"The *old honest* method of using the *whole* healthy seedling as a stock, alone should be practised. The object to obtain longevity and fruitfulness can only be obtained by giving a tree, for its basis a healthy stock capable of penetrating the soil with strong roots, and an abundance of lateral roots to draw its nutrition.'

First Vice President *T. T. Lyon*, "*Am. Pom. Soc.* says It is plainly against nature to take a cion which has grown up in the air and sunshine, place it under ground, and expect it to change its nature so as to make a perfect root system as if it were a seedling

Benjamin G. Smith, Pres Mass. Agricultural Society says: I thoroughly believe in whole stocks for grafting.

Franklin Davis, 1st Vice-President American Pomological Society: We must plant the whole stock leaving the crown as nature formed it. We know that such trees are the best, and in making an improvement so important as an Orchard, there is no economy in using the inferior article.

Judge S. Miller: "The whole root is the *natural* system and we cannot stray from this line without deterioration sooner or later.

Prof. Mehan, a life member of the American Pomological Society. A few weak fibrous roots are no value to a tree, we want the large roots also which are full of strength &c.

Prof. *L. H. Bailey* Department of Agriculture, Cornel University, says. "cuttings of roots always form new roots on one side and in 9 cases out of ten these are stronger on one side than the other.

"Piece root grafted trees have not so much strength to start with, they are more straggling, are apt to tip over, and are not so long lived.

"Trees grafted on whole roots have more force; a larger engine and more power behind.

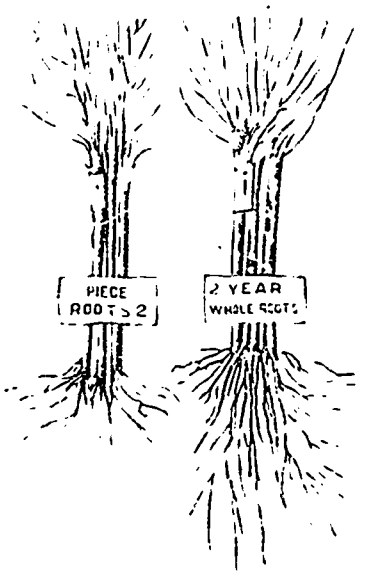
In Illinois the consensus of opinion is entirely in favour of whole roots, and the State Horticultural Society advises all to investigate before they plant piece root trees. No doubt a host of further evidence might be adduced to establish the theory and exemplify the practice of whole root grafting, but the following wood cuts, taken from photographs, should be enough to convince the advocates of sectional root grafting that their plan is unnatural, unprofitable, except to the nurserymen who make them, like the pedlar's razors, for sale, not for use.

The two following copies of photographs are taken from trees grown in the nurseries of Messrs Stark Bros. Louisiana, and No. 3 from a photo used by Mr. Prof. L H. Bailey of Cornell University in illustrating an address on root grafting and budding before the American Nurserymen's Association.

From what has been adduced, it would appear that the unmitiated should be cautioned against the danger of being supplied with trees which are not properly grown so as to make healthy and successful growth in their hands. Perhaps the advocates of piece root grafts may be able to see a way by which they can overcome the difficulties enumerated above, and as long as they are honest in their convictions and do not advocate the method for the purpose of manufacturing a cheap article irrespective of its intrinsic quality, nothingcan be said, but thedangers attending it should be set before the public so as to guard them against disappointment and loss so injurious to the good cause of fruit culture.

George Moore.

Copy from photo showing (1) piece root apple tree 2 yrs 3 to 4 feet. (2) piece root 2 yrs 4 to 5 feet. (3) WHOLE ROOT *grafted apple 2 years.*



Ben Davis—2 years in Stok

a Piece root 3 year old. *b* and *c* show how piece root-grafts grow on one side.

Experiments in Root Grafting

Advance copy of Report for 1892.

