

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: Yuma, 89.2; Tucson, 87.0; Corpus Christi, 84.0. The lowest mean temperatures were: Point Reyes Light, 54.6; East Clallam, 55.6; Tatoosh Island and Eureka, 56.0.

The regular diurnal period in temperature is shown by the hourly means given in Table IV for all stations having self-registers.

The current departures from the adopted normal temperatures for July show an excess only in Nova Scotia, New Brunswick, and on the northern coasts of California and Washington. The greatest excesses were: Chatham, 2.6; and Sydney, 2.2. The temperature was generally deficient over the rest of the country, the greatest deficiency being: Lander, 5.8; Cheyenne, 5.4; Pueblo and Washington, 4.8.

Considered by districts, the current departures from normal temperatures are as given in Table I. There were no positive departures. The greatest negative departures were: Abilene (southern slope), 3.9; middle slope, 3.7; Middle Atlantic, northern slope, and southern plateau, 3.1.

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 average departures are given in the third column, for comparison with the departures of current conditions of vegetation from the normal conditions.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
North Dakota	+ 5.4	+ 0.8	New England.....	- 3.6	- 0.5
Middle plateau.....	+ 6.0	+ 0.9	Middle Atlantic.....	-12.8	- 1.8
North Pacific.....	+ 0.2	+ 0.0	South Atlantic.....	-18.3	- 2.6
Missouri Valley.....	0.0	0.0	Florida Peninsula.....	-12.8	- 1.8
			East Gulf.....	-19.0	- 2.7
			West Gulf.....	-17.9	- 2.6
			Ohio Valley and Tenn.....	-15.9	- 2.3
			Lower Lakes.....	- 7.5	- 1.1
			Upper Lakes.....	- 1.1	- 0.2
			Upper Mississippi.....	- 4.5	- 0.6
			Northern slope.....	- 9.0	- 1.3
			Middle slope.....	- 8.0	- 1.1
			Southern slope (Abilene).....	-19.4	- 2.8
			Southern plateau.....	- 8.1	- 1.2
			Middle plateau.....	- 8.6	- 1.2
			Middle Pacific.....	- 1.8	- 0.3
			South Pacific.....	- 4.4	- 0.6

The years of highest and lowest mean temperature for previous years in July are shown in Table I of the REVIEW for July, 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: Pueblo, Denver, Fresno, Salt Lake City, Winnemucca, Idaho Falls, and Walla Walla.

The maximum and minimum temperatures of the current month are given in Table I. The highest maximum was: Yuma, 113. The lowest maximum: Tatoosh Island, 73.

The highest minimum was: Corpus Christi, 76; the lowest minima, Port Crescent, 35, and Havre, 36.

The years of highest maximum and lowest minimum temperatures are given in the last four columns of Table I of the current REVIEW. During the present month the maximum temperatures were the highest on record at: Parkersburg, Sandusky, Fort Canby, and Astoria. The minimum temperatures were the lowest on record at: Block Island, New York, Baltimore, Washington, Cape Henry, Louisville, Columbus, Ohio, Cleveland, Sandusky, Detroit, Port Huron, Sault Ste. Marie, Chicago, Milwaukee, Green Bay, Duluth, St. Paul, La Crosse, Dubuque, Des Moines, Kansas City, Concordia, Sioux City, Miles City, Baker City, Pueblo, Abilene, and Jupiter.

The greatest daily range of temperature and the extreme monthly range 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. Among the greatest daily ranges the large values were: Huron, 49; Idaho Falls, 47; Winnemucca, 46; Lander, 44. The small values were: Port Eads, 11; Corpus Christi, 12; Key West, 15; Hatteras, Block Island, Woods Hole, and Nantucket, 17. Among the extreme monthly ranges the large values were: Havre and Idaho Falls, 59; Huron, 58; Concordia, 57; Sioux City and Walla Walla, 56. The small values were: Corpus Christi, 13; Port Eads and San Diego, 17; Key West, 18.

No injurious frosts were reported during July.

MOISTURE.

The quantity of moisture in the atmosphere at any time may be expressed by means of the weight contained in a cubic foot of air, 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.

The sensible temperature experienced by the human body and attributed to the atmosphere depends not merely upon the temperature of the air, but equally upon the dryness and the wind. The temperature of the wet-bulb thermometer as obtained by the whirling apparatus used in the shaded shelter corresponds to the temperature felt by persons standing in the shade of trees or houses, exposed to a natural breeze of at least 6 miles per hour. This temperature and its depression below the dry bulb are the fundamental data for all investigations into the relation between human physiology and the atmosphere. In order to present a monthly summary of the atmospheric conditions from a hygienic and physiological point of view, Table VIII has been prepared, showing the maximum, minimum, and mean readings of the wet-bulb thermometer at 8 a. m. and 8 p. m., seventy-fifth meridian time.

