

Ill., the river was closed by a gorge 4 miles below that place on the 4th; gorge broken on the 11th. At Alton, Ill., floating ice was reported on the 4th to 6th, 10th, and 11th.

Missouri River.—Floating ice in the river at Leavenworth, Kans., on the 2d to 7th, 9th to 12th, 19th to 21st, and 25th to 28th. Ice in the river at Kansas City, Mo., 2d to 13th, 17th to 22d, 27th, and 28th. Running ice at Saint Joseph, Mo., 1st, 2d, 7th to 11th, 17th to 22d, 25th, 26th, and 27th; ice blocked at the draw in the bridge on the 28th. At Hermann, Mo., floating ice on the 4th to 6th and 16th.

Light drift ice was reported in the harbor at Portland, Me., on the 8th. Lake Champlain was clear of ice at Burlington, Vt., on the 1st, but was partially closed the latter part of the month. Navigation was obstructed by slush ice at Grand Haven, Mich., on the 3d to 6th, 9th and 10th.

Heights of rivers above low-water mark, February, 1891 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red River.						
Shreveport, La.	29.9	11, 13	25.2	28	21.5	3.7
Arkansas River.						
Fort Smith, Ark.	22.0	25	11.9	20	3.3	8.6
Little Rock, Ark.	23.0	27	14.5	20	3.1	6.4
Missouri River.						
Fort Buford, N. Dak.*						

Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Missouri River—Continued.						
Kansas City, Mo.	21.0	23	7.5	5	2.8	4.7
Mississippi River.						
Saint Paul, Minn.*	14.0					
La Crosse, Wis.*	13.0					
Dubuque, Iowa*	16.0					
Davenport, Iowa	15.0	21	5.2	1	1.1	4.1
Keokuk, Iowa	14.0	8	4.0	4	0.2	4.2
Saint Louis, Mo.	30.0	26, 27	11.5	9, 11	3.4	8.1
Cairo, Ill.	40.0	28	45.5	1	27.9	17.6
Memphis, Tenn.	33.0	26, 27, 28	33.0	1	19.0	14.0
Vicksburg, Miss.	41.0	28	43.2	2	28.2	15.0
New Orleans, La.	13.0	26	14.9	4, 5, 6, 7	11.0	3.9
Ohio River.						
Pittsburgh, Pa.	22.0	18	31.3	7, 15	9.2	22.1
Parkersburg, W. Va.	38.0	21	44.6	16	16.0	28.6
Cincinnati, Ohio	45.0	25	57.4	1	33.6	23.8
Louisville, Ky.	24.0	26	32.3	1	12.3	20.0
Cumberland River.						
Nashville, Tenn.	40.0	15	41.2	23	20.4	20.8
Tennessee River.						
Chattanooga, Tenn.	33.0	14	37.5	1	9.8	27.7
Knoxville, Tenn.	29.0	11	21.9	1.8	5.2	16.7
Monongahela River.						
Pittsburgh, Pa.	29.0	18	31.3	7, 15	9.2	22.1
Savannah River.						
Augusta, Ga.	32.0	9	27.2	16	13.1	14.1
Willamette River.						
Portland, Oregon.	15.0	15	5.7	5	1.3	4.4

* Frozen.

MISCELLANEOUS PHENOMENA.

SUN SPOTS.

Haverford College Observatory, Pa. (observed by Prof. F. P. Leavenworth):

