

THE WEATHER OF THE MONTH.

By ALFRED J. HENRY, Professor of Meteorology.

CHARACTERISTICS OF THE WEATHER FOR FEBRUARY.

The weather of February, 1901, was characterized by low temperatures, great dryness over New England, the Middle States, and the Ohio Valley, high gales along the New England and middle Atlantic coasts, and the absence of severe snow-storms and cold waves.

A remarkable feature of the month was the persistence of an area of low pressure over New England and the North Atlantic.

PRESSURE.

The distribution of monthly mean pressure is graphically shown on Chart IV and the numerical values are given in Tables I and VI.

During the opening days of the month a number of lows appeared in the southwest, but with few exceptions they failed to reach New England as vigorous storms. From the 12th until the end of the month a few lows appeared north of Montana, but in no case did they reach the St. Lawrence Valley as storms of even moderate energy. From the 4th until the close of the month pressure was abnormally low over New England and the North Atlantic, the center of the depression appearing to oscillate back and forth in the neighborhood of Newfoundland. Monthly mean pressure at St. Johns was over half an inch below the normal; at Boston, 0.28 inch; New York, 0.22 inch, and Buffalo, 0.07 inch. Mean pressure from the Mississippi Valley westward was generally in excess of the normal by amounts ranging from 0.01 inch in eastern Oregon to a maximum of 0.13 inch in Wyoming. Not within the last thirty years has monthly mean pressure been so low over New England.

TEMPERATURE OF THE AIR.

The distribution of monthly mean surface temperature, as deduced from the records of about 1,000 stations, is shown on Chart VI.

Over the greater portion of the country temperature was markedly below the normal for the season. The region of greatest continuous cold was in the lower Lake region and in the upper Ohio Valley. While there were no marked cold waves, yet temperature was almost continuously below the seasonal average in the eastern parts of the country and from the Platte River in Nebraska southward to the Gulf. In the Northwest and generally west of the Rocky Mountains, temperature was above the seasonal average by amounts varying from 2° to 5° daily. Maximum temperatures of 90° were registered in the Rio Grande Valley, and of 80° and over in southern Florida, southern Louisiana, and quite generally throughout Texas, southwestern Arizona, and southern California. In the Lake region, also in northern New England and in northern Pennsylvania, the maximum temperature did not rise as high as 40° at any time during the month. Freezing temperatures were experienced in northern and central Florida and to the Gulf coast in Alabama and Mississippi. The lowest temperatures of the month were registered in Minnesota.

The average temperature for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	10	21.6	- 4.7	- 5.0	- 2.5
Middle Atlantic	12	28.0	- 6.5	- 5.4	- 2.7
South Atlantic	10	43.4	- 6.1	- 6.1	- 3.0
Florida Peninsula	7	57.8	- 5.3	- 5.8	- 2.9
East Gulf	7	49.0	- 5.5	- 4.1	- 2.0
West Gulf	7	48.9	- 2.6	+ 3.3	+ 1.6
Ohio Valley and Tennessee	12	31.0	- 7.1	- 5.3	- 2.6
Lower Lake	8	18.2	- 8.3	- 7.2	- 3.6
Upper Lake	9	14.5	- 4.6	- 1.7	- 0.8
North Dakota	8	8.4	+ 0.3	+ 6.8	+ 3.4
Upper Mississippi Valley	11	20.4	- 5.6	+ 0.6	+ 0.8
Missouri Valley	10	22.7	- 1.6	+ 7.4	+ 3.7
Northern Slope	7	19.3	- 1.7	+ 5.6	+ 2.8
Middle Slope	6	29.9	- 2.5	+ 2.9	+ 1.4
Southern Slope	6	38.9	- 2.3	+ 2.9	+ 1.4
Southern Plateau	15	42.0	+ 1.0	+ 9.1	+ 4.6
Middle Plateau	9	31.6	+ 2.8	+ 8.5	+ 4.2
Northern Plateau	10	30.5	+ 1.6	+ 5.6	+ 2.8
North Pacific	9	42.0	+ 1.4	+ 1.8	+ 0.9
Middle Pacific	5	50.4	+ 1.2	+ 1.5	+ 0.8
South Pacific	4	55.6	+ 2.1	+ 4.3	+ 2.2

In Canada.—Prof. R. F. Stupart says:

The mean temperature was below the average throughout Ontario, the more southern parts of the Province showing the largest departures, which were from 5° to 7°. In western Quebec the temperature was likewise below average, but in all other parts of the Dominion it was above average, and particularly so in eastern Nova Scotia and in Saskatchewan and northern Alberta. A positive departure of 7° was recorded at Sydney, N. S., 7° at Prince Albert, and 8° at Edmonton. In Manitoba and the Territories there were several fairly pronounced cold spells, but no temperature lower than -30° has been reported. In Ontario the steady cold weather was the chief characteristic of the month, but no unusually low temperature occurred except in the more northern districts from Nipissing westward to Port Arthur. In Quebec and the Maritime Provinces the month was characterized more especially by two cold, blustery periods, the first between the 5th and 7th and the second between the 12th and 14th.

