

U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU

CLIMATOLOGICAL SERVICE

DISTRICT No. 11, CALIFORNIA

PROF. ALEXANDER G. McADIE
DISTRICT EDITOR

REPORT FOR JULY, 1912

Prepared under direction of WILLIS L. MOORE, Chief U. S. Weather Bureau



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CLIMATOLOGICAL DATA FOR JULY, 1912.

DISTRICT NO. 11, CALIFORNIA.

Prof. ALEXANDER G. McADIE, District Editor.

GENERAL SUMMARY.

July, 1912, was the coolest July since 1897, and possibly the coolest for a much longer period. Considering the State as a whole, the mean temperature was lower than in July of any year during the period for which such records have been kept. In certain portions of the State the month is reported by cooperative observers as the coolest July in 21 years. For example, at San Bernardino there has been only one year—1892—when the average temperature was lower than that of July, 1912. On the other hand there are certain points in the State where the temperature for the month was above the normal.

The most noticeable feature of the weather was the infrequency of high afternoon temperatures in the Great Valley and in southeastern California. Along the coast the weather was in marked contrast with that of July, 1911. Then there was much fog and frequent high winds, while this year there has been little wind and much less fog than usual. Instead of unfavorable comment there has been a general agreement that the month as a whole was one of pleasant weather.

There were a few light showers during the month and the average rainfall was slightly above the normal. The month, however, is one of little rain and even a few light showers are sufficient to bring the total above the normal amount. The principal rainy period was the 17th-18th. The water supply steadily diminished and there were some complaints of scarcity at the end of the month. The run-off has been very light and river stages are very low.

The month began with the usual barometric depression over the valley of the Colorado, a characteristic condition during July. There were some light showers on the northern coast on the 2d and much cloudy weather in the southern part of the State. Light rains fell at San Diego on the 3d, which is an unusual occurrence at this time of year. There were no changes of importance until the 14th, when moderately warm weather prevailed. In the Great Valley temperatures reached 100°, which, however, is not an unusually high temperature for the section and time of year. The warm spell continued until the 16th, gradually increasing in intensity; temperatures as high as 108° were reported on the third day. The warm spell was followed by an agreeable change to cloudy, cooler weather, with light rain in the southern counties on July 17. Thunderstorms occurred in the Sierra Madre; and on July 18 moderately heavy rain fell in Owens Valley. This was a period of unsettled weather throughout the Great Basin and numerous thunderstorms with occasional cloudbursts were reported on the eastern slope of the Sierra Nevada. Washouts occurred at several places on the Southern Pacific lines from Truckee to Winnemucca and there were some delays to traffic. The rest of the month was without special feature, except that the conditions at the close were somewhat like those prevailing on the 17th, but less marked.

From an agricultural point of view weather conditions were excellent and all crops made good growth. There

were no setbacks due to inclement weather. While the seasonal rainfall has been much below the normal, the water has been used to the utmost advantage, and there has been no waste nor loss. In the interior, as mentioned above, there were few if any excessively high temperatures, and there were no desiccating winds. There was less sunshine than usual on the northern coast, but elsewhere there was a normal amount.

TEMPERATURE.

The mean temperature for the State was 3° below the normal, the greatest negative departure in 16 years. The following table gives the means and departures for each July from 1897 to 1912, inclusive:

Year.	Mean.	Departure.	Year.	Mean.	Departure.
	° F.	° F.		° F.	° F.
1897.....	74.5	+0.5	1905.....	74.8	+0.8
1898.....	81.4	+7.4	1906.....	76.8	+2.8
1899.....	77.9	+3.9	1907.....	73.1	-0.9
1900.....	75.9	+1.9	1908.....	76.4	+2.4
1901.....	76.0	+2.0	1909.....	71.2	-2.8
1902.....	72.8	-1.2	1910.....	75.5	+1.5
1903.....	71.2	-2.8	1911.....	74.1	+0.1
1904.....	72.2	-1.8	1912.....	71.0	-3.0

The highest temperature recorded at any station was 115° at Middlewater on the 17th. Report from Greenland Ranch, Death Valley, is missing and may show a higher temperature. The highest temperature reported at Indio was 113° on the 11th, which is 4° lower than the highest temperature at the same point during July, 1911, and 6° lower than the highest temperature at the same point during July, 1910. The lowest temperature was 23° at Quincy on the 1st, which is 5° lower than the lowest recorded during the same month last year.

