

Solar halos were also reported from the following stations, not included in the districts named above:

- Albany, New York, 8th, 20th.
- Key West, Florida, 4th, 24th.
- Punta Rassa, Florida, 10th.
- Fayette, Mississippi, 5th.
- Palestine, Texas, 2d, 21st, 27th.
- Tobacco Garden, Dakota, 6th, 25th.
- Fort Keogh, Montana, 11th, 21st.
- Fort Lyon, Colorado, 17th.
- Santa Fé, New Mexico, 6th.
- Yuma, Arizona, 23d.
- Salt Lake City, Utah, 6th, 24th.
- Coalville, Utah, 23d.
- Carson City, Nevada, 4th, 9th.
- Colfax, Washington Territory, 2d, 3d, 9th, 21st, 27th.
- Lewiston, Idaho, 2d, 9th, 23d.
- San Francisco, California, 5th, 9th, 10th, 13th, 20th, 22d, 23d, 26th.
- San Diego, California, 20th, 22d, 23d.
- Poway, California, 23d.
- Princeton, California, 9th.

LUNAR HALOS.

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

- New England*: 1st, 20th, 24th, 25th, 27th, 28th, 30th.
- Middle Atlantic states*: 3d, 18th, 21st, 22d, 25th, 26th, 27th.
- South Atlantic states*: 2d, 25th, 26th, 29th, 30th.
- East Gulf states*: 5th, 6th, 26th.
- West Gulf states*: 23d to 26th, 30th.
- Ohio valley and Tennessee*: 2d, 14th, 19th, 21st, 23d to 26th, 29th, 30th.
- Lower lake region*: 1st, 18th, 22d, 23d, 26th, 27th, 29th, 30th, 31st.
- Upper lake region*: 2d, 18th to 26th, 28th, 30th.
- Extreme northwest*: 20th, 21st, 25th.
- Upper Mississippi valley*: 1st, 18th to 22d, 24th to 28th.
- Missouri valley*: 1st, 2d, 3d, 20th, 21st, 24th to 27th, 29th.
- Northern slope*: 19th, 21st, 23d to 27th, 31st.
- Middle slope*: 2d, 21st, 24th, 25th.
- Southern slope*: 23d to 26th.
- Southern plateau*: 1st, 23d, 24th, 26th.
- Middle plateau*: 20th, 23d, 24th, 25th, 27th.
- Northern plateau*: 21st to 26th, 29th.
- California*: 3d, 22d, 23d, 25th, 31st.

Lunar halos were also reported from the following stations, not included in the districts named above:

- Key West, Florida, 24th, 26th.
- Eagle Pass, Texas, 18th.
- Albany, Oregon, 19th, 20th, 23d.

MIRAGE.

- Indianola, Texas, 8th, 10th, 11th.
- Pretty Prairie, Kansas, 19th.
- Genoa, Nebraska, 22d, 23d.

MISCELLANEOUS PHENOMENA.

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 eighty-two stations show 5,596 observations to have been made, of which twenty-two were reported doubtful; of the remainder, 5,574, or 85.6 per cent., were followed by the expected weather.

SUN SPOTS.

The following record of observations has been forwarded by Mr. D. P. Todd, Director of the Lawrence Observatory, Amherst, Massachusetts:

