22d to 25th, 28th.  
 Lunar halos were also reported from the following stations, not included in the districts named above:  
 Cedar Keys, Florida, 17th.  
 Punta Rassa, Florida, 29th.  
 North Platte, Nebraska, 26th.  
 Clay Centre, Kansas, 21st, 26th.  
 Pretty Prairie, Kansas, 24th.  
 Wellington, Kansas, 23d.  
 Yates Centre, Kansas, 21st, 26th.  
 Fort Concho, Texas, 6th, 30th.  
 Coleman City, Texas, 22d.

**MIRAGE.**

Northport, Michigan: 1st, a mirage was observed here on this date from 9.00 a. m. to 3.30 p. m.; it showed the beach on the opposite side of Traverse Bay so plainly that cattle were seen walking along the shore of Antrim county. The distance across the bay at this place is twelve miles.

- Cape Lookout, North Carolina, 23d.
- Indianola, Texas, 14th, 20th, 27th to 30th.
- Rapid City, Dakota, 29th.
- Salina, Kansas, 6th.
- Pretty Prairie, Kansas, 6th.

**MISCELLANEOUS PHENOMENA.**

**SUNSETS.**

The characteristics of the sky, as indicative of fair or foul weather for the twenty-four hours succeeding each observation taken at sunset, have been noted at all Signal Service stations. Reports from one hundred and ninety-one stations show 5,696 observations to have been made, of which forty-two were reported doubtful; of the remainder, 5,654, there were 4,869 or 86.3 per cent., followed by the expected weather.

**SUN SPOTS.**

The following record of observations has been forwarded by Mr. A. S. Bender, of Sacramento, California:

DATE— Nov., 1882.	No. of new		Disappeared by rotation		Reappeared by rotation		Total No. of		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
3, 4 p. m...	1	1	1	1	.....	.....	6	20†	New group came in by rotation but not reappeared.
4, 4 p. m...	1	10	.....	.....	.....	10	7	40†	Some spots very faint.
5, 4 p. m...	.....	10	2	15†	.....	.....	5	30†	
10, 4 p. m...	1	1	3	20†	.....	.....	2	10†	
11, 4 p. m...	1	1	.....	.....	.....	.....	3	10†	
13, 4 p. m...	1	10	.....	.....	.....	.....	4	20†	One spot in new group very large.
14, 4 p. m...	1	1	1	1	.....	.....	4	20†	Group of 13th seems now to be four large spots.
15, 4 p. m...	.....	.....	1	10†	.....	.....	3	10†	
16, 4.15 p.m	.....	.....	.....	.....	1	1	4	20†	Number of spots in large group increased.
17, 4.00 p.m	1	2	1	1	.....	.....	4	15†	Number of spots in large group changing; two very large.
18, 2.45 p.m	.....	.....	.....	.....	.....	.....	4	10†	Number of spots in large group changing; five very large. The large group visible as one spot to naked eye.
19, 4 p. m...	.....	.....	.....	.....	1	3	5	15†	New group came in by rotation but not reappeared.
20, 4 p. m...	.....	.....	2	5	.....	.....	3	10†	
22, 4 p. m...	2	5	.....	.....	.....	.....	5	15†	
23, 3 p. m...	1	1	.....	.....	.....	.....	6	15†	Do.
26, 3 p. m...	.....	10	.....	.....	.....	.....	6	20†	Number of spots increased.
27, 1.30 p.m	1	1	.....	.....	.....	.....	7	45†	A large number of new spots visible in groups already noted.
29, 2.45 p.m	.....	.....	.....	.....	.....	.....	7	60	Do.
30, 4 p. m...	.....	.....	.....	.....	.....	.....	.....	.....	Atmosphere very hazy.

† Estimated.

Saint Louis, Missouri, 15th: A large spot, visible to the naked eye, was observed on the sun's disc on this date.

Boisé City, Idaho, 15th: A large sun spot was observed with the naked eye.

Wabash, Indiana, 21st: Numerous sun spots observed, some very large.

North Lewisburg, Ohio: Sun spots were seen on all clear days during the month. They were most numerous on the 2d and 25th; largest from 14th to 23d, being plainly visible to the naked eye.

Westerville, Ohio: 15th, very large spot observed on the sun's disc. On the 18th, the spot was more developed, and resembled a group of large spots.