PRECIPITATION.

[In inches and hundredths.]

The distribution of precipitation for the month of July, 1895, 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 precipitation for the current month was heaviest, over 12 inches, in Florida and western Missouri, and nearly 12 in southern Louisiana, but least, averaging less than 0.5, over the Rocky Mountain Plateau Region, California, Oregon, and the interior of Washington.

The normal distribution of precipitation for each month is shown in the Atlas of Bulletin C, entitled "Rainfall and Snow of the United States, compiled to the end of 1891, with annual, seasonal, monthly, and other charts."

The diurnal variation is shown by Table XII, which gives the total precipitation for each hour of seventy-fifth meridian time, as deduced from self-registering gauges kept at about 43 regular stations of the Weather Bureau; of these 37 are float gauges and 6 are weighing gauges.

The current departures from the adopted normal precipitation for July are given in Table I, which shows that precipi-

tation was decidedly in excess in the middle and southern slopes of the Rocky Mountains, Missouri, Alberta, and Saskatchewan; it was decidedly deficient in the Lake Region, the Ohio Valley, and the Atlantic and east Gulf States. The largest excesses were: Fort Smith, 11.2; Kansas City, 5.8; Block Island, 5.4; Hannibal, 4.9; Pueblo, 4.7; Jacksonville, 4.6. The principal deficits were: Key West, 3.8; Charlotte and Harrisburg, 3.1; Norfolk, 2.8; Cleveland, Pittsburg, and Alpena, 2.7.

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 normal exceeds 100): Above the normal: New England, 124; South Atlantic, 105; west Gulf, 155; Ohio Valley and Tennessee, 105; upper Mississippi, 132; Missouri Valley, 117; middle slope, 150; Abilene (southern slope), 284; southern Plateau, 141. Normal: Middle Plateau, 100; Southern Pacific, 100. Below the normal: Middle Atlantic, 75; Florida Peninsula, 80; east Gulf, 71; lower Lake, 83; upper Lake, 50; North Dakota, 96; northern slope, 66; northern Plateau, 60; North Pacific, 82.

The years of greatest and least precipitation are given in the REVIEW for July, 1894. The precipitation for the current month was the greatest on record at Pueblo, Abilene, Topeka, Kansas City, Springfield, Mo., Fort Smith, Chattanooga, Block Island, Nantucket, and Vineyard Haven. It was the least on record at Carson City, Corpus Christi, Green Bay, Alpena, and Harrisburg.

The total accumulated monthly departures from normal-precipitation from the beginning of the year 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.
<i>Excesses.</i>	<i>Inches.</i>	<i>Per ct.</i>	<i>Deficits.</i>	<i>Inches.</i>	<i>Per ct.</i>
South Atlantic.....	+ 0.60	102	New England.....	- 3.20	88
North Dakota.....	+ 0.90	107	Middle Atlantic.....	- 2.70	90
Northern slope.....	+ 0.30	103	Florida Peninsula.....	- 2.10	92
Abilene (southern slope)...	+ 4.20	125	East Gulf.....	- 2.00	94
Southern plateau.....	+ 0.90	117	West Gulf.....	- 1.10	96
			Ohio Valley and Tenn....	- 7.10	76
			Lower Lakes.....	- 6.50	67
			Upper Lakes.....	- 5.70	70
			Upper Mississippi.....	- 5.40	75
			Missouri Valley.....	- 3.20	85
			Middle slope.....	- 0.90	94
			Middle plateau.....	- 0.60	92
			Northern plateau.....	- 3.30	70
			North Pacific.....	- 0.50	98
			Middle Pacific.....	- 2.20	89
			South Pacific.....	- 2.20	76

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

The total snowfall at each station is given in Table II.

HAIL AND SLEET.

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

Arizona, 2, 20, 21. Arkansas, 7, 20. Colorado, 2, 6, 9 to 13, 17, 20, 26, 30. Connecticut, 13, 30. Florida, 29. Georgia, 8. Idaho, 5, 8, 30, 31. Illinois, 7, 8, 14, 16 to 19, 24, 26, 27. Indiana, 15, 18. Iowa, 7, 14, 16, 17, 18, 20, 25, 26, 28, 29. Kansas, 4, 7, 13, 19 to 22, 28. Kentucky, 20, 30. Maryland, 5, 16, 19, 21. Massachusetts, 12, 13, 27, 30. Michigan, 7, 29. Minnesota, 5, 6, 18, 24. Mississippi, 18. Missouri, 5, 14, 15, 17, 18, 19, 27, 28, 29. Montana, 2, 4, 7, 15, 17, 19, 22, 28, 30, 31. Nebraska, 4, 7, 13, 14, 16, 17, 18, 25, 26, 28, 29. Nevada, 20, 31. New Hampshire, 13, 16. New Jersey, 13, 27. New Mexico, 10, 11, 13. New York, 13, 14, 22, 25. North Carolina, 19, 30, North Dakota, 4, 5, 6, 20, 26. Ohio, 15, 21. Oklahoma, 7,

