Title: Dwarf Fruit Trees

Author: F. A. Waugh

Release date: November 15, 2011 [EBook #38024]

Language: English

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DWARF FRUIT TREES

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DWARF FRUIT TREES

THEIR PROPAGATION, PRUNING, AND GENERAL MANAGEMENT, ADAPTED TO THE UNITED STATES AND CANADA

By

F. A. WAUGH

ILLUSTRATED

NEW YORK

ORANGE JUDD COMPANY

1906

PREFACE

[Pg vii]

The commercial interests have so continuously and completely held the horticultural stage in America during the last two decades that it has been impossible for amateur horticulture to get in a word edgewise. Any public speaker or writer has had to talk about several acres at a time or he would not be listened to. He has been obliged to insist that his scheme would pay on a commercial scale before anyone would hear, much less consider, what he had to tell.

But now a change is coming. Different conditions are already upon us. A thousand signs indicate the new era. With hundreds—yes thousands—of men and women now horticulture is an avocation, a pastime. They grow trees largely for the pleasure of it; and their gardens are built amidst surroundings which would make commercial pomology laugh at itself.

And so I undertake to offer the first American fruit book in a quarter century which can boldly declare its independence of the professional element in fruit growing. I am confident that dwarf fruit trees have some commercial possibilities, but they are of far greater importance to the small householder, the owner of the private "estate," the village dweller, the suburbanite and the commuter.

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In other words, while I hope that all good people will be interested in dwarf fruit trees and that some of them will share the enthusiasm of which this book is begotten, I do not want anyone to think that I have issued any guaranty, expressed or implied, that dwarf trees will open a paying commercial enterprise. Because the argument that a thing pays has been so long the only recommendation offered for any horticultural scheme, many persons have formed the habit of assuming that every sort of praise stands on this one foundation.

F. A. WAUGH.

Massachusetts Agricultural College, 1906.

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DWARF FRUIT TREES

I

GENERAL CONSIDERATIONS

A dwarf fruit tree is simply one which does not reach full size. It is not so large as it might be expected to be. It is smaller than a normal tree of the same variety and age.

There are indeed some trees which are normally dwarf, so to speak. They never reach a considerable size. They are smaller than other better known and related species. For example, the species *Prunus pumila besseyi* is sometimes called the dwarf sand cherry, simply because it is always notably smaller than related species. The Paradise apple is spoken of as a dwarf because it never attains the stature which other apples attain.

But in the technical sense, as the term is used by nurserymen and pomologists, a dwarf tree is one which is made, by some artificial means, to grow smaller than normal trees of the same variety.

These artificial means used for making dwarf trees are chiefly three: (1) propagation on dwarfing stocks, (2) repressive pruning, and (3) training to some prescribed form. [Pg 2]

DWARFING STOCKS

The most common and important means of securing dwarf trees is that of propagating them on dwarfing stocks. These are simply such roots as make a slower and weaker growth than the trees from which cions are taken. This will be understood better from a concrete example. The quince tree normally grows slower than the pear, and usually reaches about half the size at maturity. Now pear cions will unite readily with quince roots and will grow in good health for many years. But when a pear tree is thus dependent for daily food on a quince root it fares like Oliver Twist. It never gets enough. It is always starved. It makes considerably less annual growth, and never (or at least seldom) reaches the size which it might have reached if it had been growing on a pear root.

This is, somewhat roughly stated, the whole theory of dwarfing fruit trees by grafting them on slow-growing stocks. The tree top is always under-nourished and thus restrained in its ambitious growth of branches, as seen in Fig. 1.

While the tree is made thus smaller by being grafted on a restraining root, it is not affected in its other characteristics. At least theoretically it is not. It still bears the same kind of fruit and foliage. Bartlett pear trees budded on quince roots yield fruit true to name. The pears are still Bartletts, and can not be told from those grown on an ordinary tree. Sometimes the fruit from dwarf trees seems to be better colored or better flavored than that from standard trees; but such differences are very delicate and usually receive slight thought. [Pg 3]

FIG. 1—DWARF APPLE TREES IN WESTERN NEW YORK

Dwarf fruit trees have not been very largely grown in America, but have been much more widely used in Europe. This statement holds good either for commercial plantations or for private fruit gardens. They are coming into more common use in this country because, in both market orchards and amateur gardens, our pomology is coming to be somewhat more like that of Europe. Our conditions are approaching those of the Old World, even though they will always be very different from those of Europe in horticultural matters. [Pg 4]

Dwarf fruit trees are particularly valuable in small gardens; and small gardens are becoming constantly more popular among our urban, and especially our suburban, population. This matter is discussed more fully in another chapter. Fruit of finer quality can be grown on dwarf trees, as a general rule, than can usually be grown on standard trees. Every year there are more people in America who are willing to take any necessary pains to secure fruit of extra quality. This remark applies particularly to amateur fruit growers and to owners of private estates who grow fruit for their own tables, but it is no less true of a certain class of fruit buyers, especially in the richer cities. Although $3 a barrel is still a high price for ordinary good apples, sales of fancy apples at $3 a dozen fruits are by no means infrequent in the city markets every winter.