PRECIPITATION.

The month was essentially one of light rainfall, except in southern Louisiana and along the Georgia and South Carolina coasts. Another notable exception may be found in Arizona and southern California, where the rains during the first part of the month were exceedingly heavy for that section. The total rainfall at Yuma was 3.01 inches, an amount nearly as large as the combined rainfall of the last three years. Rainfall was above the seasonal normal quite generally throughout the western Plateau region and along the north Pacific coast.

The snowfall of the month was not uniformly distributed. In some regions, as in Arizona, southern and central Utah, southern California, and the Adirondack region, including western New York, there was more snow than usual. Reports from Arizona show that the fall in that territory was greater than the combined snowfall of the two previous years. A heavy fall of snow was experienced in the Gulf and South Atlantic States on the night of the 22d and during the 23d. The snow was accompanied by high northwest winds and low temperatures, but nevertheless it remained on the ground but a short time. In the upper Missouri Valley, the Northwest, New England, and the southern and eastern portions of the Middle States the month was remarkably free from snow.

At the end of the month there was a covering of snow on the ground in northern New England and thence westward

through New York and northern Pennsylvania to Minnesota and eastern Iowa.

The distribution of snowfall is shown by Chart IX, and the amount on the ground at the end of the month by Chart X.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		<i>Inches.</i>		<i>Inches.</i>	<i>Inches.</i>
New England	10	1.00	98	-3.6	-4.2
Middle Atlantic	12	0.82	95	-2.5	-3.7
South Atlantic	10	3.44	95	-0.2	-1.6
Florida Peninsula	7	3.11	100	0.0	-0.3
East Gulf	7	4.72	102	+0.1	-0.5
West Gulf	7	1.79	58	-1.6	-3.4
Ohio Valley and Tennessee	12	1.25	29	-3.0	-4.8
Lower Lake	9	1.85	67	-0.9	-1.5
Upper Lake	5	1.02	58	-0.9	-1.7
North Dakota	5	0.45	69	-0.2	-0.5
Upper Mississippi Valley	11	1.10	58	-0.8	-1.4
Missouri Valley	10	1.00	53	-0.3	-0.8
Northern Slope	7	0.62	100	0.0	-0.4
Middle Slope	6	0.65	77	-0.2	-0.8
Southern Slope	6	0.90	100	0.0	-0.8
Southern Plateau	15	2.66	251	+1.6	+1.6
Middle Plateau	9	2.01	153	+0.7	+0.3
Northern Plateau	10	1.75	113	+0.2	-0.2
North Pacific	9	6.71	110	+0.6	+0.5
Middle Pacific	5	6.06	149	+2.0	+3.0
South Pacific	4	4.35	164	+1.7	+3.5

In Canada.—Professor Stupart says:

The precipitation did not differ greatly from average near the Pacific coast and was chiefly in the form of rain, although several days of snow occurred in all localities. In the Northwest Territories and Manitoba the snowfall was very generally a little greater than average and except in southern Alberta sleighing was good throughout the month. Near the western shores of Lake Huron and the Georgian Bay from 30 to 40 inches of snow fell, and at some points near the eastern end of Lake Erie there was also a heavy snowfall, but over the larger portion of Ontario, throughout Quebec and also in the Maritime Provinces, exclusive of eastern Nova Scotia, the precipitation was considerably less than average and was wholly in the form of snow. In Cape Breton, however, there were several days of rain, and also several heavy snowstorms.

At the close of the month the valleys and lower levels in Vancouver Island, and the mainland of British Columbia, were bare of snow, as were also the prairies of southern Alberta and western Assinibola, but all other parts of the Dominion were snow covered. Stations in western Manitoba and the Qu'Appelle Valley report from 20 to 40 inches on the level. In Ontario the depth is nearly 3 feet on the western slope toward the Georgian Bay and Lake Huron; in eastern Ontario and western Quebec the depth is about two and a half feet, and a depth of three feet or over is very general in eastern Quebec and the interior of New Brunswick.

SLEET.

