

# CLIMATOLOGICAL DATA.

CALIFORNIA SECTION  
 EDWARD A. BEALS, METEOROLOGIST.

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## GENERAL SUMMARY.

The first half of December was abnormally warm and dry, and the latter half abnormally warm and wet. For the State as a whole the average precipitation was more than twice the normal for December, and practically all of this was received after the 16th. It was the wettest month since January, 1916, and it was the wettest December in 15 years. Though the precipitation was deficient in extreme northern California, it was excessive in the southern portion of the State. Abundant precipitation in the form of snow occurred in the Sierra Nevada Mountains, while torrential rains fell in the elevated portions of southern California. On Mount Wilson, Los Angeles County, altitude 5,704 feet, 11 inches of rain fell in 24 hours on the 18th-19th, and 23.03 inches fell in 6 days, the 18th-23d, inclusive. At Squirrel Inn, San Bernardino County, altitude 5,280 feet, 30.70 inches of rain fell in 11 days. Soil erosion, damaged roads and delayed transportation resulted from these rains, but there were no floods of consequence. Desiccating, northerly winds prevailed in central and southern California during the first week, and injured maturing citrus fruit in the latter region. Destructive winds caused considerable damage in central California on the 25th. At the close of the month the accumulated seasonal precipitation was far below normal in the northern portion of the State, it was about normal in the central portion, and it was two to three times the normal in the southern portion. There was a considerable amount of well-packed snow on the ground in the Sierra Nevada Mountains; in the Coast Range and in the elevated portions of southern California there was no snow except on the highest peaks.

The weather was favorable from an agricultural viewpoint. Much field work, such as pruning and spraying, was completed during the fine, dry weather of the first half of the month, but the soil was too dry for plowing. The generous rains of the latter half revived pastures and caused winter growing crops to come up to good stands. Because of the marked improvement in pastures and ranges caused by the timely rains, livestock and grazing cattle were in excellent condition at the close of the month. Citrus fruit sustained no damage of consequence from low temperatures, though killing frosts occurred frequently in portions of the State where vegetation was dormant. The harvesting of oranges was completed in northern and central California under favorable conditions, but picking in southern California was delayed by the heavy rains. The agricultural situation at the close of December was excellent, owing to the replenished supply of soil moisture, the refilled reservoirs and the satisfactory pack of snow in the Sierra Nevada Mountains.

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## PRESSURE.

The mean sea-level pressure, determined from the records of 11 regular Weather Bureau stations, was 30.07 inches. The highest was 30.63 inches at Eureka on the 2d; the lowest was 29.01 inches at Point Reyes on the 25th; the range for the State was 1.62 inches.

## TEMPERATURE.

The monthly mean temperature for the State, as shown by the records of 98 stations, was 49.0°, which is 2.3° above normal. The highest monthly mean was 65.2°, at San Pedro; and the lowest was 29.4°, at Madeline.

The highest temperature, 88°, occurred at Ojai on the 10th; and the lowest, -2°, occurred at Madeline on the 17th.

The range for the State was 90°.

## PRECIPITATION.

The average precipitation for the State, as shown by the records of 245 stations, was 8.33 inches, or 4.30 inches above the normal.

The greatest monthly amount was 30.70 inches, at Squirrel Inn; and the least monthly amount was 0.10 inch, at Greenland Ranch.

The greatest amount in 24 hours was 11.00 inches at Mount Wilson on the 19th.

## RELATIVE HUMIDITY, SUNSHINE AND CLOUDINESS.

Stations.	Relative humidity Per cent.			Sunshine.	
	5 a. m.	5 p. m.	Mean.	Actual No. of hours	Per cent of possible.
Eureka.....	86	81	84	100	35
Fresno.....	87	66	76	154	52
Independence.....	66	46	51	164	56
Los Angeles.....	69	65	67	172	56
Red Bluff.....	82	63	72	125	43
Sacramento.....	84	72	78	152	52
San Diego.....	70	75	72	161	52
San Francisco.....	86	69	78	147	50
San Jose.....	69	69	74	142	48
San Luis Obispo.....	76	61	68	159	52