It would seem that for the milder portions of Quebec and Ontario, where root-killing is unknown, budded trees (especially as we have no reliable data bearing upon the relative length of life of budded and grafted stock) will give the most satisfactory results. But for the colder portions of our country, the piece-root would seem to serve an almost indispensable purpose, where extreme hardiness is desired; and when a variety of known hardiness is used—placed upon the piece-root, which acts as a temporary support till roots of its own are developed. We thus obtain a tree upon its own roots, the most desirable of all kinds, and without doubt the one that will best withstand the vicissitudes of our climate. It has been my experience that good apple trees, for all situations, can be grown by using only the first and second sections of root, which should not be less than 3½ inches in lengh and the scion between 5 and 6 inches. These when properly joined together will, under ordinary conditions, make a growth which, if not equal to a budded tree the first year, will generally be quite satisfactory.

The pear is almost entirely propagated by budding. There are a few nursery firms in the Eastern States which, to demonstrate conclusively, if possible, which is the best method of propagating the apple for northern sections, began last year a series of experiments in root-grafting. In this experiment, whole roots and sections o roots are used and kept apart for the purpose of comparison. I have photographs with me, illustrating the development of these grafts at the close of the first year. I will not take the time to stop and explain them, but I will place them here for your inspection. They show the process of development of these trees propagated by the different methods. This work of root examination will be continued from year to year, as was done the past autum, when a sample tree propagated by each method was taken up and the root system carefully examined, and by the photographs you will see the changes which are already apparent—the whole root-graft making the strongest growth but showing a tendency to sprout. The first section seems very satisfactory. This work will be continued till conclusive and reliable evidence is gained upon it.

John Craig

Horticulturist Central Expt Farm Ottawa.

It is gratifying to note by the above that experiments are being made to test the question of grafting on root pieces as the efficacy of the practice is doubtful in some cases.

The piece-root may be good to act as a temporary support to the tree until it makes roots of its own, but the question is; is a tree on its own roots always the most desirable?

In cases of weak growing sorts, at least, the propo-ition is open to discussion. We know that the natural vigor of a tree is reduced by grafting on a dwarf growing stock, as witness the apple on the Paradise stock, the pear on the quince, &c, and many roses are increased in vigor of growth and production of flowers by being budded on the robust dog-rose.

If the stock is hardy, there seems no reason why the hardiness of the tree should be impaired by grafting.

Is it not probable that many grafted trees are not hardy because they are not hardy crab-stocks but on such as are raised from an indiscriminate mixture of apple seeds?

It is admitted that the whole root graft makes the strongest growth, cannot the tendency to sprout be overcome by removing the suckers as they appear? however, *experientia docebit.*

Geo. Moore.

Orcharding at the North

With our constantly-increasing knowledge of fruits and fruit culture, and the growing interests of the masses, the area devoted to orcharding in this province and throughout the Dominion is continually widening, and from present indications it would seem, at first sight, but a short interval before the time was reached when the various horticultural products adapted to our soil and climatic conditions could no longer be profitably grown On second consideration, however, it will readily be seen that as our knowledge of varieties and their capabilities becomes more exact, so will our ability to produce fruit of a higher grade of excellence be correspondingly increased, so that skill assisting well-directed effort will place on the market, at a greatly decreased expenditure, an article of superior quality, thus more than off-setting the decrease in price on account of the largely augmented total market product.

We may safely take it as an axiom in successful orcharding that the healtthiest trees produce the finest fruit—fruit the best in quality, the longest keeping, and samples the handsomest in appearance. With this proposition submitted, let us consider the best means of attaining such a desirable end. Taking it for granted that we have healthy, well grown, two-or three-year old nursery trees—the former are preferable in my opinion—and desire to plant an orchard: Select well-drained, loamy soil of good depth, with a northern exposure. Any treatment previous to planting which will bring the soil into a fair state of tilth is very desirable. A root or hoed crop is particularly useful towards securing this effect. Stake out the rows thirty to forty feet apart for such large growing varieties as Golden Russet, Famouse and St. Lawrence; for varieties which come into bearing earlier, and are shorter-lived, 18 x 24 feet will be a sufficient distance. Duchess, Yellow Transparent, and Wealthy are good examples of this class. Be generous in digging the holes, give plenty of space for the roots, in addition to a thoroughly pulverised root-bed at the bottom, made by replacing the more or less infertile subsoil with richer material from the surface. You will