Date.	Number of new		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Faculae.	Remarks.
	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.		
<i>Feb., 1891.</i>										
1, 2 p. m.	0	0	1	2	0	0	2	22	0	Definition fair; spots small.
2, 9 a. m.	1	1	0	0	0	0	0	10	1	Definition good; spots small.
4, 9 a. m.	0	0	1	0	0	0	0	0	1	Definition poor; spots small.
5, 9 a. m.	1	1	0	0	0	0	1	1	1	Definition poor; spots small.
6, 9 a. m.	0	0	0	0	0	0	1	2	2	Definition fair; spots small.
8, 10 a. m.	1	1	0	0	0	0	2	2	1	Definition good; spots small.
10, 10 a. m.	1	30	0	0	0	0	2	33	0	Definition fair.
11, 11 a. m.	1	33	0	0	0	0	3	65	0	Definition fair.
13, 3 p. m.	1	3	0	0	1	26	1	Definition good; 1 large spot.
14, 9 a. m.	1	3	0	0	0	0	4	32	1	Definition fair; 1 large spot.
15, 9 a. m.	0	32	0	0	0	0	4	54	2	Definition good; 1 large spot.
18, 9 a. m.	2	14?	0	0	0	0	5	36	4	Definition fair.
19, 11 a. m.	0	0	0	0	0	0	4	14	1	Definition bad.
22, 9 a. m.	2	30	0	0	0	0	6	55	3	Definition good; immense faculae.
23, 4 p. m.	0	0	0	0	0	0	4	45	1	Definition good.
24, 10 a. m.	0	0	0	0	0	0	3	28	1	Definition fair.
25, 10 a. m.	0	27	0	0	0	0	2	46	3	Definition fair.
27, 9 a. m.	1	2	1	0	0	0	2	25	1	Definition good.
28, 9 a. m.	0	0	0	0	0	0	1	18	1	Definition good; spots small.

Mr. D. E. Hadden, Alta, Iowa: 1st, 2 groups, 3 spots; groups n. latitude. 2d, 1 group, 1 spot. 3d, large group; faculae near nw. limb. 5th, 1 group, 1 spot, and faculae;

spots small sw. 6th, faculae. 7th, faculae on e., se., and w. limbs. 10th, 1 group, 10 spots, and faculae; group n. latitude e. of meridian. 11th, 2 groups; aurora preceding evening; 15 spots, and faculae; new group s. latitude; 4 large spots in group n. latitude; faculae on w. limb. 2 groups, 12 spots; brilliant faculae by rotation on se. limb. 13th, 3 groups, 12 spots, and faculae; new group se. 14th, 3 groups, 9 spots, and faculae; groups se., nw., and sw. 15th, 2 groups; large faculae by rotation on se. limb. 17th, 1 group about 2 days in on ne. limb; clouds; could not count spots; suspected aurora in the evening. 18th, 2 groups, 12 spots, and faculae; penumbra around spots in large group; other group, small, e. of larger group. 20th, 3 groups, 18 spots; large areas faculae by rotation on ne. limb. 21st, 3 groups, 12 spots, and faculae; large group unchanged; penumbra around spots. 23d, 3 groups, 9 spots; large faculae e., and near w. limb. 26th, 2 groups, 6 or 8 spots; faculae on nw. and w. limbs; groups near meridian n. latitude. 28th, 1 group, 2 spots; extensive group faculae w.; spots in faculae. Cloudy 8th, 16th, 19th, 24th, 25th, and 27th.

Mr. John W. James, Riley, Ill: none seen till 11th, then 2 groups on sun's meridian in n. latitude. 12th, 2 new groups 1 day past meridian in s. latitude. 13th, 1 group gone. 14th, 2 new spots in s. latitude w. of meridian; prominent faculae on se. edge of disc, followed next day by a large faint spot. 18th, 2 new groups in n. latitude; these were on sun's meridian 20th, and the largest spot in them disappeared by solar rotation 26th. 25th, 1 new group on sun's meridian in n. latitude. 27th, 28th, no spots seen.

Mr. H. D. Govey, North Lewisburgh, Ohio: sun spots were observed on the 10th, 11th, 13th, 14th, and 22d.

ATMOSPHERIC ELECTRICITY.

AURORAS.
Auroras were widely observed on the 9th, when they were noted in Ind., Iowa, Minn., S. Dak., and Wis.; on the 11th, when they were noted in Ill., S. Dak., Wis., Mich., Mass., N. H., and Me.; on the 12th, when they were noted in Me., Mass.,

Mich., and Mont.; and on the 14th, when they were noted in Ill., Mich., Mass., N. H., and Me. On the 11th, at 10.40 p. m., a brilliant aurora was observed at Portland, Me. It appeared as a whitish glow resting upon a dark segment, and reached altitude about 15°, and extended from 160° to 220° of azimuth.