PRECIPITATION.

The precipitation for the season has been much below the normal, and yet the precipitation for May, June, and July has been above the normal. The actual amounts, however, are small, and the combined rainfall of these three months did not materially affect the seasonal total. The average monthly precipitation was 0.06 of an inch.

The following table gives the average and departure from the normal for each July from 1897 to 1912, inclusive:

Year.	Mean.	Departure.	Year.	Mean.	Departure.
	Inches.	Inches.		Inches.	Inches.
1897.....	0.01	-0.03	1905.....	0.01	-0.03
1898.....	T.	-0.04	1906.....	.04	.00
1899.....	T.	-0.04	1907.....	.03	-.01
1900.....	.03	-.01	1908.....	.04	.00
1901.....	.01	-.03	1909.....	.05	+.01
1902.....	.07	+.03	1910.....	.10	+.06
1903.....	.03	-.01	1911.....	.10	+.06
1904.....	.09	+.05	1912.....	.06	+.02

The greatest monthly rainfall was 1.94 inches at Dunsmuir. One hundred and thirty-eight stations reported no rain during the month.

SUNSHINE.

The following table gives the total hours of sunshine and percentages of the possible:

Stations.	Hours.	Percent- age of possible.	Stations.	Hours.	Percent- age of possible.
Eureka.....	132	29	Sacramento.....	418	92
Fresno.....	410	92	San Diego.....	292	67
Los Angeles.....	312	71	San Francisco.....	273	61
Mount Tamalpais.....	385	86	San Jose.....	350	78
Red Bluff.....	414	91	San Luis Obispo.....	295	67

NOTES ON THE RIVERS OF THE SACRAMENTO AND LOWER SAN JOAQUIN WATERSHEDS DURING JULY, 1912.

By N. R. TAYLOR, Local Forecaster.

Sacramento watershed.—There was a steady fall in all streams throughout the Sacramento drainage basin. In the Sacramento River the ranges between the stages on the first and those on the last dates were from 1 foot in the upper reaches to as much as 3 feet at the mouth of the American.

At Colusa the stage of the Sacramento equaled the lowest previous average for the month, and at Knights Landing and the city of Sacramento it averaged lower than ever before recorded during July.

In the headwaters of the Feather-Yuba and American River Basins streams were much below the usual July stages. The Feather at Oroville averaged slightly above the previous July low water, but the Yuba at Marysville was 0.4 of a foot lower than for any corresponding month since records at that point have been kept. At Folsom on the American the river lacked 0.4 of a foot of being as low as the previous low-water average of July.

While numerous shoals and sand bars have formed in the Sacramento above the mouth of the American, boats are still running as far as Chico Landing.

Lower San Joaquin watershed.—The rivers of this watershed were much below the usual July stages, especially during the first half of the month when usually snow water increases the run-off.

At San Joaquin bridge the San Joaquin River was 7 feet below the July normal stage, and the average was 14.3 feet below that of July, 1911. The Mokelumne and Cosumnes Rivers were the lowest of any July of which there is a record.

FROST FIGHTING AT POMONA.

Mr. J. E. Adamson, of Pomona, states in the Pacific Rural Press for July, 1912, as follows:

The people in and about Pomona district have been prompt to recognize the value not only of orchard heating, but of the greater efficiency to be obtained from concerted work. They have formed an association for the express purpose of furthering the interest in frost prevention and the control of the fight when the actual battle comes.

The association centralizes its power in a committee, and this again in a general manager, who will divide the valley into a number of districts, each of which will have a number, after the manner of fire districts in a city. In each of these districts will be located instruments for the recording of temperature and humidity, and also wind direction and velocity. A night watchman will make the rounds of these stations on dangerous nights, reporting to headquarters once an hour or oftener if the conditions change suddenly. These reports coming in from all over the valley will be tabulated and will then become an accurate guide to the manager in determining the advance of the cold wave and the necessary time and place to begin firing. Alarms will be sent out at the proper time and the growers in the danger zone will

be at work all over the cold area at once. It is hoped by this uniform control of the work to secure uniform results and save the individual grower the trouble of keeping a close watch before the actual danger line is reached. Other districts are rapidly falling into line and it would seem that the grower of citrus fruit has made up his mind that no longer will there be damaged fruit sent to the consumer if preparation will prevent it.