Springfield, Massachusetts, 23d. Large sun spot, visible to the naked eye.

#### METEORS.

Fort Scott, Kansas, 20th: An unusually brilliant meteor was observed in the northeastern sky at 8.00 p. m. When first seen it was about 30° above the horizon. It pursued a downward course, apparently increasing in size, and before disappearing, it burst into many fragments.

Portland, Oregon, 24th: Very brilliant meteor observed at 5.56 p. m. When first seen, it was about 80° above the horizon, and resembled a ball of fire.

Palestine, Texas, 29th: Twenty-one shooting stars were counted between 9.30 and 9.45 p. m. of this date.

New London, Connecticut, 13th.

Portland, Maine, 15th.

Bangor Maine, 5th.

New York City, 3d.

Augusta, Georgia, 1st, 12th.

Indianapolis, Indiana, 21st.

Toledo, Ohio, 13th.

Yuma, Arizona, 1st, 4th, 8th to 10th, 12th to 14th, 17th, 19th.

Visalia, California, 26th.

Alexandria, Dakota, 10th.

Wicklów, Dakota, 7th, 8th, 12th, 13th, 14th, 17th, 18th, 19th.

Anna, Illinois, 15th.

Morrison, Illinois, 7th, 14th.

Charleston, Illinois, 3d, 30th.

Vevay, Indiana, 1st, 22d, 27th.

Muscatine, Iowa, 4th.

Cedar Rapids, Iowa, 1st.

Woodstock, Maryland, 2d, 5th, 10th, 15th.

Little Rock, Arkansas, 6th.

Yates Centre, Kansas, 6th.

Clay Centre, Kansas, 5th.

Fort Scott, Kansas, 3d, 5th, 6th, 10th.

Cornish Maine, 6th.

Dexter, Maine, 3d, 5th.

Sandy Springs, Maryland, 26th.

Williamstown, Massachusetts, 10th.

Rowe, Massachusetts, 1st, 2d, 5th, 6th.

Protém, Missouri, 3d, 4th, 5th, 12th.

Clear Creek, Nebraska, 7th, 9th.

Freehold, New Jersey, 5th, 14th.

Moorestown, New Jersey, 22d, 27th.

Canal Dover, Ohio, 3d.

Westerville, Ohio, 13th.

Fallsington, Pennsylvania, 30th.

Stateburg, South Carolina, 9th.

Ashwood, Tennessee, 3d.

Snowville, Virginia, 10th.

#### EARTHQUAKES.

Saint Louis, Missouri, 14th: Three distinct shocks of earthquake were felt in the western part of the city at 9.14 p. m. The same shock was also reported to have been felt at Saint Charles, Missouri, at 9.21 p. m., and at Collinsville, Illinois, at 9.17 p. m.

Cheyenne, Wyoming, 7th: An earthquake shock was felt here at 6.20 p. m., it was accompanied by a rumbling sound.

The shock was sufficient to shake the walls and floors of buildings; the vibration came from the west.

Denver, Colorado, 7th: A light shock of earthquake occurred at this place at 6.20 p. m. The vibration came from the southwest.

Salt Lake City, Utah, 7th: A slight shock of earthquake occurred at 6.00 p. m.; vibration, from east to west; duration ten seconds.

Fort Washakie, Wyoming, 7th: Three distinct shocks of earthquake were felt here at 6.00 p. m., each of which were from two to three seconds duration. Lamps and chandeliers were observed to vibrate from west to east.

Salina, Kansas, 7th: At 6.55 p. m., an earthquake shock occurred; it lasted six seconds. The vibration was from south-east to northwest, and was sufficient to shake chandeliers, etc.

#### SAND-STORMS.

Camp Thomas, Arizona, 2d, 6th, 10th, 14th.  
Apache Pass, Arizona, 9th.

#### POLAR BANDS.

Nashville, Tennessee, 19th, 24th, 25th.  
Dubuque, Iowa, 4th.  
Wickenburg, Arizona, 19th.  
Los Angeles, California, 3d, 9th, 20th, 29th.  
Fort Meade, Dakota, 11th.  
Yates Centre, Kansas, 12th, 26th.  
Gardiner, Maine, 26th.  
Fayette, Mississippi, 7th.  
Protém, Missouri, 20th.  
Clear Creek, Nebraska, 8th, 15th, 18th.  
Freehold, New Jersey, 3d.  
Vineland, New Jersey, 3d.  
New Riegel, Ohio, 3d, 4th, 11th, 25th.  
Woodstock, Vermont, 28th.  
Wytheville, Virginia, 11th, 19th, 20th.

