

U. S. DEPARTMENT OF AGRICULTURE  
WEATHER BUREAU  
CHARLES F. MARVIN, CHIEF

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# CLIMATOLOGICAL DATA

CALIFORNIA SECTION

DECEMBER, 1919

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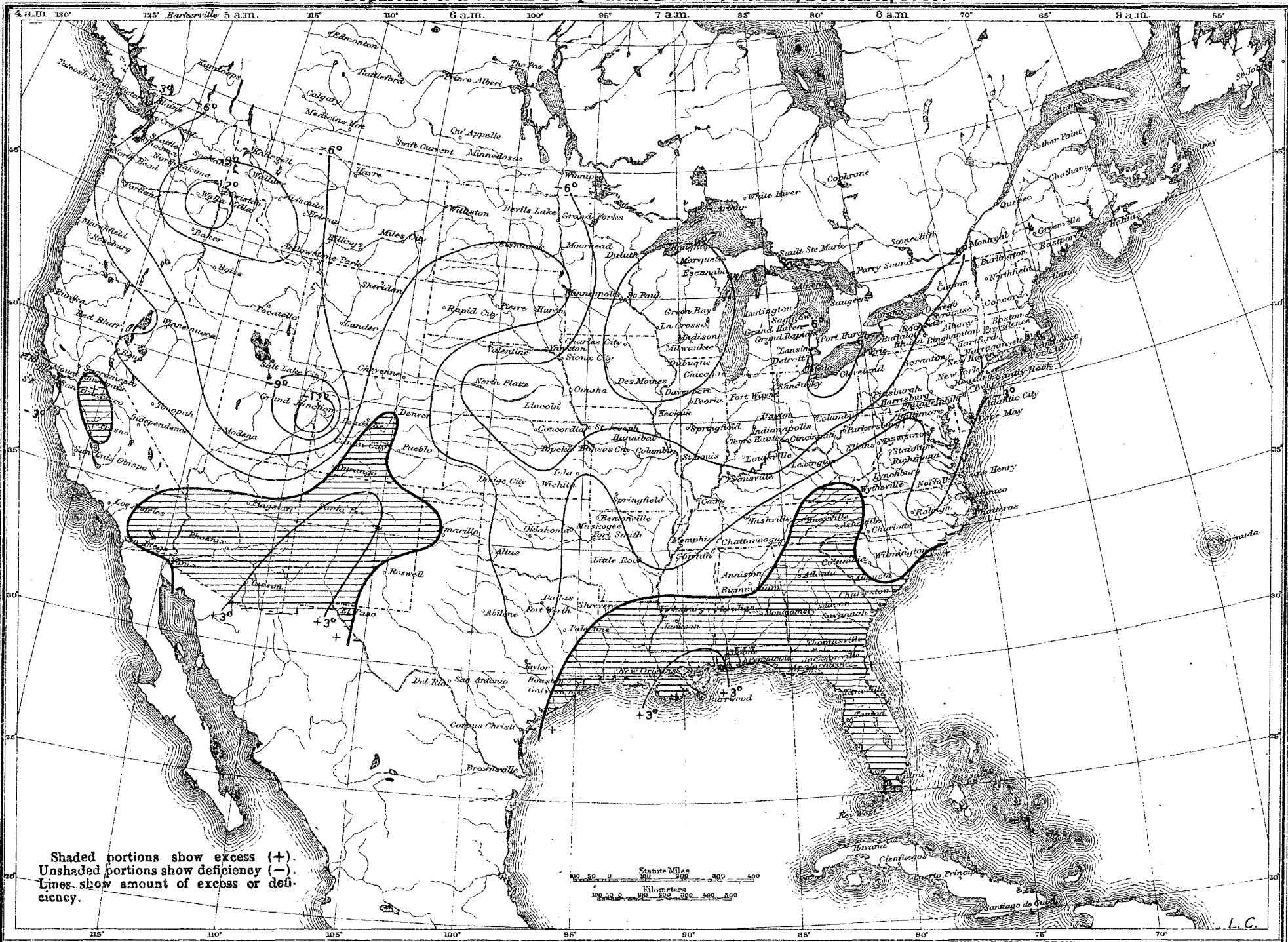
BY  
EDWARD A. BEALS,  
DISTRICT FORECASTER AND SECTION DIRECTOR.

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SAN FRANCISCO, CAL.  
WEATHER BUREAU OFFICE  
JANUARY 26, 1920

# Departure of the Mean Temperature from the Normal, December, 1919.



Shaded portions show excess (+).  
 Unshaded portions show deficiency (-).  
 Lines show amount of excess or deficiency.