DATE— Oct., 1882.	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, 12 m...	1	15	0	0	0	0	6	45†	One spot very large.
2, 8 a. m...	0	0	0	0	0	0	6	45†	Do.
3, 8 a. m...	1	5	1	2	0	0	6	50†	Do.
4, 5 p. m...	0	0	0	10	0	0	6	40†	Do.
5, 8 a. m...	1	1	0	0	1	1	7	40†	Do.
6, 9 a. m...	0	0	1	10†	0	0	6	30†	Do.
6, 5 p. m...	0	0	0	5†	0	0	6	25†	Do.
7, 5 p. m...	0	0	2	12†	0	0	3	5	Spots all small.
8, 1 p. m...	0	0	1	2	0	0	1	2	
9, 8 a. m...	0	0	0	0	0	0	0	0	No faculae.
10, 8 a. m...	1	2	0	0	1	2	1	2	Do.
14, 7 a. m...	1	10	0	0	1	10	2	12	
15, 9 a. m...	0	5	0	0	0	5	2	17	
17, 4 p. m...	0	15†	0	0	0	0	2	35†	
18, 8 a. m...	1	10†	0	0	0	0	3	45†	
20, 5 p. m...	0	5	0	0	0	0	3	50†	
21, 4 p. m...	1	1	0	0	0	0	4	50†	
25, 8 a. m...	1	10	0	0	1	10	4	35†	Spots probably reappeared by solar rotation. One spot very large.
26, 7 a. m...	0	0	1	10†	0	0	3	25†	One spot very large.
27, 8 a. m...	1	2	1	5	1	1	3	20†	Do.
30, 7 a. m...	2	15†	2	16†	2	15†	3	20†	Do.
31, 4 p. m...	2	5	0	0	0	0	6	25†	Do.

† Approximated. Faculae were seen at the time of every observation, except on the 8th and 10th.

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

DATE— Oct., 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	
2, 4 p. m...	1	1	.....	.....	.....	.....	6	25†	One group disappeared.
4, 4 p. m...	2	10	.....	.....	.....	.....	7	35†	
7, 3 p. m...	.....	.....	3	30	.....	.....	1	1	Three groups of one and two spots each, disappeared other than by rotation.
9, 4 p. m...	.....	.....	.....	.....	1	1	1	1	One group of one spot disappeared.
10, 4.45 p. m...	.....	.....	.....	.....	.....	1	1	2	New spot of same group.
12, 4 p. m...	1	2	.....	.....	.....	.....	2	4	
13, 4 p. m...	1	15†	.....	.....	.....	.....	3	20†	
14, 4 p. m...	.....	.....	.....	.....	.....	.....	2	20†	One group of two spots disappeared.
15, 4 p. m...	1	10†	.....	.....	.....	.....	3	30†	
16, 4 p. m...	.....	.....	.....	.....	.....	.....	3	40†	
19, 4 p. m...	.....	.....	.....	.....	.....	.....	3	50†	Number of spots increased, some being very small and dim.
20, 4 p. m...	1	10†	.....	.....	.....	.....	4	60†	Several of these spots small and dim.
22, 4 p. m...	.....	.....	1	10	1	1	4	50†	New spot very large; came in by rotation. (Is one of those which disappeared on 6th or 7th instant.)
23, 4 p. m...	1	4	.....	.....	.....	.....	5	45†	
24, 4 p. m...	.....	.....	2	20	.....	.....	3	30†	Some very faint spots seem to attend the large one.
25, 4 p. m...	.....	.....	.....	.....	.....	.....	2	20†	Do.
27, 4 p. m...	2	3	.....	.....	.....	.....	4	25†	Do.
28, 4 p. m...	1	10	2	20	.....	.....	3	25†	The above now appear about 10 in number, and are, for the first time, included in the total number.
29, 4 p. m...	.....	.....	.....	.....	.....	.....	3	10†	Spots increased in size and diminished in number, those attending the large spot have disappeared.
30, 4 p. m...	.....	.....	.....	.....	.....	.....	3	10†	
31, 5 p. m...	2	10†	.....	.....	.....	.....	5	20†	

† Estimated.

Mr. H. D. Glowey at North Lewisburg, Ohio, reports: Sun spots were observed on all clear days during the month. They were most numerous on the 1st, smallest and least numerous on the 9th, and largest on the 1st and 26th. Mr. I. R. Zimmermann, at Wicklow, Lake county, Dakota, reports that three large spots were observed with the unassisted eye on the sun's disk, on the 25th.

METEORS.

Augusta, Georgia, 27th: A brilliant meteor was observed at 8.10 p. m., which started from a point near the zenith, and exploded when about 10° above the northwestern horizon. No report was heard at its explosion and disappearance.

