

A man in a white lab coat and safety glasses is working in a laboratory. He is leaning over a table, handling a piece of equipment. The background shows various laboratory instruments and equipment. The image has a halftone texture.

Atmometer Evaporation

Maximum and minimum air temperatures were recorded in degrees Fahrenheit at each agroclimate station. For the stations located near Bakersfield, air temperature was continuously recorded. From January 1960 through December 1967, temperatures at Arvin-Frick and Old River 3-5 stations were measured at a height of 2 meters above ground using a California Spot Climate Recorder, developed by Professor F. A. Brooks and his colleagues at UC Davis.

The main components of that instrument include a battery-powered anemometer and three temperature sensors. Wind speed and temperature measurements are recorded on an approximately 12-inch-diameter circular chart driven by an 8-day, spring-wound clock. The chart temperature range is 120° F (0° to 120° F) over a span of 5 inches on the chart. Recorded temperatures were discernible to the nearest whole degree. The 6-volt wet cell automotive battery which powered the wind speed pen was exchanged for a newly charged one each month.

Calibration of the temperature recording system was checked in the field about every six months by immersing the sensors in water baths of various temperatures. About four different temperatures between near freezing and about 115° F were used. Temperatures of the water

baths were determined with a standard mercury-in-glass laboratory thermometer.

After 1967, temperatures were recorded with hygrothermographs housed in USWB cotton region shelters. Shelters were installed so that their floors were 48 inches above ground. These shelters were also equipped with standard USWB-type maximum and minimum



California Spot
Climate Recorder,
developed at
University of
California, Davis
records wind
movement and
air temperatures.
This instrument
was installed
at the master
agroclimate stations.

thermometers. Using a standard Townsend mounting bracket, the thermometers were positioned about 5.5 feet above ground. Temperatures were read to the nearest degree. No difference could be discerned between temperatures measured at 2 meters (78 inches) and those measured at 1.7 meters (66 inches) above ground surface.

Daily maximum and minimum temperatures from the hygrothermograph charts were adjusted to agree with those from maximum/minimum thermometers mounted in the same shelters. This was done at the end of each year by determining the linear relationship between chart and thermometer extreme temperatures for approximately weekly periods. Separate relationships were determined for maximum and minimum temperatures. The temperatures observed with the thermometers

were the standards to which those read from the instrument charts were compared.

Average daily maximum temperatures for monthly periods for the stations near Bakersfield are shown in Table 28. These same data, summarized into weekly periods, are listed in Table 29. Minimum temperatures for monthly periods are shown in Table 30 and for weekly periods are shown in Table 31. These data show variations in air temperature from year to year for the same locations. Figure 23 shows the week-to-week variation of mean air temperature for a "normal" year. The weekly temperature data used to develop that curve are means of the 1960 to 1991 average maximums listed in Table 29 and the average minimums shown in Table 31.

Only weekly maximum and minimum temperatures were measured at the outlying agroclimate stations.

Sixe's U-tube maximum/minimum thermometers were used. For these thermometers, the temperature scales are separate from the mercury-filled glass tube. The scales were carefully adjusted before installation and frequently checked with a standard thermometer to assure accuracy of the observed temperatures.

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Hygrothermograph used for measuring air temperature at various outlying agroclimate stations. Temperatures are traced on 8-day chart.

TABLE 28

Average Monthly Maximum Air Temperature at Agroclimate Stations
Near Bakersfield 1959-1991¹
(degrees Fahrenheit)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mar-Oct Average	Jan-Dec Average
1959	58.4	60.3	71.0	79.1	77.5	91.4	98.0	93.5	85.4	81.0	71.1	59.2	84.6	77.2
1960	55.6	58.6	68.7	71.4	78.4	93.6	95.6	93.3	88.7	76.1	51.4	50.9	83.2	73.5
1961	49.4	59.2	64.2	76.8	76.2	94.9	99.0	96.1	87.5	75.9	65.1	49.7	83.8	74.5
1962	50.6	55.0	61.4	74.3	72.5	86.8	92.3	90.3	85.7	73.6	62.9	56.1	79.6	71.8
1963	54.5	69.8	65.5	65.7	79.8	84.5	92.5	92.5	88.4	75.1	60.7	41.6	80.5	72.6
1964	52.0	61.0	64.2	70.2	77.5	86.5	94.2	92.5	85.8	82.5	58.4	55.9	81.7	73.4
1965	52.9	58.9	65.5	69.2	78.6	82.7	93.7	93.9	83.0		61.7	46.1		
1966	55.7	58.5	69.8	80.2	85.2	91.4	94.6	96.8	87.5	80.7	68.1	50.6	85.8	76.6
1967	56.9	55.1	70.3	62.9	83.0	89.0	101.1	104.0	92.6	89.5	70.9	54.5	86.6	77.5
1969					82.4	83.7	93.2	95.2	89.8	75.0	68.4	60.4		
1970	60.9	63.8	67.5	69.7	85.3	89.0								
1975		61.9	64.0	67.1	82.4	90.1	94.6	93.3	93.0	77.3	67.7	57.1	82.7	
1976	59.1	62.3	65.8	69.2	84.4	89.3	95.6	87.8	85.0	80.2	65.5	60.9	82.2	75.4
1977	48.5	66.1	65.1	79.4	74.7	91.8	93.8	92.7	87.9	81.9	67.8	60.6	83.4	75.9
1978	56.8	59.1	68.5	70.3	83.0	90.1	94.9	90.8	83.4	83.7	64.2	50.7	83.1	74.6
1979	55.2	60.6	66.4	73.8	84.9	91.2	95.2	91.8	91.8	79.2	67.2	61.9	84.3	76.6
1980	56.1	63.4	64.5	74.6	78.6	86.9	95.1	92.5	88.2	84.4	71.5	57.9	83.1	76.1
1981	59.3	62.8	64.7	74.2	80.3	92.6	94.2	93.4	89.2	73.8	68.0	57.5	82.8	75.8
1982	53.3	63.6	63.0	70.6	81.0	83.2	91.6	91.8	83.5	77.3	58.5	55.1	80.3	72.7
1983	50.7	62.6	64.8	68.1	80.3	86.7	89.1	92.1	88.9	79.1	63.8	58.0	81.1	73.7
1984	57.2	64.2	70.0	71.2	84.6	86.8	94.9	92.3	91.1	73.1	65.0	54.7	83.0	75.4
1985	50.8	63.5	63.5	77.8	78.5	90.7	94.9	91.3	80.5	76.3	61.5	49.1	81.7	73.2
1986	62.2	65.9	70.8	74.2	82.6	90.7	92.0	95.6	83.9	78.8	69.4	56.2	83.6	76.9
1987	54.7	63.2	67.8	81.2	84.2	91.0	89.2	93.4	89.8	82.7	61.6	56.0	84.9	76.2
1988	57.7	68.0	72.2	75.0	81.0	87.2	97.4	93.4	89.4	82.8	66.0	56.6	84.8	77.2
1989	56.4	60.7	71.2	80.4	81.0	88.8	94.4	91.8	86.7	79.0	70.2	56.4	84.2	76.4
1990	58.5	60.1	69.7	77.8	80.6	88.6	95.4	92.8	88.4	83.6	68.0	57.3	84.6	76.7
1991	57.6	70.3	63.2	71.2	77.7	87.4	96.0	91.0	94.2	86.0	70.4	58.1	83.3	76.9
Average	55.4	62.2	66.8	73.2	80.6	88.8	94.5	93.2	87.8	79.6	65.4	55.2	83.0	75.2
Std. Dev.	3.5	3.7	3.0	4.7	3.2	3.0	2.5	2.8	3.3	4.1	4.6	4.7	1.7	1.7
Std. Error	0.7	0.7	0.6	0.9	0.6	0.6	0.5	0.5	0.6	0.8	0.9	0.9	0.3	0.4

¹ Average daily temperature for monthly periods. Air temperature measured with Foxboro spot climate recorder 1/59-12/67; with hygrothermograph in standard U.S. Weather Bureau cotton region shelter after 12/67. Stations: Arvin-Frick 1/59-10/65; Old River 3-S 11/65-12/67; Bakersfield 10-S 5/69-6/70; Wasco 8-SW 1/75-12/80; Bakersfield 10-NW 1/81-12/85; Bakersfield 10-NW and 12-S (average) 1/86-12/90; Bakersfield 12-S and Lamont 2-NW (average) 1/91-12/91.

TABLE 29

**Average Weekly Maximum Air Temperature at Agroclimate Stations
Near Bakersfield 1960-1991¹**
(degrees Fahrenheit)

Week No.	Ending Date	Day of Year	1960	1961	1962	1963	1964	1965	1966	1967
1	Jan 4	4	49.6	35.0	44.3	47.3	45.3	51.4	56.3	48.8
2	11	11	57.4	51.0	52.4	55.3	51.4	56.1	56.7	54.9
3	18	18	47.6	38.1	50.5	51.1	52.3	48.9	52.0	56.6
4	25	25	60.8	56.7	46.3	59.9	55.1	56.6	54.4	58.9
5	Feb 1	32	62.3	62.6	56.8	58.1	50.7	47.4	62.4	61.6
6	8	39	65.7	62.9	52.7	77.0	60.3	51.1	54.9	51.0
7	15	46	61.6	66.1	61.9	67.0	59.0	54.9	54.1	56.3
8	22	53	57.7	60.6	56.0	64.0	64.3	67.9	65.6	61.6
9	Mar 1	60	56.9	66.7	50.7	71.7	61.5	65.4	59.0	
10	8	67	67.4	62.3	60.3	64.3	54.0	69.9	63.9	65.7
11	15	74	63.3	64.6	52.3	64.7	61.4	57.0	70.4	68.0
12	22	81	77.6	64.9	62.0	65.6	69.0	67.9	66.4	71.1
13	29	88	67.0	61.4	62.0	67.0	66.0	64.5	76.0	66.3
14	Apr 5	95	72.3	81.4	67.1	64.1	68.1	61.0	86.3	62.4
15	12	102	70.8	77.6	77.0	66.4	71.6	55.3	74.3	59.6
16	19	109	67.6	77.1	80.3	64.3	78.3	71.0	78.4	60.6
17	26	116	64.5	67.4	74.0	64.1	66.3	78.6	81.1	64.9
18	May 3	123	64.3	79.1	72.0	74.6	69.9	81.1	88.3	70.9
19	10	130	75.9	75.3	79.6	78.0	68.4	72.0	78.1	76.2
20	17	137	75.1	76.3	63.9	79.0	85.0	83.7	84.0	82.3
21	24	144	70.2	78.1	71.9	84.7	82.6	75.6	90.3	97.7
22	31	151	81.5	75.6	72.3	78.3	79.9	87.6	84.3	80.0
23	Jun 7	158	91.0	82.1	81.6	80.9	82.9	80.9	81.1	77.6
24	14	165	89.6	89.7	83.6	79.9	80.0	78.3	92.0	82.4
25	21	172	88.1	104.7	89.3	94.6	83.0	84.6	96.9	94.0
26	28	179	95.3	103.3	92.0	83.4	99.0	84.0	93.1	97.3
27	Jul 5	186	92.2	93.0	91.0	84.4	87.4	95.4	94.0	103.7
28	12	193	93.6	100.6	91.7	92.0	94.9	95.9	91.9	100.4
29	19	200	97.4	101.1	90.4	95.0	95.6	96.9	92.7	100.7
30	26	207	99.5	99.6	95.1	96.0	96.9	90.9	100.1	100.6
31	Aug 2	214	91.7	97.0	92.7	91.3	93.7	90.9	96.0	100.7
32	9	221	95.3	100.6	84.3	93.7	96.6	96.7	101.9	99.0
33	16	228	95.9	94.4	94.1	98.6	91.3	93.6	100.0	104.7
34	23	235	95.3	97.9	91.9	91.0	95.0	90.6	98.4	107.9
35	30	242	88.4	92.4	90.7	88.9	90.9	94.1	89.1	105.3
36	Sep 6	249	86.4	91.3	90.4	87.4	82.1	86.4	92.4	97.7
37	13	256	92.5	90.9	86.1	92.7	87.0	83.4	84.4	92.0
38	20	263	88.5	82.7	84.7	78.4	86.0	81.7	85.0	
39	27	270	88.4	85.3	85.3	91.3	89.9	83.3	86.6	91.1
40	Oct 4	277	82.2	90.0	77.3	92.3	86.0	84.2	84.4	89.4
41	11	284	71.4	78.6	74.6	77.7	87.9		84.7	92.9
42	18	291	76.7	90.9	69.7	71.7	81.0		76.3	97.3
43	25	298	79.8	71.0	73.6	71.0	82.3		80.7	88.3
44	Nov 1	305	73.3	63.3	72.1	71.4	70.1		82.3	79.1
45	8	312	59.5	74.0	72.0	65.6	65.9	69.7	73.3	79.6
46	15	319	61.2	69.6	63.6	68.4	54.4	64.1	69.4	72.7
47	22	326	60.3	58.1	57.7	57.6	54.4	61.6	69.9	68.0
48	29	333	58.7	59.1	57.7	51.6	58.1	54.6	58.1	63.7
49	Dec 6	340	56.4	58.0	58.7	41.0	55.7	39.4	61.7	58.1
50	13	347	52.4	47.9	62.0	45.7	53.0	45.3	52.6	50.2
51	20	354	56.0	54.7	64.1	37.0	54.3	41.9	44.4	45.6
52	27	361	41.3	45.7	44.6	43.3	65.7	48.3	44.1	
Mar-Oct Average			82.0	84.0	79.3	80.5	81.7	80.9 ²	85.9	89.5 ²
Jan-Dec Average			73.8	75.2	71.7	72.7	73.5	72.2 ²	76.8	77.3 ²