0 50 100 150 200 250 300 350 400  
 Statute Miles  
 0 100 200 300 400 500  
 Kilometers

L.C.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

CALIFORNIA SECTION.

EDWARD A. BEALS, District Forecaster.

VOL. XXIII. SAN FRANCISCO, DECEMBER, 1919. No. 12.

GENERAL SUMMARY.

Temperature and precipitation were both below normal in California during December, which was the seventh consecutive month with subnormal temperature. At several stations in the extreme north portion of the State the lowest temperatures ever recorded in December occurred during this month. Cold, northerly winds prevailed. Precipitation was heavy during the first decade of the month. Between the 1st and 4th, and on the 10th and 11th extremely heavy rains fell in the northern portion of the State, and the first heavy snowfall of the season occurred in the mountains. The remainder of the month was relatively dry, however, practically no rain falling in southern California, and only a few scattered showers fell in the northern half of the State. At the close of December the accumulated seasonal precipitation was everywhere deficient, the deficiency being most marked in northern and central California, where less than one-half of the normal seasonal precipitation had been received.

Fog was of frequent occurrence, particularly in the interior valleys. Several collisions between ferry steamers on San Francisco Bay resulted from this cause. Frosts formed on many mornings. The number of days on which frost occurred at certain stations was as follows: San Jose, 12; Red Bluff, 11; Eureka, Sacramento and San Luis Obispo, 10 each; Fresno, 8, and San Francisco, 7. No damage from high winds was reported. There was more sunshine than is usual during December, and summer-like weather prevailed in southern California during the latter half of the month.

The copious rains of the first decade were of great value agriculturally. Winter truck thrived, some was harvested, and more was planted. While moisture helped winter grains, little growth followed, owing to the cold weather. The slow growth of grass caused stock to deteriorate. The increased moisture softened the soil, making plowing possible. There followed extensive preparation of the soil in anticipation of early spring seeding. Frost caused some damage to olives and citrus fruits in the interior valleys, but most of the fruit had been harvested before the killing frosts came. Desiccating, northerly winds caused some dropping of oranges and lemons in southern California, but the picking and shipping of mature fruit proceeded without interruption. As a whole, the weather of the month was favorable from an agricultural point of view. The fine weather was used to good advantage in the performance of the varied duties which mark the close of one crop-growing season, and which precede the advent of the next.

A. H. P.

PRESSURE.

The mean-sea level pressure, determined from the records of twelve regular Weather Bureau stations, was 30.13 inches. The highest was 30.66 inches at Independence on the 26th; the lowest was 29.53 inches at Red Bluff on the 11th; the range for the State was 1.13 inches.

TEMPERATURE.

The monthly mean temperature for the State, as shown by the records of 99 stations, was 46.1°, which is 0.6° below the normal. The highest monthly mean was 58.9°, at Los Angeles; and the lowest was 21.8°, at Fordyce Dam. The highest temperature, 83°, occurred at King City on the 6th; and the lowest, -19°, occurred at Portola on the 12th. The range for the State was 107°.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 239 stations, was 3.87 inches, or 0.16 inch below the normal. The greatest monthly amount was 14.00 inches, at Upper Mattole. No rain fell at two stations. The greatest amount in 24 hours was 5.60 inches at Kennett on the 10th-11th.

RELATIVE HUMIDITY, SUNSHINE AND CLOUDINESS.

Stations.	Relative humidity. (Per cent.)			Actual No. of hours	Sunshine. Per cent of possible.
	5 a. m.	5 p. m.	Mean.		
Eureka	84	77	80	112	39
Fresno	85	64	75	159	53
Independence	64	50	57	237	79
Los Angeles	64	55	60	262	85
Mount Tamalpais	71	69	71	163	57
Red Bluff	83	68	78	115	40
Sacramento	94	87	90	100	34
San Diego	63	63	67	213	69
San Francisco	72	68	75	140	47
San Jose	72	76	75	162	54
San Luis Obispo	75	56	66	213	70

WIND MOVEMENT.—(Miles.)

Stations.	Total miles for month.	Ave. hr. velocity.	Maximum velocity.	Direction.	Date.	Prev. dir.
Eureka	5,277	7.2	42	sw.	10	se.
Fresno	3,877	5.3	25	nw.	11	nw.
Independence	3,496	4.8	36	se.	4	nw.
Los Angeles	4,224	5.7	22	e.	4	ne.
Mount Tamalpais	14,990	20.1	66	se.	4	ne.
Point Reyes	13,099	17.6	85	s.	4	se.
Red Bluff	3,352	4.5	31	se.	10	nw.
Sacramento	4,906	6.6	42	se.	10	se.
San Diego	3,611	4.9	29	se.	4	nw.
San Francisco	6,060	8.1	36	se.	4	se.
San Jose	4,303	5.9	36	se.	10	se.
San Luis Obispo	2,814	3.3	22	se.	4	n.