## WIND MOVEMENT.—(Miles.)

Stations.	Total mov. for month.	Ave. hr. velocity.	Maximum velocity.	Direction.	Date	Prev. dir.
Eureka.....	4,201	5.6	48	SW.	1	se.
Fresno.....	3,730	5.0	24	SE.	20	nw.
Independence.....	4,551	6.1	40	SE.	20	nw.
Los Angeles.....	4,930	6.7	43	NE.	3	ne.
Point Reyes.....	12,966	17.4	96	S.	25	s.
Red Bluff.....	4,018	5.4	36	SE.	1	nw.
Sacramento.....	5,886	7.9	50	S.	25	se.
San Diego.....	4,746	6.4	40	S.	18	nw.
San Francisco.....	6,175	8.3	58	SW.	25	se.
San Jose.....	4,915	6.6	43	S.	25	se.
San Luis Obispo.....	3,080	4.1	26	SE.	25	s.

## 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	1904....	47.2	3.04	1911....	43.3	2.05	1918....	43.8	2.10
1898....	44.4	1.20	1905....	45.3	1.55	1912....	44.7	1.58	1919....	46.1	3.37
1899....	45.8	3.63	1906....	47.3	8.42	1913....	44.5	7.04	1920....	45.7	8.33
1900....	47.3	1.68	1907....	48.3	5.41	1914....	41.8	5.00	1921....	49.0	8.33
1901....	47.4	1.45	1908....	43.2	2.33	1915....	45.7	5.56	.....	.....	.....
1902....	46.6	2.96	1909....	43.3	6.92	1916....	41.8	5.81	.....	.....	.....
1903....	48.0	1.44	1910....	47.8	1.87	1917....	49.8	1.43	.....	.....	.....

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

Stations.	Data.	Day of Month.																															
		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	Total
Chula Vista**.....	{ Evaporation.....	.071	.095	.069	.296	.137	.093	.066	.092	.235	.160	.136	.125	.069	.076	.063	.166	.097	.187	.203	.047	.038	.116	.026	.040	0	.017	.029	.040	.076	.074	.059	2.988
	{ Wind movement.....	.60	.70	.59	.85	.37	.82	.48	.66	.84	.57	.40	.54	.47	.53	.50	.85	.93	.287	.175	.90	.89	.175	.42	.41	.98	.61	.51	.43	.50	.38	.49	2.360
Dodgeland*.....	{ Evaporation.....	.002	.011	.247	.042	.010	.018	.095	.048	.011	.006	.068	.017	.020	.016	.008	.005	.011	.020	.063	.008	.004	0	0	0	0	0	0	0	0	0	.38	0.738
	{ Wind movement.....	.29	.132	.178	.122	.12	.18	.5	.24	.33	.22	.4	.16	.13	.28	.11	.24	.40	.34	.36	.49	.58	.93	.87	.81	.45	.177	.26	.17	.17	.51	.40	1.500
Oakdale (near)*.....	{ Evaporation.....	.20	.260	.070	.040	.075	.038	.040	.037	.010	.053	.074	.052	.249	.026	.047	.006	.044	.022	.042	.093	.173	.094	.073	.147	.....	.027	.013	.037	.013	.....	.....	.....
	{ Wind movement.....	.20	.40	.350	.50	.40	.20	.50	.40	.65	.55	.60	.50	.60	.30	.70	.50	.70	.100	.120	.250	.210	.310	.150	.390	.330	.250	.270	.120	.80	.70	.50	3.820
Tahoe**.....	{ Evaporation.....	.090	.....	.....	.120	.135	.145	.110	.073	.060	.095	.060	.050	.030	.055	.045	.060	.070	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	{ Wind movement.....	.31	.31	.16	.67	.22	.51	.44	.15	.15	.9	.15	.16	.12	.15	.6	.10	.17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

\* Observations taken at 7 a. m.; \*\* at 8 a. m. † Included in the next following entry.

Climatological Data for December, 1921.