TABLE 29 (continued)

Average Weekly Maximum Air Temperature at Agroclimate Stations
Near Bakersfield 1960-1991¹
(degrees Fahrenheit)

Week No.	Ending Date	Day of Year	1969	1970	1975	1976	1977	1978	1979	1980
1	Jan 4	4		54.3		55.0	56.9	58.4	49.0	54.9
2	11	11		58.3		53.9	46.9	62.9	61.0	59.0
3	18	18		62.4		56.6	40.3	62.4	54.6	62.7
4	25	25		66.3		64.3	53.4	55.7	53.1	49.6
5	Feb 1	32		57.9		67.1	48.0	47.0	52.7	52.7
6	8	39		62.4	60.6	56.0	61.0	61.7	58.7	56.4
7	15	46		62.4	59.7	61.9	68.0	54.3	63.1	65.0
8	22	53		61.3	57.1	62.6	74.7	62.3	59.0	65.0
9	Mar 1	60		70.7	70.6	66.0	62.3	60.7	61.6	68.8
10	8	67		59.9	66.6	57.7	68.0	67.1	67.7	62.9
11	15	74		66.1	59.9	66.0	63.6	62.6	70.4	62.7
12	22	81		70.9	62.6	71.0	66.4	72.6	62.4	65.1
13	29	88		74.3	62.7	65.9	64.0	72.9	67.7	66.4
14	Apr 5	95		74.3	56.4	67.3	71.7	66.7	61.6	68.4
15	12	102		73.3	63.7	66.7	79.3	71.6	69.4	75.4
16	19	109		64.4	64.9	65.0	81.7	69.7	72.7	83.3
17	26	116		68.3	69.0	75.6	81.6	69.6	77.0	70.9
18	May 3	123		74.3	76.1	78.7	75.9	76.3	78.1	75.1
19	10	130	79.4	76.3	75.1	81.1	66.3	80.1	74.9	77.0
20	17	137	84.6	86.3	83.4	91.0	70.0	84.0	90.4	77.4
21	24	144	84.6	88.0	81.3	82.0	78.1	84.0	87.9	82.7
22	31	151	86.0	90.1	91.3	84.6	85.0	86.1	89.4	77.3
23	Jun 7	158	85.1	96.9	92.6	82.6	95.0	92.6	93.9	80.9
24	14	165	78.4	77.3	96.3	81.3	82.7	94.4	94.3	85.6
25	21	172	85.7	89.9	86.0	95.1	89.4	89.6	84.7	91.7
26	28	179	84.0	93.6	85.7	97.9	99.1	85.3	92.6	87.6
27	Jul 5	186	90.0		87.4	91.1	91.3	85.7	87.3	90.6
28	12	193	90.0		96.1	96.1	93.0	95.0	89.6	89.0
29	19	200	94.3		91.6	94.9	95.9	96.7	101.4	95.7
30	26	207	96.3		100.9	97.9	93.4	98.4	97.6	101.1
31	Aug 2	214	95.0		96.1	93.3	96.7	97.9	100.4	100.4
32	9	221	96.4		99.1	85.4	93.0		98.9	96.7
33	16	228	95.6		95.4	86.7	94.3	92.8	89.9	94.7
34	23	235	95.7		88.6	83.0	92.3	88.7	88.9	87.1
35	30	242	92.3		89.3	94.3	90.3	87.9	87.6	89.3
36	Sep 6	249	95.9		93.9	98.9	93.9	84.4	89.6	92.4
37	13	256	93.7		89.9	84.1	94.0	78.0	95.7	87.0
38	20	263	82.4		91.3	82.7	80.4	79.3	95.6	82.9
39	27	270	88.0		96.3	86.1	86.0	88.9	88.6	90.3
40	Oct 4	277	82.9		90.4	76.3	85.0	92.6	86.9	95.0
41	11	284	77.7		79.0	86.7	86.4	86.9	83.6	94.9
42	18	291	72.9		76.7	85.4	87.3	86.0	80.1	73.9
43	25	298	73.4		74.6	76.1	78.6	80.3	76.6	82.0
44	Nov 1	305	75.0		69.4	74.1	71.6	74.1	70.1	79.0
45	8	312	71.3		72.7	81.3	68.7	74.4	70.4	81.1
46	15	319	69.7		69.9	67.3	69.6	60.0	70.1	68.3
47	22	326	65.6		64.9	59.4	65.6	63.4	64.3	68.7
48	29	333	64.7		61.6	52.9	67.0	58.9	63.9	67.3
49	Dec 6	340	62.3		62.7	64.0	61.7	56.9	68.0	61.3
50	13	347	61.7		50.3	62.3	55.7	55.4	53.7	56.1
51	20	354	63.4		55.9	61.1	62.7	53.1	72.4	64.4
52	27	361	60.7		58.0	57.9	61.6	43.1	57.9	58.7
Mar-Oct Average					82.3	82.4	83.5	83.3 ²	84.1	83.2
Jan-Dec Average					75.0 ²	75.6	75.9	75.1 ²	76.5	76.4

TABLE 29 (continued)

Average Weekly Maximum Air Temperature at Agroclimate Stations
Near Bakersfield 1960-1991¹
(degrees Fahrenheit)

Week No.	Ending Date	Day of Year	1981	1982	1983	1984	1985	1986	1987	1988
1	Jan 4	4	51.7	56.5	43.5	56.0	51.3	60.2	56.3	51.6
2	11	11	48.9	55.9	41.9	49.0	51.9	57.2	50.0	53.5
3	18	18	67.8	46.9	49.3	55.3	50.9	63.1	46.9	56.3
4	25	25	67.4	54.0	57.9	58.7	48.7	64.0	60.1	60.7
5	Feb 1	32	58.8	57.3	61.9	67.4	50.7	64.9	60.3	63.3
6	8	39	59.3	59.7	58.9	67.4	54.3	58.7	67.4	64.7
7	15	46	60.9	62.4	64.3	62.6	63.1	64.4	65.2	70.7
8	22	53	67.3	68.0	65.6	61.7	65.7	67.4	60.9	68.4
9	Mar 1	60	66.3	64.3	62.3	66.0	64.1	73.1	59.9	72.4
10	8	67	63.0	64.4	65.6	70.9	57.9	74.2	71.7	68.3
11	15	74	63.8	63.3	67.4	70.4	67.0	61.3	66.6	68.2
12	22	81	67.0	59.0	62.6	69.0	63.9	70.8	60.2	77.6
13	29	88	67.6	64.7	61.6	71.9	62.4	78.5	69.1	75.8
14	Apr 5	95	67.9	62.6	67.6	66.3	78.9	70.1	74.4	77.5
15	12	102	70.6	63.7	65.1	68.0	80.4	72.0	77.7	84.8
16	19	109	74.9	69.3	72.4	76.7	76.4	70.5	82.7	69.4
17	26	116	76.1	80.0	68.1	71.7	69.6	79.0	87.0	69.3
18	May 3	123	81.7	80.0	69.4	73.3	82.1	79.5	81.9	73.0
19	10	130	83.6	78.0	68.7	81.4	74.3	73.4	94.2	73.5
20	17	137	81.0	79.6	77.6	79.9	78.7	83.3	91.2	83.5
21	24	144	81.1	85.4	90.4	86.4	83.6	83.0	77.0	90.4
22	31	151	87.4	81.3	89.1	93.9	76.4	92.2	78.0	80.2
23	Jun 7	158	93.7	76.1	84.6	81.1	81.7	85.5	91.3	79.7
24	14	165	85.6	83.6	87.4	82.1	95.1	93.4	86.4	86.4
25	21	172	97.3	89.4	88.6	89.0	94.7	87.4	85.8	90.0
26	28	179	99.5	85.7	87.0	94.3	91.4	96.5	94.9	91.6
27	Jul 5	186	94.1	80.6	86.9	96.4	93.6	92.8	88.5	93.1
28	12	193	91.3	90.4	88.1	98.1	95.4	91.9	92.4	94.4
29	19	200	93.9	92.9	89.1	98.7	97.1	91.7	90.2	96.4
30	26	207	97.3	94.9	88.6	86.1	95.3	90.9	85.2	100.2
31	Aug 2	214	93.1	95.0	93.9	92.7	89.3	94.2	93.2	98.6
32	9	221	95.6	92.9	94.9	93.3	93.6	98.8	98.7	90.5
33	16	228	94.6	88.7	95.1	92.3	90.1	97.8	89.5	88.8
34	23	235	90.6	94.7	87.0	93.6	88.9	94.8	87.8	94.3
35	30	242	94.1	91.3	89.4	91.7	93.6	93.6	95.3	98.1
36	Sep 6	249	93.3	92.0	92.6	92.7	82.6	95.7	93.3	99.8
37	13	256	94.7	88.7	93.3	93.4	75.9	86.8	86.7	91.1
38	20	263	92.3	79.7	95.0	94.6	79.1	75.7	88.6	85.8
39	27	270	83.0	79.0	83.1	84.0	87.0	72.7	90.5	81.8
40	Oct 4	277	75.4	75.7	73.9	82.1	83.0	77.3	95.4	89.8
41	11	284	74.6	78.0	80.4	80.0	88.4	84.7	89.0	83.2
42	18	291	70.6	82.0	76.1	68.3	77.9	77.2	83.2	82.7
43	25	298	80.4	79.7	80.3	71.4	71.0	77.9	77.0	86.4
44	Nov 1	305	68.7	67.1	79.6	69.6	71.4	75.1	71.8	75.0
45	8	312	72.4	67.4	68.1	72.4	74.7	73.4	64.2	73.2
46	15	319	72.9	54.7	67.9	69.4	56.4	73.1	63.4	67.7
47	22	326	67.9	59.1	62.0	58.9	55.6	64.4	64.9	63.4
48	29	333	59.6	60.0	57.7	59.4	58.6	67.3	54.2	58.7
49	Dec 6	340	50.9	55.9	57.7	59.7	61.7	62.8	66.4	60.9
50	13	347	56.1	56.4	60.1	52.4	50.7	52.9	57.7	64.7
51	20	354	66.0	60.0	56.6	52.3	44.0	58.5	54.3	55.0
52	27	361	55.7	53.3	58.4	49.1	39.7	54.2	49.4	51.1
Mar-Oct Average			82.4	80.3	81.2	83.0	81.9	83.4	84.7	84.8
Jan-Dec Average			75.6	73.1	73.7	75.4	73.3	76.9	76.3	77.4

