

II, for voluntary observers. Both the mean temperatures and the departures from the normal are given in Table I for the regular stations of the Weather Bureau.

The *monthly mean temperatures* published in Table I, for the regular stations of the Weather Bureau, are the simple means of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

The *regular diurnal period* in temperature is shown by the hourly means given in Table V for 29 stations selected out of 82 that maintain continuous thermograph records.

The *distribution of the observed monthly mean temperature* of the air over the United States and Canada is shown by the dotted isotherms on Chart IV; the lines are drawn over the Rocky Mountain Plateau Region, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

The *highest mean temperatures* were: Key West, 70.6; Jupiter, 67.6; Yuma, 65.1; Corpus Christi, 63.4.

The *lowest mean temperatures* were: In the United States: Moorhead, 14.4. In Canada: Winnipeg, 9.6.

As compared with the normal for March the mean temperatures for the current month were in excess on the coast of California and some Plateau stations, but elsewhere generally deficient. The greatest excesses were: Elpaso, 2.3; Baker City, 1.9; Idaho Falls, 1.4; Los Angeles and Eureka, 1.3. The greatest deficits were: Huron, 7.8; Williston, 6.9; Lexington, 6.7; North Platte, 6.6; Pittsburg, 6.4; Havre, Moorhead, and Parkersburg, 6.1; Cincinnati, 6.0.

Considered by districts the mean temperatures for the current month show departures from the normal as given in Table I. The greatest positive departure was: South Pacific, 1.2. The greatest negative departures were: Northern Slope, 5.5; Ohio Valley and Tennessee, 4.8; lower Lake, 4.4.

The *years of highest and lowest mean temperatures* for March are shown in Table I of the REVIEW for March, 1894. The mean temperature for the current month was not the highest on record at any regular station of the Weather Bureau. It was the lowest on record at Northfield, 19.9; Woods Hole, 31.6; Harrisburg, 32.8; Parkersburg, 35.2; Lexington, 37.7; Port Angeles, 39.6; Tatoosh Island, 42.0.

The *maximum and minimum temperatures* of the current month are given in Table I. The highest maxima were: 99, Yuma (25th); 92, Phoenix (25th); 90, Abilene (21st), and San Antonio (31st); 89, Los Angeles (24th), Elpaso (25th); 88, Savannah and Jacksonville (31st). The lowest maxima were: 44, Sault Ste. Marie (21st); 48, Eastport (26th), Moorhead (24th); 49, Marquette (30th); 50, Northfield (1st), Oswego (30th). The highest minima were: 54, Key West (21st); 45, Galveston (16th); 44, Port Eads (frequently); 43, Jupiter (21st); 42, Corpus Christi (16th); 41, New Orleans (20th), San Diego (4th). The lowest minima were: -32, Havre (3d); -28, Moorhead (13th); -18, Helena (3d); -16, Sault Ste. Marie and Huron (13th), and Williston (frequently).

The *years of highest maximum and lowest minimum temperatures* are given in the last four columns of Table I. During the current month the maximum temperatures were the highest on record at: Savannah and Jacksonville, 88; Montgomery, 87; Meridian, 85; Elpaso, 89. The minimum temperatures were the lowest on record for this month at: Northfield, -15; Harrisburg, 6; Moorhead, -28; Landar, -22; Idaho Falls, -15; Tatoosh Island, 24; Port Angeles, 18; Fort Canby, 22; Astoria, 24; Portland, Oreg., 20; Roseburg, 18; Eureka, 29; Redbluff, 26; San Francisco, 33.

The *greatest daily range of temperature and the extreme*

*monthly ranges* are given for each of the regular Weather Bureau stations in Table I, which also gives data from which may be computed the extreme monthly ranges for each station. The largest values of the greatest daily ranges were: Dodge City, 53; North Platte, 50; Pueblo, 49; Moorhead, 47; Huron, 46; Pierre, and Amarillo, 45. The smallest values were: Tatoosh Island, 14; Key West, 15; Galveston, 16; Block Island, 18; Point Reyes Light, 19; Port Eads, 20. Among the extreme monthly ranges the largest values were: Havre, 96; Huron, 90; Miles City, 89; North Platte, 88; Pierre, 86. The smallest values were: Galveston, 27; Key West, 28; Tatoosh Island, 31; Port Eads and Neahbay, 33; Nantucket and Hatteras, 34.

