

instrument, but the insulation in the "cut-out" was consumed; 5th, the electric charges entered the office several times during the day, exhibiting the same peculiarities as on the 4th. Jacksboro', Tex., 25th. Stockton, Tex., 15th, 16th, 24th. Fort Quitman, Tex., 24th, 25th, during thunder-storms, compelled to cut out instruments. Dayton, Wash. Ty., 16th, 5 p. m., during rain storm, the telegraph wires were so powerfully charged with electricity from a passing cloud that the line could be worked between Dayton and Pomeroy without the aid of a battery. Umatilla, Or., 28th, air so charged with electricity that a shock could be felt by touching the stone pipe on telegraph wire. Fort Yates, Dak., 4th, electric storm.

THUNDER STORMS.

There were reported in the various districts on the following dates:

Middle Atlantic States: 12th, 15th, 18th, 20th, 27th.

South Atlantic States: 1st, 6th, 10th, 12th, 15th, 16th, 27th, 28th.

Florida Peninsula: 1st.

East Gulf States: 6th to 9th, 12th, 15th, 16th, 18th, 21st, 26th, 27th.

West Gulf States: 4th, 5th, 8th, 12th, 15th to 20th, 26th, 27th, 29th, 31st.

Rio Grande Valley: 6th, 7th, 20th.

Ohio Valley and Tennessee: 3d to 6th, 9th, 11th, 14th to 21st, 23d, 25th to 29th.

Lower Lake Region: 15th, 18th, 27th, 29th, 30th.

Upper Lake Region: 4th, 5th, 7th, 17th, 18th, 20th, 25th, 26th, 29th.

Upper Mississippi Valley: 3d, 4th, 5th, 9th, 11th, 12th, 14th, 16th to 25th, 26th, 27th.

Missouri Valley: 3d, 4th, 5th, 7th, 8th, 9th, 11th to 15th, 17th to 20th, 24th to 27th, 31st.

Middle Slope: 23d, 25th, 26th, 27th.

Southern Slope: 5th to 8th, 15th, 16th, 18th, 19th, 20th, 24th, 25th.

Southern Plateau: 24th, 25th.

Middle Pacific Coast Region: 15th, 16th.

They were also reported from the following stations, not included in the above districts: St. Vincent, Minn., 17th; Ft. Sisseton, Dak., 4th; Deadwood, Dak., 4th, 5th; Dayton, Wash. Ty., 1st; San Buenaventura, Cal., 13th.

During thunderstorms, the following instances of damage by lightning occurred: Springfield, Ill., 27th, cow killed by lightning. San Francisco, Cal., 15th, as the pilot boat "Lady Mine" was proceeding to sea, and had reached the bar, she was struck by lightning, and her main-top-mast and main-mast-head, were shivered. This is the first case on record of damage by lightning to a vessel in or near this port. Charleston, Ill., 17th, a hickory tree was struck and shattered. At the fair grounds, one mile west of Court House, a two year old child was knocked insensible. Cresco, Ia., 17th, barn struck by lightning, killing two horses and one cow.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos have been observed in the various districts on the following dates: New England, 2d, 5th, 9th, 11th, 15th, 18th, 20th, 26th, 28th, 29th; Middle Atlantic states, 5th, 6th, 7th, 8th, 12th, 15th, 18th, 29th, 31st; South Atlantic states, 9th, 10th, 11th, 17th, 26th; Florida peninsula, 25th, 29th; East Gulf states, 3d, 17th, 19th, 22d, 24th, 25th; West Gulf states, 4th, 11th, 24th; Ohio valley and Tennessee, 2d, 3d, 4th, 6th, 7th, 8th, 11th to 14th, 17th, 18th, 19th, 23d, 24th, 26th, 27th to 31st; lower lake region, 5th, 7th, 8th, 9th, 11th, 14th, 15th, 17th, 20th, 25th, 29th, 31st; upper lake region, 1st, 4th, 11th, 14th, 19th, 28th, 29th; Upper Mississippi valley, 1st, 2d, 4th to 7th, 10th, 11th, 12th, 14th, 18th, 19th, 20th, 23d, 24th, 25th, 27th, 28th, 29th, 30th; Missouri valley, 1st, 5th to 9th, 11th, 13th, 20th, 23d, 24th, 29th; middle slope, 4th, 6th, 14th, 15th,