TABLE 29 (continued)

Average Weekly Maximum Air Temperature at Agroclimate Stations
Near Bakersfield 1960-1991¹
(degrees Fahrenheit)

Week No.	Ending Date	Day of Year	1989	1990	1991	Average	Std. Dev.	Std. Error
1	Jan 4	4	47.9	56.1	52.4	51.6	5.6	1.1
2	11	11	52.2	64.2	54.2	54.2	4.9	1.0
3	18	18	54.0	60.5	54.9	53.7	7.0	1.4
4	25	25	61.2	52.9	64.0	57.6	5.3	1.1
5	Feb 1	32	65.0	57.9	65.7	58.4	6.1	1.2
6	8	39	49.5	56.4	69.2	59.9	6.2	1.2
7	15	46	56.3	57.9	69.3	62.0	4.4	0.9
8	22	53	68.7	57.7	70.2	63.9	4.5	0.9
9	Mar 1	60	68.7	64.9	71.9	65.1	5.3	1.1
10	8	67	68.4	64.6	65.0	65.1	4.5	0.9
11	15	74	72.8	61.3	60.6	64.4	4.4	0.9
12	22	81	73.4	77.7	59.7	67.6	5.3	1.0
13	29	88	69.7	74.4	62.8	67.8	4.9	1.0
14	Apr 5	95	75.3	77.4	73.3	70.0	6.8	1.3
15	12	102	89.2	76.1	68.5	71.8	7.4	1.4
16	19	109	84.3	79.2	72.0	73.3	6.5	1.3
17	26	116	72.6	76.2	69.0	72.7	5.9	1.2
18	May 3	123	80.4	81.9	74.1	76.6	5.0	1.0
19	10	130	84.7	86.3	77.9	77.4	5.7	1.1
20	17	137	78.4	80.4	76.3	81.0	5.9	1.1
21	24	144	74.4	78.2	80.0	82.6	6.0	1.2
22	31	151	80.6	75.4	81.3	83.1	5.6	1.1
23	Jun 7	158	87.8	84.9	88.9	85.7	5.7	1.1
24	14	165	88.9	85.5	93.4	86.4	5.6	1.1
25	21	172	91.4	90.0	87.3	90.3	4.7	0.9
26	28	179	89.2	91.9	82.0	91.7	5.7	1.1
27	Jul 5	186	89.2	92.2	96.0	91.1	4.5	0.9
28	12	193	95.8	94.4	95.2	93.7	3.2	0.6
29	19	200	92.9	97.9	92.1	95.1	3.3	0.6
30	26	207	97.4	96.5	94.0	95.8	4.3	0.8
31	Aug 2	214	91.7	97.1	98.0	95.0	3.1	0.6
32	9	221	95.1	100.5	89.0	95.2	4.4	0.9
33	16	228	96.0	95.9	91.4	93.9	3.8	0.8
34	23	235	88.8	87.9	92.7	92.0	4.8	0.9
35	30	242	88.9	86.2	90.0	91.6	3.8	0.8
36	Sep 6	249	93.2	90.7	95.2	91.7	4.5	0.9
37	13	256	88.0	93.0	87.3	88.9	4.9	1.0
38	20	263	83.2	86.1	97.1	85.5	5.8	1.2
39	27	270	86.0	82.9	96.3	86.6	4.9	1.0
40	Oct 4	277	77.1	91.4	96.5	85.1	6.7	1.3
41	11	284	86.5	84.9	93.5	83.4	6.0	1.2
42	18	291	81.8	84.1	93.6	80.1	7.2	1.4
43	25	298	78.7	79.8	80.1	78.0	4.5	0.9
44	Nov 1	305	70.5	77.9	68.3	72.8	4.3	0.9
45	8	312	73.0	69.7	79.7	71.8	5.1	1.0
46	15	319	71.2	75.1	70.8	67.0	5.5	1.1
47	22	326	72.0	64.9	66.0	63.0	4.4	0.9
48	29	333	64.4	63.4	67.0	60.3	4.4	0.9
49	Dec 6	340	65.4	62.4	62.7	58.9	6.5	1.3
50	13	347	57.5	65.0	50.6	54.9	5.3	1.0
51	20	354	59.1	55.1	51.3	55.5	8.0	1.0
52	27	361	44.4	48.4	63.2	51.9	7.4	1.5
Mar-Oct Average			84.0	84.6	83.4	83.0	2.0	0.4
Jan-Dec Average			76.4	76.8	76.9	75.3	1.7	0.3

TABLE 30

**Average Monthly Minimum Air Temperature at Agroclimate Stations
Near Bakersfield 1959-1991¹**
(degrees fahrenheit)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mar-Oct Average	Jan-Dec Average
1959	36.5	35.2	40.5	45.9	46.2	54.3	59.5	56.3	50.5	44.7	33.7	31.3	49.7	44.6
1960	33.6	36.3	40.5	41.8	52.9	55.0	58.1	53.9	50.0	41.0	35.2	30.8	49.2	44.1
1961	28.1	35.6	38.2	44.8	48.7	60.9	62.6	63.2	49.9	42.7	31.8	33.1	51.4	45.0
1962	25.3	37.5	37.2	42.7	44.2	50.8	53.7	52.8	47.9	39.6	31.9	25.0	46.1	40.7
1963	22.8	46.8	37.7	41.7	53.0	55.0	56.7	56.5	57.0	48.3	38.2	29.5	50.7	45.3
1964	28.1	28.8	35.3	42.1	46.6	54.5	58.8	57.7	48.0	47.1	32.9	34.9	48.8	42.9
1965	33.2	31.4	40.4	44.2	45.9	52.0	59.0	60.3	48.8		41.3	31.9		
1966	31.6	35.2	40.8	46.5	52.6	58.7	59.8	61.9	55.5	45.1	40.6	35.0	52.6	46.9
1967	29.3	34.2	40.5	44.5	52.4	57.4	66.8	68.1	62.0	52.2	47.4		55.5	
1969					53.0	59.0	62.3	60.5	57.2	42.9	36.5	31.0		
1970	36.5	38.1	41.4	41.4	50.7	58.5								
1975		37.8	40.0	41.0	50.2	57.0	60.6	59.2	59.3	45.9	34.6	29.9	51.7	
1976	29.1	38.8	39.0	42.7	52.1	55.4	62.2	57.9	58.3	49.7	42.0	29.4	52.2	46.4
1977	35.6	37.3	36.4	45.6	48.0	59.7	59.8	61.6	55.8	48.9	37.2	39.8	52.0	47.1
1978	39.1	39.8	44.2	41.9	48.3	55.1	59.8	56.5	52.3	48.3	34.6	28.7	50.8	45.7
1979	33.9	34.3	42.5	43.3	52.2	55.8	60.8	59.1	57.3	49.6	35.5	31.9	52.6	46.4
1980	39.0	40.8	39.6	44.7	50.1	52.0	60.8	57.6	52.7	45.9	33.8	31.3	50.4	45.7
1981	37.9	40.9	42.3	46.4	51.4	59.4	61.3	61.2	58.4	44.3	41.1	37.8	53.1	48.5
1982	32.9	41.4	41.7	45.5	52.1	55.7	60.7	61.3	57.6	48.7	40.1	34.6	52.9	47.7
1983	35.1	41.6	44.4	44.4	52.2	56.6	58.4	64.2	60.8	53.5	43.2	40.2	54.3	49.6
1984	38.6	37.5	42.8	43.1	53.0	57.2	67.4	64.0	62.3	46.0	39.9	37.1	54.5	49.1
1985	34.6	37.1	39.2	47.7	49.1	59.3	65.0	59.4	55.8	48.2	39.6	34.2	53.0	47.4
1986	40.7	42.4	46.4	46.0	51.4	59.0	61.2	63.0	54.3	46.0	38.1	36.0	53.4	48.7
1987	33.0	37.4	41.6	48.2	54.3	58.2	57.8	59.8	55.8	53.8	40.4	33.3	53.7	47.8
1988	34.8	36.0	40.8	46.6	49.8	57.0	65.4	62.2	56.2	49.6	38.7	32.0	53.5	47.4
1989	29.7	36.9	43.2	50.0	51.2	56.6	60.5	58.7	54.8	46.5	34.8	26.0	52.7	45.7
1990	31.4	33.0	41.6	48.6	48.9	55.9	63.7	62.2	57.0	47.8	33.3	24.4	53.2	45.6
1991	32.9	37.6	38.8	42.6	47.6	55.1	64.4	60.8	60.0	51.4	38.0	33.2	52.6	46.9
Average	33.2	37.4	40.6	44.6	50.3	56.5	61.0	60.0	55.4	47.2	37.6	32.4	51.9	46.3
Std. Dev.	4.3	3.6	2.5	2.4	2.5	2.4	3.0	3.2	4.1	3.5	3.8	4.0	2.0	2.0
Std. Error	0.8	0.7	0.5	0.5	0.5	0.5	0.6	0.6	0.8	0.7	0.7	0.8	0.4	0.4

¹ Average of daily temperature for monthly periods. Air temperature measured with Foxboro spot climate recorder 1/59-12/67; with hygrothermograph in standard U.S. Weather Bureau cotton region shelter after 12/67. Stations: Arvin-Frick 1/59-10/65; Old River 3-S 11/65-12/67; Bakersfield 10-S 5/69-6/70; Wasco 8-SW 1/75-12/80; Bakersfield 10-NW 1/81-12/85; Bakersfield 10-NW and 12-S (average) 1/86-12/90; Bakersfield 12-S and Lamont 2-NW (average) 1/91-12/91.