COMPARATIVE DATA FOR DECEMBER.

Year.	Mean temp.	Ave. precip.	Year.	Mean temp.	Ave. precip.	Year.	Mean temp.	Ave. precip.	Year.	Mean temp.	Ave. precip.
1897	44.4	1.75	1903	48.0	1.44	1909	43.3	6.92	1915	45.7	5.56
1898	44.4	1.20	1904	47.2	3.04	1910	47.8	1.87	1916	41.9	3.81
1899	45.8	3.03	1905	45.3	1.55	1911	43.3	2.05	1917	49.8	1.43
1900	47.3	1.68	1906	47.3	8.42	1912	44.7	1.58	1918	43.8	2.10
1901	47.4	1.45	1907	48.3	5.41	1913	44.8	7.04	1919	46.1	3.87
1902	46.6	2.96	1908	43.2	2.33	1914	41.8	5.00			

The departures from the normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete reports are used in determining section or division means.  
† Also on other dates. a, b, c, etc., indicate respectively, 1, 2, 3, etc., days missing from the record.

Daily evaporation (inches) and wind movement (miles) for December, 1919.

Stations.	Data.	Day of Month.																															Monthly.	
		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		
Chula Vista**1	{ Evaporation	.087	.102	.052	.112	.093	.054	.066	.087	.086	.079	.043	.106	.136	.109	.041	.118	.105	.095	.087	.072	.071	.067	.050	.080	.064	.155	.168	.222	.209	.107	.039	2.982	
	{ Wind movement	56	66	137	116	106	87	101	99	85	60	72	92	80	51	28	56	50	59	51	47	51	59	50	59	51	52	65	66	68	58	39	2,108	
Dodge Island**2	{ Evaporation	.090	.066	.024	.015	.236	.009	.013	.005	.045	.145	.024	.039	.059	*	*	*	.033	.029	.045	.042	.058	.055	.023	.025	.044	.060	.030	.001	.008	.012	.001	1.140	
	{ Wind movement	41	55	15	90	40	30	10	40	40	130	206	100	74	20	20	10	20	10	20	15	25	20	20	30	30	25	15	30	23	20	1,301		
Oakdale (near)**3	{ Evaporation	.098	.000	.000	.050	.141	.081	.051	.058	.048	.094	.085	.000	*	*	*	.103	.073	.014	.057	.046	.032	.034	.037	.039	.022	.012	.007	.000	.084	.000	.007	1.323	
	{ Wind movement	172	180	230	159	331	200	100	70	163	310	500	130	133	27	50	50	40	60	80	72	76	42	120	60	120	130	70	98	92	53	107	4,022	
Taboe**4	{ Evaporation							.080	.040	.160							.130	.160	.020		.030	.040	.090	.090	.090	.150	.190	.230	.130	.150	.070	.090	.120	1,600
	{ Wind movement	66	1	83	129	92	61	74	119	47		95	87	124	51	26	51	21	14	13	21	54	38	67	48	68	70	87	101	34	35	164	56	1,997

\* Observation taken at 7 a. m.; \*\* at 8 a. m. † Included in next following entry.  
1 Ele. 9 ft.; 10 miles SE of San Diego. 2 Ele. 125 ft.; 16 miles SW of Chico. 3 Ele. 215 ft.; Woodward Reservoir, 8 miles N of Oakdale. 4 Ele. 6230 feet; float in Lake Taboe.

Climatological Data for December, 1919.

Table with columns: Stations, Counties, Elevation, Length of record, Mean, Departure from normal, Highest, Date, Lowest, Date, Greatest daily range, Total, Departure from normal, Greatest in 24 hours, Snowfall, Precipitation, Number of days (Clear, Partly cloudy, Cloudy), Prevailing direction of wind, Observers.

Daily Precipitation for December, 1919.

Table with columns for Stations, Watersheds, and Day of Month (1-31), plus a Total column. Rows list various California locations such as Alturas, Antioch, Atascadero, etc., with their corresponding precipitation values for each day.

Except as otherwise indicated observations are generally made late in the afternoon, near sunset, and precipitation recorded is for the 24 hours ending at the time of observation. \*\*\* Regular Weather Bureau station; precipitation is for the 24-hour period, midnight to midnight. † Separate dates of fall not recorded. T, trace, or less than 0.01 inch.

