

WIND.

PREVAILING WINDS.

The prevailing winds for August, 1894, viz, those that were recorded most frequently at Weather Bureau stations, are shown in Tables I and VIII; they are not given on Chart II, as has hitherto been the custom, but the resultant winds are published instead.

RESULTANT WINDS.

The resultant winds for the current month, as deduced from the hourly records by self-registers at about 67 regular Weather Bureau stations, are given in Table VIII. Other resultants, deduced from the personal observations made at 8 a. m. and 8 p. m., are given in Table IX. These latter resultants are also shown graphically on Chart II, in connection with the isobars based on the same system of simultaneous observation; the small figure attached to each arrow shows the number of hours that this resultant prevailed, on the assumption that each of the morning and evening observations represents one hour's duration of a wind of average velocity; these figures (or the ratio between them and the total number of observations in this month) indicate the extent to which winds from different directions counterbalanced each other. The original north, south, east, and west components are given in detail in Table IX.

During August the resultant movement was generally from the southwest in New England and westerly on the Pacific coast; from the southeast in the Missouri Valley, and northerly in the Ohio Valley and Tennessee.

HIGH WINDS.

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Huron, S. Dak.....	5	Miles. 52	s.	Pikes Peak, Colo.....	23	Miles. 50	ne.
Pensacola, Fla.....	7	52	se.	Tatoosh Island, Wash..	23	53	e.

LOCAL STORMS.

Destructive or severe local storms were reported as follows:

1st.—Carlisle, Pa., thunderstorm. Alpena, Mich., windstorm. Near Albuquerque, N. Mex., 1 person killed by lightning.

2d.—Friendship, N. Y., and Harrisburg, Pa., thunderstorms. Grafton, W. Va., rainstorm. Newton, Ala., windstorm. Pueblo, Colo, thunderstorm.

3d.—Kingston, R. I., and Montville, Conn., thunderstorms. New London, Conn., and Abilene, Tex., rainstorms.

7th.—Pensacola, Fla., windstorm. Billings, Mont., hailstorm.

9th.—South Canisteo, N. Y., thunderstorm. Near Dyberry, Pa., 1 person killed. Purcellville, Va., 1 person killed by lightning. Person County, N. C., a boy killed by lightning.

10th.—New Bedford, Mass., Staunton, Va., Olney, Ill., and Warrentown, Mo., thunderstorms.

11th.—Knoxville, Tenn., thunderstorm. Cincinnati, Ohio, rainstorm. Martinsville, Olney, and Ursa, Ill., thunderstorms.

12th.—Society Hill, S. C., horse killed by lightning. Little Mountain, S. C., thunderstorm. North Madison, Ohio, windstorm. Kimball, S. Dak., thunderstorm. Sulphur Hot Springs, N. Mex., hailstorm.

13th.—Norfolk, Va., 1 person killed by lightning. New England City, Va., hailstorm. Columbia and Unionville, Mo., Rockwell City, Iowa, and Mingusville, Mont., thunderstorms.

14th.—Near Blandville, Ky., hailstorm. Springfield, Ill., thunderstorm. Martinsville and Rochester, Ill., stock killed by lightning.

15th.—Plymouth, N. H., near Salem and near Tenafly, N. J., and Keysville, Va., thunderstorms. Near Bailey, N. C., hailstorm. New England City, S. C., and Palo Alto, Miss., thunderstorms. Egypt, Miss., and Greendale, Ky., windstorms. Wild Rice, N. Dak., thunderstorm.

16th.—Yorkville, S. C., thunderstorm. Columbus, Tex., 1 person killed by lightning.

17th.—Steffenville, Mo., stock killed by lightning.

18th.—Near Pinopolis, S. C., stock killed by lightning.

19th.—Mount Morris, N. Y., rainstorm. Near Factoryville, N. Y., Parkersburg, W. Va., and Springdale and Trenton, Tenn., thunderstorms. Henderson County, Ky., hailstorm. McConnellsville, Ohio, and Beardsley, Minn., thunderstorms. Near Halls Peak, N. Mex., rainstorm.

20th.—Eastport, Me., thunderstorm. Boston, Mass., rainstorm. Sandy Hook, Conn., man killed by lightning. Waukesha, Wis., thunderstorm. Forest City, S. Dak., 2 horses killed by lightning.

21st.—Jacksonville, Fla., and St. Vincent, Minn., thunderstorms.

22d.—Pensacola, Fla., 1 person killed by lightning. Aurora, Tex., 2 persons and 2 horses killed by lightning. Campbell, Minn., thunderstorm. Clear Lake, Minn., 3 horses killed by lightning.

24th.—Egypt, Miss., windstorm.

25th.—St. Johnsbury, Vt., thunderstorm. Massena, N. Y., horse killed by lightning. Mansfield, La., windstorm. Duarte, Cal., thunderstorm. Los Angeles, Cal., 2 persons stunned by lightning.

26th.—Cornish, Me., and Easton, Md., thunderstorms. Parkersburg, W. Va., 1 person killed by lightning. Atlantic City, N. J., 1 person killed and 2 injured by lightning. Jacksonville, Fla., thunderstorm. Florence Station, Tenn., 2 horses killed by lightning. Marlin, Tex., stock killed by lightning. Olney, Ill., and Edmanton, Cal., thunderstorms.

27th.—Port Royal, S. C., windstorm, 3 persons drowned. Yerington, Nev., thunderstorm.

28th.—Orlando, Fla., thunderstorm.

29th.—Hess Road Station, N. Y., 3 horses killed by lightning. Amelia, Fla., thunderstorm.