The following are the dates on which sleet fell in the respective States:

Alabama, 6, 7, 11, 23. Arizona, 1, 2, 5, 6, 7, 9. Arkansas, 6, 7, 9, 10, 11, 12, 22, 26. California, 1, 2, 3, 5, 6, 7, 8, 10, 23. Colorado, 7, 17, 18, 19, 21. Connecticut, 4. Delaware, 9. District of Columbia, 9. Georgia, 2, 7, 23, 25, 26. Idaho, 14, 16. Illinois, 1, 2, 3, 4, 7, 8, 11, 17, 28. Indiana, 3, 8, 9, 11, 17, 28. Indian Territory, 1, 6, 7, 10. Iowa, 2, 8, 11, 16, 17, 25, 28. Kansas, 2, 6, 7, 8. Kentucky, 2, 17. Louisiana, 6, 22, 23. Maine, 4. Maryland, 3, 4, 8, 9, 10. Massachusetts, 9, 10, 11, 12, 23, 24. Michigan, 17. Minnesota, 17, 28. Mississippi, 6, 13, 21, 22, 23, 27. Missouri, 1, 2, 3, 7, 8, 11, 14, 21, 28. Montana, 16, 19. Nebraska, 6, 7, 22, 28. Nevada, 4, 17, 19, 23, 24, 26. New Jersey, 3, 4, 9. New Mexico, 2, 5, 7, 8, 9, 11. New York, 4, 15. North Carolina, 3, 7, 8, 11, 23, 26. North Dakota, 16, 27. Ohio, 3, 4, 8, 9, 17. Oklahoma, 10. Oregon, 1, 2, 16, 17, 19. Pennsylvania, 3, 4, 9. Rhode Island, 4. South Carolina, 3, 7, 23, 24, 25, 26. South Dakota, 16, 17, 24, 25. Tennessee, 6, 10, 17. Texas, 3, 5, 10, 11, 12, 21, 22, 23. Utah, 2, 3, 4, 6, 17, 18, 19, 22, 24, 25. Virginia, 3, 8, 9. Washington, 15, 16, 17, 18, 19, 22, 23, 24. West Virginia, 4, 9. Wisconsin, 17. Wyoming, 7, 16, 25, 26, 27.

HAIL.

The following are the dates on which hail fell in the respective States:

Arizona, 1, 2, 6, 7, 11, 24. Arkansas, 10. California, 1, 5, 8, 23. Florida, 19. Illinois, 3. Indiana, 3. Indian Territory, 2, 3. Kansas, 25. Kentucky, 2, 3, 7, 11, 17, 22. New Mexico, 24. Oregon, 1, 2, 7, 16, 17, 18, 22. Texas, 2, 3, 22, 28.

HUMIDITY.

The averages by districts appear in the subjoined table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	65	-10	Missouri Valley	75	-2
Middle Atlantic	66	-8	Northern Slope	78	+6
South Atlantic	67	-11	Middle Slope	72	+6
Florida Peninsula	75	-7	Southern Slope	70	0
East Gulf	68	-10	Southern Plateau	56	+8
West Gulf	75	+2	Middle Plateau	76	+14
Ohio Valley and Tennessee	73	+2	Northern Plateau	79	+1
Lower Lake	80	0	North Pacific Coast	78	-7
Upper Lake	82	+1	Middle Pacific Coast	80	+4
North Dakota	73	+2	South Pacific Coast	74	+3
Upper Mississippi	78	+1			

SUNSHINE AND CLOUDINESS.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographical districts, appear in Table I.

The averages for the various districts, with departures from the normal, are shown in the table below:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	4.4	-1.1	Missouri Valley	4.6	-0.8
Middle Atlantic	4.5	-1.1	Northern Slope	4.9	+0.1
South Atlantic	4.3	-1.0	Middle Slope	5.2	+0.8
Florida Peninsula	4.1	-0.5	Southern Slope	5.4	+0.6
East Gulf	5.5	0.0	Southern Plateau	3.8	+0.8
West Gulf	6.2	+0.4	Middle Plateau	6.2	+2.0
Ohio Valley and Tennessee	5.8	+0.4	Northern Plateau	6.4	+0.3
Lower Lake	7.3	+0.5	North Pacific Coast	6.3	-0.7
Upper Lake	5.8	-0.5	Middle Pacific Coast	6.2	+1.4
North Dakota	4.0	-1.1	South Pacific Coast	4.6	+0.5
Upper Mississippi	4.3	-1.0			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Atlantic City, N. J.	5	55	nw.	Mount Tamalpais, Cal.	17	56	nw.
Block Island, R. I.	5	59	nw.	New York, N. Y.	4	52	nw.
Do.	6	59	nw.	Do.	5	53	nw.
Do.	7	50	nw.	Do.	6	54	nw.
Do.	10	54	nw.	Do.	10	50	nw.
Do.	13	58	nw.	Do.	12	52	nw.
Cape Henry, Va.	12	66	n.	Do.	13	57	nw.
Do.	13	52	nw.	Do.	14	52	nw.
Do.	20	54	n.	Do.	15	50	nw.
Cheyenne, Wyo.	16	54	nw.	Do.	17	52	nw.
Chicago, Ill.	3	58	nw.	Valentine, Nebr.	17	54	nw.
El Paso, Tex.	22	50	nw.	Williston, N. Dak.	17	60	nw.
Hatteras, N. C.	13	50	nw.				