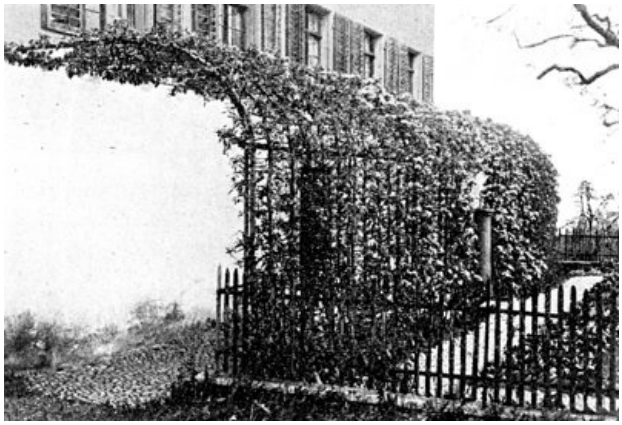

FIG. 2—TRAINED CORDON APPLE TREES
From Loebner's "Zwergobstbäume"

In this respect also we are approaching European conditions. In the markets of the continental capitals in particular fancy fruits are frequently sold at prices which seem almost incredible to an American. Single apples sometimes bring 50 cents to a dollar, and peaches an equal price. Just recently a story has been going the rounds of the newspapers that the caterer for the Czar's table sometimes pays as high as $15 apiece for peaches for the royal table. Hereupon a solemn American editor remarked that if the whole royal family should live upon nothing but peaches it would still be cheaper than carrying on the Japanese war. [Pg 6]

Now if there is anywhere within reach a market for apples or peaches at $3 a dozen specimens—and there unquestionably is—then it will pay to grow fancy fruits with special care to meet this demand. This kind of fruit can be grown better upon dwarf trees than upon standards in many cases, if not in most. At least such is the conviction of the present writer. Moreover this has been the experience in the old country.

With such facts in view there seems to be a possible future for dwarf fruit trees, even for commercial purposes. Their present utility in amateur gardens and on wealthy private estates can not be questioned. These various amateur and commercial adaptations of dwarf trees will have to be more carefully analyzed and discussed in a future chapter, and the subject may therefore be dropped for the present.

FIG. 3—BISMARCK APPLE, FIRST YEAR PLANTED
22 inches high; bearing 4 fruits

II

[Pg 8]

ADVANTAGES AND DISADVANTAGES

It is a good prejudice which expects every man who writes anything to be enthusiastic over his subject. Such enthusiasm doubtless leads a writer many times to over-state his case, and to claim more than the calm judgment of the multitude will ratify. And on the other hand, readers usually tacitly discount the statements of any man who writes about any matter in which he is plainly interested. The present writer knows that he is also under the ban, and that the reader firmly expects him to claim more for dwarf fruit trees than their merits will fairly warrant. This expectation the writer hopes to disappoint. It will be enough to set down here the obvious advantages and disadvantages which the horticulturist will meet in handling dwarf fruit trees. These statements are mostly of matters of common experience and they need no coloring to make them serve their present purpose.

We may fairly set down the following good points standing more or less generally to the credit of dwarf fruit trees:

1. *Early bearing.*—This is a sufficiently obvious advantage. The Alexander apple will bear the second year after planting when grown as a dwarf, while it requires six to ten years to come into bearing as a standard. This habit of early bearing proves valuable in many ways. It encourages men to plant trees. The disinclination of old men to plant trees rests upon the slenderness of the chance that they will ever gather of the fruit. But a man may plant dwarf trees whenever his expectation of life is two years or more. Such trees would serve octogenarians, consumptives and those sentenced to be hanged for murder.

[Pg 9]

FIG. 4—PEAR TREE, TRAINED AS AN ESPALIER

Early bearing—to return to the subject—makes dwarf trees valuable to that large and unfortunately growing class of citizens who rent the premises where they live. They do not expect to stay more than five or six years in any one place. In that length of time ordinary trees would not begin to yield any fruit. But with dwarf trees there is excellent probability of seeing something ripen. Then again early bearing is a great advantage when one is testing new or old varieties. It is a great advantage when a commercial orchard is designed and when dwarf trees are used for fillers as explained below.

[Pg 10]

2. *Small size.*—The very smallness of the dwarf trees has many advantages in it. The trees are easier to reach and to care for. They are easier to prune and to spray. This facility in spraying is what has chiefly recommended smaller fruit trees to commercial fruit growers in recent years. Particularly in those places where the San José scale is a perennial problem a very large tree becomes an impossibility, and the smaller the trees can be the better it suits.

The small size of dwarf trees permits the planting of larger numbers on a given area. This is specially worth while to the amateur who has a small garden where only three or four standard trees could grow, but where he can comfortably handle forty or fifty dwarfs. Yet it is also worth the consideration of the commercial fruit grower who is trying to earn a profit on expensive land. If he can increase the number of bearing trees on each acre, especially during the early years of establishing his orchard, it almost certainly means increased income.

FIG. 5—BUSH APPLE TREE, THREE YEARS PLANTED

3. *High quality.*—It is not perfectly certain that every kind of fruit can be produced in higher quality on dwarf trees than on standards, but such is the general rule. This is

notably true of certain pears, as Buerré Giffard and Doyenne du Comice, and it is generally the case with all apples that can be successfully grown on Paradise roots. One can secure size, color, flavor and finish on an Alexander or a Ribston Pippin, for example, which can never be secured on a standard tree. One who has not seen this thing done will hardly understand it; those who have will not need more argument. Such plums as we have fruited on dwarf trees have shown similar improvement in quality, being always distinctly superior to the same varieties grown on standard trees. The significance of these facts will appear at once to any one familiar with the course of the fruit markets in America. There are greater rewards awaiting the fruit grower who can produce fruit of superior quality than the one who succeeds merely in increasing the quantity of his output. [Pg 12]

SPECIAL USES FOR DWARF TREES

These various items of advantage recommend dwarf fruit trees for several specific purposes, some of which are worth pointing out in detail.

