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DWARF APPLES NOT COMMERCIALY PROMISING.

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SUMMARIZED BY  
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FROM BULLETIN BY  
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## DWARF APPLES NOT COMMERCIALY PROMISING.

F. H. HALL.

**Advantages of dwarf apples few.** After a ten-year test in three orchards, under widely varying climatic and soil conditions, the Station cannot recommend dwarf apple trees for the professional grower. They come into bearing but little, if any, earlier than standard trees of the same varieties, and the amount of fruit so produced is too small to make the difference in bearing age of the two classes of trees of commercial value. Though ten years is too short a time to test productiveness thoroughly, there are no indications that the larger number of dwarf trees on an acre will yield more fruit than the proper number of standard trees.

In these experiments, also, the fruit on the dwarf trees was not, nor did it appear as though it would ever be, larger, handsomer or better flavored than that on full-sized trees of the same kinds.

The small size of the trees on dwarfing stocks makes it possible to grow more trees, and, consequently, more varieties, if desired, on a given area, and the dwarfed trees are more ornamental than standards. These points may make trees of this type useful and valuable to the amateur grower; but they are of no advantage to the commercial orchardist.

**Some disadvantages.** On the other hand, dwarf trees have several disadvantages that prevent their selection by growers of fruit for market. There is great confusion in apple stocks in America, as well as in Europe, and it is difficult, and sometimes proves impossible, to get trees on the dwarfing stock desired. This is a distinct detriment; for a half-dwarf tree, where one desires a true dwarf, is almost as much out of place as would be a standard. Dwarfed trees are usually sold at a higher price per tree than standards, which gives a very high acre-cost since from four to nine times as many dwarfs would be needed as standards.

In the cold climate of New York, semi-dwarf and dwarf trees, particularly the latter, are very liable to winter injury or to winter killing.

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\* This is a brief review of Bulletin No. 406 of this Station, on Dwarf Apples, by U. P. Hedrick. Anyone specially interested in the details of the investigation will be furnished, on request, with a copy of the complete bulletin. Names of those who so desire will be placed on the Station mailing list to receive copies of future bulletins as issued, either popular or complete edition as requested.

The union between stock and cion is not as good with dwarf trees as with standards, consequently more dwarf trees break off and are lost.

To maintain the trees as dwarfs requires watchfulness and labor, since the cions frequently throw out roots if the union is at or near the surface of the ground. These roots must be removed or the trees quickly cease to be dwarfs.

The rooting system of dwarfing stocks is relatively shallow, which results in several disadvantages: The dwarf trees are easily blown over, particularly when heavy with fruit; they suffer more from drought than do the deeper-rooting standard trees, and they cannot be so thoroughly cultivated to conserve the moisture because of the shallow-rooting habit; in cultivating root injuries are frequent, leading to lessened vitality of the tree, to ready entrance of disease, and to the formation of suckers, a vexatious trouble of dwarf stocks. Suckering is due also, no doubt, to the fact that dwarf stocks are usually propagated from cuttings or layers.

To maintain the trees as dwarfs some summer pruning is necessary, and it has been found impossible during the ten years to find a method and a time that will assure satisfactory results from summer pruning. On the one hand, the results for which summer pruning is done, maintenance of dwarfness and promotion of fruitfulness, do not always follow; and, on the other hand, positive harm often results because of the weak, sickly, second growth which often is an after effect, and which nearly always succumbs the following winter.

**The tests  
in brief.**

The Station tests really owe their origin to the feeling, some fifteen years ago, that San José scale had come to New York State to stay and that it could probably be controlled only by fumigating the trees under tents. This would be, practically, an impossibility with mature standard trees, but would be a feasible method with dwarfs. Could dwarfs be substituted for standards and the productivity of New York orchards still be maintained? Interest in dwarf apples had also been stimulated from various quarters and it was held that advantages aside from ease in scale control made them a commercial possibility.

Accordingly the Station, at the request of various horticultural organizations, began an investigation with trees of this type and set three orchards, in cooperation with the owners. These were on the farms, respectively, of Edward Van Alstyne at Kinderhook in the Hudson Valley, of F. E. Dawley at Fayetteville in central New York, and of Albert Wood & Son at Carlton, in great western New York apple region.

These orchards are as diverse in soil and climatic conditions as they are separated in distance; so that success or failure in them should prove the applicability, or the reverse, of dwarf-apple culture in the whole state.