Moorhead, Minnesota, 4th: At 7.40 p. m., a very brilliant

meteor was observed in the northeastern sky, apparently about two feet in diameter. During its passage, it produced a bright red light, and when at a point northwest of this city it exploded, emitting an intense white light. A second explosion followed with a blue light, and then a dark mass was observed to shoot toward the earth. It left a path of dazzling light that remained visible for about one minute, floating from northeast to southwest.

The following reports serve to indicate that the above meteor was the same as that observed at Saint Vincent, Minnesota, and at Alexandria, Dakota, on the same date. At the former station, at about 8.00 p. m., a brilliant meteor passed across the sky from east to west. It appeared to be about the size of an orange, and was intensely brilliant, resembling a ball of fire. It was visible several seconds, and illuminated the whole sky. A bright cloud was left in its track, which remained stationary for about fifteen seconds, when it twisted and coiled into a serpentine shape, floated southward and soon faded away. Alexandria, Dakota, 4th: At 7.30 p. m., a large meteor, was observed, emitting a light strong enough to indicate its path behind clouds of considerable density. It was first seen at an altitude of 45° in the northern sky, and left a trail which remained distinctly visible for several seconds after its disappearance.

Meteors have also been reported as follows:

Springfield, Massachusetts, 9th.  
 Palestine, Texas, 11th, 13th.  
 Logansport, Indiana, 15th.  
 Fort Yates, Dakota, 4th.  
 Tobacco Garden, Dakota, 5th, 7th.  
 Davenport, Iowa, 5th, 12th.  
 Yuma, Arizona, 11th, 12th, 17th, 28th.  
 Visalia, California, 2d, 16th, 17th, 18th, 30th.  
 Red Bluff, California, 5th.  
 Alexandria, Dakota, 16th, 25th, 31st.  
 Anna, Illinois, 11th.  
 Morrison, Illinois, 10th, 14th.  
 Swanwick, Illinois, 5th, 11th.  
 Vevay, Indiana, 15th, 30th.  
 Monticello, Iowa, 20th, 21st.  
 Indianola, Iowa, 28th.  
 Creswell, Kansas, 10th.  
 Yates Centre, Kansas, 3d.  
 Salina, Kansas, 15th.  
 Dexter, Maine, 15th.  
 Woodstock, Maryland, 4th, 7th, 18th, 24th, 30th.  
 Westerville, Ohio, 5th, 6th.  
 Marion, Ohio, 2d.  
 New Riegel, Ohio, 15th, 16th.  
 Fall River, Massachusetts, 10th, 11th.  
 Rowe, Massachusetts, 8th, 10th, 15th, 20th, 30th.  
 Fayette, Mississippi, 10th, 12th.  
 Protem, Missouri, 4th, 6th, 8th, 22d.  
 Freehold, New Jersey, 15th, 30th.  
 Palermo, New York, 14th.  
 Murfreesboro, Tennessee, 15th, 16th, 21st.  
 Beloit, Wisconsin, 1st.

#### EARTHQUAKES.

The shocks on the night of the 14th—15th, and of the afternoon of the 22d, were the most extensive, and the severest experienced during the month. The first-mentioned shock was reported by stations in eastern Missouri; throughout central Illinois, and is reported to have been felt as far eastward as Indianapolis, Indiana. The shock of the 22d was felt at various points in the states of Arkansas, Kansas, Missouri and Texas. Concerning this shock, the following reports have been received:

Mount Ida, Arkansas, 22d: At 4.15 p. m., a distinct shock, accompanied by a rumbling sound, was felt at various places in this (Montgomery) county.

Fort Smith, Arkansas, 22d: At 4.15 p. m., three distinct

shocks, all occurring within about thirty seconds were felt at this place. The vibrations were east and west. Houses were shaken so that furniture and crockery rattled; bells were rung, and in a few instances bricks were shaken from chimneys.

Little Rock, Arkansas, 22d: Two light shocks of earthquake were felt between 4.00 and 5.00 p. m. The shocks were separated by an interval of ten seconds, and the vibration was from southeast to northwest.

Rogers, Arkansas, 22d: A slight earthquake shock, continuing about thirty seconds was felt here at 4:12 p. m. Reports from Seligman, Missouri, state that it was also plainly felt at that place.