1. *For suburban places.*—A large and increasing percentage of our population now lives the suburban life—in that zone where city and country meet. They have small tracts of land, which, however, they too often lease instead of owning. On these they do more or less gardening,—usually more, in proportion to the size of their holdings. For them dwarf fruit trees are a precious boon. It is possible to plant three hundred to five hundred dwarf fruit trees on a quarter of an acre, where less than a dozen standard trees would flourish. This gives the opportunity to experiment with all sorts and varieties of fruits, a privilege very dear to the heart of the commuter. The dwarf fruit trees also work more readily into a scheme of more or less ornamental gardening, where fruits are combined with vegetables and flowers. Especially if some sort of formal gardening is attempted, the cordons, espaliers and pyramids exactly suit the demands. Then the fact, already mentioned, that the dwarf trees come into bearing much sooner, is a consideration of the highest value to the suburban gardener. He fully expects to move from one home to another at least once in ten years, if not once in five. With the best of intentions and the most favorable of opportunities he can hardly expect to settle down anywhere for life. The suburbs themselves change too rapidly for that; and the place which today is away off in the country may be all covered with factories five years from now. It is terribly discouraging, under such circumstances, to plant a tree knowing that ten years must pass before any considerable fruitage can be expected from it. It is altogether another feeling with which one plants a tree which promises fruit within two or three years. [Pg 13]

So that, whatever the drawbacks to the planting of dwarfs, they are the salvation of the suburban garden. For such circumstances they can be freely recommended, without exception or reservation.

2. *For orchard fillers.*—As commercial orcharding becomes more refined, under the stress of modern competition, and as good orchard land increases in value, up to one hundred, two hundred, or even three hundred dollars an acre, new methods must be adopted with a view to increasing the returns. This opportunity looms especially large for the first few years after the establishment of the commercial orchard, more particularly the apple orchard. When standard trees are planted thirty-five to the acre, which is now the usual practice, the land is not more than one-fourth occupied for the first five years, and not more than half occupied for the first ten years. Indeed it is full twenty years from the time of planting before the thirty-five apple trees will use the whole acre. And since a good farmer can not afford to let expensive land lie idle he has before him a very pretty problem to determine how the space between the standard trees shall be utilized during the early years of the orchard's growth. [Pg 14]

Several different methods are in vogue for the solution of this problem; but probably the best one is that system which supplies fillers or temporary trees between the standard or permanent ones. In an orchard of standard apple trees these fillers may very properly be dwarf apple trees; or between standard pears dwarf pears may be planted. If there are thirty-five standard apple trees to an acre, and if a dwarf tree is placed half way between each two standards in every direction, including the diagonal direction, this will make one hundred and five dwarf trees, or one hundred and forty trees in all, instead of the thirty-five trees with which the acre of apple orchard land is more commonly furnished. The dwarf apple trees will be bearing good crops at the end of five years at most; and they can be kept on the land for five years longer at the least, before they will begin to crowd the permanent standards. During these five years, if the orchard has a paying management at all, they will easily pay all the expenses of the enterprise, and should leave a substantial balance of profit. [Pg 15]

As this system of filling, or interplanting, commercial orchards is becoming more and more common, the suitability of dwarf trees, for this purpose, becomes more generally evident.

3. *For school gardens.*—Thus far school gardens in America have been mostly temporary and experimental affairs. But we are already satisfied that they have come to stay, and that gardening in some form will be a permanent feature of the curriculum in many of our best schools. As soon as a school garden becomes a permanent institution, with ground of its own to be held in use year after year, the dependence on annual crops will give way to the use of various perennial plants, shrubs and trees.

And among these dwarf fruit trees will naturally be one of the first introductions. Their small size adapts them to the school premises, their habit of early bearing again serves to recommend them most strikingly, and the special opportunity which they offer to pupils to observe details of pruning and other items of tree management, make them almost a first necessity in the permanent school garden.

4. *For covering walls and fences.*—There are many places about every farm, suburban establishment, or even about many city homes, where back walls and fences could be put out of sight very agreeably by almost any sort of foliage. Various ornamental climbers and creepers are in vogue for this service; but a certain number [Pg 16] of such unattractive walls and fences could be treated quite as acceptably, from the esthetic point of view, with trained fruit trees, and the result would be more satisfactory in some other ways. Apples or pears trained as cordons or espaliers, or peaches, nectarines, or cherries in fan forms, will thrive on almost any brick or wooden wall, except those with a northern front. It is necessary only to supply a proper soil, to plant sound trees of proper sorts, and to give them the prescribed care. The result is not only a thing of beauty but one of practical utility as well.

There are many places where the owner of a city or suburban lot can secure the fun and the substantial benefits belonging to the fruit grower on land that would be otherwise wasted, if he will only build a woven wire fence on the property line between him and his not-too-agreeable neighbor, using this fence as a support for a row of cordon plums, pears or apples. If he has time and inclination to do a little more work with the trees he can better plant U-form peaches, nectarines or apricots, or he can grow plums in U-form, or he can have fan-form cherry trees, or apples or pears in Verrier-palmettes. One of the most interesting and productive lots in the author's dwarf fruit garden is a row of plum trees on such a woven wire trellis. The trees in this row stand two feet apart, and form a perfect screen. (Fig. 6.) The majority of the trees which were necessarily taken for planting this row were not propagated on suitable stocks, and many varieties were introduced for experimental purposes which were obviously unadapted to this mode of training, but nevertheless [Pg 17] the net result has been highly satisfactory.

FIG. 6—PLUMS AS UPRIGHT CORDONS, SET TWO FEET APART

In a very similar manner apple, pear or plum trees may be trained so as to form an arched arbor way. In this kind of make-up they present a most agreeable novelty. An example of this kind of training is shown in the illustration, page 5. For this purpose [Pg 18] cordon trees are usually best; though peach or apricot trees in U-form or double U-form will answer very well. Even apple trees or pears formed as palmettes-Verrier can be carried up over an arched trellis.

Mr. Geo. Bunyard in "The Fruit Garden" tells of carrying apple trees up over the slate roof of an outbuilding, with marked success. The fruit-bearing portion of the trees,

lying there on the slate roof beautifully exposed to the sun above, and assisted by the heat absorbed and radiated by the slate, yielded large crops of apples of very superior quality.