TABLE 31

Average Weekly Minimum Air Temperature at Agroclimate Stations Near Bakersfield 1960-1991¹
(degrees fahrenheit)

Week No.	Ending Date	Day of Year	1960	1961	1962	1963	1964	1965	1966	1967
1	Jan 4	4	24.4	24.0	29.3	17.8	27.0	32.6	34.5	23.4
2	11	11	32.4	21.6	25.9	20.3	26.3	31.4	35.9	22.4
3	18	18	30.1	29.0	22.3	21.3	26.1	34.6	30.4	26.7
4	25	25	42.2	28.3	24.6	21.6	29.4	35.6	26.0	35.9
5	Feb 1	32	37.4	38.1	29.2	40.1	32.3	31.3	36.6	36.7
6	8	39	39.9	40.6	36.0	48.6	28.1	35.4	39.4	36.9
7	15	46	37.3	37.9	48.4	50.1	26.1	26.0	28.1	33.4
8	22	53	33.0	31.4	34.3	46.4	29.0	31.1	35.4	30.4
9	Mar 1	60	34.7	31.3	30.7	39.6	31.3	33.0	39.0	
10	8	67	37.5	33.0	38.9	34.9	30.7	38.4	33.6	34.9
11	15	74	38.7	38.2	34.3	37.6	34.1	41.3	43.6	41.7
12	22	81	42.3	40.6	41.1	35.7	38.0	40.6	39.9	46.1
13	29	88	46.2	41.0	35.7	40.9	38.3	41.4	44.1	41.0
14	Apr 5	95	46.1	47.9	40.0	39.6	38.6	41.3	50.3	36.3
15	12	102	46.0	47.9	43.6	44.3	40.3	39.0	48.3	41.0
16	19	109	39.9	45.7	45.7	43.9	46.0	42.6	46.0	40.3
17	26	116	41.5	36.1	40.7	38.6	39.4	49.3	42.4	49.0
18	May 3	123	44.8	46.1	41.4	46.0	42.1	46.7	48.0	55.0
19	10	130	47.4	47.3	49.1	51.1	42.4	37.4	51.4	51.2
20	17	137	49.0	48.3	42.4	47.4	49.9	48.7	51.1	47.9
21	24	144	44.7	51.1	39.1	55.3	49.7	50.6	55.0	61.9
22	31	151	50.8	48.3	46.9	59.7	49.0	49.9	53.6	53.1
23	Jun 7	158	61.0	54.3	46.3	53.7	54.7	49.6	50.6	49.9
24	14	165	56.5	57.0	49.1	54.1	51.9	53.9	59.3	53.1
25	21	172	57.4	66.4	54.3	62.1	53.3	49.4	64.7	61.9
26	28	179	53.5	67.6	53.0	52.4	59.0	53.9	56.4	61.4
27	Jul 5	186	54.5	60.0	52.0	50.1	51.7	57.3	57.3	71.0
28	12	193	56.2	63.1	53.6	58.1	57.6	57.4	56.9	64.7
29	19	200	56.3	65.6	53.7	58.4	59.4	63.7	58.7	67.1
30	26	207	62.1	61.6	55.6	57.7	60.3	56.0	63.3	62.3
31	Aug 2	214	57.3	59.4	53.3	58.3	62.1	62.3	66.9	69.3
32	9	221	54.3	68.9	53.0	58.3	61.6	60.4	64.3	63.1
33	16	228	58.5	62.0	56.1	59.9	56.1	65.6	64.1	69.0
34	23	235	54.9	65.9	52.0	53.4	59.0	58.3	62.4	68.7
35	30	242	49.6	58.1	50.6	52.3	55.0	55.9	55.6	71.3
36	Sep 6	249	48.6	54.7	49.1	58.0	47.7	53.4	57.1	68.0
37	13	256	55.9	49.0	49.0	58.0	47.7	48.7	53.9	57.6
38	20	263	50.4	49.4	47.0	55.7	49.3	48.7	51.9	
39	27	270	47.2	48.7	48.0	56.1	49.7	47.3	55.6	60.7
40	Oct 4	277	46.5	48.1	46.0	56.9	46.9	43.1	60.6	60.9
41	11	284	44.9	42.0	37.9	47.6	51.6		51.7	55.0
42	18	291	37.8	49.9	42.2	45.6	46.1		38.0	54.0
43	25	298	39.6	38.7	38.0	48.3	43.0		39.3	54.0
44	Nov 1	305	38.3	37.9	37.0	44.6	46.0		43.3	40.7
45	8	312	38.1	32.9	39.4	40.9	38.3	36.9	42.6	42.9
46	15	319	39.2	30.4	34.7	40.6	36.4	43.3	38.7	46.3
47	22	326	32.3	28.0	26.1	34.3	24.7	48.7	43.0	51.7
48	29	333	31.1	34.6	28.7	37.6	31.3	36.0	35.4	50.0
49	Dec 6	340	33.8	42.7	23.0	35.9	33.3	33.9	45.0	33.7
50	13	347	29.8	26.6	24.0	29.3	29.9	37.0	34.7	29.0
51	20	354	31.1	31.0	38.3	28.4	28.6	25.7	37.2	26.4
52	27	361	31.8	34.4	22.3	26.3	48.6	26.6	31.9	
Mar-Oct Average			49.0	51.4	46.2	50.7	48.8	49.7 ²	52.5	55.4
Jan-Dec Average			44.1	45.1	41.0	45.3	43.0	44.6 ²	47.2	48.8 ²

TABLE 31 (continued)

Average Weekly Minimum Air Temperature at Agroclimate Stations Near Bakersfield 1960-1991¹
(degrees fahrenheit)

Week No.	Ending Date	Day of Year	1969	1970	1975	1976	1977	1978	1979	1980
1	4	4		21.9		25.5	36.6	45.0	30.3	35.1
2	11	11		34.4		29.0	33.4	41.9	39.6	40.3
3	18	18		41.6		28.1	30.9	42.3	37.4	46.0
4	25	25		46.0		30.4	37.7	35.1	33.9	32.6
5	Feb 1	32		32.7		33.4	38.3	35.9	29.3	37.4
6	8	39		33.0	41.6	37.3	32.3	41.9	29.4	39.4
7	15	46		43.6	40.7	41.4	37.3	37.3	35.4	35.7
8	22	53		35.9	30.7	36.9	43.0	36.3	35.9	46.9
9	Mar 1	60		41.9	37.7	40.1	35.9	45.0	36.0	41.8
10	8	67		40.6	46.9	35.3	34.1	45.6	39.3	42.9
11	15	74		42.6	39.7	38.4	32.9	40.4	48.9	39.7
12	22	81		38.6	37.7	42.6	40.0	45.1	39.9	36.6
13	29	88		43.9	37.0	38.0	39.9	43.9	44.1	38.3
14	Apr 5	95		39.7	38.0	40.1	38.6	41.9	39.7	40.1
15	12	102		43.1	41.1	42.1	45.6	42.7	42.4	41.7
16	19	109		42.7	41.6	40.7	47.3	41.1	42.6	46.9
17	26	116		39.9	42.6	45.7	46.6	42.1	44.9	44.6
18	May 3	123		42.4	44.1	45.6	47.6	47.3	47.4	52.3
19	10	130	51.3	48.9	43.1	51.9	44.7	46.3	47.6	50.9
20	17	137	54.1	48.3	51.6	56.0	45.6	47.9	50.7	48.3
21	24	144	53.3	51.6	49.9	49.4	50.9	48.7	58.3	53.1
22	31	151	57.1	56.1	57.9	51.0	50.9	50.3	54.1	46.6
23	Jun 7	158	59.8	61.1	57.7	50.1	59.1	56.1	59.3	48.9
24	14	165	58.0	55.3	60.6	52.6	55.9	56.0	57.4	48.3
25	21	172	62.1	58.3	55.7	59.6	56.9	53.9	50.7	54.6
26	28	179	58.0	62.4	53.3	58.3	64.7	54.0	56.9	52.9
27	Jul 5	186	55.4		53.7	55.7	62.6	54.3	52.6	60.9
28	12	193	60.0		63.1	61.7	57.0	56.9	56.4	55.4
29	19	200	62.4		60.0	61.7	62.3	60.6	65.1	58.0
30	26	207	66.4		63.1	62.4	60.1	64.9	67.6	64.0
31	Aug 2	214	65.9		59.3	64.1	62.1	62.3	61.3	68.6
32	9	221	61.4		60.6	55.9	59.9		60.4	60.3
33	16	228	64.9		59.4	58.3	60.4	56.4	58.9	57.7
34	23	235	58.9		59.1	56.7	64.6	54.9	57.0	56.9
35	30	242	56.6		56.7	59.4	59.4	54.6	59.0	53.4
36	Sep 6	249	61.4		57.4	60.8	58.4	51.1	57.9	49.1
37	13	256	59.6		61.1	62.2	59.3	50.6	60.3	54.0
38	20	263	55.0		60.4	55.1	53.4	47.6	58.4	50.6
39	27	270	53.3		58.0	55.7	52.9	51.3	53.0	52.1
40	Oct 4	277	50.3		55.7	55.7	52.4	56.1	55.4	53.7
41	11	284	41.6		50.7	54.6	51.0	51.4	52.6	54.9
42	18	291	46.1		45.9	50.3	50.0	50.1	53.0	42.0
43	25	298	40.4		41.7	49.9	48.1	45.9	46.6	42.0
44	Nov 1	305	41.1		38.3	40.0	44.7	40.7	41.7	37.1
45	8	312	43.6		39.6	41.9	40.7	38.3	39.3	40.6
46	15	319	43.7		34.7	45.6	36.1	35.6	35.7	35.7
47	22	326	32.3		28.6	48.4	34.6	32.6	33.7	28.0
48	29	333	27.3		32.1	33.1	36.9	30.9	33.7	29.4
49	Dec 6	340	29.3		30.1	28.7	34.3	29.1	32.1	34.9
50	13	347	28.1		33.3	29.7	34.6	20.7	31.4	22.6
51	20	354	32.0		24.6	29.0	34.7	29.9	28.6	28.0
52	27	361	39.1		31.4	26.3	49.9	33.1	33.4	36.0
Mar-Oct Average					51.5	51.9	52.0	50.7 ²	52.6	50.2
Jan-Dec Average					45.7 ²	46.2	47.1	45.9 ²	46.5	45.5

TABLE 31 (CONTINUED)

Average Weekly Minimum Air Temperature at Agroclimate Stations Near Bakersfield 1960-1991¹
(degrees fahrenheit)

Week No.	Ending Date	Day of Year	1981	1982	1983	1984	1985	1986	1987	1988
1	4	4	34.5	37.8	31.5	48.6		45.4	34.4	34.7
2	11	11	34.4	31.4	30.7	41.0	39.3	40.6	34.7	35.8
3	18	18	38.8	31.9	32.0	36.1	32.9	38.1	29.2	35.3
4	25	25	40.7	32.0	38.0	36.1	36.6	42.0	30.5	31.3
5	Feb 1	32	36.7	35.1	41.4	38.9	32.9	38.0	36.6	37.4
6	8	39	35.2	35.6	39.1	30.3	32.6	37.6	39.2	30.3
7	15	46	44.8	44.9	40.9	38.4	35.6	40.9	44.7	35.3
8	22	53	43.3	46.1	40.9	36.3	40.9	46.1	34.3	33.6
9	Mar 1	60	37.9	41.6	46.9	36.6	42.0	45.0	32.3	48.6
10	8	67	40.8	45.0	47.0	42.7	35.9	49.7	48.8	42.5
11	15	74	41.4	46.4	46.4	44.7	41.0	42.9	43.7	38.3
12	22	81	44.1	37.9	42.9	41.3	40.9	42.5	40.8	41.7
13	29	88	43.2	43.0	40.7	43.7	38.7	52.2	36.6	42.6
14	Apr 5	95	39.4	40.0	42.1	41.9	43.6	46.7	43.6	43.3
15	12	102	42.2	44.0	41.9	40.9	50.7	48.9	46.7	47.5
16	19	109	45.6	43.4	43.9	47.3	50.1	43.0	47.4	48.7
17	26	116	49.5	50.3	47.9	43.6	42.6	47.2	48.3	43.5
18	May 3	123	50.6	51.1	48.0	43.6	49.9	47.0	52.4	43.9
19	10	130	46.7	51.1	46.4	47.6	46.3	46.1	57.7	46.0
20	17	137	49.8	48.6	50.9	49.3	48.7	49.9	60.6	53.6
21	24	144	50.2	53.4	57.9	55.3	52.3	52.1	50.9	53.9
22	31	151	58.3	53.6	60.3	61.6	48.1	54.9	50.6	50.0
23	Jun 7	158	59.3	46.4	57.7	55.4	54.1	57.6	58.9	51.8
24	14	165	53.7	53.7	57.9	51.4	62.4	58.8	55.2	53.0
25	21	172	58.7	61.9	55.4	59.3	63.3	56.8	54.4	60.8
26	28	179	62.4	60.6	55.9	61.3	58.3	63.1	59.5	62.5
27	Jul 5	186	63.7	55.6	57.7	67.4	60.0	61.2	57.9	59.1
28	12	193	60.6	58.7	57.0	65.7	66.4	61.0	59.9	60.4
29	19	200	59.1	61.1	58.6	73.6	46.3	60.0	60.5	65.4
30	26	207	61.9	62.3	57.1	62.6	67.6	62.9	54.0	71.6
31	Aug 2	214	60.4	63.9	62.9	65.1	59.7	60.3	58.2	67.4
32	9	221	62.3	60.6	66.0	62.7	60.0	64.7	62.2	61.8
33	16	228	64.9	58.0	67.4	66.6	59.0	64.1	58.2	53.2
34	23	235	59.1	65.7	64.4	65.4	58.1	63.4	57.2	60.5
35	30	242	60.3	62.1	58.6	62.4	61.3	61.0	60.8	68.2
36	Sep 6	249	58.9	59.6	62.0	62.7	58.7	62.0	60.2	67.4
37	13	256	63.3	60.3	59.9	67.0	53.0	55.4	53.7	57.4
38	20	263	61.3	56.1	62.1	66.4	53.1	48.4	53.7	52.8
39	27	270	51.4	58.4	60.4	54.6	59.3	49.0	56.3	51.0
40	Oct 4	277	53.0	47.4	55.3	53.0	55.1	46.7	58.4	52.5
41	11	284	47.0	45.4	56.9	53.3	45.3	50.4	54.4	51.1
42	18	291	38.6	48.0	50.6	42.3	44.7	43.9	51.3	49.0
43	25	298	46.0	56.3	51.4	43.0	44.1	42.9	51.7	49.9
44	Nov 1	305	40.4	46.0	55.6	42.0	46.1	45.5	55.0	46.5
45	8	312	44.3	40.3	49.4	43.7	45.3	37.4	44.7	45.6
46	15	319	46.3	36.0	46.4	39.9	32.9	36.4	44.6	40.3
47	22	326	39.4	40.9	41.6	40.6	34.4	44.7	39.4	32.5
48	29	333	36.6	41.1	36.0	36.1	45.1	35.4	32.3	36.5
49	Dec 6	340	34.3	37.9	36.9	40.3	43.6	35.2	36.8	31.2
50	13	347	37.1	34.7	39.1	40.4	32.3	34.2	38.2	30.4
51	20	354	41.7	34.0	41.4	33.0	28.1	34.7	32.0	35.0
52	27	361	35.4	35.6	42.6	34.4	30.6	39.2	27.2	31.5
Mar-Oct Average			52.8	53.0	54.5	54.5	52.1	53.2	53.7	53.4
Jan-Dec Average		48.3	47.9	49.7	49.2	49.2	47.0 ²	48.7	47.8	47.6