Fayetteville, Arkansas, 22d. An earthquake shock was felt here at 4.15 p. m. The vibration was from north to south, and lasted eight seconds. It was sufficiently violent to throw bottles from shelves.

Wichita, Kansas, 22d: An earthquake shock occurred at this place at 4.19 p. m. (Jefferson City, Missouri, mean time.) Its duration was about five seconds. There were three pulsations, the first being the strongest. Windows were rattled, the walls of buildings swayed, and furniture moved in houses.

Wellington, Kansas, 22d: A shock of earthquake was distinctly felt here about 4.00 p. m. The pulsation seemed to be east and west, and continued for several seconds.

Leavenworth, Kansas, 22d: A slight earthquake shock was felt here at 3.54 p. m. A tremulous movement of the earth was first noticed, which continued with even intensity from twenty to forty seconds, when a heavier shock followed, lasting about fifteen seconds. The disturbance then became less perceptible for about a minute and thirty seconds, when the most distinct shock occurred, which was sufficient to rattle windows and shake chandeliers.

Warrenton, Missouri, 22d: About 4.25 p. m., an earthquake shock was felt at this place. The vibration was north and south. The shock was sufficient to cause windows, etc., to rattle.

Sherman, Texas, 22d: An earthquake shock was felt at this place about 4.00 p. m. At the Eagle mills, which were shut down at the time, the machinery was seen to vibrate, and the belts creaked as if the engine was being started. At Compress, the shock was so violent as to ring the call-bell on the engine, and cotton bales standing on end were seen to sway. McKenny, Greenville, Bonham, and Paris, all in northern Texas, report having experienced the shock. At Paris, a clock was thrown from the side of a wall, and at Bonham, loose bricks were shaken from the top of a wall.

The following are reports of the shock on the night of the 14th-15th:

Saint Louis, Missouri, 14th: An earthquake shock occurred at 11.48 p. m., and was also felt at Saint Charles, Missouri. The shock covered about the same region as the one of September 27, 1882, but it was in general feebler.

Vandalia, Illinois, 15th: A well-defined earthquake shock, similar to that felt in this locality on the morning of September 27th, occurred at about 12.15 a. m. The noise preceding the shock is described as being similar to that of an approaching storm, and was plainly heard fully three minutes before the shock was felt. Houses seemed to rock, doors and windows rattled, and people were awakened. About an hour later a second shock was felt, though not so severe as the first.

Decatur, Illinois, 15th: Two slight shocks of earthquake were felt in this city last night, the first at 11.30 p. m. (14th), and the second at 4.30 a. m. Lamps and windows were shaken, and considerable alarm was felt.

Centralia, Illinois, 15th: Three shocks of earthquake were felt at this place during last night. The first shock occurred a few minutes after midnight, the second about 1.00 a. m., and the third at 3.30 a. m., the last being the severest.

Salem, Illinois, 15th: Two distinct earthquake shocks were felt here last night.

Bunker Hill Illinois, 15th: A distinct shock of earthquake occurred here at 1.00 a. m.

Indianapolis, Indiana, 15th: Several farmers from neighboring localities report the occurrence of an earthquake shock at 12.15 a. m.; vibration from northwest to southeast.

Springfield, Illinois, 15th: Three shocks of earthquake, sufficient to rattle windows, overturn bottles, &c., were felt in this city at 12.15 a. m. These were followed by a succession of milder shocks lasting about two minutes, and then by gentle undulations which continued for about ten minutes.

Other shocks have occurred during the month as follows:

Poway, California, 8th: An earthquake shock, severer than is usually felt here, occurred at 2.50 a. m.

San Diego, California, 8th: A heavy earthquake shock, lasting several seconds, occurred at this place at 2.00 a. m. The shock was generally felt in the surrounding country, and was the severest that has been experienced for many years.

Montreal, Canada, 10th: An earthquake shock occurred at 4.15 a. m., of sufficient violence to startle residents. Buildings and furniture were shaken, but no damage was done. Reports from Lachine state that the shock was distinctly felt at that place; and as was the case at Montreal, it was accompanied by a rumbling sound. The wave appears to have passed from northeast to southwest. Similar reports have been received from Saint Hilaire and other points. The shock seems to have been confined to hilly regions.