16th, 20th, 27th, 28th, 29th; northern plateau, 12th, 17th, 20th, 22d, 23d, 25th, 29th; middle plateau, 10th, 22d, 24th, 28th; Middle Pacific coast region, 6th, 12th, 22d to 26th, 28th; South Pacific coast region, 10th, 16th, 18th, 28th. They were also reported from the following stations, not included in the districts named above: St. Vincent, Minn., 30th; Helena, Mont., 27th, 28th; Florence and Tucson, Ariz., 10th; Albany, Or., 12th, 20th, 21st, 23d. Clinton, Ia., 2d, 3 p. m., an unusually conspicuous and brilliant halo of 22° radius was observed. Outside of this there was a part of a halo of much larger radius, while the parhelic circle extended parallel with the horizon, completely around the heavens. Fine parhelia were visible.

LUNAR HALOS.

Have been observed in the various districts on the following dates: New England, 6th, 8th, 9th, 23rd, 25th, 29th; Middle Atlantic states, 1st to 8th, 23d, 25th to 28th, 31st; South Atlantic states, 1st, 25th, 26th, 27th, 29th; Florida peninsula, 1st, 25th, 27th, 28th, 31st; East Gulf states, 22d, 27th, 28th; West Gulf states, 1st, 4th, 9th, 15th, 24th, 25th; Ohio valley and Tennessee, 1st, 3d, 4th, 6th to 9th, 11th, 14th, 21st, 23d, 27th to 31st; lower lake region, 1st to 5th, 8th, 9th, 25th, 28th, 31st; upper lake region, 1st, 2d, 19th, 22d, 23d, 24th, 27th, 28th, 29th, 31st; Upper Mississippi valley, 2d, 3d, 11th, 14th, 20th, 23d, 24th, 25th, 27th, 31st; Missouri valley, 1st, 2d, 3d, 23d to 29th; northern slope, 10th, 22d, 29th, 30th; middle slope, 10th, 25th, 28th, 29th; northern plateau, 1st, 29th, middle plateau, 1st, 2d, 4th, 8th, 10th, 24th; Middle Pacific coast region, 3d, 24th, 26th, 28th; South Pacific coast region, 2d, 3d, 11th. They were also reported from the following stations not included in the districts named above: Eagle Pass, Tex., 3d; Brownsville, Tex., 29th; Moorhead, Minn., 31st; El Paso, Tex., 12th; Florence, Ariz., 11th, 25th; Roseburg, Or., 6th. An exceptionally brilliant display occurred at Northfield, Minn., on the 29th. There were two rings; one around the moon, and the other passing through it. The circle around the moon showed the prismatic colors very distinctly; the other was white.

MIRAGE.

New Haven, 5th, a well defined mirage was observed over Long Island. The Island seemed unusually prominent and above it appeared its inverted image. Indianola, Tex., 8th, 28th. Olivet, Dak., 27th. Northport, Mich., 5th, 3 to 4 p. m.

MISCELLANEOUS PHENOMENA.

METEORS.

Davenport, 12th; Ft. Benton, Mont., 8th; Florence, Ariz., 24th; Yuma, Ariz., 29th; Vevay, Ind., 13th, 31st; Monticello, Ia., 22d; Holton, Kan., 10th; Woodstock, Md., 3d, 12th, 14th, 21st, 22d; Rowe, Mass., 19th; Freehold, N. J., 13th; Rio Vista, Cal., 27th.

POLAR BANDS.

