

that it seemed as though thousands of needles were pricking them as the storm passed. It should be noted that as these storms occurred after dark, there was a very favorable oppor-

tunity for observing lightning, but not for noting other phenomena of these violent storms. Several spoke of observing the funnel cloud by the light of the vivid flashes of lightning.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS.

The following table shows the danger point and the highest and lowest stages for the month of September, 1894:
Heights of rivers above low-water mark, September, 1894.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Shreveport, La.	29.2	2.5	1, 29	3.7	10	1.2
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	11.3	16	0.7	1	10.6
Little Rock, Ark.	23.0	9.8	18	2.9	3, 4	6.9
<i>Missouri River.</i>						
Bismarck, N. Dak.	75.0					
Pierre, S. Dak. *	13.0	2.2	1	1.8	21, 22	0.4
Sioux City, Iowa.	18.7	7.7	1	6.1	28, 29	1.6
Omaha, Nebr.	18.0	8.2	1	6.6	30	1.6
Kansas City, Mo.	21.0	9.7	3	6.7	29, 30	3.0
<i>Mississippi River.</i>						
St. Paul, Minn.	14.0	1.9	16-18	1.4	2	0.5
La Crosse, Wis.	10.0	1.3	23-27	0.9	5, 6, 14-19	0.4
Dubuque, Iowa.	16.0					
Davenport, Iowa.	15.0	1.6	11, 12	0.1	1-7	0.5
Keokuk, Iowa.	14.0	1.9	24	0.7	1-3	2.6
Hannibal, Mo.	17.0	2.6	25	0.2	1-3	2.8
St. Louis, Mo.	30.0	6.1	18	3.4	3, 4	2.7
Cairo, Ill.	40.0	6.4	21	5.1	5	1.3
Memphis, Tenn.	33.0	1.9	1	1.0	8, 9	0.9
Vicksburg, Miss.	41.0	2.2	28, 29	0.2	14	2.4
New Orleans, La.	13.0	4.2	20, 21	3.0	1, 2	1.2
<i>Ohio River.</i>						
Parkersburg, W. Va.	38.0	12.4	23	0.3	10, 11	12.1
Cincinnati, Ohio.	45.0	13.0	27	3.1	14, 15	9.9
Louisville, Ky.	24.0	0.7	29	2.6	18-20	4.1

Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Cumberland River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Nashville, Tenn.	40.0	1.7	18, 20	0.4	28-30	1.3
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33.0	4.0	1	0.8	30	3.2
Knoxville, Tenn.	29.0					
<i>Monongahela River.</i>						
Pittsburg, Pa.	22.0	10.6	21	2.0	28	8.6
<i>Savannah River.</i>						
Augusta, Ga.	32.6	13.7	19	5.0	13	8.7
<i>Willamette River.</i>						
Portland, Oregon.	15.0	6.3	2	2.2	24	4.1
<i>Susquehanna River.</i>						
Harrisburg, Pa.	17.0					
<i>Alabama River.</i>						
Montgomery, Ala.	48.0	4.7	22	0.0	7	4.7
<i>James River.</i>						
Lynchburg, Va.	18.0	1.5	1, 30	0.2	13-18	1.7
<i>Sacramento River.</i>						
Red Bluff, Cal.	22.0	1.2	30	0.6	23-25	0.6
Sacramento, Cal.	25.0	8.2	1, 2	7.5	13-30	0.7
<i>Des Moines River.</i>						
Des Moines, Iowa.	19.0	4.0	9	2.8	10, 11, 14-19, 26-28.	1.2

* Record for 22 days.

The above table shows that no floods occurred during the month in the rivers therein tabulated. In most cases the rivers were unusually low.

ATMOSPHERIC ELECTRICITY.

GENERAL STATISTICS.

The table showing in detail for September, 1894, the statistics relative to auroras and thunderstorms is placed among the meteorological tables as No. XI, instead of being given in the text as heretofore. It shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month. It is not certain that all the meteorological stations are equally faithful in reporting thunderstorms and auroras, and it is therefore necessary for the student to guard against the assumption that the frequency of these phenomena varies with the number of the reports. Even if the number of reports be divided by the number of stations in each State, the percentages of frequency thus obtained are liable to a similar uncertainty, and therefore for the present such percentages are omitted.

In comparing the relative frequency of thunderstorms or auroras in different portions of the globe and at different seasons of the year it is customary, and, in fact, imperative, to ignore the number of stations and the number of reports as such and to consider only the number of days on which the phenomena occur. In such studies, therefore, the number of stations is of importance principally as an indication of the probability that all of the thunderstorms and auroras have been recorded. Even from this point of view, however, it is necessary to know not merely the number of stations, but their geographical distribution within each State as an assurance against overlooking any very local phenomena that might have occurred only in the regions where no observer was at hand. Owing to the want of space in Table XI,

the publication of the necessary data here referred to will be delayed until the annual summary.

THUNDERSTORMS.

A mention of the more severe thunderstorms reported during the month is given under "Local storms." The dates on which reports of thunderstorms were most numerous were: 8th, 181; 10th, 171; 5th, 138; 9th, 134; 14th, 121; 7th, 106.

The States where thunderstorm reports were most numerous were: Missouri, Pennsylvania, Ohio, Iowa, Kansas, Florida, and Illinois.

The States where the dates of thunderstorms were most frequent were: Florida, where they were recorded on 23 days; Missouri, on 22 days; Kansas and Michigan, on 20 days.

DAMAGE BY LIGHTNING.

The following statistics of the damage done by lightning in September, so far as reported by the observers of this Bureau, are furnished by Mr. Alexander McAdie:

During September, 1894, 29 persons were killed and 14 severely injured; 56 barns were struck, with a loss of not less than \$141,350; 42 dwelling houses were struck and a number of churches, several schoolhouses, 1 armory, and 1 railroad depot.

AURORAS.

The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four days preceding and following the date of full moon, viz, from the 10th to the 18th, inclusive. On the remaining twenty-one days of the month 243 reports were received, or an average of 12 per day. The dates on which the reported number especially exceeded this average were the 27th, 73;