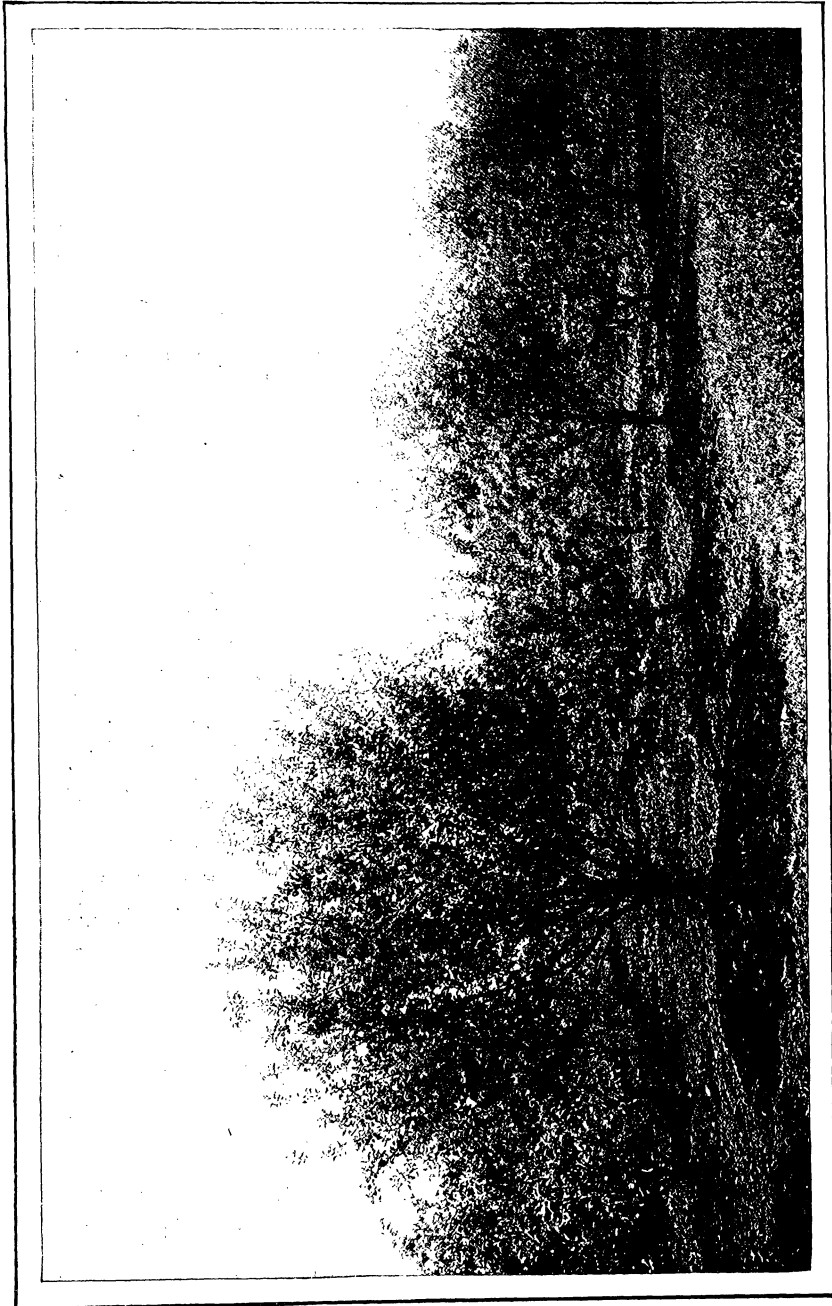


PLATE I.—WOOD ORCHARD: TREES ON FRENCH CRAB, DOUCIN AND PARADISE STOCKS.



PLATE II.—WAGNER APPLE TREES ON PARADISE STOCK BLOWN OVER, TEN YEARS FROM SETTING.

The Wood orchard was set in the fall of 1903, with trees one year from the bud. The other two were set in the autumn of 1904 with trees two years from the bud. The trees were cut to whips at planting, which proved a bad plan, as growth was none too vigorous and many of the trees failed to put out enough buds to make satisfactory heads. It would have been better to grow the trees a year longer in the nursery and form the heads there, in part, at least.

In each case it was planned to grow a permanent orchard of standard trees,—on French crab stock,—with fillers on Doucin stock — which produces half-dwarf trees — and, between these, fillers on Paradise stock — which gives true dwarfs. In the Wood orchard the trees were set fifteen feet apart, in the other two orchards twelve feet.

The Van Alstyne orchard was planted to 306 trees on the three stocks as follows: Standard trees, 27; on Doucin stock, 153 trees; on Paradise, 126. These were distributed among the following varieties: Baldwin, Boiken, Holland Pippin, Hubbardston, Jonathan, Lady, McIntosh, R. I. Greening, Rome, Sutton, Wealthy and Wagener.