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IV, which 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, respectively.

Thunderstorms.—Reports of 357 thunderstorms were received during the current month as against 705 in 1900 and 210 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country were most numerous were: 3d, 99; 28th, 42; 2d, 35.

Reports were most numerous from: California, 47; Florida, 34; Louisiana, 31.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz: January 31 to February 7, 1901.

In Canada.—Auroras were reported as follows: Parry Sound, 13th, 16th; Minnedosa, 10th, 12th, 20th, 27th; Swift Current, 19th.

DESCRIPTION OF TABLES AND CHARTS.

By ALFRED J. HENRY, Professor of Meteorology.

Table I gives, for about 145 Weather Bureau stations making two observations daily and for about 25 others making only one observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation, the total depth of snowfall, and the mean wet-bulb temperatures. The altitudes of the instruments above ground are also given.

Table II gives, for about 2,700 stations occupied by voluntary observers, the highest maximum and the lowest minimum temperatures, the mean temperature deduced from the average of all the daily maxima and minima, or other readings, as indicated by the numeral following the name of the station; the total monthly precipitation, and the total depth in inches of any snow that may have fallen. When the spaces in the snow column are left blank it indicates that no snow has fallen, but when it is possible that there may have been snow of which no record has been made, that fact is indicated by leaders, thus (. . .).

Table III gives, for all stations that make observations at 8 a. m. and 8 p. m., the four component directions and the resultant directions based on these two observations only and without considering the velocity of the wind. The total movement for the whole month, as read from the dial of the Robinson anemometer, is given for each station in Table I. By adding the four components for the stations comprised in any geographical division the average resultant direction for that division can be obtained.

Table IV gives the total number of stations in each State from which meteorological reports of any kind have been received, and the number of such stations reporting thunderstorms (T) and auroras (A) on each day of the current month.

Table V gives a record of rains whose intensity at some period of the storm's continuance equaled or exceeded the following rates:

Duration, minutes..	5	10	15	20	25	30	35	40	45	50	60	80	100	120
Rates pr. hr. (ins.)..	3.00	1.80	1.40	1.20	1.05	1.00	0.94	0.90	0.86	0.84	0.75	0.60	0.54	0.50

In the northern part of the United States, especially in the colder months of the year, rains of the intensities shown in the above table seldom occur. In all cases where no storm of sufficient intensity to entitle it to a place in the full table has occurred, the greatest rainfall of any single storm has been given, also the greatest hourly fall during that storm.

Table VI gives, for about 30 stations furnished by the Canadian Meteorological Service, Prof. R. F. Stupart, director, the means of pressure and temperature, total precipitation and depth of snowfall, and the respective departures from normal values, except in the case of snowfall.

Table VII gives the heights of rivers referred to zeros of gages.

NOTES EXPLANATORY OF THE CHARTS.

Chart I, tracks of centers of high areas, and Chart II, tracks of centers of low areas, are constructed in the same way. The roman numerals show number and chronological order of highs (Chart I) and lows (Chart II). The figures within the circles show the days of the month; the letters *a* and *p* indicate, respectively, the 8 a. m. and 8 p. m., seventy-fifth meridian time, observations. Within each circle is also given (Chart I) the highest barometric reading and (Chart II) the lowest pressure at or near the center at that time.

Chart III.—Total precipitation. The scale of shades showing the depth of rainfall is given on the chart itself. For isolated stations the rainfall is given in inches and tenths, when appreciable; otherwise, a "trace" is indicated by a capital T, and no rain at all, by 0.0.

Chart IV.—Sea-level pressure, temperature, and resultant surface winds. The wind directions on this Chart are the computed resultants of observations at 8 a. m. and 8 p. m., daily; the resultant duration is shown by figures attached to each arrow. The temperatures are the means of daily maxima and minima and are reduced to sea level. The pressures are the means of 8 a. m. and 8 p. m. observations, daily, and are reduced to sea level and to standard gravity. The reduction for 30 inches of the mercurial barometer, as formerly shown by the marginal figures for each degree of latitude, has already been applied.

Chart V.—Hydrographs for seven principal rivers of the United States.

Chart VI.—Surface temperatures; maximum, minimum, and mean. Lines of equal monthly mean temperature in