

North Dakota, Ohio, Pennsylvania, Tennessee, Texas, and Vermont. 25th, Connecticut, Kentucky, Maine, Maryland, Massachusetts, New Jersey, North Carolina, and Pennsylvania. 26th, Connecticut, Maryland, Missouri, Nebraska, Nevada, New Jersey, North Carolina, Pennsylvania, South Carolina, Virginia, and West Virginia. 27th, Connecticut, Louisiana, Maryland, New Jersey, and Rhode Island. 28th, Kansas, Nebraska, North Carolina, and Ohio. 29th, Connecticut, Idaho, Kentucky, Maryland, Massachusetts, Missouri, Nevada, New Jersey, New York, North Carolina, North Dakota, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia. 30th, Connecticut, Georgia, Maine, Maryland, Massachusetts, Nevada, New Hampshire, New Jersey, New York, Pennsylvania, and Virginia. 31st, Arkansas, Illinois, Indiana, and South Carolina.

WET AND DRY PERIODS.

The Weather Crop Bulletin for the month of January shows that there was a slight excess of precipitation over the greater portion of the spring-wheat region and near Lake Superior; the month was considered dry throughout the southern and Atlantic coast States; the snow that covered the greater portion of the winter-wheat region on the 29th had by February 1 disappeared only in the southern portions of Indiana, Illinois, and Missouri, leaving the greater portion of the winter-wheat crop still covered.

The advantage of a snow covering consists in keeping the ground warm and in protecting plants, seeds, and roots from killing cold and frost; it also prevents the moisture already in the ground from evaporating, but does not add very much to it. A foot of snow is but an inch of rain and when the dry, warm winds blow, more snow evaporates into the air than melts into the ground.

The following notes have been generally extracted from the monthly reports of the State weather services, and refer principally to the relations between the precipitation and the crops:

Iowa.—College Springs, fall wheat has suffered slightly with drought.

Keokuk, from January 10-20 frost was entirely out of the ground and farmers engaged in plowing.

Minnesota.—The dry spells of weather were from the 17th-19th and 21st-27th; the number of rainy days averaged only six; the amount of snow on the ground on the 15th was about normal, and on the 31st was about 10 inches, which is 4 inches less than last year, but in excess of the years 1889 and 1892.

Nevada.—Cranes Ranch, the month was good for feeding stock, horses on the range doing well. Eureka, if more snow does not fall, a scarcity of water next summer is feared by the farmers. Sunnyside, the snow has lain longer on the ground this month than was ever known before in this valley; the weather has been very cold.

New England.—The ground was mostly bare throughout the month in the south, most of the snow for the month coming on the 27th or 30th. No damage has been reported to fruit trees during the month, but the indications are that grass, roots, and fall-sown grain have suffered slightly.

New Jersey.—Cape May City, this has been a remarkably mild January; no snow has fallen; the grass is green; the early spring bulbs are 2 inches above ground; and the farmers have done much of their spring sowing.

Oklahoma.—Buffalo, Beaver Co., the finest January ever known; cattle on range doing well and keeping fat on buffalo grass, requiring no extra feed. Lehigh, Choctaw Nation, weather favorable for stock. Keokuk Falls, plenty of rainfall will bring wheat through all right.

South Carolina.—The month was favorable for all crops, and the heavy general rains from the 6-11th, which were followed by unusual warmth, developed a vigorous stand of small grains. The consensus of all the reports indicates that wheat, oats, garden truck, fruits, and all other winter crops never looked more promising in January than they do this year.

South Dakota.—Reports indicate that the snow on the ranges west of the Missouri River has not been so deep as to interfere materially with the grazing of stock. All kinds of stock have done well, and reports indicate that the loss from cold and stormy weather will be unusually light.

Tennessee.—The cold wave of the 24th and 25th proved the most severe since 1886; it was more beneficial than damaging in its effects, as it served to arrest the growth of wheat and check the rise of sap in fruit trees. The close of the month finds wheat in excellent condition.

Utah.—Unless considerably more snow falls on the southern mountains during February and March, the following season will witness a scarcity of water in the southern part of the Territory. The precipitation for the month throughout the Territory was almost entirely in the form of snow; the average amount reported for the month was 13 inches.

Ohio.—The precipitation fell mostly during the earlier and later portions of the month, the latter being mostly in the form of snow, preceding the cold wave, and affording a fair protection to the cereals in the ground. The wheat generally advanced nicely during the month under the advantage of the excess of clear and fair days and above normal temperature. The number of days with precipitation was the least noted for January since the beginning of the service.

WIND.