TABLE 31 (continued)

Average Weekly Minimum Air Temperature at Agroclimate Stations Near Bakersfield 1960-1991¹
(degrees fahrenheit)

Week No.	Ending Date	Day of Year	1989	1990	1991	Average	Std. Dev.	Std. Error
1	Jan 4	4	31.0	28.1	29.3	31.8	7.4	1.5
2	11	11	30.2	29.8	37.2	32.8	6.1	1.2
3	18	18	25.8	39.4	37.4	32.9	6.2	1.2
4	25	25	32.0	28.4	28.9	33.4	5.7	1.1
5	Feb 1	32	31.7	30.5	27.7	35.0	3.6	0.7
6	8	39	33.0	31.9	35.5	36.2	4.6	0.9
7	15	46	34.2	30.1	36.6	37.9	6.1	1.2
8	22	53	37.4	31.0	38.7	37.1	5.4	1.1
9	Mar 1	60	42.6	40.2	42.2	39.0	4.9	1.2
10	8	67	41.5	41.6	39.6	40.1	5.1	1.0
11	15	74	47.1	35.7	34.9	40.6	4.2	0.8
12	22	81	38.6	44.0	39.2	40.7	2.5	0.5
13	29	88	44.2	44.0	39.9	41.6	3.5	0.7
14	Apr 5	95	45.0	44.8	44.1	42.0	3.3	0.6
15	12	102	52.7	46.5	39.4	44.3	3.5	0.7
16	19	109	54.3	51.6	40.2	44.9	3.6	0.7
17	26	116	48.9	49.0	46.2	44.6	3.8	0.8
18	May 3	123	47.2	48.3	42.7	47.0	3.4	0.7
19	10	130	58.0	51.4	47.1	48.4	4.2	0.8
20	17	137	50.0	46.6	46.5	49.7	3.4	0.6
21	24	144	48.5	47.9	49.4	51.6	4.3	0.8
22	31	151	48.7	50.7	49.8	52.7	4.2	0.8
23	Jun 7	158	54.9	53.0	53.5	54.6	4.3	0.8
24	14	165	56.6	55.4	57.4	55.4	3.2	0.6
25	21	172	58.3	55.2	54.4	57.8	4.1	0.8
26	28	179	57.6	58.9	53.9	58.2	4.0	0.8
27	Jul 5	186	55.8	60.0	65.4	58.2	4.9	1.0
28	12	193	60.5	63.8	65.4	59.9	3.4	0.7
29	19	200	60.0	68.6	61.3	61.1	5.0	1.0
30	26	207	65.5	62.6	62.0	62.2	3.9	0.8
31	Aug 2	214	61.9	62.4	66.2	62.3	3.7	0.7
32	9	221	62.4	68.5	58.4	61.3	3.6	0.7
33	16	228	61.2	66.4	65.8	61.2	4.1	0.8
34	23	235	58.0	58.4	61.5	59.8	4.1	0.8
35	30	242	55.1	56.4	57.2	58.1	4.7	0.9
36	Sep 6	249	55.0	57.1	64.1	57.7	5.4	1.1
37	13	256	52.5	59.5	56.5	56.4	4.9	1.0
38	20	263	55.9	55.2	58.9	54.3	4.9	1.0
39	27	270	54.9	56.7	61.6	54.0	4.2	0.8
40	Oct 4	277	52.2	56.8	55.4	52.9	4.6	0.9
41	11	284	48.5	48.0	56.4	49.8	4.8	1.0
42	18	291	48.0	48.7	54.9	46.8	4.7	0.9
43	25	298	50.5	44.2	48.3	45.8	4.9	1.0
44	Nov 1	305	35.8	44.5	38.8	42.7	4.9	1.0
45	8	312	36.2	33.1	42.3	40.7	3.8	0.8
46	15	319	37.5	36.6	43.6	39.1	4.5	0.9
47	22	326	35.4	38.0	35.9	36.5	6.9	1.4
48	29	333	31.8	27.4	32.3	34.6	5.0	1.0
49	Dec 6	340	26.7	26.4	25.9	33.7	5.4	1.1
50	13	347	27.4	33.1	37.1	31.7	5.0	1.0
51	20	354	23.6	26.4	33.0	31.4	4.7	0.9
52	27	361	25.7	16.0	36.2	33.0	7.4	1.5
Mar-Oct Average			52.7	53.2	52.5	52.0	1.9	0.4
Jan-Dec Average			45.9	46.2	46.8	46.4	1.9	0.4

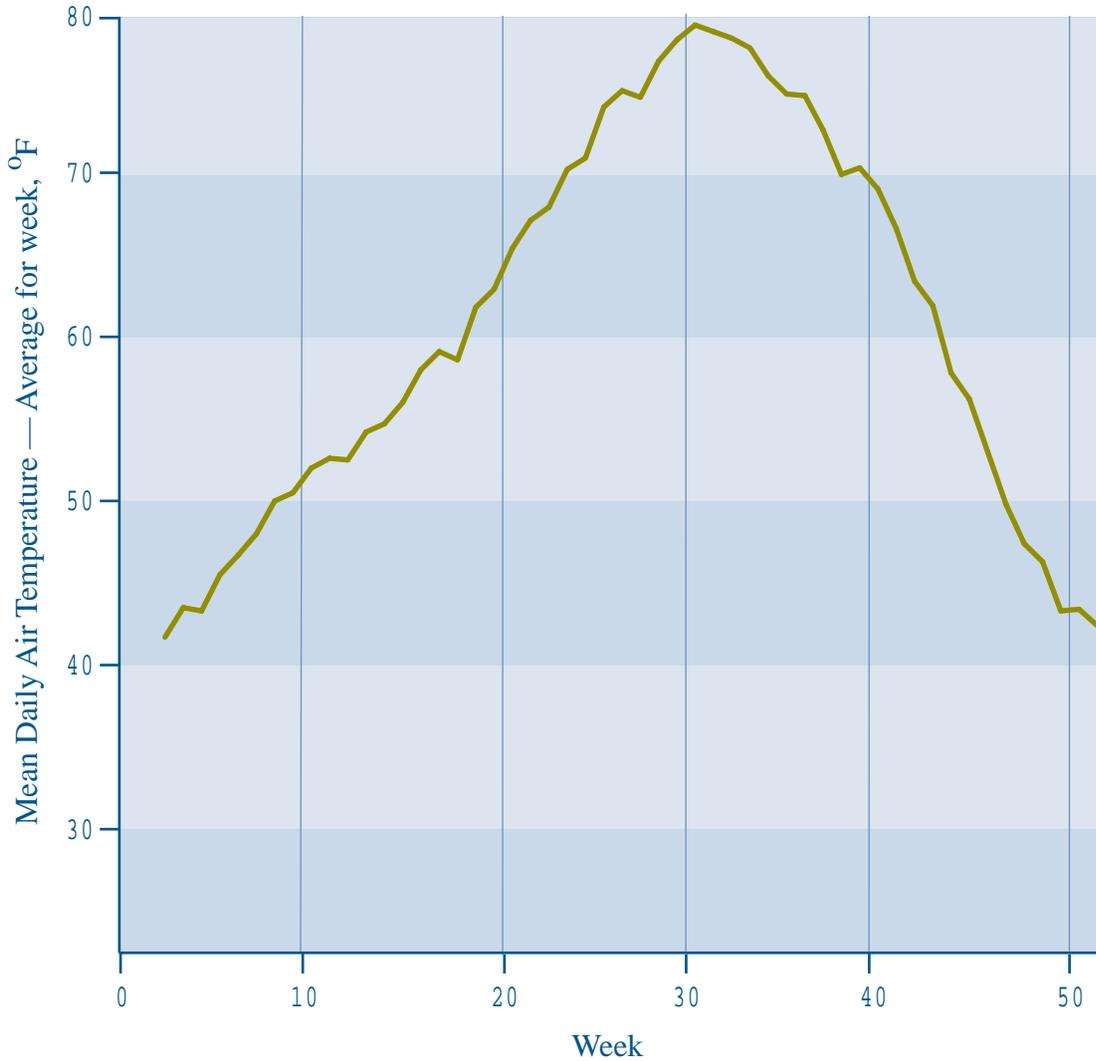
¹ Average of daily temperatures for weekly periods.

² Partially estimated.

AIR TEMPERATURES

FIGURE 23

Mean (Max+Min) Air Temperatures °F for Agroclimate Stations Near Bakersfield – Average –1960-1991



Continued from page 90

Thermometers at the outlying agroclimate stations were housed in small shelters designed by DWR technicians. Specifications for those shelters and an evaluation of their effectiveness are described in DWR Technical Memorandum 31, *An Evaluation of the Department of Water Resources Small Thermometer Shelter*, August 1966. Temperatures observed in the small thermometer

shelter were found to be within 1°F of those observed in the larger cotton region shelter. The DWR shelters were installed at a height which placed the thermometers 5.5 feet above ground surface.

At the outlying agroclimate stations, the thermometers were read at approximately weekly intervals when the stations were serviced.