St. Louis, 30th; Florence, Ariz., 13th; Riley, Ill., 29th; New Corydon, Ind., 1st, 3d, 12th, 19th, 23d, 29th, 30th; Yates Centre, Kan., 4th, 5th, 11th; Cornish, Me., 26th; Auburn, N. H., 5th, 8th; Atco, N. J. 29th; Wytheville, Va., 3d, 11th, 31st.

EARTHQUAKES.

San Diego, Cal., 11th, about 4 p. m., slight shock, from north to south, of very short duration. San Francisco, 16th, 1.46 p. m., light shock felt in city. Salinas City, Cal., light shocks of earthquakes felt twice during month. Poway, Cal., 11th, 3.30 p. m., slight shock.

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 185 stations show 5,690 observations to have been made, of

which 29 were reported doubtful; of the remainder, 5,661, or 85.3 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, Mass.:

DATE— Mar., 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	
3, 9 a. m.	1	20†	.....	.....	.....	.....	2	25†	
4, 11 a. m.	0	0	0	0	0	0	2	25†	
5, 10 a. m.	2	3	0	0	1	2	4	30†	
8, 11 a. m.	1	2	.....	.....	1	2	5	30†	
13, 10 a. m.	3	12	.....	.....	.....	.....	5	20†	
14, 11 a. m.	1	3	0	0	0	0	6	23†	
17, 11 a. m.	1	10†	.....	.....	.....	.....	3	20†	
18, 8 a. m.	0	5	1	5	0	0	4	35†	
19, 12 p. m.	2	15	0	0	0	0	4	35†	
20, 11 a. m.	0	0	0	0	0	0	4	30†	
22, 3 p. m.	1	2	1	5	1	2	4	30†	
23, 10 a. m.	0	0	0	0	0	0	4	30†	
25, 12 m.	0	0	0	0	0	0	4	30†	
28, 2 p. m.	0	0	1	10†	0	0	3	15†	
29, 11 a. m.	2	6	0	0	1	2	5	20†	
30, 1 p. m.	2	15†	1	3	1	5	6	35†	
31, 8 a. m.	0	0	1	5	0	0	5	30†	

†Approximated. Faculae were seen at the time of every observation.

The following record of observations has been forwarded by Mr. A. G. Bender, Sacramento, Cal.: 2d, 11.30 a. m., one group, twenty spots; this might be regarded as two groups, but they are close together; 3d, 11.30 a. m., one group, twenty spots; two of the smaller spots much enlarged; 4th, 12 m., two groups, thirty spots; one new group, six spots; first group much changed; second group appeared near centre of upper section; 5th, 11.30 a. m., two groups, twenty spots; one group, one spot, reappeared by rotation; the new group seen on 4th, not visible; 6th, 1 p. m., two groups, twenty spots; the first named group continues to change in number and form of spots; 7th, 1 p. m., five groups, twenty-five spots, one new group, two spots appeared near centre of upper section; 8th, 1 p. m., four groups, twelve spots; one new group, one spot; first named group changed to five large and three small spots. 9th, 12 m., four groups, twelve spots; 10th, 11.45 a. m., six groups, thirty-five spots; two new groups, seven spots; one of the earlier groups first showing two spots, now shows ten or more; the new groups appeared one in each section; 11th, 1 p. m., seven groups, thirty-five or forty spots; one group reappeared by rotation; much change in groups since 10th; 12th, six groups, thirty spots; one group, five spots, disappeared by rotation; a little cloudy; 14th, 3.15 p. m., five groups, twenty-five or thirty spots; cloudy, but occasional views show one group, one spot, to have disappeared by rotation; 16th, 11.30 a. m., five groups, ten spots; one new group, three spots; one group, one spot, disappeared by rotation; new group is near one already seen; 17th, 12 m., three groups, fifteen to twenty spots; one group, one spot, disappeared by rotation or became connected by new spots with another; 18th, 12 m., three groups, nine spots; much change in appearance of two groups. 19th, four groups, twenty-five spots; one new group, eight spots, near centre of upper section changing while under observation; 20th, 1 p. m., four groups, thirty-five spots; a large cluster added to the spot which appeared on the 11th; 21st, 1 p. m., four groups, three spots; one group, five spots, disappeared by rotation; one group, one spot, reappeared by rotation; the cluster mentioned on 20th has become dim, except one spot; 22nd, 12.45 p. m., four groups, thirty spots; one new group, three spots; one group, five spots, disappeared by rotation; one new spot near the one that appeared on 21st; new group in left part of lower section, rather dim; cluster seen on 20th, still dim; day a little cloudy; 23rd, 12.30 p. m., six groups, forty to fifty spots; two new groups, ten spots near centre of lower section; 24th, 1.30 p. m., six groups, thirty-five spots; some spots disappeared; 25th, 1.30 p. m., four groups, twenty-five spots; one group disappeared by rotation;

