

izers in summer, which stimulates a too-vigorous growth in the fall when the tree should be maturing the wood and buds already produced.

Severe freezing is often the direct cause.—Peach trees will usually withstand a temperature of ten degrees below zero, and quite frequently twenty degrees. On the other hand, five degrees below has sometimes destroyed whole orchards. This shows that it is not always cold weather that kills the buds.

Sudden changes of temperature.—A sudden drop of fifteen or twenty degrees is more injurious than a gradual fall. Sudden thawing is more damaging than sudden freezing.

Swelling of buds during warm days in winter.—A warm spell early in the spring will cause the buds to swell and, if they are not properly protected, a subsequent freezing will greatly injure, if not kill them. Purple twigged varieties are more susceptible to this evil than green twigged varieties, as they absorb heat more rapidly.

An excess of humidity in the soil.—Undrained soils are apt to favor the premature flowing of the sap, which often occurs during the winter in changeable climates.

An unfavorable exposure.—This may be remedied to a certain extent by the planting of wind-breaks on the windward side of orchards to moderate the aerial currents.

METHODS OF PROTECTION.

"Baling," or closely drawing together the branches and wrapping with coarse grass, cornstalks, or canvas.

Temporary sheds.—Between the rows of trees, posts are sunk on which board sheds are erected over the trees.

Coating the buds with some sticky substance has been tried with the hope of affording protection.

Laying down the trees in autumn and covering with soil, spruce boughs or other material.—Different systems are practised for this purpose. Some growers cut the roots on one side of the tree, and then bend the tree over in the direction opposite the cut side. The Iowa Experiment Station advises training the trunks along the ground and allowing the upright heads to form several feet to one side of the stump, thus making it comparatively easy to lay the head over on the ground by twisting the trunk. Others prefer training the roots laterally, in two opposite directions, by pieces of sheet iron imbedded in the ground; by this means the roots may be twisted sufficiently to layer the tree.

All these methods, baling, sheds, coating buds and layering, have been resorted to with more or less success, but are, under most conditions, rather too expensive for commercial purposes.

Whitewashing the Branches and Buds is the most promising means of winter protection yet applied. Whitewashing retards the bloom, as heat is reflected by whitened buds rather than absorbed. Experiments have been conducted along this line by Prof. J. C. Whitten, Horticulturist at the Missouri Station, and also by W. M. Orr, a prominent Ontario fruit grower.

Prof. Bailey, of Cornell, says: "The bursting vegetation of spring-time is supported by a local store of nutri-