Continued on page 103

FIGURE 24

Average Maximum and Minimum Air Temperatures for 9 Agroclimate Stations – 1959-1991 and for 9 Adjacent USWB Stations in the San Joaquin Valley–1961-1990

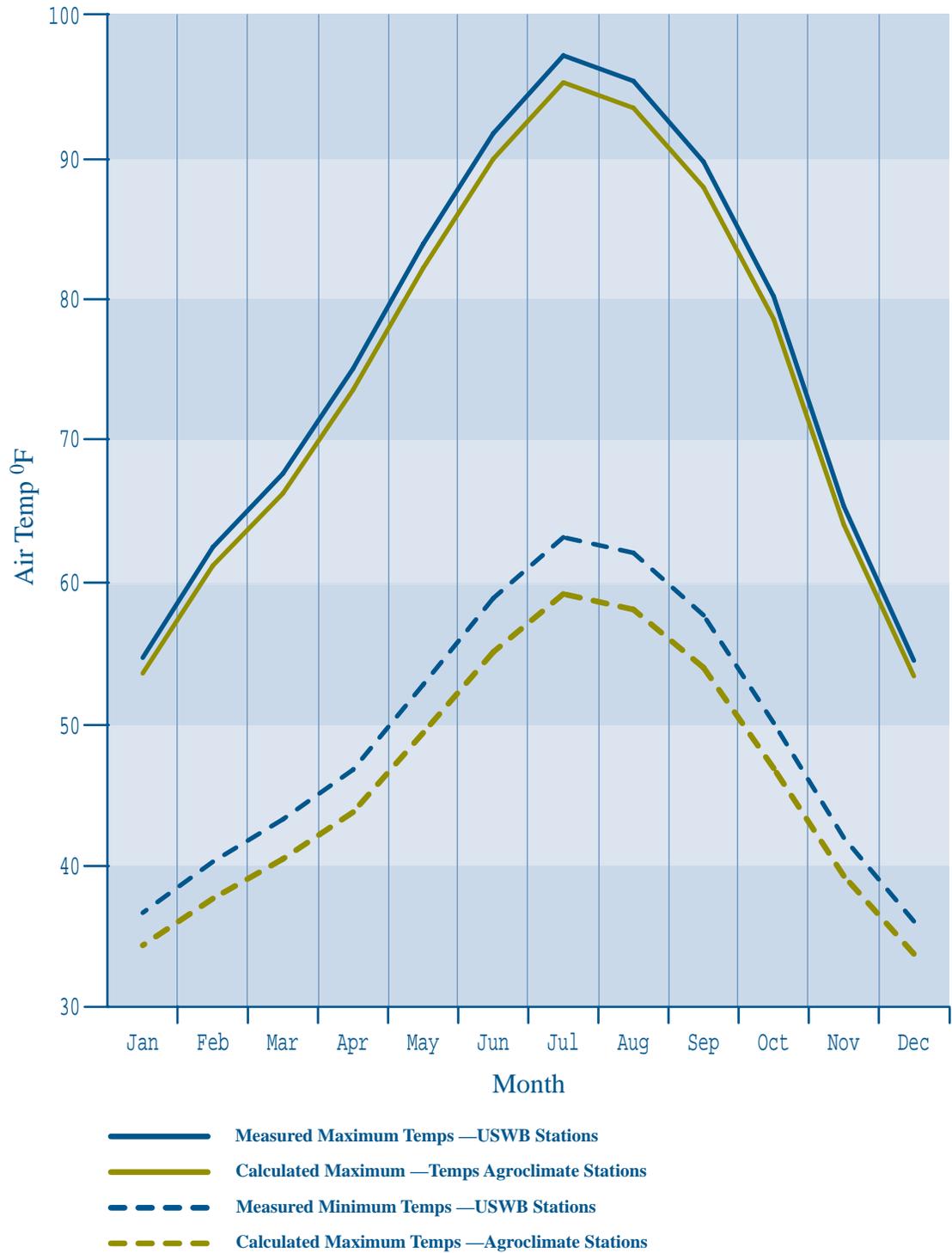
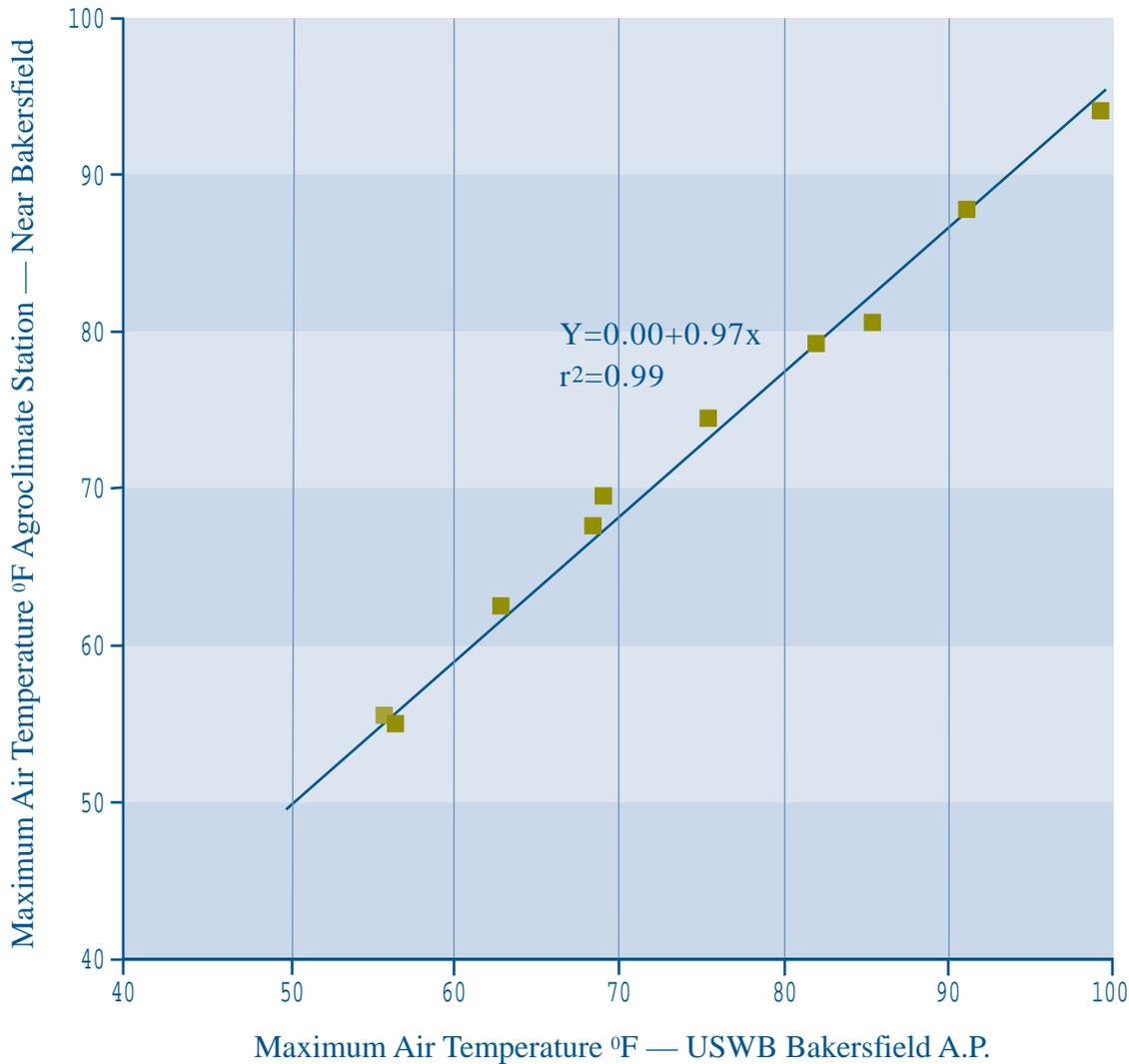


FIGURE 25

Relationship Between Maximum Air Temperatures at Irrigated and Dryland Sites Near Bakersfield – Average – 1959-1991



Continued from page 101

Maximum, minimum, and "present" temperatures for the measurement period were observed and recorded, and the thermometer indices were reset to the present temperature.

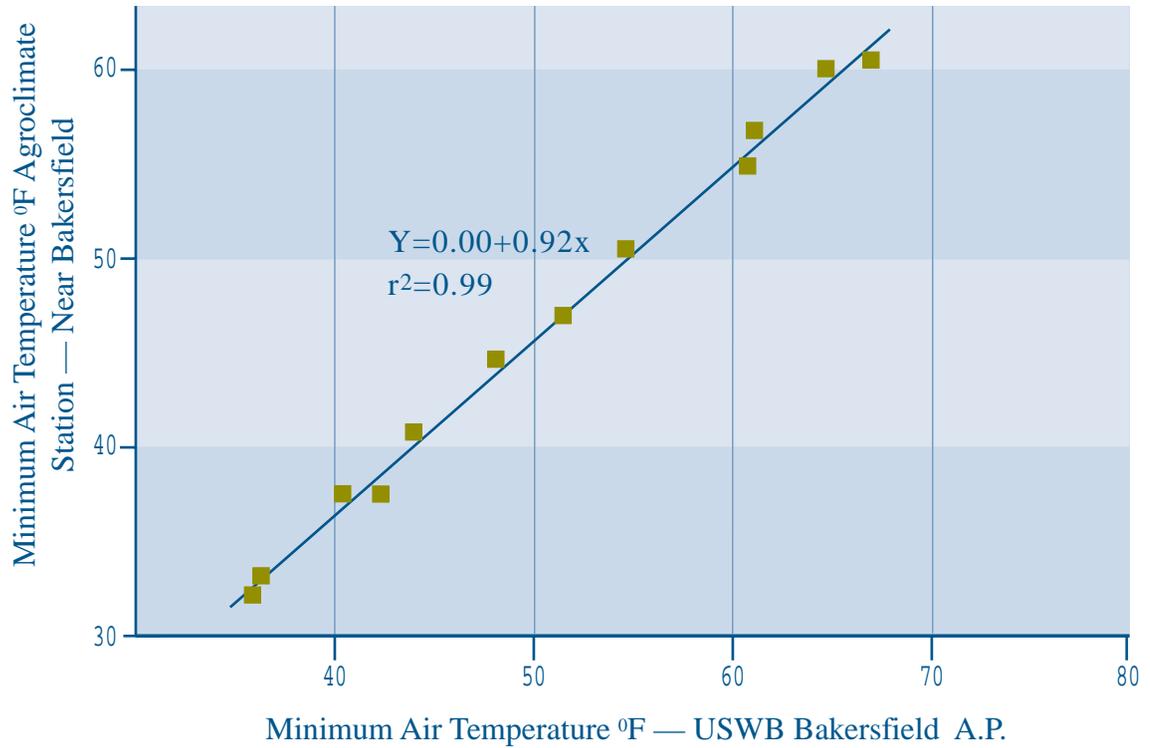
For one year, 1963, weekly extreme air temperatures (maximum and minimum) measured at eight agroclimate stations were compared to similar temperatures observed at

the nearest USWB station. Thus, there were about 52 sets of maximum temperatures for each agroclimate station and an equal number of data pairs for the minimum temperatures.

Weekly extreme temperatures for each of the eight outlying agroclimate stations were correlated to weekly maximum and minimum temperatures observed at the nearest USWB station

FIGURE 26

Relationship Between Minimum Air Temperatures at Irrigated and Dryland Sites Near Bakersfield – Average – 1959-1991



(Tables 32 and 33). Then, using the determined linear relationships and the USWB monthly records, average temperatures were calculated for each agroclimate station for each week. These temperature estimates were for 1963 only. Results of those comparisons for the eight outlying agroclimate stations are present in Tables 34 and 35. Measured maximum and minimum air temperatures for the Arvin-Frick station are also included in Tables 34 and 35.

Records for the Fresno State/DWR station did not begin until 1969. The linear relationships between temperatures at that station and the USWB's Fresno airport station was

determined for the 10-year period 1971 to 1980. Then, the 1963 record for the USWB Fresno airport station was used as the basis for estimating monthly maximum and minimum temperatures at Fresno State/DWR for that year.

The data presented in Tables 34 and 35 indicate the temperature variations between locations for 1963.