Daily Temperature for December, 1919.

Table with columns for Stations, 1-31, and Mean. Rows list various California cities like Bakersfield, Calexico, Chico, Escondido, Eureka, Fresno, Independence, Los Angeles, Merced, Mount Tamalpais, Oakland, Orland, Oroville, Paso Robles, Point Reyes, Pomona, Porterville, Red Bluff, Redlands, Sacramento, San Bernardino, San Diego, San Francisco, San Jose, San Luis Obispo, Santa Barbara, Santa Rosa, and Stockton.

SUPPLEMENTAL PRECIPITATION TABLE.

Table with columns for Stations, Watersheds, and Precip. inches. Rows list various locations and watersheds such as Abbots, Anguana, Angiola, Antelope Valley, Arrowhead Springs, Auburn, Avalon, Bagdad, Barrett Dam, Beaumont, Bellota, Big Bar, Big Sur, Bishop Creek, Cahulla, Calaveras R. S., Campbell, Campo, Canon Dam, Cascada, Cedarville, Centerville, Chester, China Flat, Chula Vista, Churn Creek, Clovis, Coalinga, Colgate, Colusa, Covelo, Crockett, Cuyamaca, Deer Creek, Del Monte, Denair, De Saba, and Dinuba.

**SNOWFALL IN THE MOUNTAINS.**

The higher peaks of the mountains of California were snow-covered abnormally early during the season of 1919-20. About 10 inches of snow fell at Huntington Lake, Fresno County, altitude 7,000 feet, on September 29-30. Warm weather followed, however, and the snow soon melted. Between 10 and 15 inches of snow fell during October in the higher portions of the Sierra Nevada, but this also disappeared before the close of the month. As little or no snow fell during the greater part of November, the mountains remained bare, and streams maintained extremely low stages.

On November 30th, however a well-defined storm arrived, and during the following ten or twelve days precipitation was general throughout California. Snowfall was heavy in the elevated portions of the State. The Coast Ranges and the mountains of southern California were covered with deep snow for the first time during the present season. The snowfall in the Sierra Nevada was extraordinary. At Summit, Placer County, altitude 7,017 feet, 49 inches of snow fell in 48 hours, on November 30-December 2. At Fordyce Dam, Nevada County, altitude 6,500 feet, 62 inches of snow fell during the first three days of December. At the latter station a total of 105 inches of snow fell during the first 12 days of the month. Though much snow fell during the first half of December, no snow was added during the latter half. Low temperatures, however, prevented that on the ground from melting rapidly. At the close of December the amount on the ground in the higher portions of the Sierra Nevada was greater than that of the same date of the preceding year. However, it was less than the normal for that date. The absence of additional snowfall during the latter portion of December and the early part of January was unfortunate in view of the excellent foundation of densely packed snow laid down in the early part of December. While at the close of December the higher portions of the Sierra Nevada were snow-covered, little snow remained below the 5,000-foot level. Streams continued to maintain abnormally low stages for a period which usually marks the middle of the rainy season. A. H. P.

**COMPARATIVE SNOWFALL DATA FOR DECEMBER.**

(Amount on the Ground.)

	FORDYCE DAM.			SUMMIT.			TAMARACK.		
	1st.	15th.	End of mo.	1st.	15th.	End of mo.	1st.	15th.	End of mo.
1906.....	2	60	60	5	70	46	55	101	125
1907.....	0	30	72	0	42	87	0	39	74
1908.....	11	27	21	24	32	21	29	48	32
1909.....	2	25	43	2	24	45	26	52	65
1910.....	5	2	0	7	4	4	8	21	24
1911.....	4	1	44	1	2	56	3	5	45
1912.....	6	22	30	T.	14	19	3	29	42
1913.....	35	35	60	31	24	80	35	41	110
1914.....	8	40	31	12	46	26	10	31	27
1915.....	9	57	45	6	67	40	3	67	48
1916.....	15	42	74	14	16	77	7	32	86
1917.....	4	0	0	6	0	0	16	8	8
1918.....	17	23	23	20	17	16	17	27	32
1919.....	18	50	35	34	52	37	36	48	29

