

It is for the reasons illustrated above that I choose to qualify the title of this essay as I do, and to speak of apple culture in the "Cold" North, not merely in the north. And perhaps, in order to be entirely definite, I should say that by the Cold North I mean those regions where the winter temperature often sinks 20° below the zero of Fahrenheit, and sometimes more than 40° below that point—those regions, in short, where the mercury sometimes freezes in the bulb.

There can be little doubt that there is an exact limit to the vitality of every species and variety of plant, as regards temperature. Whether that limit in the downward direction is the point of complete congelation, as some maintain, I, in common with most fruit-growers in the Cold North, have serious doubts. Where mercury freezes, I do not believe that any portion of the sap of any tree remains unfrozen; yet the trees adapted to such extremes endure them unharmed. Our experience tells us that varieties of trees which endure without injury a temperature of 20° , are killed at 25° , and so on, all the way down, until at last all but the birch, the spruce and the willow perish, where 60° to 85° are recorded by Arctic explorers.

It is plain that there can be no safety in planting an orchard of trees that cannot be relied upon to endure all probable extremes of cold in the place where they are to grow. Hundreds of those who have thought differently have been brought most unwillingly to accept this conclusion as one not to be evaded. Therefore the limit of successful orcharding northward is absolutely determined by two factors: the intensity of the cold, and the resisting power of the trees. Practically, in the Cold North of which I write, the planting of orchards must be limited to the species and varieties that are not killed by a minus temperature of 42° . This is the *aerial* temperature. A much less degree of cold will destroy the roots of any kind of fruit tree with which I am acquainted.

This last mentioned fact, that the roots of fruit trees are much more easily killed by cold than the trunks and limbs, one of the highest importance, and one which is not y