Monthly maximum and minimum air temperatures measured at the agroclimate stations were both consistently lower than those measured at nearby USWB stations. This difference is attributable to differences in the station environments. The agroclimate

Continued on page 108

TABLE 32

Average Monthly Maximum Air Temperature for Several U.S. Weather Bureau Stations in the San Joaquin Valley 1963¹
(degrees fahrenheit)

Month	Bakersfield Airport	Madera	Fresno Airport	Modesto	Merced FS2	Newman 2NW	Wasco	Visalia	Average ²	Std. Dev.	Std. Error
Jan	57.2	54.1	54.7	52.3	54.2	51.9	54.9	57.4	54.6	1.9	0.6
Feb	68.4	65.7	66.4	67.1	67.5	65.9	67.3	68.0	67.0	0.9	0.3
Mar	67.4	65.8	65.3	65.6	66.7	65.7	68.1	67.6	66.5	1.0	0.3
Apr	67.9	66.6	66.8	66.2	67.2	66.6	68.9	68.6	67.4	0.9	0.3
May	81.1	81.0	81.1	78.6	80.9	80.4	82.4	82.5	81.0	1.1	0.4
Jun	87.0	87.8	88.0	87.4	88.6	89.2	88.3	87.6	88.0	0.7	0.2
Jul	93.9	95.7	95.9	92.3	94.7	92.1	95.1	94.8	94.3	1.3	0.5
Aug	93.3	95.4	95.1	92.4	94.4	91.5	95.1	94.9	94.0	1.4	0.4
Sep	89.2	88.3	91.3	89.6	91.8	87.8	89.4	90.4	89.7	1.3	0.4
Oct	76.7	79.3	77.5	76.9	79.5	76.5	78.0	78.6	77.9	1.1	0.3
Nov	64.3	62.1	60.8	59.5	60.3	58.3	64.2	64.2	61.7	2.2	0.7
Dec	48.5	43.8	45.0	45.5	45.0	45.0	45.9	45.9	45.6	1.3	0.4
Mar-Oct	82.1	82.5	82.6	81.1	83.0	81.2	83.2	83.1	82.3	0.8	0.2
Jan-Dec	74.6	73.8	74.0	72.8	74.2	72.6	74.8	75.0	74.0	0.8	0.3

¹ Data from U.S. Weather Bureau *Climatological Data _ California*, Volume 67, Nos. 1 to 12, 1963.

² Fresno Airport was the USWB station nearest to two agroclimate stations (Kerman 2-ESE and Fresno State/DWR); thus temperatures from Fresno AP were counted twice in calculating average.

TABLE 33

Average Monthly Minimum Air Temperature for Several U.S. Weather Bureau Stations in the San Joaquin Valley 1963¹
(degrees fahrenheit)

Month	Bakersfield Airport	Madera	Fresno Airport	Modesto	Merced FS2	Newman 2NW	Wasco	Visalia	Average ²	Std. Dev.	Std. Error
Jan	32.5	29.8	29.7	32.1	29.5	29.3	29.8	31.0	30.5	1.2	0.4
Feb	48.4	46.7	46.3	47.8	46.4	47.2	45.9	47.6	47.0	0.8	0.3
Mar	44.2	40.8	41.2	41.5	40.7	40.0	42.5	43.0	41.7	1.3	0.4
Apr	46.9	44.8	45.0	44.5	44.1	43.6	45.7	46.1	45.1	1.0	0.3
May	57.1	52.9	54.1	51.5	52.4	50.2	55.6	55.6	53.7	2.2	0.7
Jun	62.5	54.8	58.4	55.2	54.5	54.6	59.9	59.4	57.4	2.9	0.9
Jul	65.7	56.9	61.1	56.4	56.0	55.5	62.5	61.7	59.5	3.5	1.1
Aug	66.4	59.3	61.3	56.4	57.7	56.4	63.4	61.1	60.3	3.3	1.0
Sep	65.1	59.0	61.8	57.4	57.7	56.6	62.5	61.9	60.3	2.8	0.9
Oct	56.4	50.8	53.3	51.1	50.4	50.4	54.5	54.2	52.6	2.1	0.7
Nov	45.0	43.8	43.3	42.6	42.5	41.9	43.3	44.0	43.3	0.9	0.3
Dec	34.4	35.2	35.0	34.6	33.9	35.0	35.1	35.0	34.8	0.4	0.1
Mar-Oct	58.0	52.4	54.5	51.8	51.7	50.9	55.8	55.4	53.8	2.3	0.7
Jan-Dec	52.1	47.9	49.2	47.6	47.2	46.7	50.1	50.1	48.8	1.7	0.5

¹ Data from USWB *Climatological Data _ California*, Volume 67, Nos. 1 to 12, 1963.

² Fresno Airport was the USWB station nearest to two agroclimate stations (Kerman 2-ESE and Fresno State/DWR); thus temperatures from Fresno airport were counted twice in calculating average.

TABLE 34

Calculated Average Monthly Maximum Air Temperature for Several Agroclimate Stations in the San Joaquin Valley – 1963
(degrees fahrenheit)

Month	Arvin-Frick ¹	Berenda 2-N	Kerman 2-ESE	Fresno State/DWR	Maze Bridge 2-S	Merced 5-SE	Newman 1-SE	Pond 1-N	Traver 4-ESE	Average	Std.Dev.	Std. Error
Jan	54.5	54.2	54.1	56.0	53.1	54.7	52.8	54.4	56.2	54.4	1.1	0.4
Feb	69.8	65.1	65.0	66.5	66.0	67.4	66.1	66.0	66.3	66.5	1.4	0.5
Mar	65.5	65.2	63.9	65.5	64.7	66.6	65.9	66.8	65.9	65.6	0.8	0.3
Apr	65.7	65.9	65.3	66.9	65.2	67.1	66.1	67.5	66.9	66.3	0.8	0.3
May	79.8	79.5	78.6	79.7	76.1	80.2	79.8	80.2	80.1	79.3	1.2	0.4
Jun	84.5	85.9	85.1	85.9	83.8	87.6	88.1	85.7	85.0	85.7	1.3	0.4
Jul	92.5	93.3	92.4	93.0	88.1	93.5	90.9	92.1	91.9	92.0	1.6	0.5
Aug	92.5	93.0	91.7	92.3	88.2	93.2	90.3	92.1	92.0	91.7	1.5	0.5
Sep	88.4	86.4	88.1	88.9	85.8	90.7	86.8	86.8	87.7	87.7	1.4	0.5
Oct	75.1	77.9	75.3	76.5	74.6	78.9	76.1	76.1	76.4	76.3	1.3	0.4
Nov	60.7	61.7	59.7	61.5	59.4	60.5	58.9	63.1	62.7	60.9	1.4	0.5
Dec	41.6	44.5	45.0	47.3	39.9	45.8	46.3	46.0	45.3	44.6	2.2	0.7
Mar-Oct	80.5	80.9	80.1	81.1	78.3	82.2	80.5	80.9	80.7	80.6	1.0	0.3
Jan-Dec	72.6	72.7	72.0	73.3	70.4	73.9	72.3	73.1	73.0	72.6	0.9	0.3

¹ Measured.

TABLE 35

Calculated Average Monthly Minimum Air Temperature for Several Agroclimate Stations in the San Joaquin Valley – 1963
(degrees fahrenheit)

Month	Arvin-Frick ¹	Berenda 2-N	Kerman 2-ESE	Fresno State/DWR	Maze Bridge 2-S	Merced 5-SE	Newman 1-SE	Pond 1-N	Traver 4-ESE	Average	Std.Dev.	Std. Error
Jan	22.8	29.1	27.6	27.8	30.4	27.0	29.9	28.5	29.2	28.0	2.1	0.7
Feb	46.8	44.6	43.0	43.0	44.2	45.1	46.3	43.3	44.0	44.5	1.3	0.5
Mar	37.7	39.2	38.3	38.4	38.7	39.0	39.7	40.2	39.9	39.0	0.8	0.3
Apr	41.7	42.9	41.8	41.8	41.3	42.7	43.0	43.1	42.6	42.3	0.6	0.2
May	53.0	50.3	50.2	50.2	47.5	51.6	49.1	52.3	51.1	50.6	1.6	0.5
Jun	55.0	52.1	54.3	54.2	50.8	53.8	53.1	56.2	54.5	53.8	1.5	0.5
Jul	56.7	54.0	56.8	56.6	51.8	55.4	53.9	58.6	56.5	55.6	1.9	0.6
Aug	56.5	56.2	56.9	56.8	51.8	57.2	54.8	59.4	56.0	56.2	1.9	0.6
Sep	57.0	55.9	57.4	57.3	52.7	57.2	54.9	58.6	56.7	56.4	1.6	0.5
Oct	48.3	48.4	49.5	49.5	47.2	49.4	49.2	51.2	49.9	49.2	1.1	0.4
Nov	38.2	42.0	40.2	40.3	39.7	41.0	41.4	40.9	40.8	40.5	1.0	0.3
Dec	29.4	34.1	32.5	32.7	32.6	31.7	35.1	33.4	32.8	32.7	1.5	0.5
Mar-Oct	50.7	49.9	50.7	50.6	47.7	50.8	49.7	52.5	50.9	50.4	1.2	0.4
Jan-Dec	45.3	45.7	45.7	45.7	44.1	45.9	45.9	47.1	46.2	45.7	0.8	0.3

¹ Measured.

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TABLE 36

Average Monthly Maximum Temperature for Several U.S. Weather Bureau Stations in the San Joaquin Valley 1961-1991 (degrees fahrenheit)

Month	Bakersfield Airport	Madera	Fresno Airport	Modesto	Merced	Newman	Wasco	Visalia	Average	Std. Dev.	Std. Error
Jan	56.9	53.8	54.1	53.6	54.5	54.4	56.1	53.8	54.7	1.2	0.4
Feb	63.9	61.4	61.7	61.9	62.3	62.6	64.3	61.5	62.5	1.1	0.4
Mar	68.9	66.7	66.6	67.1	67.4	68.1	70.1	66.9	67.7	1.2	0.4
Apr	75.9	74.2	75.1	73.8	74.9	75.2	77.9	73.8	75.1	1.3	0.5
May	84.6	83.5	84.2	81.6	83.7	84.0	86.5	82.7	83.9	1.4	0.5
Jun	92.4	91.5	92.7	88.9	91.4	91.8	94.6	90.6	91.7	1.7	0.6
Jul	98.5	97.8	98.6	94.2	96.9	96.4	99.5	96.0	97.2	1.7	0.6
Aug	96.6	96.1	96.7	92.4	95.2	94.2	97.7	94.3	95.4	1.7	0.6
Sep	90.1	90.0	90.1	87.5	90.0	89.5	92.0	88.5	89.7	1.3	0.5
Oct	80.7	80.4	79.7	78.3	80.5	80.3	82.2	79.3	80.2	1.1	0.4
Nov	66.8	65.3	64.7	63.7	65.3	65.2	67.2	64.9	65.4	1.1	0.4
Dec	56.9	53.4	53.6	53.1	54.0	53.9	55.7	55.7	54.5	1.4	0.5
Mar-Oct	86.0	85.0	85.5	83.0	85.0	84.9	87.6	84.0	85.1	1.3	0.5
Jan-Dec	77.7	76.2	76.5	74.7	76.3	76.3	78.7	75.7	76.5	1.2	0.4

TABLE 37

Average Monthly Minimum Temperature for Several U.S. Weather Bureau Stations in the San Joaquin Valley 1961-1991 (degrees fahrenheit)

Month	Bakersfield Airport	Madera	Fresno Airport	Modesto	Merced	Newman	Wasco	Visalia	Average	Std. Dev.	Std. Error
Jan	38.6	35.5	37.4	37.4	35.7	35.5	36.5	37.0	36.7	1.1	0.4
Feb	42.6	38.6	40.5	41.1	38.7	39.1	40.7	41.2	40.3	1.1	0.4
Mar	45.8	41.9	43.4	43.4	41.4	41.3	44.3	44.6	43.3	1.6	0.6
Apr	50.1	45.6	47.3	46.6	44.4	44.0	48.3	48.4	46.8	2.1	0.8
May	57.3	51.2	53.7	51.4	50.4	49.6	54.6	54.1	52.8	2.6	0.9
Jun	64.0	57.3	60.4	56.7	56.1	55.3	61.1	60.3	58.9	3.0	1.1
Jul	69.6	61.5	65.1	59.9	60.2	58.6	65.6	64.7	63.2	3.7	1.3
Aug	68.5	60.4	63.8	59.4	59.0	58.0	64.3	63.3	62.1	3.5	1.2
Sep	63.5	55.5	58.8	56.1	54.8	54.4	59.4	58.8	57.7	3.1	1.1
Oct	54.8	47.7	50.7	49.9	47.5	48.1	50.6	51.5	50.1	2.4	0.9
Nov	44.7	40.2	42.5	42.6	40.4	40.7	41.8	42.8	42.0	1.5	0.5
Dec	38.6	34.9	36.8	36.8	35.1	34.9	35.3	36.4	36.1	1.3	0.5
Mar-Oct	59.2	52.6	55.4	52.9	51.7	51.2	56.0	55.7	54.3	2.7	1.0
Jan-Dec	53.2	47.5	50.0	48.4	47.0	46.6	50.2	50.3	49.2	2.2	0.8

stations were located in irrigated pastures while the USWB stations were located at dryland sites.