Table with columns: Stations, Counties, Elevation, Length of record, Temperature (Mean, Departure from normal, Highest, Date, Lowest, Date, Greatest daily range), Precipitation (Total, Departure from normal, Greatest in 24 hours, Snowfall, Precipitation on inch or more, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, and Observers. The table lists data for numerous stations across California, including Antioch, Atascadero, Bakersfield, Barstow, Berkeley, Blue Canon, Bonita, Branscomb, Brawley, Calexico, Chico, Chula Vista, Claremont, Cloverdale, Colfax, Colusa, Corona, Crescent City, Davis, Dodgeland, El Cajon, Elsinore, Escondido-1, EUREKA, Folsom, Fontana, Fordyce Dam, Fort Bidwell, FRESNO, Grass Valley, Greenland Ranch, Hanford, Healdsburg, Hollister, INDEPENDENCE, Indio, Kennett, La Porte, Lemon Cove, Lick Observatory, Lindsay, Long Beach, LOS ANGELES, McCloud, Marysville, Mecca, Merced, Mount Tamalpais, Mount Wilson, Napa, Needles, Nevada City, Newman, Oakdale (near), Oakland, Ojai, Orland, Oroville (near), Pasadena, Paso Robles-1, Petaluma, PLACER, POINT RYDES, Pomona, Porterville, RED BLUFF, Redding, Redlands, Riverside, Rocklin, SACRAMENTO, Salinas, San Bernardino, SAN DIEGO, SAN FRANCISCO, San Jacinto, SAN JOSE, SAN LUIS OBISPO, San Pedro, Santa Ana, Santa Barbara, Santa Cruz, Santa Rosa, Serterre, Sisson, Spreckels, Springville (near), Sutter Inn, Stockton, Summit, Tahoe, Ukiah, Vacaville, Visalia, Watsonville, Weaverville, Willows, Yosemite, Yreka.

Daily Precipitation for December, 1921.

Table with columns for Stations, Drainage-basin, Day of Month (1-31), and Total. Rows list various California locations such as Antioch, Atascadero, Bakersfield, etc., with their corresponding precipitation data for each day of the month.

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. ||| Precipitation measured in the morning; amount then recorded is for the preceding 24 hours. \* Precipitation included in the next following measurement. Separate dates of fall not recorded. T., trace, or less than 0.01 inch.

Daily Temperature for December, 1921.

Table with columns for Stations, days 1-31, and Mean. Rows list various California cities like Bakersfield, Calexico, Chico, etc., with their daily maximum and minimum temperatures.

SUPPLEMENTAL PRECIPITATION TABLE.

Table with columns for Stations, Drainage-basin, and Precip. inches. Rows list various locations and their corresponding precipitation amounts for December 1921.

\*Data obtained from 3-inch rain gage.

**SNOWFALL IN THE MOUNTAINS.**

During the autumn months of 1921 the snowfall in the mountains of California was light. From 12 to 18 inches of snow fell in October in the highest portions of the Sierra Nevada Mountains, but was soon melted. The snowfall during November was also light, and was limited to the Sierra Nevada, the highest portions of which were covered at the close of the month.

There was little precipitation anywhere in California during the first half of December, but heavy rain and snow fell after the 16th of the month. More than 100 inches of snow fell at the 7,000-foot level in the Sierra Nevada, and greater amounts fell at higher elevations. At Glacier Point, in the Yosemite National Park, altitude 7,000 feet, the snowfall during one week, December 18 - 24, inclusive, measured 108 inches. Though little moisture was lost through evaporation, rising temperatures and warm rains caused the snow to melt. While the snow on the ground in the high Sierra Nevada at the end of December was not deep, it was well packed, and its water content was high.

In the Siskiyou Mountains and in the Coast Range snowfall was moderately heavy during the latter half of December. However, warm rains during the last week caused rapid melting, and little snow remained at the close of the month.

In southern California precipitation was extremely heavy during the latter half of the month. Only a small portion of the precipitation was in the form of snow, however, and the snowfall was limited to the higher elevations. Except on the highest peaks, there was little snow on the ground in the mountains of southern California at the close of December.

