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Overcoming Winter Injury*

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WINTER injury to fruit trees causes great loss to fruit growers in the colder parts of the United States and Canada every year, but in some years the losses are so great that in many cases discouragement follows and new trees are not planted. Even in the warmer parts of the United States and Canada where the tenderer kinds of fruit are grown an occasional severe winter destroys many an orchard which after years of care had begun to bear profitable crops. We have been asked at this time to prepare a paper on "Overcoming Winter Injury," but it must be admitted at the outset that the best known methods of overcoming winter injury are not entirely satisfactory.

None of the important tree fruits grown in North America are indigenous. The apple, pear, domestic or European plum, Japanese plum, cherry, peach, orange and lemon are all natives of the old world and it would be difficult to find any district in North America where the climate both of the air and soil, is the same as where these fruits grew or grow wild in Europe or Asia. Centuries of acclimatization fixed limits beyond which these fruits did not perpetuate themselves, or, at least, spread but slowly, being probably killed out at their outer limits by very exceptional climatic conditions, either of summer or winter, occurring after long intervals, perhaps even of centuries.

It is not to be wondered at that these fruits transported to other climates which at first glance seemed to be very similar in most particulars to those in which they flourished at home, do not perpetuate themselves. It may be that there is not enough snow in the winter and the roots are killed, or it may be that it is too dry in summer and the trees die of drought, or it may be that the air is too dry in winter and the trees dry out. Too much rain late in summer may start the trees into new growth and they are in

bad condition to withstand the low temperatures of winter, and frequent changes in temperature in winter from high to low temperatures, and vice versa, may be new and too trying experiences for these imported fruits. It will require a long time to determine in what parts of America these fruits will become naturalized and what the limiting factors are which prevent their survival in other parts. While these trees are said to be hardy if they survive a few generations in a particular district, this term is only used in a relative sense. True hardiness is adaptability to environment not for a few generations or a few centuries but for many centuries. No increase in the ability of individual specimens, which

continue hardy long enough in his district to make it profitable for him to grow them. He finds by experience that the hardiest fruits for him come from the climates in the old world, or in America, most nearly resembling that in which he lives, or they come from varieties which are descended from species which come from climates most nearly resembling his own. Thus the first step in overcoming winter injury is to plant the hardiest varieties. Unfortunately, the hardiest varieties are not always the best in color, or quality, or may not be of the season of maturity which is desired. Man obtains what he wants by crossing the hardiest varieties with those having the other characteristics. He may extend the limits of the successful culture of the different kinds of cultivated fruit by crossing them with the native species.

There are not yet, however, sufficient hardy fruits having all the other desirable qualities, which are suited to all the climates in America where man would like to grow fruit, hence it is usually necessary to grow fruits which may not always prove hardy when there are unfavorable summers and exceptionally severe winters. In such cases, and they are numerous, it is necessary to resort to special methods of culture as an aid to overcoming winter injury.

It is not our purpose in this paper to deal with winter injury in the south, as we are not familiar enough with the conditions there to discuss the matter, but we believe that some of the methods here suggested of overcoming winter injury may be useful even in the citrus belts.

The Central Experiment Farm, Ottawa, Canada, is situated in latitude 45 degrees north, and 75 degrees west longitude. There is usually a sufficient supply of moisture and heat during the growing season to cause a strong growth on healthy trees of apple, pear, domestica plum, cherry and peach, and there is usually a good covering of snow to protect the roots of the trees in winter. The temperature in winter seldom goes as low as 30 degrees F. below zero, and very rarely any lower. Winter sets in as a rule during the latter part of November with the ground frozen and there are usually few thaws between that and the middle of March. The snow, as a

Delightful and Instructive

THE CANADIAN HORTICULTURIST is not only a source of delight for one interested in horticulture, but unusually instructive on things that pertain to the culture of plants, shrubs and fruits. It is to me a treat to read the well written essays, including the discussions on the improvement of home grounds and of parks.—A. E. Small, Buffalo, N. Y.

were half hardy or which killed to the ground twenty years ago, to withstand adverse climatic conditions at Ottawa, has been noticed at Ottawa.

The natural perpetuation of the species or variety, or the extension of its range when not under cultivation, need not, however, cause any anxiety to the fruit grower. His object is to extend the *successful culture* of the different fruits over as wide a territory and as great a diversity of climates as possible, and he can, if his trees are all destroyed, soon plant a new orchard of the same varieties from other sources; whereas in nature long periods might elapse, after a series of exceptional years, when there had been great destruction to trees, before the range of the species was again extended.

There is a great difference in the hardiness of varieties of the same kind of fruit and it is only by experiment that man is able to determine what varieties will

*A part of a paper read at the meeting of the American Pomological Society, held at St. Catharines, Ont., in September. The forms of winter injury mentioned in the concluding paragraph of the matter herewith published already have been discussed by Mr. Macoun in the columns of THE CANADIAN HORTICULTURIST and of Farm and Dairy, which is published in the same office. Any person not familiar with what Mr. Macoun has said on these subjects, may secure copies of Mr. Macoun's report for year ending March 31, 1908, by writing to the Central Experimental Farm, Ottawa.