SOME DISADVANTAGES

There are, of course, some disadvantages in growing dwarf fruit trees, and these should be examined with as much care as the advantages. The more important ones are as follows:

1. *Greater expense.*—The trees are somewhat harder to propagate, and therefore cost more. There is no general demand for them in America, so that they are carried by only a few nurseries and are not looked upon as staple goods even with those dealers; and on this account the price is necessarily increased. Thus each tree costs more than a similar tree of the same age and variety propagated in the usual way. But the greatest increase of expense comes from the fact that many more trees are required to plant the same area. There is often an advantage, as already argued, in planting more trees to the acre, but it costs something to gain this advantage. An acre of ground can be planted with thirty-five standard apple trees set thirty-five feet [Pg 19] apart each way, and these trees will cost, roughly estimating retail prices at $12 a hundred, $4.20. To plant an acre to dwarf apple trees, setting them six feet apart each way, which is about as thick as these trees should ever be planted, will require 1,210 trees. Estimating the retail price roughly at $15 a hundred this would make the first cost $181.50—a considerably greater initial investment in the orchard.

2. *The trees are shorter lived.*—This statement is true for certain kinds of dwarf trees, but not for others. Certain varieties of pears, for example, which do not unite well with the quince root, naturally make short lived trees. On the other hand other varieties of pears appear to live as long and thrive fully as well on quince roots as on pear roots. There is a common belief, especially in England, that apples worked on French paradise roots are apt to be short-lived. The nurserymen who hold this belief contend, however, that the so-called English Paradise, more properly called Doucin, supplies a stock on which apples will live to as great an age as on any other stock whatever. There is some evidence to show that vigorous varieties of plums worked on Americana roots or on dwarf sand cherry are shorter lived than the same varieties on freer growing stocks. In many cases, however, dwarf trees live as long as standards; and in almost all cases they live long enough.

3. *They require more care.*—This objection stands particularly against the dwarf trees trained in special and intricate forms. Such trees undoubtedly do require more careful attention, more frequent going-over, and more hand work in the course of the year. It is probably not true that apples, pears, plums or peaches in bush or pyramid [Pg 20] forms require any more labor or attention than standard trees to secure equally good results. On the other hand it must not be forgotten, as has already been pointed out, that whatever care may be required is much more easily given the dwarf trees than the standards.

4. *They are not a commercial success.*—This statement, too, though undoubtedly having some truth in it, can not stand without qualification. It is certainly true that no one could grow ordinary varieties of apples, like Baldwin or Ben Davis for instance, on dwarf trees in competition with men who are growing the same varieties on standards. It is probably true that fancy varieties of apples can be grown with profit on dwarf trees, but even this can not be strongly urged. So far as apples are concerned the chief value of dwarf trees for modern commercial enterprises in America will come through their use as fillers between rows of standard trees. In the case of pears the situation is somewhat more favorable to dwarf trees. There are a number of orchards in this country where pears have been successfully grown for market, these many years, on dwarf trees. The famous and everywhere planted Bartlett succeeds admirably on the quince stock wherever the soil is suited to it. No successful commercial orchards of dwarf peaches or plums can be cited in this country, individual trees of these kinds even being extremely rare; yet there is good reason to suppose that under favorable conditions dwarf peaches and plums may have some commercial value. Such value may be more in the way of supplementing [Pg 21] standard trees than in superseding them, but it is still worth consideration. So that, after all, when we say that dwarf fruit trees are not a commercial success we mean merely that they will not take the place of standard trees. The large market orchards must always continue to be made up of standard trees; but in their own way the dwarf trees will find a limited place even in commercial operations, and this use of them seems destined to be more general in the future than it has been in the past.

III

[Pg 22]

PROPAGATION

The propagation of dwarf fruit trees is in some senses a more critical and interesting problem than the propagation of ordinary nursery stock. The successful production of a dwarf fruit tree depends primarily on its propagation. The selection of stocks for dwarfing purposes is necessarily a complicated matter. Under the terms of the problem it is impossible that the stock and the cion which are wedded together should be very closely related. The stock must be distinctly different and pronouncedly dwarfer in his habit of growth.

It is not always an easy matter to find a stock which is thus distinctly different from the tree which it is desired to grow and which will at the same time form with it a vigorous and long lived union. It is necessary further that the propagation can be carried on with ease and with a fair degree of success in commercial nurseries. If difficult methods of grafting are required, or if only a small stand of nursery trees can be secured, the undertaking becomes too expensive from the nurseryman's point of view.

The methods of propagating dwarf trees are for the most part the same as those used in reproducing the same kinds of fruit on standard stocks. As a matter of fact nearly all dwarf trees are propagated by budding. Apples, pears, and plums can be readily grafted, but budding is simpler, speedier, and usually the cheaper process in the [Pg 23] nursery. In the upper Mississippi Valley, where plums are somewhat extensively worked on Americana plum roots, grafting is rather common. The side graft and the whip graft are the forms most used.

The theory of the production of a dwarf fruit tree by the restraining of its growth has already been mentioned in another chapter. The dwarf stock simply supplies less food than is required for the normal growth of the variety under propagation, and the tree is, in a sense, starved or stunted into its dwarf stature.

As the selection of proper stocks—the adaptation of stock to cion—is one of the fundamental problems in dwarf fruit growing, we may now address ourselves to that. We will take up the different classes of fruit in order.

THE APPLE

Everyone who has observed the wild or native apples which grow in New England pastures must frequently have noticed certain dwarf and slow-growing specimens. It it not difficult to find such which do not reach a height of five feet in ten years of unobstructed growth. If the cions of ordinary varieties of apples like Greening and Winesap should be grafted upon these stocks, the result would be a dwarf Greening or Winesap. If these dwarf wild apples could be produced with certainty and at a low price, they would furnish a source of supply for dwarf apple stocks.