VARIATION OF RAINFALL WITH ALTITUDE.

By A. G. McADIE.

In the Monthly Weather Review for September, 1911, page 1422, there was published a discussion of the rainfall records of four stations near Fresno for the seasons 1909-10 and 1910-11. The data were supplied through the courtesy of Mr. E. J. Crawford, assistant general superintendent of the San Joaquin Light & Power Corporation. The stations are:

	Elevation.
Fresno.....	230 feet..
San Joaquin power house.....	do... 1,013
Reservoir No. 1.....	do... 2,441
Colorado Valley Dam.....	do... 3,500

By combining the records the following annual amounts were determined for the various elevations:

	Rainfall.
230 feet.....	inches.. 11.40
1,013 feet.....	do... 31.53
2,441 feet.....	do... 31.63
3,500 feet.....	do... 50.16

or a gradient of 1.18 inches per 100 feet.

Attention was called to an apparent irregularity in the rate of increase between the second and third stations.

Mr. Crawford has offered the following reasonable explanation. The 1,000-foot elevation represents a locality on the main San Joaquin River so situated that the 2,000-foot level has to be passed over before the 1,000-foot level is reached. In other words, the power house, itself at an elevation of a little over 1,000 feet, is surrounded by hills exceeding 2,000 feet. The amount caught at the lower level is practically the same as that of the higher elevation.

Mr. Crawford furnishes the following additional data for the season of 1911-12:

Months.	Fresno.	San Joaquin power house.	Reservoir No. 1.	Colorado Valley Dam.
September.....	0.01	0.06	0.08	0.30
October.....	.09	.07	.08	.25
November.....	.17	1.45	1.27	2.62
December.....	1.06	1.18	1.78	3.49
January.....	.72	.64	2.18	2.90
February.....	.00	.08	.09	.34
March.....	3.02	6.02	5.66	9.61
April.....	1.86	3.55	3.67	7.00
May.....	.41	.77	.75	1.58
June.....	.00	.00	.00	.11
July.....				
August.....				
Total.....	7.34	13.82	15.56	28.20

For the three seasons, 1909-10, 1910-11, and 1911-12, we find that the seasonal rainfalls average:

	Rainfall.
230 feet.....	inches.. 10.05
1,013 feet.....	do... 25.63
2,441 feet.....	do... 26.27
3,500 feet.....	do... 42.84

Neglecting the second station, for the reason above stated, we find that the average increase up to 3,500 feet is at the rate of 1 inch per 100 feet; the average increase up to 2,441 feet is at the rate of 0.73 inch per 100 feet; while the average rate of increase in the level between 2,441 feet and 3,500 feet is at the rate of 1.45 inches.

TABLE 1.—Climatological data for July, 1912. District No. 11—Continued.

