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PUBLICATION OF SEISMOLOGICAL DATA IN THE REVIEW TO BE DISCONTINUED

Announcement is made that a bill (H. R. 8303), quoted hereunder, authorizing the Coast and Geodetic Survey to make seismological investigations and for other purposes, was introduced in the last Congress, passed by the House of Representatives on June 5, 1924, but failed of passage in the Senate because of the legislative congestion in the closing days of the session:

Be it enacted, etc., That the Coast and Geodetic Survey is hereby authorized to make investigations and reports in seismology, including such investigations as have been heretofore performed by the Weather Bureau.

The transfer as above proposed was fully discussed by the two departments concerned, both of which were agreeable to its enactment.

In view of the necessity of effecting economies in the conduct of the work of the Weather Bureau, it was decided to discontinue, with the close of the fiscal year ending June 30, 1924, the publication of the table of Seismological Reports.—*Editor.*

SUBSTITUTION OF FRUIT TEMPERATURES FOR AIR TEMPERATURES IN REGULATING ORCHARD HEATING FOR ORANGES[1]

551.574 (794)

By FLOYD D. YOUNG, Meteorologist
[Weather Bureau Office, Los Angeles, Calif., August 27, 1924]

Orchard heating has been practiced to some extent in southern California citrus groves for more than 30 years. Throughout all of this period very little has been definitely known regarding the temperatures which will damage the fruit on the trees. The generally accepted critical temperatures are the results of the more or less unsystematic observations of the fruit growers themselves. Many of the thermometers used to record temperatures in the citrus groves have been inaccurate, and until the last few years practically all thermometers were poorly exposed.

Most orange growers who have orchard heating equipment very naturally wish to maintain a margin of safety, with the result that heaters often are lighted unnecessarily, and much fuel is wasted.

When investigations in connection with orchard heating were begun at Pomona, Calif., in the fall of 1917, the desirability of finding a method of eliminating some of the uncertainty regarding the proper time to light the heaters was recognized. Two methods of procedure were available: (1) To obtain accurate records of the air temperature in the orchards on cold nights, with special attention to duration of low temperatures, and to determine the amount of damage to the fruit which resulted; (2) to determine the practicability of regulating the firing by obtaining the temperature of the fruit itself, on the trees.

Data secured in connection with both methods will be discussed in this paper. It is desired to show that although a temperature of 27° F., indicated by an unsheltered thermometer, is generally considered to be the danger point for mature oranges, temperatures several degrees lower than this have occurred on several nights during a season without damage. Temperatures which have caused the loss of the entire crop in an orchard are given also, as a matter of information and record.

It is also desired to show that for efficiency in regulating the lighting of the orchard heaters, fruit temperatures are best; sheltered thermometer readings next; then readings of the unsheltered mercurial thermometer; and, least of all readings of unsheltered thermometers of other types.

LOW AIR TEMPERATURES AND RESULTING DAMAGE

Enough data were obtained during the winter of 1918–19 to indicate that the generally accepted critical temperature for oranges, 27° F., registered by thermometers exposed to the sky, was too high. During that season air temperatures in a naval orange grove were recorded as shown in Table 1. A standard minimum thermometer, exposed inside a fruit-region instrument shelter, 4½ feet above the ground, was used to record the lowest temperature each night, and a 29-hour thermograph recorded the duration of the low temperatures.

Only 3 per cent of the fruit harvested from this grove was so badly frozen as to be unmarketable. Twenty-nine per cent of the crop was frozen sufficiently to prevent its being included in the "Choice" or "Extra Choice" grades. So far as frost damage was concerned, the remaining 68 per cent of the crop was marketable as first grade fruit.

Thermometers exposed to the sky would have registered temperatures from one to three degrees lower than those in Table 1.

TABLE 1.—*Low temperatures and durations in navel orange groves near Pomona, Calif., winters of 1918–19, 1921–22, and 1922–23.*

Date	Minimum temperature	Dew point	Type of night	Duration below 27° F.
1918–19	°F.	°F.		H m
Dec. 25	24.2	32	Moderately dry	4 25
30	24.4	[1] 46	Dry	4 40
31	24.1	28	do	9 55
Jan. 1	23.3	21	do	10 42
2	23.1	26	do	9 45
1922				
Jan. 20	19.8	12	do	12 33
21	22.0	22	do	13 0
22	24.6	22	do	8 10
23	25.2	29	Moderately dry	1 45
Feb. 3	25.1	28	do	2 49
1923				
Jan. 3	26.8	33	Damp	0 34
4	25.0	34	do	5 50
14	25.6	41	Very damp	4 50
28	26.6	37	do	0 47
Feb. 4	26.5	28	Damp	2 56
6	26.8	35	Very damp	0 40
7	26.2	38	do	2 5
8	27.0	41	do	
10	25.3	34	do	6 12

[1] Dewpoint fell to 21° F. before morning.

[1] Credit is due Mr. Edwin H. Jones for making the observations shown in Figures 5 and 7, and to Mr. C. W. Norman for making the observations shown in Figures 2 and 4 and a part of those shown in Figures 3 and 6. The writer desires to express his appreciation for the never-failing interest shown by Mr. Jones and Mr. Norman, despite the long hours of disagreeable night work.