31st.—Salt Lake City, Utah, thunderstorm. Crook, Oreg., horse killed by lightning.

Mr. Baturoni reports from Vera Cruz that a severe thunderstorm occurred on August 18, between 4 and 5.30 a. m. Nine lightning strokes occurred in eleven minutes, but fortunately all fell outside of the city.

ATMOSPHERIC ELECTRICITY.

GENERAL STATISTICS.

The table showing in detail for August, 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: 15th, 227; 2d, 189; 1st, 188; 10th, 169.

The States where thunderstorm reports were most numer-

ous were: Florida, Ohio, Missouri, Louisiana, Colorado, Pennsylvania, and North Carolina.

The States where the dates of thunderstorms were most frequent were: Florida, where they were recorded every day in the month, Georgia on thirty days, and Louisiana and Texas, where they occurred on twenty-nine days.

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 11th to the 19th, inclusive. On the remaining twenty-two days of the month 174 reports were received, or an average of 8 per day. The dates on which the reported number especially exceeded this average were the 19th, 87; 20th, 35 [see p. 328]. The States from which auroras were reported by a large percentage of observers were: Minnesota, North Dakota, Oregon, and Washington.

The States where the dates of auroras were most frequent were: Iowa, 5; Minnesota, 9; New Hampshire, 5; North Dakota, 6.

DAMAGE BY LIGHTNING.

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

During August, 1894, 78 lives were lost and 76 persons injured; 81 barns, with a minimum loss of \$129,800, were struck; 41 dwellings, 5 churches, 2 academies, and 2 mills or factories were struck; 22 horses and 15 cows, not in stables, were killed.

For purposes of comparison Mr. McAdie gives the following statement of the deaths due to lightning, so far as collected by the U. S. Weather Bureau, for the month of August during successive years, viz: 1890, 12; 1891, 34; 1892, 54; 1893, 18; 1894, 78.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS.

The following table shows the danger point and the highest and lowest stages for the month of August, 1894:

Heights of rivers above low-water mark, August, 1894.

Stations.	Danger-point gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>						
Shreveport, La.	29.2	1.1	5	3.4	16	2.3
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	2.9	15	0.6	11	2.3
Little Rock, Ark.	23.0	4.8	14	3.0	31	1.8
<i>Missouri River.</i>						
Bismarck, N. Dak.	75.0					
Pierre, S. Dak.	13.0					
Sioux City, Iowa	18.7	10.9	1	7.8	27, 28	3.1
Omaha, Nebr.	18.0	10.9	1	8.2	31	2.7
Kansas City, Mo.	21.0	13.2	1	8.1	31	5.1
<i>Mississippi River.</i>						
St. Paul, Minn.	14.0	2.0	24	0.2	6	1.8
La Crosse, Wis.	10.0	1.2	1, 2	0.8	7-13	0.4
Dubuque, Iowa	16.0	1.2	1	0.4	16-20	0.8
Davenport, Iowa	15.0	0.5	1, 2	0.1	10, 11, 16-19, 21-31	0.4
<i>Ohio River.</i>						
Keokuk, Iowa	14.0	0.2	1	0.7	28-31	0.9
Hannibal, Mo.	17.0	1.0	1-3	0.2	30, 31	1.2
St. Louis, Mo.	30.0	8.8	1	3.6	31	5.2
Osage, Ill.	40.0	9.9	1	5.7	21, 22	4.2
Memphis, Tenn.	33.0	4.8	1	1.4	23, 24	3.4
Violsburg, Miss.	41.0	7.2	1	0.8	30, 31	6.4
New Orleans, La.	13.0	4.2	1, 2	3.1	21, 31	1.1
<i>Ohio River.</i>						
Parkersburg, W. Va.	38.0	1.2	2, 3	0.6	11, 18, 20-25, 28-31	0.6

Heights of rivers—Continued.

Stations.	Danger-point gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Ohio River—Continued.</i>						
Cincinnati, Ohio	45.0	5.1	19	3.5	31	1.6
Louisville, Ky.	24.0	3.5	14, 22, 23	2.8	2, 3, 7	0.9
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	2.6	2	0.7	18, 19, 23	1.9
<i>Tennessee River.</i>						
Chatanooga, Tenn.	33.0	4.6	17	1.8	14	2.8
Knoxville, Tenn.	29.0					
<i>Monongahela River.</i>						
Pittsburg, Pa.	22.0	6.2	8, 9	5.0	5	1.2
<i>Savannah River.</i>						
Augusta, Ga.	32.6	24.0	7	5.6	25	18.4
<i>Willamette River.</i>						
Portland, Oregon	15.0	12.2	1	5.2	26	7.0
<i>Swiftwater River.</i>						
Harrisburg, Pa.	17.0					
<i>Alabama River.</i>						
Montgomery, Ala.	48.0	16.0	25, 26	0.5	16	15.5
<i>James River.</i>						
Lynchburg, Va.	18.0	0.4	28	0.0	1, 2, 9-26, 31	0.5
<i>Sacramento River.</i>						
Red Bluff, Cal.	22.0	1.0	1-3	0.7	17-31	0.3
Sacramento, Cal.	25.0	9.6	1, 2	5.2	23-31	1.4
<i>Des Moines River.</i>						
Des Moines, Iowa	19.0	3.7	30, 31	3.3	1, 2, 5, 7, 10, 16	0.4

The above table shows that no floods occurred during the month in the rivers therein tabulated. In most cases the rivers were unusually low. A local flood occurred on the 22d and 23d at Bisbee, Ariz., causing about \$5,000 damage.