The Paradise apple so-called (Fig. 7) is simply one of these dwarf varieties which can [Pg 24] be reproduced freely and cheaply. This reproduction is secured nearly always by means of mound layerage. As the variety does not come true to seed, any more than such varieties as King or Hubbardston do, some such method of propagation is necessary. This Paradise apple is naturally inclined to stool out somewhat from the roots. This habit is encouraged by cutting the plants back to the ground. When the young shoots are thrown up they are banked up with a hoe or by plowing furrows up against the rows of plants. The young shoots then form roots at the base and these rooted shoots or layers are removed when one year old. They are then planted in nursery rows in the spring, where they are usually budded the following July or August.

These Paradise stocks are largely grown in France. Practically all the supply comes from that country. The nurserymen who grow dwarf apple trees in America import their stocks from France during the winter, plant them in nursery rows early in the spring, bud the stocks the following July or August, and have the dwarf apple trees for sale the second year following.

This Paradise is the dwarfest stock known for apples. Its effect on nearly all varieties is very marked, causing them to form very small trees and to bear very early. Some of the more vigorous varieties, like Northern Spy for instance, do not submit kindly to such treatment. For this, or possibly for more recondite reasons, a few varieties do not succeed well on Paradise roots. The writer would be glad to give a list of such [Pg 26] varieties which are not adapted to the Paradise stock, but confesses he is unable to do so.

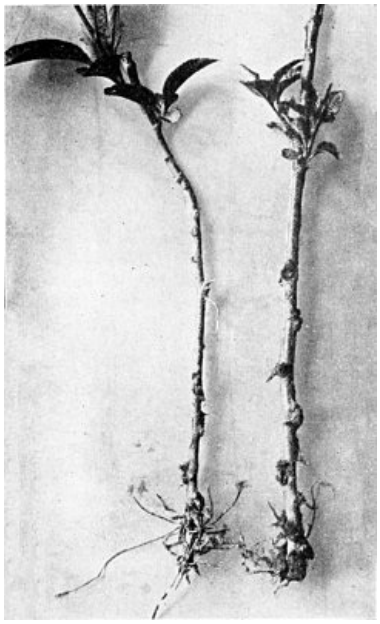

FIG. 7—PARADISE APPLE STOCKS IN EARLY SPRING

The Doucin stock is simply another variety of dwarf apple. It is more vigorous and larger growing than the Paradise, and, therefore, produces a tree, when ordinary varieties are grafted upon it, about midway in size between the ordinary standard apple and the same variety growing upon Paradise.

This Doucin is sometimes called the English or Broad-Leaved Paradise, but this name is misleading. It will be well to remember this in buying stocks or in buying trees in England. Dwarf apples are largely propagated in England, but the trees which are said to be on Paradise roots are often on Doucin. This confusion comes about from the Englishman's habit of calling Doucin the Broad-Leaved Paradise.

The Doucin is perhaps better for the free-growing bush form trees, especially where excessive dwarfing is not needed. For orchard planting in the United States this Doucin stock would be likely to suit many growers better than Paradise. For trees which are to be kept within very narrow bounds, or those which are to be trained in particular forms, the Paradise stock is better. For all sorts of cordon apple trees, the Paradise is essential.

THE PEAR

Dwarf pears are always propagated on quince roots. Any kind of a quince may be used as a stock for pears, but the one commonly employed by nurserymen is the Angers quince, named after Angers, France, from which place the supply largely comes. Almost all the quince stocks used by nurserymen in America are imported from France. As in dealing with apple stocks, the importation is made during the winter, the stocks are planted in nursery rows in the early spring, and are usually budded in July or August of the same year. [Pg 27]

A few varieties of pears do not make good unions with the quince. In some cases this antipathy is overcome by the expedient of double-working. The quince root is first budded with some variety which unites well with it. After this pear cion has grown one year, the refractory variety is budded upon this pear shoot. The complete tree, when it leaves the nursery, consists of three pieces,—a quince root below, a pear top above, and a short section of only one or two inches in length of some other variety of pear which simply holds together the two essential parts of the tree.

This practise of double-working is sometimes undertaken with other kinds of fruit for special purposes. There are no other cases, however, in which it becomes a generally recognized commercial practise.

THE PEACH

The peach is dwarfed by budding it upon almost any kind of a plum root, especially upon the smaller growing species of plums. The stock most used is the ordinary Myrobalan plum. This is simply because the Myrobalan stock is commoner and cheaper. The St. Julien plum probably furnishes a better dwarfing stock for peaches, but it is more expensive and harder to work. [Pg 28]

The Americana plum, now somewhat largely grown for stocks in the States of the upper Mississippi valley, furnishes a good dwarfing stock for the peach. According to

the writer's experience the Americana stock gives better results with peaches than either Myrobalan or St. Julien. It should be observed that this stock requires budding rather early in the season.

The dwarf sand cherry, which is further discussed below under plums, also makes a good stock for peaches. As this stock is very dwarf, it produces the smallest possible peach tree. The peach cion rapidly overgrows the stock and the tree can hardly be expected to be long lived. The growth is very vigorous and satisfactory during early years, however. I have not had an opportunity to determine how long peaches will live and thrive on this stock.

Nectarines can be grown in dwarf form in exactly the same manner employed for peaches.

THE PLUM

In all the old books it is said that dwarf plum trees are secured by working on Myrobalan stocks. This statement is hardly true according to our present standards, and is certainly far from satisfactory. This rule came into vogue at the time when only large growing Domestica plums were propagated in this country and the stocks used were mostly either "horse plums" or Myrobalan. The Myrobalan stock does give a somewhat smaller tree than the old fashioned horse plums; but this Myrobalan stock has been for many years the one principally used for propagating all kinds of [Pg 29] plums in America. It has come to be looked upon as a standard rather than a dwarf stock. When we think of dwarf trees, therefore, we expect to see something smaller than what will grow under ordinary circumstances on a Myrobalan root.