The *accumulated monthly departures* from normal temperatures from January 1 to the end of the current month are given in the second column of the following table, and the averages are given in the third column. The latter may serve for comparison with the departures of current conditions of vegetation from the normal condition.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
	0	0		0	0
West Gulf .....	+ 0.6	+ 0.2	New England .....	- 4.9	- 1.6
Upper Lake .....	+ 4.5	+ 1.5	Middle Atlantic .....	- 5.8	- 1.9
North Dakota .....	+ 6.0	+ 2.0	South Atlantic .....	- 5.6	- 1.9
Upper Mississippi .....	+ 6.9	+ 2.3	Florida Peninsula .....	- 8.8	- 2.9
Missouri Valley .....	+10.0	+ 3.3	East Gulf .....	- 6.9	- 2.3
Northern Slope .....	+11.1	+ 3.7	Ohio Valley and Tenn .....	- 4.1	- 1.4
Middle Slope .....	+11.3	+ 3.8	Lower Lake .....	- 4.7	- 1.6
Abilene (southern Slope) .....	+ 5.6	+ 1.9			
Southern Plateau .....	+ 6.0	+ 2.0			
Middle Plateau .....	+10.9	+ 3.6			
Northern Plateau .....	+21.0	+ 7.0			
North Pacific .....	+ 4.7	+ 1.6			
Middle Pacific .....	+ 6.7	+ 2.2			
South Pacific .....	+ 9.0	+ 3.0			

The limit of freezing weather is shown on Chart VI by the isotherm of minimum 32°, and the approximate limit of frost by the isotherm of minimum 40°. These minimum temperatures are such as occur within the thermometer shelters of the Weather Bureau stations.

MOISTURE.

The *quantity of moisture* in the atmosphere at any time may be expressed by the weight of the vapor coexisting with the air contained in a cubic foot of space, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-points for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, are given in Table I.

The *rate of evaporation* from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer, but a properly constructed evaporimeter may be made to give the *quantity* of water evaporated from a similar surface during any interval of time. Such an evaporimeter, therefore, would sum up or integrate the effect of those influences that determine the temperature as given by the wet bulb; from this quantity the *average humidity of the air* during any given interval of time may be deduced.

Measurements of evaporation within the thermometer shelters are difficult to make so as to be comparable at temperatures above and below freezing, and may be replaced by computations based on the wet-bulb temperatures. The absolute amount of evaporation from natural surfaces not protected from wind, rain, sunshine, and radiation, are being made at a few experimental stations and will be discussed in special contributions.

*Sensible temperatures.*—The sensation of temperature experienced by the human body and ordinarily attributed to the

condition of the atmosphere depends not merely on the temperature of the air, but also on its dryness, on the velocity of the wind, and on the suddenness of atmospheric changes, all combined with the physiological condition of the observer. A complete expression for the relation between atmospheric conditions and nervous sensations has not yet been obtained.

**PRECIPITATION.**

[In inches and hundredths.]

The distribution of precipitation for the current month, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III. The total precipitation for the current month was heaviest (from 9 to 12 inches) in a narrow belt on the western slope of the Appalachians, stretching from central Tennessee to southwest Virginia. Equally heavy rain fell over a small area of the western slope of the Sierra Nevada, in central California. The largest values at regular stations were: Halifax, 8.8; Portland, Me., 8.0; Neahbay, 7.2 Yarmouth, 7.0; Eureka and Sydney, 6.9.

The current departures from the normal precipitation are given in Table I, which shows that there was a slight excess in New England and in several smaller regions, but, in general, there was a slight deficiency. Large excesses were: Portland, Me., 4.6; Rochester, 3.4; Northfield, 3.1. Large deficits were: Cape Henry and Augusta, 3.8; Neahbay, 3.3; Charlotte and Chattanooga, 3.2; Vicksburg, 3.1; Columbia, 3.0.

The average departure for each district is also given in Table I. By dividing these by the respective normals the following corresponding percentages are obtained (precipitation is in excess when the percentages of the normals exceed 100):

Above the normal: New England, 128; middle Atlantic, 105; lower Lake, 140; North Dakota, 178; northern Slope, 204; middle Plateau, 130; southern Pacific, 127.

Normal: Florida Peninsula and northern Plateau.

Below the normal: south Atlantic, 54; east Gulf, 85; west Gulf, 73; Ohio Valley and Tennessee, 98; upper Lake, 67; upper Mississippi, 73; Missouri Valley, 73; middle Slope, 63; southern Slope (Abilene), 9; southern Plateau, 63; north Pacific, 72; middle Pacific, 93.

The years of greatest and least precipitation for March are given in the REVIEW for March, 1890. The precipitation for the current month was the greatest on record at: Portland, Me., 8.02; Northfield, 6.41; Cheyenne, 2.06; Huron, and Helena, 1.71; Williston, 1.80. It was the least on record at: Cape Henry, 1.38; Hannibal, 0.92; Elpaso, T.