Winnemucca, Nevada, 12th: An earthquake shock is reported to have been felt in the southern part of Humboldt country. The tremor was from south to west, and was accompanied by a rumbling sound.

Murphy, North Carolina, 15th: A slight shock of earthquake occurred at this place at 12.30 p. m. The vibration was from south or southwest to north or northeast.

Point San José, California, 20th: A light earthquake shock occurred at 2.15 a. m.

San Francisco, California, 20th: A severe shock of earthquake was felt in this city at 2.15 a. m. The vibration appeared to be from southwest to southeast, and was of about one second's duration. On the 31st, a sharp shock occurred at 6.45 p. m., and was also felt at Sonoma, Napa, Petaluma, and San Rafael, in this state. The vibration was from west to east.

New-Berne, North Carolina, 23d: At about 7.00 a. m., a distinct shock, supposed to be that of an earthquake, was felt in this city. The shock was sufficient to shake houses, and was accompanied by a rumbling noise.

Saint Louis, Missouri, 26th: At 4.15 p. m., a slight shock of earthquake was felt in this city. Only a few persons noticed the shock, but the noise accompanying it was more generally heard.

At Panama, Central America, a slight shock occurred at midnight of 11th-12th. No damage resulted.

#### WATER-SPOUTS.

Captain Dale, of the brig "Leader," reported having seen a water-spout on October 24th, when the vessel was about two hundred and fifty miles south of Cape Hatteras.

#### SAND-STORMS.

West Las Animas, Colorado, 10th, 11th.

Yuma, Arizona, 11th, 15th.

Fort Verde, Arizona, 25th.

Camp Thomas, Arizona, 2d, 5th, 6th, 11th, 12th, 14th, 15th, 19th, 26th.

Los Angeles, California, 14th.

Fort Garland, Colorado, 11th, 29th.

#### POLAR BANDS.

Fort Myer, Virginia, 20th, 25th.

Palestine, Texas, 26th.

Nashville, Tennessee, 1st.

Yates Centre, Kansas, 26th.

Gardiner, Maine, 2d, 3d, 27th.

Fayette, Mississippi, 12th.

Protom, Missouri, 19th, 22d, 29th.

Freehold, New Jersey, 25th.

Vineland, New Jersey, 2d.

New Riegel, Ohio, 16th, 22d, 26th.

Wytheville, Virginia, 17th, 26th, 28th.

#### ZODIACAL LIGHT.

Havana, Cuba, 2d, 3d, 4th, 11th, 12th, 13th, 15th to 19th.

Palestine, Texas, 8th to 11th.

Little Rock, Arkansas, 10th.

Nashville, Tennessee, 3d, 6th, 10th to 15th, 27th, 28th, 30th, 31st.

Monticello, Iowa, 12th.

Cambridge, Massachusetts. Suspected on 3d and 9th; visible on 10th, 15th, and 16th.

Northport, Michigan, 14th.

New Riegel, Ohio, 16th, 20th, 21st, 22d, 24th.

Stateburg, South Carolina, 19th.

Wytheville, Virginia, 15th.

Pensacola, Florida, 12th.

#### PRAIRIE FIRES.

Huron, Dakota, 28th: During the early morning, the wind changed to northwest, and reached a velocity of forty-one miles per hour, causing the prairie fires to jump the ordinary fire-brakes, which are from ten to fifteen feet in width. The citizens turned out at an early hour, and by 4.00 p. m., had succeeded in conquering the flames. The fires have done great damage in this vicinity. A number of unprotected hay- and grain-stacks, shanties, barns, etc., were destroyed. A man and team narrowly escaped perishing, and were seriously burned. In one instance, a horse was surrounded by the fires and, unable to escape, was burned to death.

Prairie fires have also been reported as follows:

Yankton, Dakota, 14th to 17th, 30th, 31st.

North Platte, Nebraska, 14th.

