

HARDY STOCKS



STOOD THE SHOCKS!

THE DAMAGE to apple trees which resulted from the Nov. 11, 1940, freeze could have been prevented in a large measure by the use of hardy, intermediate stocks, like Hibernial and Virginia Crab. This was the general opinion of a large group of midwestern fruit growers and horticultural specialists who met at Ames recently to observe results in the experimental stock orchards of the Iowa Agricultural Experiment Station. The use of certain stock combinations in these orchards indicated that hardy stocks were the most important single factor in preventing cold injury. It was also observed that the new varieties, Sharon, Edgewood, Secor, Hawkeye Greening and Norwel, came through the storm in perfect condition, even to the extent of carrying a crop of fruit at the present time.

A subsequent visit to the Apple Grove Orchards at Mitchellville, Iowa, owned and operated by Robert M. Clark, further convinced the horticulturists that the use of hardy stocks is practical in large scale orchard operations. Mr. Clark has been experimenting for 23 years with hardy stocks and has

used them extensively in developing about 92 acres of orchard. Notwithstanding the November freeze the crop in this orchard for 1941 will approximate 6,000 to 8,000 bushels. Of course there was injury to a number of the trees in the orchard but the evidence was strongly in favor of the use of hardy stocks as a method for preventing damage such as resulted from the November blizzard. Mr. Clark demonstrated how the stocks may be topbudded over a period of 2 to 4 years and emphasized that the buds should be set on the main scaffold branches at a distance of 2 or 3 feet from the trunk. After the past freeze, this practice resulted in less injury than where buds were inserted close to the main trunk. In some instances tender varieties, such as Delicious and Grimes Golden, were killed back to the stock, but the stock was uninjured and in good condition to be reworked. With stocks from 5 to 10 years old,

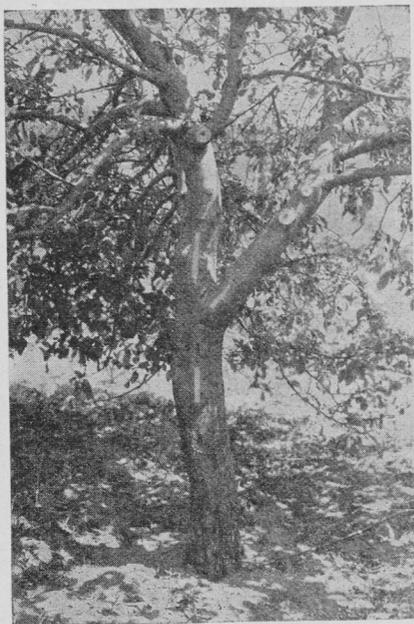
By T. J. MANEY

The Apple Trees on Hibernial and Virginia Crab Were Least Injured by the Freeze in November

this operation should not mean great loss in time or money.

During the past 3 years Dr. S. W. Edgcombe, through the Extension Service of Iowa State College, has established over 150 hardy stock demonstration orchards throughout the state. In these orchards the Virginia Crab and Hibernial stocks were practically uninjured by the freeze and should, in the future, be foundations for long-lived farm home orchards. The story of how such trees may be developed is related in a publication entitled, "Top-working on Hardy Apple Stocks," Extension Circular 236, Iowa State College, Ames, Iowa.

Throughout the midwestern states, many apple trees on their own trunks have been killed outright; others show various degrees of injury. The fact that Iowa must face a shortage of winter apples for the next 10 years makes it advisable for growers to get whatever salvage they can from their orchards. Injured limbs should be pruned out to give new shoots a chance to develop. Certain trees which



This Jonathan tree was topworked on Hiberna stock. The sections where bark was removed show there was no injury from the freeze of last November 11.

are almost completely girdled in the trunks but uninjured in the tops or roots may be saved by bridge grafting, an operation which can be performed without much difficulty.

Young trees with trunk diameter of 2 to 3 inches may have been killed in the tops. If shoots develop at the base of the trunk above the graft union, such shoots may be trained into a new tree with a saving of time. Growers are also advised to protect the bodies of trees which survive against disease, cankers and borers and to spray the foliage according to schedule to prevent a build-up of insect pests and diseases.

In planting new orchards, it would be well for the growers to plant on new land. Get back into orcharding gradually by planting a few acres each year. Orchards developed in this way are never injured by cold as badly as are larger orchards in which the trees are all of one age. There is also some sense to the statement that a young

These selected peach seedlings developed by the Iowa Station were uninjured, set a full fruit crop.

orchard may keep one young and an old orchard may make one old—it is always well to have something to look forward to.

Future orchards should be longer lived and more productive if they are developed by the use of hardy stocks. If hardy stocks are not used, then midwestern growers must insist that nurserymen sell them root-grafted trees. Experience has shown that budded trees are short-lived under our severe climate. Our local nurserymen appreciate this fact, but eastern and southern firms will continue to pass out budded trees to Iowa growers.

This is a good time for the orchardist or prospective orchardist to plan for the future, for now the opportunity is at hand to take advantage of the best information on varieties, stocks, methods for the prevention of soil erosion, orchard location, soil fertility and other modern orchard practices.

The blizzard of Nov. 11, 1940, which swept across Iowa will probably go down in history as a major disaster to the horticultural industry of the state. To appreciate the full effect of this storm on horticultural plants, one must consider the conditions which preceded the

freeze. The fall had been unusually warm, and sufficient moisture was present in the soil to keep plants in an active growing condition up to the time of the first killing frost, Nov. 7. On this date, the temperature dropped to 24°F., a degree insufficient to injure the leaves on most fruiting plants.