The Americana plum, already mentioned, is a first-rate stock in nearly all respects except that it can not be bought so cheaply as the Myrobalan. It is now grown to a considerable extent by nurserymen in Minnesota, Iowa and the neighboring States. If grafted, or budded early, all varieties of plums take well upon it. The trees on Americana roots make a good growth in the nursery and are easily transplanted. The tree produced on this stock is only moderately dwarf. Still this dwarfing effect is always well marked, this result being shown by the overgrowing of the cion. The top thus appears to outgrow the root, and such trees are apt to blow over during wind storms. Suitable precautions should be taken to guard against damage of this sort.

Prof. A. T. Erwin of Iowa writes on this subject as follows:

> "Regarding the Americana as a plum stock, I would state that we are using it by the thousands out here; in fact, have about quit using anything else. As a stock for the European and Japanese sorts, it does dwarf them, and the cion tends to outgrow the stock at the point of union, causing an enlargement. The union is also not very congenial, and they frequently break off on account of high winds. However, in my experience and observation, this is not the case when the Americana is used as a stock for [Pg 30] Americana varieties. It does not dwarf the trees seriously and the union is splendid. It is by all odds the best stock we have for plums, and since we do not grow anything but Americana varieties, it works first rate. It does tend to sprout some, though there is little trouble in this regard after the trees come into bearing."

FIG. 8
THE WESTERN SAND CHERRY
Prunus pumila besseyi

The sand cherry seems to be the dwarfing stock par excellence for the plum. This sand cherry is a heterogeneous species, or as some botanists think, is three species, ranging throughout the Northern States from Maine to Colorado. The narrow leaf upright form growing about five feet tall, known as *Prunus pumila*, is found along the Atlantic coast. The broad leafed dwarfer form known as *Prunus pumila besseyi* or *P. besseyi*, is found in the Western States. Another rarer form of more irregular growth known as *Prunus pumila cuneata*, or as [Pg 31] *P. cuneata*, is found in the North Central States.

All of these different forms may be used for propagating plums or peaches. The western form (*P. besseyi*) (Fig. 8) is in some respects the best, producing the dwarfest and apparently the best trees. In our experience, however, nearly all varieties of plums and peaches give a better stand of trees when budded on *P. pumila*. *Prunus cuneata* is inferior to the others.

The eastern form, *P. pumila*, has another advantage from the standpoint of the nurseryman in that it is more easily propagated from cuttings. For the most part the western sand cherry is propagated from seed. Both forms can be propagated from layers.

FIG. 9—UPRIGHT CORDON PLUM
With buds set into the naked trunk

NURSERY MANAGEMENT

Dwarf trees are managed in the nursery very much the same as standards of the same varieties. There are no special points to be observed except in the formation of the tops. Western New York nurserymen, who now grow the principal supply of [Pg 32] dwarf apple and pear trees, have the custom of forming their nursery stock with high heads. That is, the heads are formed at a height of eighteen inches to three feet from the ground. In this matter the pattern is taken after the usual style of standard trees. This is quite wrong. Of course, some planters might like to have dwarf trees with trunks two or three feet tall, but the best form has a much shorter stem. At any rate the buyer of dwarf trees ought to be at liberty to form the head within three or four inches of the ground if he so desires. This becomes very difficult if the tree is once pruned up to a height of two or three feet.

In order that the planter may reach his own ideal perfectly in this matter, it is sometimes necessary to buy one year old trees, what the English nurserymen call maidens. This, of course, enables the tree planter to form the head wherever he desires.

IV

[Pg 33]

PRUNING DWARF FRUIT TREES

The pruning of dwarf fruit trees is a matter of the greatest consequence, for on proper pruning depend both the form and the productivity of the trees. Some of the details of management will be explained in the succeeding chapters, dealing with the particular kinds of fruits, but a few general statements should be set down here.

1. The trees are severely headed in. This applies more particularly to bush and pyramid forms. By the term "heading in" we refer to the shortening of the leaders. Such shortening is usually given at the spring pruning, while the trees are dormant. The leaders may be headed in at times, however, during the latter part of the growing season, in July. Such stopping of growing leaders will be practised more often on young trees just coming into bearing than on old trees. (Fig. 10). Constant heading back of some sort, however, is required in nearly all cases, if the tree is to be retained in its dwarf form. The mistake has often been made of thinking that a tree propagated on a dwarf root would take care of itself.

2. Summer pruning is essential. In most American orchard practise one annual pruning (sometimes one pruning every five years!) is considered sufficient, and systematic summer pruning is seldom or never given. Now summer pruning tends much more to repress the growth of a tree than winter pruning does. In fact, heavy [Pg 35] winter pruning leads rather to increased vegetative vigor. Aside from any special system of pruning, therefore, this rule is to be remembered, that summer pruning is desirable, on general principles, for dwarf fruit trees.

FIG. 10—BUSH APPLE, THREE YEARS OLD
Showing strong leaders formed during the summer

3. Side shoots usually need pinching during the growing season. Leaders are more frequently allowed to grow unchecked throughout the season, or are stopped only late in their period of development. In the pomaceous fruits, which form distinct fruit spurs, the checking of these side shoots helps toward the production of fruit buds. As long as every bud is allowed to push out into a strong shoot no fruit spurs can become established. Thus the summer pinching of the side shoots on apples and pears has the purpose of encouraging the formation of fruit spurs. On peach and plum trees equally distinct fruit spurs do not form; but if the side shoots are allowed to push forth unrestricted they are apt to choke one another. There will be too many of them, they will not get light enough, their growth will be weak and sappy, and they will not form fruit buds. Good fruit buds on a peach tree, for example, form on strong, clean, healthy shoots of this year's growth for next year's crop of fruit. It is seen, therefore, that in nearly all sorts of dwarf fruit trees the summer pruning is especially directed to the suppression or regulation of the growth of side shoots.

This part of the treatment becomes of prime importance in dealing with cordons and espaliers.