Fort Sill, Indian Territory, 28th, 29th.

Fort Bayard, New Mexico, 21st.

Fort Randall, Dakota, 25th.

Fort Meade, Dakota, 13th, 14th.

Poway, California, 19th.

Morrison, Dakota, 15th.

Wicklow, Dakota, 5th, 8th, 13th, 14th, 15th, 28th.

Humboldt, Iowa, 28th, 30th.

#### DROUGHT.

Johnstown, New York, 31st: The month has been dry and dusty throughout. The fields are too dry for ploughing.

Charlotte, Vermont, 31st: The springs and wells have not recovered from the effects of the drought experienced during the summer.

Woodstock, Vermont: Month dry, wells and streams becoming low at the close of the month.

#### MIGRATION OF BIRDS.

*Geese flying south:* Newport, Rhode Island, 12th; Bangor, Maine, 6th; Palestine, Texas, 18th, 26th; Indianola, Texas, 26th; Jacksboro, Texas, 10th, 12th, 14th, 17th, 19th, 22d; Fort Smith, Arkansas, 28th; Creswell, Kansas, 10th, 1th, 20th, 23d; Independence, Kansas, 30th; Yates Centre, Kansas, 20th; Fort Scott, Kansas, 23d; Pretty Prairie, Kansas, 7th; Protom, Missouri, 23d, 24th, 31st; Flushing, New York, 29th; North Volney, New York, 11th; Franklin, Pennsylvania, 10th; Wellsboro, Pennsylvania, 23d, 24th; Stateburg, South Carolina, 14th; Ashwood, Tennessee, 12th; Austin, Tennessee, 29th; Nashville, Tennessee, 19th; Memphis, Tennessee, 9th; Embarrass, Wisconsin, 11th, 23d; La Crosse, Wisconsin, 15th; Cleveland, Ohio, 18th; Saint Vincent, Minnesota, 1st; Morgantown, West Virginia, 13th, 17th; Tobacco Garden, Dakota, 10th, 17th; Huron, Dakota, 1st, 10th, 16th; Yankton, Dakota, 28th; Morrison, Dakota, 9th, 13th, 14th, 31st; Alexandria, Dakota, 9th; Dubuque, Iowa, 7th; Davenport, Iowa, 23d; Monticello, Iowa, 23d; Cairo, Illinois, 13th, 18th, 24th, 27th, 29th; Campaign, Illinois, 31st; Fort Wayne, Indiana, 19th; Fort Sill, Indian Territory, 28th, 29th, 30th; Red Bluff, California, 23d; Poway, Califor-

nia, 2d; Portland, Oregon, 13th, 15th, 25th, 26th; Roseburg, Oregon, 29th; Lewiston, Idaho, flying east, 29th; Yankton, Dakota, flying southeast, 25th.

*Ducks flying south:* Portsmouth, North Carolina, 17th; Shreveport, Louisiana, 17th; Indianola, Texas, 26th; Coleman City, Texas, 18th; Nashville, Tennessee, 19th; Memphis, Tennessee, 31st; Toledo, Ohio, 26th; Grand Haven, Michigan, 19th; Saint Louis, Missouri, 26th; Protom, Missouri, 18th, 27th; Creswell, Kansas, 21st; Yates Centre, Kansas, 30th; Fort Scott, Kansas, 16th, 18th, 28; Pretty Prairie, Kan-

sas, 7th; Dubuque, Iowa, 7th; Davenport, Iowa, 17th, 29th; Des Moines, Iowa, 16th; Monticello, Iowa, 23d; Portland, Oregon, 2d; Port Huron, Michigan, flying east, 20th; Cape Lookout, North Carolina, appearing in large numbers, 13th, 17th, 21st.

*Cranes flying south:* Tobacco Garden, Dakota, 9th, 17th, 22d; Creswell, Kansas, 26th; Yates Centre, Kansas, 26th; Pretty Prairie, Kansas, 7th; Embarrass, Wisconsin, 21st.

*Brants flying south:* Independence, Kansas, 18th, 25th; Yates Centre, Kansas, 24th.

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