PREVAILING WINDS.

The prevailing winds for January, 1894, viz., those that were recorded most frequently at Weather Bureau stations, are shown in the table of climatological data, but these are not given on Chart II, as has hitherto been the custom. The summary of State Weather Service reports also states the prevailing winds as recorded at voluntary stations, and according to these the most frequent winds in the respective States were as follows:

North.—Alabama.

Northeast.—Florida and South Carolina.

East.—Georgia.

Southeast.—None.

South.—Arkansas, Illinois, Kansas, Louisiana, Mississippi, Missouri, Oklahoma, Tennessee, Texas, and Washington.

Southwest.—Arizona, Idaho, Indiana, Michigan, Montana, Nevada, North Carolina, Ohio, Virginia, and West Virginia.

West.—California, Colorado, New York, and Pennsylvania.

Northwest.—Indiana, Iowa, Minnesota, Nebraska, New England, North Dakota, South Dakota, Utah, Wisconsin, and Wyoming.

RESULTANT WINDS.

The resultants of all the hourly records of winds, as deduced from self-registers, are given in Table VIII in the latter part

of this REVIEW, in accordance with the announcement made in the REVIEW for December, 1893. The resultants deduced from observations at 8 a. m. and 8 p. m. at all stations of the second order, which are also those observations that appear on the morning and evening maps of the Weather Bureau, are given in Table IX. These latter resultants are also shown graphically on Chart II, where a small figure attached to each arrow shows the number of hours that this resultant prevailed, assuming each of the 62 observations to represent an hour's duration of a wind of average velocity. The smallness of these figures will indicate sometimes the infrequency of a given wind, but more often it represents the balance between winds from opposite directions. The actual north, south, east, and west components, on which these resultants are based, are given in detail in Table IX. The movement from the northwest has prevailed over New England and the middle and south Atlantic States; the movements from northeast and southeast have prevailed over the Gulf States, Tennessee, and Kentucky; the movement from southwest has prevailed over Ohio, Indiana, the lower Lake region, the upper Lake region, Minnesota, Montana, Washington, and Oregon.

HIGH WINDS.

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows. Maxi-

imum velocities are averages for 5 minutes; extreme velocities are gusts of shorter duration:

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		<i>Miles.</i>				<i>Miles.</i>	
Amarillo, Tex.	5	50	w.	Galveston, Tex.	24	50	nw.
Atlantic City, N. J.	30	52	w.	Hatteras, N. C.	30	50	w.
Block Island, R. I.	12	50	nw.	Havre, Mont.	13	50	sw.
Do	13	50	nw.	Kittyhawk, N. C.	25	52	n.
Do	16	50	ne.	Nantucket, Mass.	27	52	ne.
Do	17	54	ne.	Do	29	55	se.
Do	29	68	sw.	Do	30	51	nw.
Do	30	66	nw.	Pikes Peak, Colo.	1	84	w.
Boston, Mass.	29	51	ne.	Do	6	80	w.
Chicago, Ill.	20	51	s.	Do	7	97	w.
Cleveland, Ohio	11	54	w.	Do	16	80	w.
Do	12	52	w.	Do	20	102	w.
Colorado Springs, Colo.	16	60	sw.	Do	24	82	nw.
Do	20	73	nw.	Do	28	84	nw.
Do	21	63	nw.	Portland, Oregon.	13	50	sw.
Do	28	53	nw.	Tatoosh Island, Wash.	12	58	s.
Eastport, Me.	29	57	ne.	Do	13	62	s.
Do	30	78	ne.	Do	15	60	w.
Fort Canby, Wash.	11	51	s.	Do	17	52	s.
Do	12	91	s.	Do	23	50	e.
Do	13	90	s.	Do	10	54	w.
Do	14	72	s.	Williston, N. Dak.	1	52	sw.
Do	15	78	sw.	Winnemucca, Nev.	12	62	nw.
Do	17	84	se.	Woods Holl, Mass.	13	59	nw.
Do	18	52	sw.	Do	25	52	nw.
Do	19	56	sw.	Do	30	68	nw.
Do	25	52	s.				

LOCAL STORMS.

5th.—During a thunderstorm at Gordonville, Mo., a house was struck by lightning.

7th.—A rainstorm began at Norfolk, Va., at 6.05 a. m., and ended at 4.10 p. m. A vessel was wrecked about 1 mile south of Little Island Life-Saving Station.