The Dawley orchard was planted with 512 trees, the number on each stock being: Standard, 42; Doucin, 161; Paradise, 309. The following are the varieties: Alexander, Baldwin, Boiken, Esopus, Gravenstein, Green Sweet, Grimes, Hubbardston, Jacob Sweet, Jonathan, Longfield, McIntosh, Monmouth, Northern Spy, Pumpkin Sweet, R. I. Greening, Rome, Sutton, Wagener, Wealthy, Wolf River, Yellow Transparent.

In the Wood orchard there were originally 375 trees: 45 on standard, 110 on Doucin and 220 on Paradise stocks, distributed among the varieties Alexander, Baldwin, Ben Davis, Boiken, Gravenstein, Holland Winter, Jonathan, Lady, McIntosh, Monmouth, R. I. Greening, Rome, Sutton, Bismark, Twenty Ounce and Wealthy.

**Care of  
the  
orchards.**

Clean cultivation, with cover crops, usually legumes, was adopted as the method of tillage in each orchard, which was followed throughout with slight changes as conditions demanded; and the trees were sprayed whenever necessary. Much time and labor had to be given each year to removing suckers and cion roots, operations essential to keep the trees true to type and to maintain their vigor. Pruning also was a perplexing problem, since the severe trimming of the trees at setting made it difficult to secure good heads in many cases. The winter pruning was not unlike that of standards, though more heading back was needed to restrict the size of the trees. Summer pruning is a necessity in the successful culture of dwarf trees, but no satisfactory system was developed by a series of experiments in the three orchards extending over ten years in time. "We have been forced to conclude that the great variations in temperature and moisture in the summer and the cold winters in New York almost or quite debar the summer pruning here that is practical in the Old World."

The usual orchard mishaps occurred, like failure of trees to grow, girdling by mice, injury by stray animals, death from blight or from unknown causes, but the percentage of loss was small from these incidental perils of all orchard culture; but it was large from those apparently due to the dwarfness of the trees. Many trees winter killed; many failed to make a good union, with death or failure as the result; and the surface-rooting habit caused an unexpected number of deaths and failures. At the end of the tests the number of missing or replaced trees was quite too large for profitable orcharding.

### **Fruit bearing.**

Contrary to what has been generally claimed for dwarf trees, ten years from bud proved too short a time to give satisfactory data regarding productiveness. This is in part, undoubtedly, due to the whip-pruning of the trees at setting, the severe pruning necessary later to secure good heads, and the experiments in summer pruning; but the dwarfness of trees on either Doucin or Paradise stock has not induced notably earlier fruiting. In all three orchards the Paradise trees came in bearing soonest; but in no one of the three orchards was there what could be called a commercial crop on any of the stocks until the tenth year after setting. Then, taking an average of the three orchards, the standard trees bore  $66\frac{1}{2}$  pounds each, those on Doucin  $63\frac{2}{3}$  pounds and those on Paradise 52 pounds.

Computed on the acre basis, this would make the Paradise most productive for the first ten years, Doucin next and standards last, the acre yields thus coming in the order of dwarfness. But so many exceptions could rightly be made to this calculation that it is hardly worth making. Those who have watched the experiment have been surprised at the comparatively small yield of the Paradise trees. Few, indeed, are the trees of this true dwarf type that have been bent to the ground with a load of fruit as they have been so often depicted.

The figures are hardly fair to the dwarfing stocks; for the orchard conditions in this test have been better suited to the standard trees so that both in matter of yield and in time of coming in bearing, the figures favor the standards. On the other hand there is no question but that the eye always favors the dwarf trees. Such trees are seen loaded with fruit and the conclusion follows that they have come in bearing earlier and are more productive than larger trees which really bear more fruit, either per tree or per acre, though seeming to carry less. Dwarfs are much more spectacular than standard trees—hence, in part, their reputation for early and productive bearing.

The same is true also regarding the color and quality of the fruit on trees of the two types. The fruit on the dwarf tree is close to the eye and therefore in stronger contrast with the foliage, so it appears larger and brighter than that on larger trees; but when picked and compared it would be almost impossible to tell from which type

of tree the fruit came. Again, dwarf trees are commonly pruned more severely, the crop thinned, and the trees, generally, given better care, which, of course, make a more attractive crop than one grown on less well cared for standards. Grown under as nearly identical conditions as possible, as on the trees in these tests, it is doubtful whether there is much difference in the product of the trees on the three stocks.