The total accumulated monthly departures from normal precipitation from January 1 to the end of the current month are given in the second column of the following table; the third column gives the ratio of the current accumulated precipitation to its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
	Inches.	Perc't.		Inches.	Perc't.
Middle Atlantic.....	+ 0.40	104	New England.....	- 0.80	93
Florida Peninsula.....	+ 0.40	105	South Atlantic.....	- 1.70	87
Lower Lakes.....	+ 0.80	110	East Gulf.....	- 2.30	86
North Dakota.....	+ 1.10	153	West Gulf.....	- 3.30	79
Northern Slope.....	+ 0.40	121	Ohio Valley and Tenn.....	- 1.80	73
Middle Plateau.....	+ 0.30	107	Upper Lakes.....	- 1.80	72
North Pacific.....	+ 3.20	114	Upper Mississippi.....	- 1.20	64
			Missouri Valley.....	- 1.70	63
			Middle Slope.....	- 1.70	50
			Abilene (southern Slope).....	- 1.30	64
			Southern Plateau.....	- 0.40	75
			Northern Plateau.....	- 1.40	76
			Middle Pacific.....	- 1.00	103
			South Pacific.....	- 1.50	77

Details as to excessive precipitation are given in Tables XII and XIII.

The total monthly snowfall at each station is given in Table II. Its geographical distribution is shown on Chart VI. The southern limit of freezing temperatures and possible snow is shown on this chart by the isotherm of minimum 32°.

The depth of snow on the ground at the close of the month is shown on Chart VII.

**HAIL.**

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

Alabama, 6, 11, 12, 31. Arizona, 5. Arkansas, 5, 6, 31. California, 1 to 4, 14, 26, 27, 28. Colorado, 22, 25, 27, 28. District of Columbia, 19. Florida, 10. Georgia, 18, 19, 30. Idaho, 12, 20, 24. Illinois, 26 to 29. Indiana, 6, 28, 29. Iowa, 27, 28, 30, 31. Kansas, 22, 27, 31. Kentucky, 29. Louisiana, 10, 17, 18. Mississippi, 10, 17, 31. Missouri, 27, 28, 29, 31. Nebraska, 27. Nevada, 25. New Hampshire, New Mexico, 2. New York, 30. North Carolina, 1, 11, 12, 18. Ohio, 26, 28, 29. Oklahoma, 1. Oregon, 29. South Dakota, 27. Tennessee, 1, 29, 30. Texas, 10, 11. Virginia, 29, 30. Washington, 6, 7, 20, 28, 29. West Virginia, 29. Wisconsin, 28, 31.

**SLEET.**

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

Alabama, 11, 12, 19. Arkansas, 4, 12 to 15, 23. California, 1, 2, 3. Colorado, 20, 22, 25, 28, 31. Connecticut, 2, 11, 16, 19. Delaware, 10, 11, 23. District of Columbia, 11, 23. Georgia, 11, 18, 19. Idaho, 1, 5, 24 to 30. Illinois, 3, 4, 5, 10, 14, 15, 18, 22, 23, 26. Indiana, 1, 6. Indian Territory, 14, 15. Iowa, 4, 5, 11, 27, 31. Kansas, 1 to 4, 6, 13, 14, 17, 21, 22, 23, 31. Kentucky, 3, 5, 11, 14, 19, 23. Louisiana, 12. Maine, 3, 4, 7, 12, 27, 29. Maryland, 1, 11, 16, 19, 23, 24, 26. Massachusetts, 2, 7, 11, 15, 16, 17, 19, 29. Michigan, 5, 6, 25, 28, 29, 31. Minnesota, 5, 18, 27 to 31. Mississippi, 3, 11, 18, 19. Missouri, 2 to 5, 8, 11 to 15, 22, 23, 27. Montana, 11, 13, 30. Nebraska, 1 to 5, 12, 17, 18, 22, 28, 30, 31. Nevada, 1, 2, 4, 8, 16, 26 to 30. New Hampshire, 6, 7, 19, 26, 29, 30. New Jersey, 1, 10 to 13, 15, 16, 23, 24. New Mexico, 4, 5, 17. New York, 1, 2, 7, 10, 11, 12, 16, 19, 29, 30. North Carolina, 3, 11, 23, 24. North Dakota, 25, 28, 29, 30. Ohio, 1, 5, 6, 16, 24, 26. Oklahoma, 2, 3, 14, 15, 18. Oregon, 1, 2, 5, 6, 7, 26 to 30. Pennsylvania, 1, 7, 10, 11, 15, 16, 19, 26. South Carolina, 13, 24. South Dakota, 4, 15, 31. Tennessee, 3, 11, 15, 19, 23, 24. Texas, 2, 3, 4, 6, 15. Utah, 4, 10, 17, 28, 30. Vermont, 7, 19, 29, 30, 31. Virginia, 1, 11, 26. Washington, 6, 27, 29, 30. West Virginia, 1, 6, 10, 15, 23. Wisconsin, 5, 6, 9, 25, 27, 30, 31.

**WIND.**

The prevailing winds for March, 1896, viz, those that were recorded most frequently, are shown in Table I for the regular Weather Bureau stations.

The resultant winds, as 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 IV, where 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 uniform wind of average velocity. These figures indicate the relative extent to which winds from different directions counterbalanced each other.

The diurnal variation in the velocity of the wind is shown in Table VII, which gives the total movement for each hour of seventy-fifth meridian time, as deduced from self-registering anemometers at about 136 stations.

**HIGH WINDS.**

Maximum 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;