The temperature differences attributed to station environment are illustrated on Figures 24, 25, and 26.

Figure 24 shows the average monthly air temperature for agroclimate stations near Bakersfield for the period 1959 to 1991. That figure also shows the average of air temperatures for three USWB stations (Bakersfield airport, Buttonwillow, and Wasco) for the period 1961 to 1990.

Figure 27 shows similar monthly temperature data for the Fresno State/DWR station (irrigated pasture) and the USWB Fresno airport station (dryland). The temperatures shown are the averages for the 10-year period 1971 to 1980.

Figure 28 shows monthly temperatures for nine agroclimate stations at different locations in the Valley and nearby USWB dryland stations for 1963.

Both maximum and minimum air temperatures are consistently lower for the irrigated pasture sites than those observed at nearby dryland sites. Measurement of air temperatures at the Fresno State/DWR agroclimate station differed from those at the other outlying stations. Between

January 1969 and December 1974, Sixe's U-tube type thermometers were installed in a USWB cotton region shelter. Beginning in 1975, USWB-type maximum/minimum thermometers were used. The thermometers were read once each week. For the 10-year period 1971 to 1980, observed weekly maximum and minimum temperatures were compared to those measured at the USWB Fresno airport station. (The USWB station is located about 4 miles southeast of the agroclimate station.) The Fresno State/DWR temperature data were correlated to temperatures at the USWB station for the same weekly periods. Then, using the linear relationships between the two sites, long-term monthly averages were calculated based on the long-term monthly USWB Fresno airport record.

The weekly relationships calculated were:

$$T_{\max} \text{ Fresno State/DWR} = 0.00 + 0.971 T_{\max} \text{ USWB Fresno airport}$$

$$T_{\min} \text{ Fresno State/DWR} = 0.00 + 0.932 T_{\min} \text{ USWB Fresno airport}$$

The calculated average monthly maximum and minimum temperatures for the Fresno State/DWR agroclimate station are shown on Figure 29.

FIGURE 27

Observed Air Temperature for 9 USWB Stations and Calculated Air Temperature for 9 Agroclimate Stations in the San Joaquin Valley – 1963

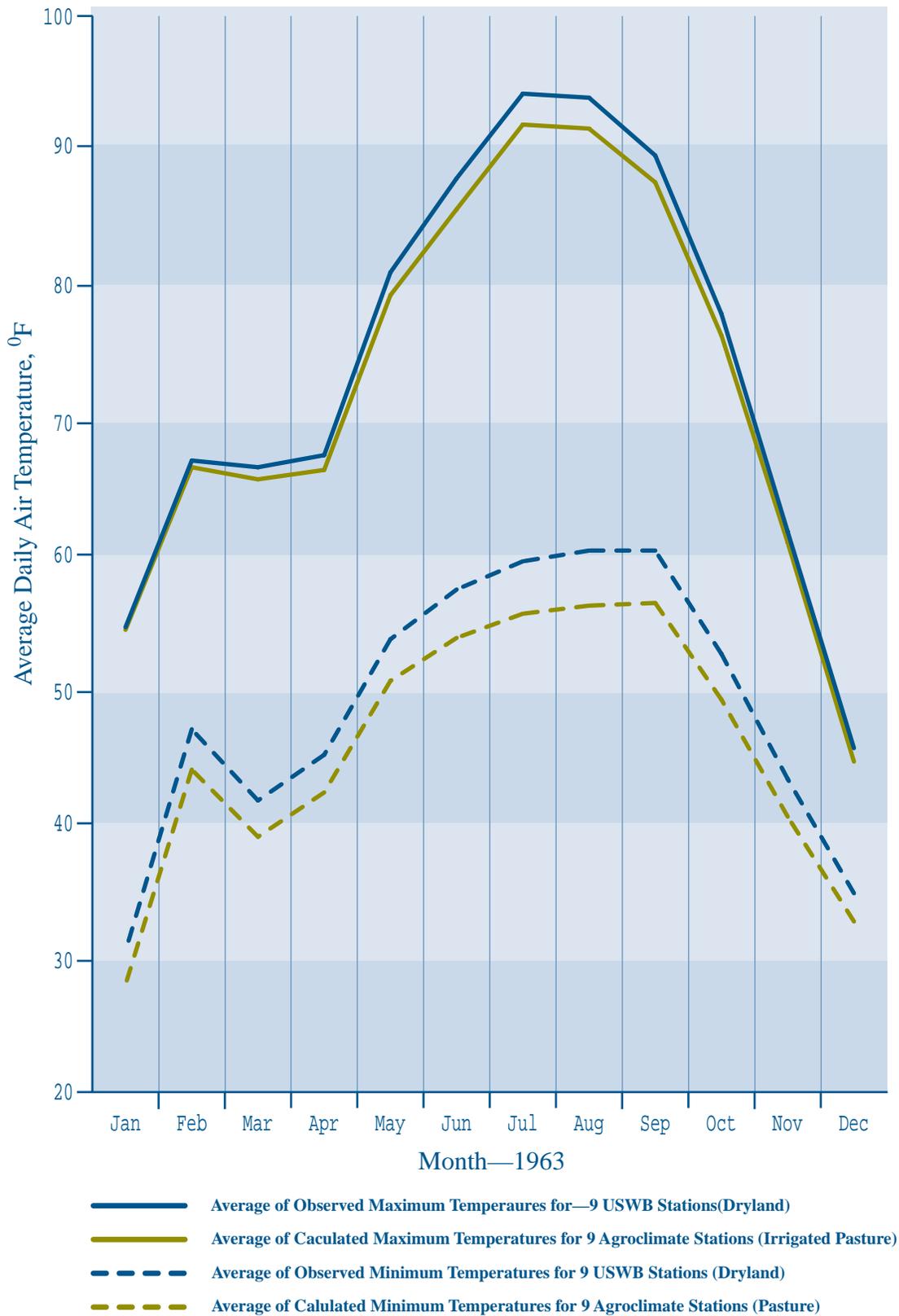
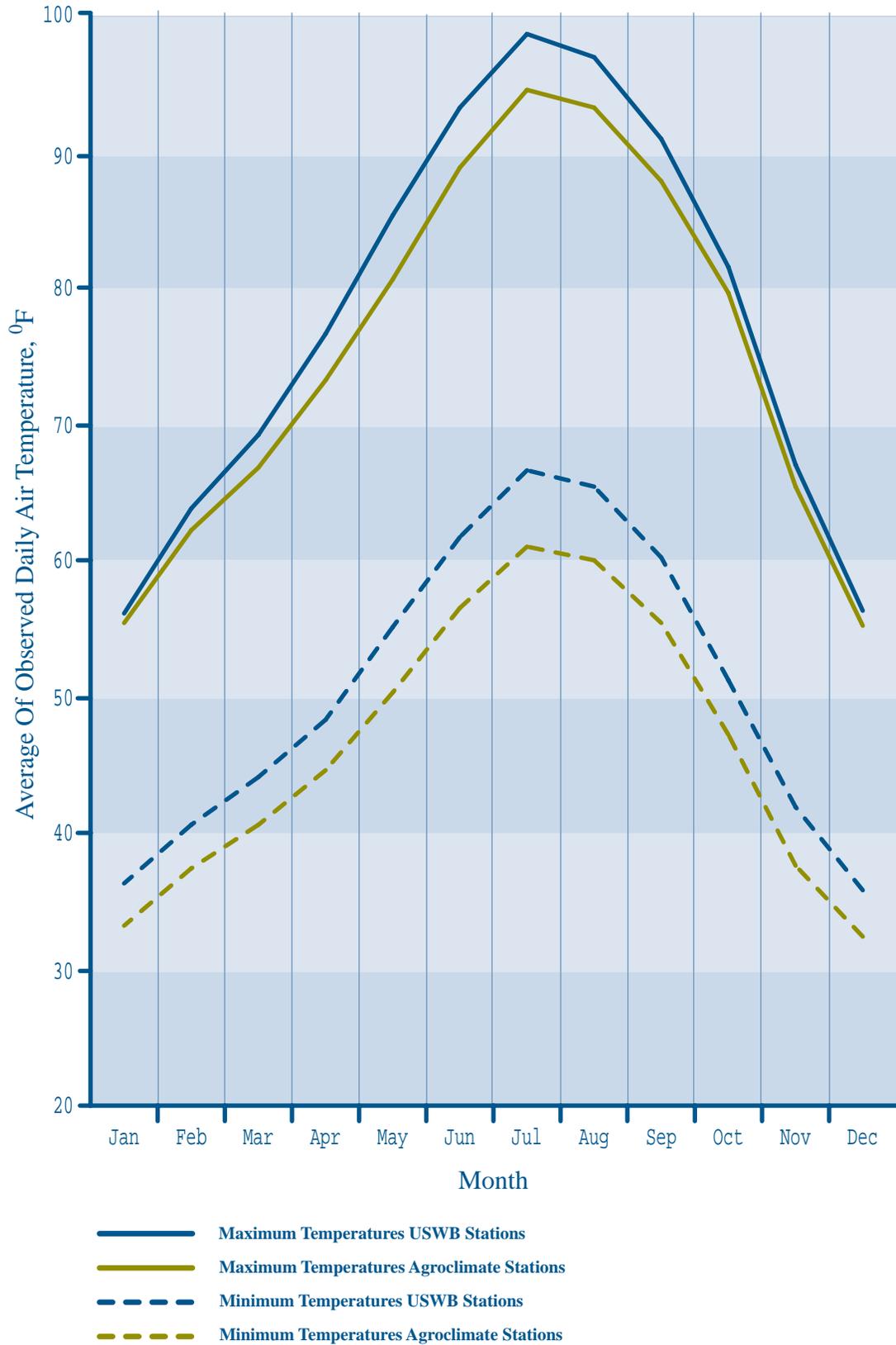


FIGURE 28

Average Maximum and Minimum Air Temperature for USWB (Dryland) Locations and Agroclimate (Irrigated Pasture) Locations Near Bakersfield – 1959-1991



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FIGURE 29

Average Air Temperature, at USWB Fresno A.P. Station (Dryland) and Fresno State/DWR Agroclimate Station (Irrigated Pasture) – 1971-1980