T. means trace.

**Snowfall Data. [In inches.]**

WATERSHED, COUNTY, STATION.	Elevation, feet.	Total snow-fall.	Compr'd with normal.	Am't on ground 15th.	Am't on ground end mo.
<b>Klamath Watershed.</b>					
<i>Siskiyou County.</i>					
Yreka.....	2,625	5	.....	2	0
<i>Trinity County.</i>					
Hayfork.....	2,300	18	.....	8	T.
Ruth.....	2,925	5	.....	0	0
Weaverville.....	2,162	14	.....	0	0
<b>Mountain Lakes.</b>					
<i>Inyo County.</i>					
Bishop Creek.....	8,390	3	-25	2	1
Independence.....	3,907	2	.....	0	0
Lone Pine.....	3,723	0	.....	0	0
<i>Lassen County.</i>					
Madeline.....	5,270	.....	.....	6	.....
Standish.....	4,000	21	.....	.....	2
<i>Modoc County.</i>					
Alturas.....	4,400	.....	.....	.....	.....
Cedarville.....	4,675	23	+12	23	1
Fort Bidwell.....	4,376	22	.....	6	2
<i>Nevada County.</i>					
Grass Valley.....	2,690	1	.....	0	0
Nevada City.....	2,850	4	+1	0	0
North Bloomfield.....	3,214	17	+10	0	0
Truckee.....	5,817	.....	.....	.....	.....
<i>Placer County.</i>					
Tahoe.....	6,230	72	.....	38	29
<b>Sacramento Watershed.</b>					
<i>Butte County.</i>					
De Sable.....	2,500	20	+10	4	0
Inskip.....	4,975	49	+8	32	19
West Branch.....	3,216	20	-1	12	0
<i>Nevada County.</i>					
Deer Creek.....	3,700	20	-3	14	3
Fordyce Dam.....	6,500	107	+54	50	35
Lake Spaulding.....	4,600	48	-6	32	6
<i>Placer County.</i>					
Blue Canon.....	4,695	62	+33	28	5
Emigrant Gap.....	5,230	62	+23	34	13
Summit.....	7,017	65	-7	52	37
<i>Plumas County.</i>					
Canon Dam.....	4,570	26	.....	28	14
Chester.....	4,550	33	+4	19	12
La Porte.....	5,000	60	+23	36	21
Portola.....	4,832	31	.....	15	2
Quincy.....	3,400	33	+28	12	4
<i>Sierra County.</i>					
Downieville.....	3,150	27	+10	3	0
Sierraville.....	5,000	40	+22	12	8
<i>Siskiyou County.</i>					
McCloud.....	3,270	33	+4	22	T.
Sisson.....	3,555	35	+11	16	0
<i>Yuba County.</i>					
Camptonville.....	3,500	26	-13	4	0
<b>San Joaquin Watershed.</b>					
<i>Alpine County.</i>					
Markleeville.....	5,525	38	.....	9	T.
Tamarack.....	8,000	84	-11	48	29
Twin Lakes.....	7,970	.....	.....	.....	.....
<i>Calaveras County.</i>					
Calaveras Ranger Station.....	3,400	9	.....	0	0
<i>Fresno County.</i>					
Camp Seven.....	6,980	45	.....	24	16
Cascada.....	4,900	26	.....	3	0
Hume.....	5,300	.....	.....	.....	.....
Huntington Lake.....	6,950	58	.....	28	16
Stevenson Creek.....	4,250	.....	.....	.....	.....
<i>Kern County.</i>					
Glennville.....	3,300	T.	-7	0	0
<i>Mariposa County.</i>					
Glacier Point.....	.....	.....	.....	.....	.....
Yosemite.....	3,945	36	+19	11	7
<i>Tulare County.</i>					
Hot Springs.....	3,300	0	-2	0	0
Springville.....	4,000	4	-8	0	0
<i>Tuolumne County.</i>					
Hetch Hetchy.....	3,665	22	+15	0	0
Lake Eleanor.....	4,700	40	+16	10	T.
<b>Mountains of Southern California.</b>					
Cuyamaca.....	4,677	0	-2	0	0
Julian.....	4,222	T.	.....	0	0
Mount Wilson.....	5,704	6	.....	1	T.
Nellie.....	5,350	2	.....	0	0
Seven Oaks.....	5,000	2	-10	0	0
Squirrel Inn.....	5,280	5	-6	1	0

# Total Precipitation, Inches, December, 1919.



**Scale of Shades.**

- 0 to 1 inch.
- 1 to 2 inches.
- 2 to 4 inches.
- 4 to 6 inches.
- Over 6 inches.

Based on 700 records.

Statute Miles  
0 100 200 300 400

Kilometers  
0 100 200 300 400 500





The influence of the diversified topography of California upon its precipitation is shown by the lines of equal rainfall in inches, on the accompanying relief map.