12th.—A windstorm, with a maximum velocity of 36 miles per hour, occurred at Baltimore, Md.; the roof of the city jail was blown off. At Olympia, Wash., high south winds and heavy rain prevailed during the 12th and 13th. The storm was reported very severe down Puget Sound, and electric wires were badly damaged. At Astoria, Oreg., rain occurred at intervals during the 12th, with high south winds, increasing in the late afternoon to a violent gale. The rain continued until 2.45 p. m.; 13th, began again at 7 p. m., and continued throughout the day. The storm was the most severe in a number of years, and damaged buildings and electric wires.

15th.—At Seattle, Wash., rain fell at intervals during the day, accompanied by high winds in the evening, attaining a maximum velocity of 37 miles per hour from the south at 7.30 p. m. Much damage was done to shipping; electric wires were prostrated; and washouts and landslides occurred on railroads.

20th.—At Oxford, Fla., high winds and a thunderstorm damaged timber. A thunderstorm began at Abilene, Tex., at 11 p. m. of the 19th and continued until 1 a. m., 20th. The wind reached a maximum velocity of 48 miles per hour. Some damage was done to outbuildings. A tornado passed over Dallas and Oak Cliff, Tex. The whirling wind was accompanied by thunder and vivid and continuous lightning. One person was killed. Galveston, Tex., thunderstorm, 1 person killed by lightning.

27th.—Heavy snowstorms occurred over New England and New York, delaying traffic. At Provincetown, Mass., trees were broken from the weight of the snow and damage was done to electric wires. At Nantasket Beach, Mass., the coast was strewn with wreckage.

29-30th.—A severe gale and snowstorm prevailed over New England and the middle Atlantic States. At Eastport, Me., the storm began the evening of the 29th, and by 6.55 a. m. of the 30th the wind had reached a maximum velocity of 78 miles per hour and an extreme velocity of 90 miles. There was very little shipping in port, and the tide being unusually low, the damage was not very great. The storm was the most severe since the opening of the Weather Bureau station (April, 1873), and nothing equaling it has occurred since September, 1869. At Gloucester, Mass., a heavy southeast gale prevailed during the 29th; a vessel was wrecked near Eastern Point. All along the New England coast a number of vessels were damaged. At Atlantic City, N. J., the wind attained a maximum velocity of 52 miles per hour and an extreme velocity of 60 miles; damage was done to electric wires. Throughout New York and Pennsylvania the snow was exceptionally heavy, and caused great delay to traffic and damage to electric wires. At Baltimore, Md., the wind reached a maximum velocity of 48 miles per hour from the west. The storm was the most severe in years. One person was blown down and considerably injured and another injured by flying debris. Considerable damage was done to property.

ATMOSPHERIC ELECTRICITY.

THUNDERSTORMS AND AURORAS.

The table on page 20 shows in detail for January, 1894, 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.

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 are the 4th and 5th, 19th and 20th, 23d and 24th. The dates on which reports were least numerous are the 1st, 2d, 21st, 25th, 30th, and 31st. The States from which the most numerous reports were received were: Alabama, Illinois, Louisiana, Missouri, and Texas.

AURORAS.

The evenings on which bright moonlight must have interfered with observations were from the 17th to 25th. On the remaining twenty-three evenings 209 reports were received, or an average of 7 per day. The dates on which the reported

number especially exceeded this average were the 2d, 3d, 4th, and 11th. The display of the 3d was reported from 115 stations. The only date on which thunderstorms and auroras were especially numerous were the 3d and 4th, respectively, as though the maximum of thunderstorms occurred shortly after the maximum of auroras.

The following special descriptions of the auroras of the 3d and 11th have been received:

Maine.—Indian Stream, 3d, an aurora was first noticed at 7.43 p. m. The northern half of the heavens was then covered with pale clouds, with here and there a patch of red, and an occasional movement like a faint flash from the northern horizon to zenith. Cloudiness increased rapidly until 8.13 p. m., when the whole heavens, except a small space at the southwest horizon, were covered by faint luminous clouds, which faded rapidly.

Massachusetts.—Boston, 3d, a dim auroral glow was observed at 6.15 p. m., and continued until 9.15 p. m., when it was obscured by clouds. It was most brilliant at 7.40 p. m., when the diffused light reached near the zenith. East Templeton, 3d, a very fine aurora. Between 6 and 7 p. m. 6 or 7 dark red streamers to the east and north; about 8 p. m., 2 distinct arches; at midnight, obscured by clouds.

New York.—Buffalo, 3d, a faint aurora first observed as a diffused patch of red light about 45° east of north, altitude 60°. Waves of light of a whitish, yellow color seemed to move from east to west, and were observed near the zenith; no arch visible. Oswego, 3d, an aurora was observed from 7.40 to