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**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	43	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	0	16	8
1918.....	17	23	23	20	17	17	27	27	32
1919.....	18	50	35	34	52	37	36	48	29
1920.....	13	55	54	18	66	67	29	53	85
1921.....	0	0	47	0	0	56	7	0	75

T. means trace.

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

DRAINAGE-BASIN, COUNTY, STATION.	Elevation, feet.	Total snow-fall.	Compr'd with normal.	Am't on ground 15th.	Am't on ground end mo.
<b>Klamath Drainage-Basin.</b>					
<i>Siskiyou County.</i>					
Yreka.....	2,625	4	.....	0	0
<i>Trinity County.</i>					
Hayfork.....	2,300	20	.....	0	2
Ruth.....	2,925	30	.....	10	3
Weaverville.....	2,162	11	.....	0	0
<b>Mountain Lakes.</b>					
<i>Alpine County.</i>					
Markleeville.....	5,525	36	.....	0	8
Tamarack.....	8,000	98	.....	0	75
Twin Lakes.....	7,970	.....	.....	.....	.....
<i>Inyo County.</i>					
Bishop Creek.....	8,390	10	-18	0	4
Independence.....	3,907	0	.....	0	0
<i>Lassen County.</i>					
Madeline.....	5,270	12	+1	0	3
Litchfield.....	4,000	12	.....	0	2
Westwood.....	4,500	59	.....	0	16
<i>Modoc County.</i>					
Cedarville.....	4,675	14	+3	0	2
Fort Bidwell.....	4,375	22	.....	0	8
<i>Nevada County.</i>					
Grass Valley.....	2,690	13	.....	0	0
Nevada City.....	2,850	10	+7	0	0
North Bloomfield.....	3,214	18	+11	0	0
<i>Placer County.</i>					
Tahoe.....	6,230	74	+51	0	34
<i>Mono County.</i>					
Shields Ranch.....	3,500	42	.....	0	15
<b>Sacramento Drainage-Basin.</b>					
<i>Butte County.</i>					
De Saba.....	2,500	24	+14	0	T.
Inskip.....	4,975	97	+56	0	38
West Branch.....	3,216	38	+17	0	11
<i>Nevada County.</i>					
Deer Creek.....	3,700	50	+27	0	14
Fordyce Dam.....	6,500	106	+53	0	47
Lake Spaulding.....	4,600	94	+40	0	29
<i>Placer County.</i>					
Blue Canon.....	4,695	79	+50	0	26
Emigrant Gap.....	5,230	80	+41	0	32
Summit.....	7,017	100	+28	0	56
<i>Plumas County.</i>					
Canon Dam.....	4,570	48	.....	0	26
Chester.....	4,550	70	+41	0	26
La Porte.....	5,000	66	+29	0	38
Portola.....	4,832	58	.....	0	16
Quincy.....	3,400	34	+24	0	10
<i>Sierra County.</i>					
Downieville.....	3,150	28	+11	0	6
Sierraville.....	5,000	27	+9	0	0
<i>Siskiyou County.</i>					
McCloud.....	3,270	55	+26	0	11
Sisson.....	3,555	51	+27	0	9
<i>Yuba County.</i>					
Camptonville.....	3,500	36	+23	0	2
<b>San Joaquin Drainage-Basin.</b>					
<i>Calaveras County.</i>					
Calaveras Ranger Station.....	3,400	.....	.....	.....	.....
<i>Fresno County.</i>					
Camp Severn.....	6,980	95	.....	0	44
Cascada.....	4,900	34	.....	0	0
Dinkey Meadow.....	5,600	80	.....	0	48
Hume.....	5,300	.....	.....	.....	.....
Huntington Lake.....	6,950	90	.....	0	51
Hobblers Camp.....	8,200	114	.....	0	85
Kings River, North Fork.....	6,100	101	.....	0	44
<i>Kern County.</i>					
Glennville.....	3,300	T.	-7	0	0
<i>Mariposa County.</i>					
Dudley.....	3,000	13	.....	0	0
Glacier Point.....	7,000	118	.....	0	84
Yosemite.....	3,945	69	+52	0	18
<i>Tulare County.</i>					
Giant Forest.....	6,400	66	.....	0	20
Hot Springs.....	3,300	0	-2	0	0
Springville.....	4,000	10	-2	0	0
<i>Tuolumne County.</i>					
Hetch Hetchy.....	3,665	36	+29	0	4
Lake Eleanor.....	4,700	72	+48	0	12
<b>Mountains of Southern California.</b>					
Cuyamaca.....	4,677	0	-2	0	0
Julian.....	4,222	0	.....	0	0
Mount Wilson.....	5,704	4	.....	0	0
Nellie.....	5,350	3	.....	0	0
Seven Oaks.....	5,000	10	-2	0	0
Squirrel Inn.....	5,280	0	-11	0	0