4. The control of the fruit spurs or of the side shoots here contemplated requires that the trees be gone over more than once during the growing season. In fact, four [Pg 36] successive examinations of the tree are usually required. Old trees can sometimes be managed with two or three, but young ones, on the other hand, will sometimes require six or more. Of course, there are usually only a few shoots that need attention at each succeeding visit, and the work can be very rapidly performed. The first pruning, or pinching, falls about three weeks after the trees have started into growth. The next one comes ten days later, the next one ten days later again, and the fourth pruning two weeks after the third. From this time onward the intervals lengthen. These specifications, of course, are only approximate and suggestive. Some judgment is required to select just the proper moment for pinching back a shoot and even more to select the time for a general summer pruning. Those trees which enjoy the sympathetic presence of the gardener every day are sure to fare best. The bulk of this pruning can be done with the thumb nail and forefinger, but I find a light pair of pruning scissors pleasanter to work with.

5. Root pruning is sometimes advisable. Since the whole program is arranged to check the growth of the dwarf tree, root pruning would naturally fit well with the other practises recommended. Root pruning checks the growth of a tree about as positively as any treatment that can be devised. When dwarf pear or apple trees seem to be making too much wood growth and not enough fruit, they can be taken up, as for transplanting, during the dormant season and set right back into place. This digging up and replanting is always accompanied by some cutting of roots. The [Pg 38] whole root system is disturbed and has to re-establish itself before the top vegetates very strongly once more. Such root pruning ought to be done late in the fall. It is a special practice, suited to refractory cases, and the gardener is not recommended to indulge in it too freely.

FIG. 11—BUSH APPLE
Three years old, before pruning

FIG. 12—BUSH APPLE
Same tree after pruning

6. A certain equilibrium between vegetative growth and fruit bearing should be established at the earliest possible moment, and should be maintained thereafter. Of course, some such equilibrium is sought in the management of a standard tree; but it is secured earlier in the life of the dwarf tree and should be much more accurately maintained. The tree must make a certain amount of growth each year, but this must be only enough to keep it in good health, and to furnish foliage enough to mature the fruit. Beyond this wood growth the tree should bear a certain amount of fruit every year, for annual bearing is not only an ideal but a rule in the management of dwarf trees. This equilibrium once established must be maintained not by haphazard pruning, but by some suitable system. If there is the proper balance between summer pruning and winter pruning, combined with proper control of cultivation and fertilization, then the balance between vegetation and fruitage can be kept up. It is a delicate business, like courting two girls at once, but it can be carried out successfully.

7. The training of trees into mathematical forms is largely a mechanical process. For the most part the trees are shaped while they are growing. The young shoots are twisted and bent to the desired positions, and are tied into place until the stems become hardened. There are many clever little tricks for expediting this sort of work and for making the results more sure, but a rehearsal of them here would be tedious. The most important rule to remember is that constant attention must be given the shoots while they are growing. Mistakes are corrected with difficulty after an undesirable form has been allowed to harden.

[Pg 40]

FIG. 13—CORDON PEARS
Before pruning

FIG. 14—CORDON PEARS
After pruning

SPECIAL FORMS FOR TRAINED TREES

We have already explained the connection between dwarf trees and the practise of training them in special forms. It is true that this practise looks childish to American eyes. It seems to be only a kind of play, and a rather juvenile sport at that. Nevertheless we should understand that in some parts of the world it is a real and profitable commercial undertaking. We should consider also that in other places, where fruit of very high quality is better appreciated, perhaps, than it is in America, the extra trouble is thought to be worth while for the superior quality which it gives the fruit. As this matter is coming to be of more importance in America also, and as the interest in amateur fruit growing is enormously increasing, we may fairly begin to talk about these methods.

The formation of trees into bushes and pyramids, by means of systematic pruning according to a definite plan, as explained in the succeeding chapters, while apparently simpler and more reasonable to our American eyes, it is still a method of training the tree. The fruiting branches are placed at definite points and the fruit spurs are encouraged to grow in regular succession. It is not a very great step from this to a distribution of the branches into a more precise form.

The different forms which are used most commonly are named and classified in the following outline: [Pg 42]

A.—Forms of three dimensions:
- *a.* Vase or bush
- *b.* Pyramid
- *c.* Winged pyramid, etc.

B.—Forms of two dimensions:
- *a.* Various espaliers
- *b.* Palmette-Verrier
- *c.* Fans or Fan-espaliers
- *d.* U-form and double U-form

C.—Trained to a single stem:
- *a.* Upright cordon
- *b.* Oblique cordon
- *c.* Horizontal cordon
  - (with one arm)
  - (with two arms)
- *d.* Serpentine cordon, etc.

Among the forms of three dimensions none is of much practical importance besides the pyramid and bush or vase form. These are sufficiently explained in the chapters on pears and apples. Here we need only to define them. The pyramid tree is one which has a straight central stem with branches radiating therefrom. It is especially adapted to upright growing varieties of pears. The bush or vase form has several main arms or branches, all standing out from approximately the same point and growing upward at a more or less acute angle, thus forming roughly a vase. The secondary branches put out from these, bearing fruiting wood, as the gardener may order.

FIG. 15—PEARS IN DOUBLE U-FORM
From Loebner's "Zwergobstbäume"

The flying pyramid or winged pyramid, described in all European books, is considerably different from the ordinary pyramid and is more precise in its design. [Pg 43]

Usually six arms are brought out at the base of the tree. These are grown in a direction approximately horizontal until they reach a convenient length,—say two to three feet. They are then suddenly bent upward and inward and are conducted along wires set for this purpose until they meet in a common point with the main stem of the tree some four to eight feet above where the branches put out. There is thus formed a precise mathematical pyramid. Along these main arms fruiting spurs are allowed to grow, but no branches are expected to develop. [Pg 44]

Sometimes the flying pyramid is made more elaborate by bending the arms into a spiral form. Other more or less complex modifications are practised to some extent. All of them are to be regarded merely as curiosities and as of no practical value.