Stations.	Counties.	Elevation, feet.	Length of record, years.	Temperature, in degrees Fahrenheit.						Precipitation, in inches.					Sky.			Observers.		
				Mean.	Departure from the normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from the normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Number of rainy days, 0.01 inch or more.	Number of clear days.	Number of part-ly cloudy days.		Number of cloudy days.	Prevailing wind direction.
<i>California—Continued.</i>																				
Santa Rosa.....	Sonoma.....	181	23	63.6	- 2.7	92	15	42	27	46	0.00	- 0.05	0.00	0	0	23	6	2	s.	Southern Pacific Co.
Selma **.....	Fresno.....	311	26	79.7	- 4.9	108	16	60	5	5	0.00	0.00	0.00	0	0	31	0	0	.....	Do.
Seven Oaks.....	San Bernardino.....	5,000	2	63.3	.....	85	15	36	2	36	0.27	.....	0.18	0	2	15	8	8	w.	M. Lewis.
Shasta.....	Shasta.....	1,048	16	72.2	-10.3	104	17	39	8	53	0.00	- 0.08	0.00	0	0	28	3	0	nw.	Dr. T. J. Edgecomb.
Sierra Madre.....	Los Angeles.....	1,400	15	66.7	- 5.8	97	15	50	4	33	T.	- 0.01	T.	0	0	26	1	4	s.	Mrs. A. E. Gregory.
Sierraville.....	Sierra.....	5,000	2	60.4	.....	95	16	30	1†	59	0.00	.....	0.00	0	0	15	12	4	sw.	C. D. Johnson.
Sisson.....	Siskiyou.....	3,555	23	62.1	- 7.8	92	16	37	2	41	0.48	+ 0.38	0.48	0	1	27	3	1	n.	Southern Pacific Co.
Soledad **.....	Monterey.....	188	38	68.9	+ 2.8	90	16	56	29	.....	0.00	0.00	0.00	0	0	31	0	0	n.	Do.
Sonora.....	Tuolumne.....	1,825	24	73.9	.....	100	16	47	1	36	0.00	- 0.02	0.00	0	0	27	4	0	w.	Chas. P. Jones.
Southeast Farallon.....	San Francisco.....	30	9	54.8	.....	63	30	48	9	9	0.01	.....	0.01	0	1	11	9	11	nw.	U. S. Weather Bureau.
Springville.....	Tulare.....	4,000	5	68.4	.....	95	16	41	3	35	T.	.....	T.	0	0	26	4	1	.....	D. L. Wishon.
Squirrel Inn.....	San Bernardino.....	5,280	2	63.2	.....	81	15	38	3	30	T.	.....	T.	0	0	26	4	1	sw.	A. D. Frantz.
Stanwood.....	Butte.....	2,140	8	72.4	.....	94	12	44	7	42	0.00	.....	0.00	0	0	31	0	0	s.	California Gas & Electric Co.
Stirling City.....	do.....	3,525	8	70.9	.....	99	15	48	21†	42	0.10	.....	0.10	0	1	24	7	0	se	Butte County R. R. Co.
Stockton (S. H.).....	San Joaquin.....	23	41	71.2	- 1.4	99	16	53	1†	36	T.	0.00	T.	0	0	27	4	0	nw.	State Hospital.
Storey.....	Madera.....	296	12	76.6	- 2.1	109	16	49	31	46	0.00	.....	0.00	0	0	31	0	0	.....	Santa Fe Co.
Suisun **.....	Solano.....	20	32	.....	.....	100	17	48	1	40	0.00	.....	0.00	0	0	15	0	w.	Southern Pacific Co.	
Sulphur Banks.....	Lake.....	1,350	.....	73.2	.....	100	17	48	1	40	0.00	.....	0.00	0	0	16	0	.....	J. T. LaBree.	
Sumnerdale.....	Mariposa.....	5,270	16	65.1	- 2.5	87	16	42	3	28	0.00	- 0.03	0.00	0	0	22	6	2	w.	Bertus Gude, jr.
Summit.....	Placer.....	7,017	39	50.2	-10.8	68	9†	30	1†	33	0.30	+ 0.14	0.30	0	1	28	0	3	sw.	Southern Pacific Co.
Susanville.....	Lassen.....	4,175	23	64.4	- 5.7	90	16	33	1	40	0.15	- 0.01	0.15	0	1	25	6	0	sw.	James Branham.
Tamarack.....	Alpine.....	8,000	6	53.2	.....	80	16	24	1	40	0.68	.....	0.40	4.0	3	16	10	5	sw.	California Gas & Electric Co.
Tehachapi **.....	Kern.....	3,964	35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Southern Pacific Co.
Tehama.....	Tehama.....	220	41	81.8	- 2.3	103	16	60	1	.....	0.00	- 0.06	0.00	0	0	27	1	3	n.	Do.
Tejon Rancho.....	Kern.....	1,500	10	71.1	.....	87	17	53	2	21	0.00	.....	0.00	0	0	25	0	6	n.	S. E. Bailey.
Three Rivers.....	Tulare.....	870	2	77.2	.....	109	16	47	3	46	T.	.....	T.	0	0	20	10	1	sw.	E. D. Barton.
Towle.....	Placer.....	3,704	26	66.1	- 4.6	95	17	40	1	35	0.00	- 0.02	0.00	0	0	31	0	0	sw.	Southern Pacific Co.
Tracy **.....	San Joaquin.....	64	32	78.6	- 1.3	105	15	60	3†	.....	0.00	0.00	0.00	0	0	16	15	0	nw.	Do.
Ukiah.....	Mendocino.....	620	19	70.9	- 0.4	104	15	42	1	55	0.00	- 0.02	0.00	0	0	24	7	0	nw.	Dr. Geo. McCowen.
Upper Lake.....	Lake.....	1,350	27	71.6	- 2.3	105	16	41	1	51	0.00	- 0.02	0.00	0	0	30	1	0	nw.	C. M. Hammond.
Vacaville.....	Solano.....	175	24	73.2	- 2.3	107	16	49	3	49	0.00	0.00	0.00	0	0	29	2	0	sw.	G. C. Coburn.
Valley Springs **.....	Calaveras.....	673	23	78.5	- 1.5	104	16	65	30	.....	0.00	- 0.01	0.00	0	0	26	5	0	nw.	Southern Pacific Co.
Visalia.....	Tulare.....	334	24	70.9	- 9.1	104	16	32	31	63	0.00	- 0.02	0.00	0	0	21	10	0	se.	Santa Fe Co.
Warner Springs.....	San Diego.....	3,165	4	69.6	.....	96	14	44	23	39	0.66	.....	0.60	0	2	21	8	2	.....	Mrs. F. S. Sandford.
Wasco (B. R.).....	Kern.....	336	12	.....	.....	.....	.....	.....	.....	.....	0.00	.....	0.00	0	0	.....	.....	.....	.....	Santa Fe Co.
Watsonville.....	Santa Cruz.....	23	16	73.8	+11.4	85	20†	32	1	50	0.00	0.00	0.00	0	0	8	23	0	w.	Spreckels Sugar Co.
Weaverville.....	Trinity.....	.....	.....	66.8	.....	93	9†	37	1	45	0.01	.....	0.01	0	1	25	4	2	w.	U. S. Forest Service.
Weitchpec.....	Humboldt.....	1,700	2	65.9	.....	95	15†	40	1	40	0.00	.....	0.00	0	0	26	5	0	sw.	M. E. Lathrop.
Westley **.....	Stanislaus.....	90	23	78.3	- 4.4	105	16	60	12	.....	0.00	- 0.02	0.00	0	0	30	0	1	n.	Southern Pacific Co.
Wheatland.....	Yuba.....	84	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	William Lumbard.
Willows.....	Glenn.....	136	33	80.2	- 2.7	112	16	55	4†	44	T.	0.00	T.	0	0	30	1	0	se.	E. C. Mills.
Yosemite.....	Mariposa.....	3,945	8	61.6	.....	100	16	33	2	58	0.00	.....	0.00	0	0	28	0	3	s.	J. P. Kelley.