#### ZODIACAL LIGHT.

Palestine, Texas, 7th, 13th, 14th, 15th, 28th, 29th, 30th.  
Nashville, Tennessee, 4th, 6th.  
Visalia, California, 17th.  
Cambridge, Massachusetts.—Observed 2d, 4th, 8th, 9th, 11th, 27th, 30th; suspected 14th, 15th.  
Somerset, Massachusetts, 27th, 30th.  
New Riegel, Ohio, 8th, 14th, 15th, 18th, 20th, 21st.

#### PRAIRIE AND FOREST FIRES.

New York City, 2d: Extensive forest fires are reported to be burning in the Catskill mountains near Germantown.

Fort Sill, Indian Territory, 6th, 8th, 29th.

Saint Vincent, Minnesota, 21st, 22d.

North Platte, Nebraska, 15th.

Wicklów, Dakota, 1st to 4th, 6th, 7th, 9th, 10th, 11th.

Humboldt, Iowa, 15th.

Creswell, Kansas, 11th.

#### MIGRATION OF BIRDS.

*Geese flying south:* Yuma, Arizona, 11th; Fort Smith, Arkansas, 2d; Little Rock, Arkansas, 10th; San Diego, California, 1st; Tobacco Garden, Dakota, 4th; Yankton, Dakota, 15th; Cairo, Illinois, 1st, 2d, 5th, 7th, 24th, 26th, 27th; Champaign, Illinois, 10th; Charleston, Illinois, 1st 2d, 3d; Elmira, Illinois, 4th, 13th; Springfield, Illinois, 27th; Laconia, Indiana, 11th; Fort Sill, Indian Territory, 12th; Indianola, Iowa, 12th; Creswell, Kansas, 1st, 8th; Fort Scott, Kansas, 3d, 11th; Independence, Kansas, 1st, 2d, 3d; Yates Centre, Kansas, 2d; Shreveport, Louisiana, 8th; Williamstown, Massachusetts, 17th, 18th; Northport, Michigan, 2d; Saint Vincent, Minnesota, 8th, 9th; Protém, Missouri, 2d; Clear Creek, Nebraska, 1st, 5th; Cape May, New Jersey, 12th; Freehold, New Jersey, 3d; Moorestown, New Jersey, 2d; Ithaca, New York, 16th; Palermo, New York, 14th; Portland, Oregon, 27th; Roseburg, Oregon, 6th; Williamsport, Pennsylvania, 2d; Block Island, Rhode Island, 20th, 21st; Ashwood, Tennessee, 2d; Brownsville, Texas, 12th; Coleman City, Texas, 5th, 11th; Denison, Texas,

1st; Eagle Pass, Texas, 23d; Indianola, Texas, 7th, 8th, 27th; Palestine, Texas, 1st, 2d, 12th, 17th; Uvalde, Texas, 11th; Charlotte, Vermont, 17th; Johnstown, Virginia 2d; Spokane, Falls, Washington Territory, 9th; Morgantown, West Virginia, 13th, 14th, 27th.

*Ducks flying south:* Little Rock, Arkansas, 10th; Macon, Georgia, 3d, 4th, 15th; Charleston, Illinois, 12th, 26th; Davenport, Iowa, 13th, 15th; Dubuque, Iowa, 11th, 12th; Muscatine, Iowa, 12th; Fort Scott, Kansas, 1st, 2d, 10th; Yates

Centre, Kansas, 1st, 2d, 5th, 16th; Northport, Michigan, 2d; Clear Creek, Nebraska, 1st; Bordentown, New Jersey, 24th; Ithaca, New York, 16th; Narragansett Pier, Rhode Island, 11th; Coleman City, Texas, 25th; Indianola, Texas, 7th, 8th, 27th; Morgantown, West Virginia, 14th.

*Brents flying south:* Independence, Iowa, 8th; Dyberry, Pennsylvania, 14th.

*Cranes flying south:* Charleston, Illinois, 20th; Yates Centre, Kansas, 2d.