Oregon, 5, 28. Pennsylvania, 8, 16, 20, 21, 25, 27. Rhode Island, 13, 14. South Dakota, 14, 17, 26, 27, 31. Texas, 4. Utah, 9, 10, 11, 29. Vermont, 13. Virginia, 9. West Virginia, 2, 27. Wisconsin, 7, 16, 17, 25, 26. Wyoming, 17, 19, 31. Sleet was not reported during July.

INLAND NAVIGATION.

The extreme and average stages of water in the rivers during the current month are given in Table VII, from which it will be seen that the only river that attained the danger line during the month was the Red River, which on the 29th and 30th was about 1 foot above the danger line at Shreveport, La. Among other rather near approaches to the danger line were the Willamette at Portland, Oreg., on the 8th and 9th, and the Big Sandy at Louisa, Ky., on the 26th.

SUNSHINE AND CLOUDINESS.

The sunshine is now recorded automatically at 15 regular stations of the Weather Bureau by its photographic, and at 28 by its thermal effects. The photographic record sheets show the apparent solar time, but the thermometric sheets show seventy-fifth meridian time. For convenience the results are all given in Table XI for each hour of mean local time. The cloudiness is determined by numerous personal observations at all stations during the daytime, and is given in the column of "average cloudiness" in Table I; its complement or clear sky is given in the last column of Table XI.

COMPARISON OF SUNSHINE AND CLEAR SKY.

The sunshine registers give the duration of direct sunshine whence the percentage of possible sunshine is derived; the observer's personal estimates give the percentage of area of clear sky. It should not be assumed that these numbers should agree, and for comparative purposes they have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental record of percentages of duration of sunshine is almost always larger than the observer's personal estimates of percentages of area of clear sky; the average excess for July, 1895, is 10 per cent for photographic records, and 15 per cent for thermometric records. The details are shown in the following table:

Difference between instrumental and personal observations of sunshine for July, 1895.

Photographic stations.	Difference.			Thermometric stations.	Difference.		
	Instrumental.	Personal.	Difference.		Instrumental.	Personal.	Difference.
Galveston, Tex.....	85	80	5	Chicago, Ill.....	83	63	19
Salt Lake City, Utah*..	76	54	22	Cincinnati, Ohio†	80	54	26
Portland, Oreg.*.....	71	56	15	Salt Lake City, Utah†	75	54	21
Helena, Mont.....	69	67	2	Portland, Me.....	74	35	39
Cleveland, Ohio.....	68	50	18	Key West, Fla.....	73	51	22
Santa Fe, N. Mex.....	68	48	20	Philadelphia, Pa.....	73	49	24
San Diego, Cal.....	67	69	- 2	Des Moines, Iowa.....	71	57	14
Dodge City, Kans.....	63	58	5	Vicksburg, Miss.....	71	68	3
Savannah, Ga.....	62	52	10	Washington, D. C.....	71	55	16
Bismarck, N. Dak.....	61	56	5	Atlanta, Ga.....	70	45	25
Denver, Colo.....	59	49	10	Marquette, Mich.....	70	45	25
Spokane, Wash.....	59	50	9	Baltimore, Md.....	69	57	12
Memphis, Tenn.†.....	56	40	16	Portland, Oreg.*.....	68	56	12
Kansas City, Mo.*.....	54	42	12	Rochester, N. Y.....	67	49	18
Eastport, Mo.....	50	42	8	Columbus, Ohio.....	66	46	20
				Detroit, Mich.....	63	50	13
				New Haven, Conn.....	62	57	5
				New Orleans, La.....	62	62	0
				Louisville, Ky.....	61	46	19
				St. Louis, Mo.....	61	42	15
				Seattle, Wash.....	60	60	0
				Wilmington, N. C.....	60	60	0
				New York, N. Y.....	59	46	13
				Little Rock, Ark.....	58	44	14
				Norfolk, Va.....	57	49	8
				Boston, Mass.....	55	38	17
				Buffalo, N. Y.....	52	32	20
				San Francisco, Cal.....	49	51	- 2

* Records kept by both methods. † All values for 16 days, except hourly percentages from 5 a. m. to noon, inclusive.