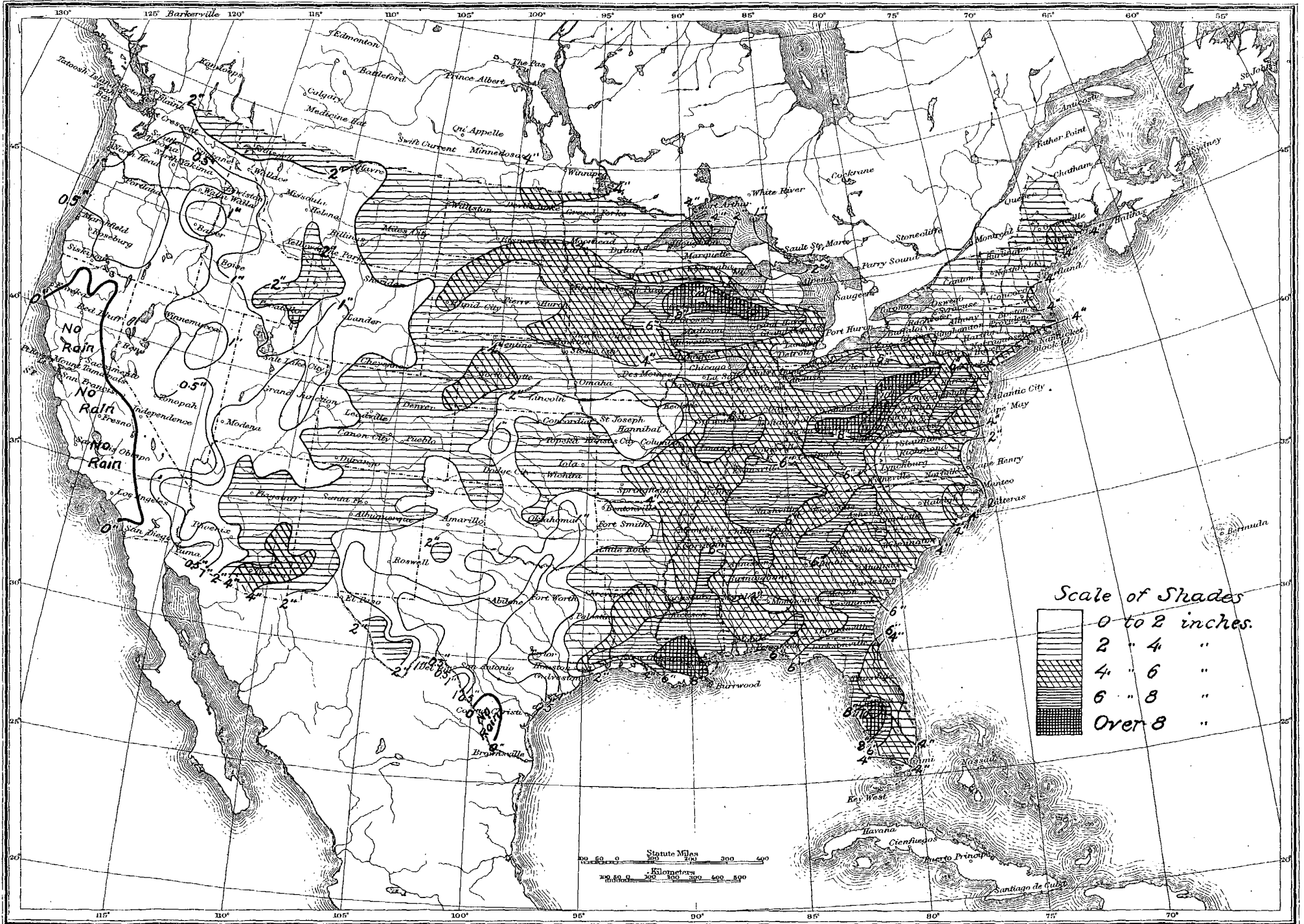
* a, b, c, etc., indicate respectively 1, 2, 3, etc., days missing from the record.
 ** Temperature extremes are from observed readings of the dry bulb; means are computed from observed readings.
 † Also on other dates.
 T. Precipitation is less than 0.01 inch rain or melted snow.