group first seen on 22d has also disappeared; 26th, 1 p. m., three groups, twenty spots; one group, five spots disappeared by rotation; some of the spots also disappeared; 27th, 12 m., four groups, twenty spots; one new group, two spots, appeared to the right of centre of upper section; 28th, 1.15 p. m., three groups, ten spots; one group, two spots, disappeared by rotation, 29th, 12 m., three groups, three spots; one new group, one spot, possibly appeared by rotation; one group, seven spots, disappeared by rotation; 30th, 1.30 p. m., two groups, six spots; some new spots appear near a former single one; one group, one spot, disappeared by rotation; 31st, 12 m., two groups, six spots. Mr. William Dawson, at Spiceland, Ind., reports: 1st, two groups, seven spots, one large spot, 4' from east edge; 2d, two groups, twenty spots; 5th, four groups, thirty-five spots; large group of thirty spots, west of centre and one large spot near east edge; 15th, six groups, twenty spots, five of them large; 19th, four groups, sixty spots; one large spot 8' from east edge; 31st, seven groups, thirty spots; the large spot nearing the west edge has nearly or quite divided into two. Mr. David Trowbridge, at Waterburg, N. Y., reports: 2d, one group, three spots; 3d, one group, (same as on 2d,) six spots; 4th, two groups, eight spots; a new group has arisen near middle of disk; 8th, four groups, eight spots; 11th, six groups, seven spots; one group has just appeared by rotation; 17th, three groups, five spots; 19th, three groups, (same as 17th,) ten large spots; 20th, four groups, eleven spots; 29th, five groups, five spots, all faint but one; one group appeared by rotation. Mr. H. D. Gowey, at North Lewisburg, Ohio, reports: sun spots were observed on every clear day during the month. They were most numerous on the 10th, and least numerous on the 1st; largest on the 26th, and smallest on the 31st.

SAND STORMS.

Leavenworth, 21st; Fort Cummins, N. Mex., 24th; San Carlos, Ariz., 17th, 22d, 27th, 28th; Tucson, Ariz., 3d; Yuma, Ariz., 3d, 6th, 7th, 25th; Camp Thomas, Ariz., 3d, 5th, 13th, 17th, 22d, 25th; Umatilla, Or., 24th to 28th; on the latter date, trains were delayed on account of the track being covered with sand. Fort Garland, Col., 17th. St. Louis, Missouri Weather service reports: during heavy gale which covered the state on 21st, a marked dust storm was reported from Greenfield, Clinton, Harrisonville, Pleasant Hill, Lexington and Savannah, in the western part of the state.

PRAIRIE AND FOREST FIRES.