Then on Nov. 11 came the blizzard. In less than 24 hours, temperatures throughout the state dropped from a high of 50°F. to a low of 0°F. During the period from Nov. 11 to 15, temperatures from -3°F. to -15°F. were reported in various sections. Fruiting and ornamental plants were caught in an immature condition and injured to such an extent that many orchards were total losses. The full extent of the injury is not apparent even at this time. Some injured plants may fold up quickly during the late summer, or again they may survive over a period of years.

Fruiting plants which were damaged included the apple, peach, pear, sour and sweet cherries, apricot, blackberry, and red and black raspberries. Currants and gooseberries were only slightly injured. Plums, except for certain hybrid varieties, withstood the freeze.



Grapes, apparently uninjured, showed considerable bud injury when growth started. Strawberry plants, which were unmulched at the time of the cold snap, were not entirely killed, were injured in the roots and dormant fruit buds. This injury was shown at picking time by low yields of small, knotty berries.

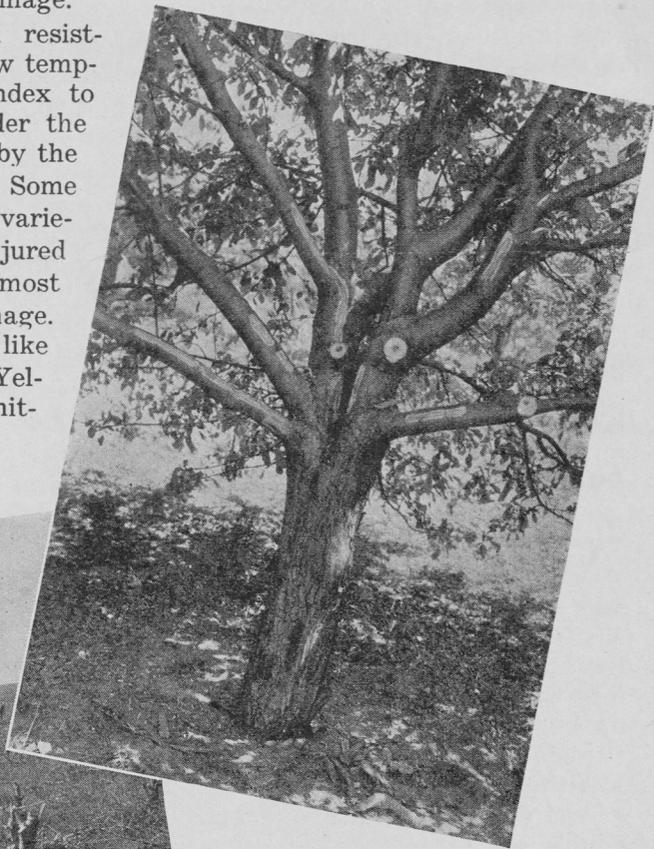
Injury to ornamental plants is most noticeable in the evergreen group. In all parts of the state Junipers, including Pfitzer, Irish, Swedish, Greek, Chinese and other selected types, fared badly. Douglas-fir, Yellow Pine, Arborvitae and Yew were also damaged. Roses in the hybrid tea and hybrid perpetual group were killed or badly damaged. Even hardy roses, like the *R. rugosa*, were killed to the ground line. In the main, the commonly planted ornamental shrubs, with the exception of Morrow honeysuckle, escaped serious injury. The same holds true for deciduous trees; the exception being ornamental crab apples, some varieties of which were killed or badly hurt. The Chinese elm, whose dead trunks and branches are a blot on the landscape in every midwest community, was severely injured.

Unseasonal freezes of the Nov. 11 type are not common in Iowa, but nevertheless they have occurred. In the first annual report of the Iowa State Horticultural Society, published in 1868, a cold spell was reported as happening late in October. In this case, there was no frost until Oct. 26. Then there was rain attended by snow and a hard freeze, which was reported to have killed three-fourths of all apple trees in southwestern Iowa.

Again on Oct. 28, 1925, a cold spell developed with temperatures dropping to -5°F . This freeze caused heavy damage to young trees in the nurseries, but orchard trees, although they showed evidence of bark and wood injury, came through with little permanent damage.

The known cold resistance of plants to low temperatures was no index to their hardiness under the conditions imposed by the November freeze. Some of the most hardy varieties were badly injured while some of the most tender escaped damage. Apple varieties like *Duchess*, *Wealthy*, *Yellow Transparent*, *Whit-*

ney Crab, *Haralson*, *Hawkeye Greening* and *Willow Twig* were uninjured in nurseries and orchards. The new varieties, *Edgewood*, *Secor* and *Sharon*, recently introduced by the Iowa Agricultural Experiment Station, fared better than the standard sorts such as *Grimes*, *Delicious*, *Golden Delicious* and members of the *Winesap* group. In general new varieties developed in Iowa, Minnesota and Canada were superior in cold resistance to the varieties developed in eastern states. *Cortland*, *Milton* and *Early McIntosh* were the least injured of the New York varieties; while *Orleans*, *Kendall*, *Newfane* and *Webster* were killed outright or badly injured.



Above: This Jonathan tree, grown on its own stem, was uninjured in its top, but the trunk was killed.



Left: Extensive commercial orchards in southwestern Iowa, like the one shown here, were almost total losses in many instances.