TABLE 2.—Daily precipitation for July, 1912. District No. 11—Continued.

Stations.	Watershed.	Day of month.																														Total.			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		31		
<i>California—Contd.</i>																																			
Tulare.....	San Joaquin.																																		
Tustin (near).....	Coast.....																																	0.00	
Ukiah.....	do.....																																	0.00	
Upper Lake.....	Sacramento.																																	0.00	
Upper Matole.....	Coast.....																																	0.00	
Vacaville.....	Sacramento.																																	0.00	
Valley Springs.....	San Joaquin.																																	0.00	
Visalia.....	do.....																																	0.00	
Warner Springs.....	Coast.....				.06																													0.00	
Wasco.....	San Joaquin.													T.																				0.00	
Watsonville.....	Coast.....																																	0.00	
Weaverville.....	do.....																																	0.00	
Weitchpec.....	Klamath.....																																	0.00	
West Branch.....	Sacramento.																																	T.	
Westley.....	San Joaquin.																																	T.	
West Point.....	do.....																																	T.	
West Saticoy.....	Coast.....																																	0.00	
Wheatland.....	Sacramento.																																		0.00
Willows.....	do.....																																	T.	
Yosemite.....	San Joaquin.																																	T.	

* Precipitation included in that of the next measurement.
 † Separate dates of falls not recorded.
 ‡ Precipitation for the 24 hours ending on the morning when it is measured.
 T. Precipitation is less than 0.01 inch rain or melted snow.

Total Precipitation, July, 1912.



DEPARTURE OF THE MONTH TEMPERATURE FROM THE NORMAL, JULY, 1914.