Ft. Gibson, Ind. Ty., 12th, 15th, 18th, 25th. Omaha, 3d, 28th; that of the latter date was very disastrous. In Sarpy county, barns, corn-cribs, stock and other property were destroyed. A man in attempting to rescue a team was fatally burned. Yankton, 10th, 15th, 17th, 22d, 28th, 31st. Terry's Landing, Mont., 22d. Ft. Supply, Ind. Ty., 4th, 14th. Dodge City, Kan., 22d, 28th. Pike's Peak, 14th, 15th. Ft. Bayard, N. Mex., 30th. Yates Centre, Kan., 2d. Council Grove, Kan., 16th. Protom, Mo., 15th, 16th, 21st, 22d. Lincoln, Neb., 25th. Fayetteville, N. C., 25th. North Platte, Neb., 14th, 25th. Alexandria, Dak., 27th, 28th.

ZODIACAL LIGHT.

New Haven, 7th, 8th; Cedar Keys, Fla., 7th, 20th; Punta Rassa, Fla., 9th; Nashville, 9th, 10th, 13th, 15th, 18th, 19th; St. Vincent, Minn., 8th; Springfield, Ill., 13th; New Corydon, Ind., 12th, 13th; Clinton, Iowa, 12th, 13th; Monticello, Iowa, 13th, 18th; Yates Centre, Kan., 10th, 12th, 14th; Cornish, Me., 7th, 8th, 13th, 14th; Orono, Me., 7th, 8th; Harvard College, Cambridge, Mass., suspected, 15th, 20th, 24th, 25th; distinct, 8th, 11th, 13th, 14th, 17th, 19th, 25th; Somerset, Mass., 8th, 11th, 19th; Williamstown, Mass., 17th, 19th; Fall River, Mass., 18th, 19th; Rowe, Mass., 14th, 19th; Fayetteville, N. C., 11th, 12th, 13th; Albany, Or., 10th; Dyberry, Pa., 8th.

MIGRATION OF BIRDS.

Geese flying southward: Indianola, 12th; Port Huron, 30th; Yankton, Dak., 17th, 19th; Charleston, Ill., 5th. *Geese flying northward*: Alexandria, Dak., 16th; Indianola, 2d; Champaign, Ill., 5th; Bismarck, Dak., 30th, 31st; Dubuque, 2d; Des Moines, 18th; Davenport, 4th; Yankton, Dak., 21st, 22d, 26th; Leavenworth, 16th; Cheyenne, Wyo., 2d; Terry's Landing, Mont., 16th; Ft. Assinnaboine, Mont., 31st; Portland, Or., 10th; Ft. Hale, Dak., 16th; Logansport, Ind., 5th; Monticello, Ia., 17th; Cedar Rapids, Ia., 1st; Protem, Mo., 1st; Palermo, N. Y., 20th; Wellsboro, Pa., 5th. *Ducks flying south-*

ward: Indianola, 13th; Port Huron, 18th; Yankton, Dak., 19th; Charleston, Ill., 5th. *Ducks flying northward*: Alexandria, Dak., 16th; Ft. Macon, N. C., 12th; Detroit, Mich., 5th to 8th; Toledo, 2d; Dubuque, 2d; Yankton, Dak., 22d, 26th; Charleston, Ill., 23d; Monticello, Ia., 5th, 27th; Des Moines, 17th; Northfield, Minn., 10th. *Cranes flying northward*: Ft. Gibson, Ind. Ty., 18th; Charleston, Ill., 15th; Nora Springs, Ia., 29th; Des Moines, Ia., 1st, 17th; Fayette, Miss., 14th; Protem, Mo., 19th; Murfreesboro, Tenn., 9th, 10th. *Sand hills flying northward*: Ft. Gibson, Ind. Ty., 18th. *Pigeons flying northward*: Monticello, Ia., 5th, 27th.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR :

W. B. HAZEN,

Brig. & Bvt. Maj. Gen'l,

Chief Signal Officer, U. S. A.

Copy furnished for

Entered at the Post Office, Washington, D. C., as Second-Class Matter.

This Paper is furnished by the Government of the United States, without charge, to the Co-operating Observers acting with the Signal Office in the collection of Simultaneous Reports.