The various forms of espaliers and fan-shaped trees have their special and legitimate uses. It may be said here that the Palmette-Verrier is regarded generally as being the most successful for the largest number of varieties of fruits. It is a safe rule also that the simpler forms are generally the better. With rare exceptions a tree confined to a moderately small space is more satisfactory than one trained over a large space.

Great care must be exercised in forming these trees. If the geometrical style of training is undertaken at all, it should be carried out with considerable precision. If one arm happens to be placed a little higher, or at a little more moderate angle, or otherwise more favorably than the corresponding arm, it will very soon divert to its own use the major portion of food supplied by the top. It will outgrow its mate and the form which the gardener designed will eventually be lost. It will be seen at once that this condition makes the same care and precision necessary in all forms of training.

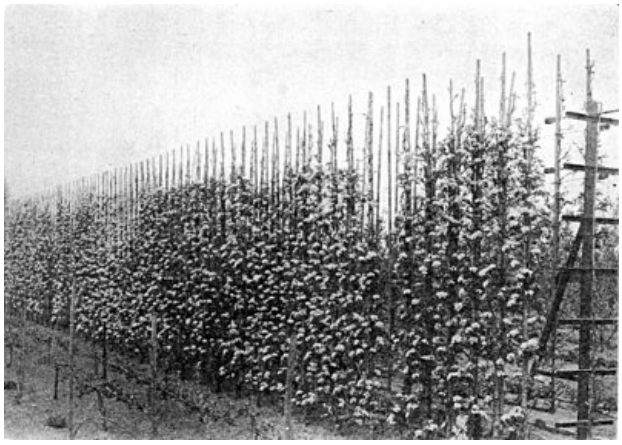

Fig. 16—PEARS IN U-FORM
Sometimes called two-arm upright cordons

The U-form classifies somewhere between the cordon and the espalier. It consists of two upright branches joined to a single trunk below by an arc of a circle. The fruit is all borne on the two parallel stems which are treated essentially the same as upright cordons. (Fig. 17.) [Pg 46]

The double U-form is made by growing two U's from the same tree. The stem is first divided near the ground into two branches and each of these is immediately divided into two more. The tree thus provides four parallel and equally spaced upright and fruiting stems equal to four upright cordons, except that they are all supported from a single trunk. The U- and double U-forms are employed mostly for plums, apricots, peaches and nectarines.

One occasionally sees much more elaborate schemes of training than any here mentioned. There are complex geometrical designs, even pictorial figures—birds, dogs, and beer-steins—and sometimes the initials of the gardener, or the name of his kingly and imperial majesty. In every case the method of producing these forms is practically the same. A frame is built of wood or wire in the form which it is desired to give the tree. Branches are developed at suitable points on the tree and these are tied out while they are growing to the wooden or metal form. It does not require any special care or ingenuity to produce the most elaborate designs in this method. It is essentially a job of carpentry.

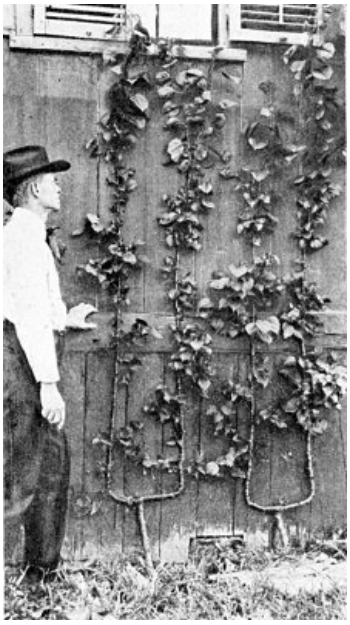

FIG. 17—APRICOTS IN U-FORM

We come now to the cordons. If we take the simplest form, namely the upright cordon, we have what we may call a tree of one dimension only. The upright cordon has nothing but height, eschewing both breadth and thickness. A cordon is simply a tree trained to a single stem and this stem may be placed in any position. The position or direction of the stem classifies the cordon. There are, therefore, besides the upright cordon, others which are oblique, that is, which make an angle with the horizontal, those which are horizontal, and those which are bent into various forms. The serpent form is one of the simplest of these. This form of cordon is simply bent back and forth against a trellis forming a series of S's one above another. The horizontal cordons are of two varieties, namely one-arm and two-arm forms. It is altogether a matter of convenience which one of these forms is chosen. [Pg 48]

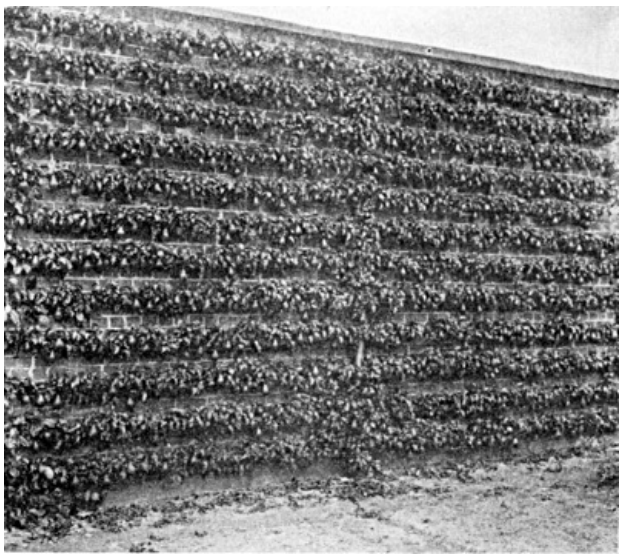

FIG. 18—PEAR IN ESPALIER
This tree is carrying over 200 fruits

In conclusion it may be pointed out that the slower growing trees, pears and apples, are the better suited to the more elaborate forms of training. The more free and rapid growing species, such as peaches, nectarines, cherries, and Japanese plums, are better managed in somewhat simpler forms, preferably the fan. Such trees do well, however, in the U-form or double U-form. [Pg 50]

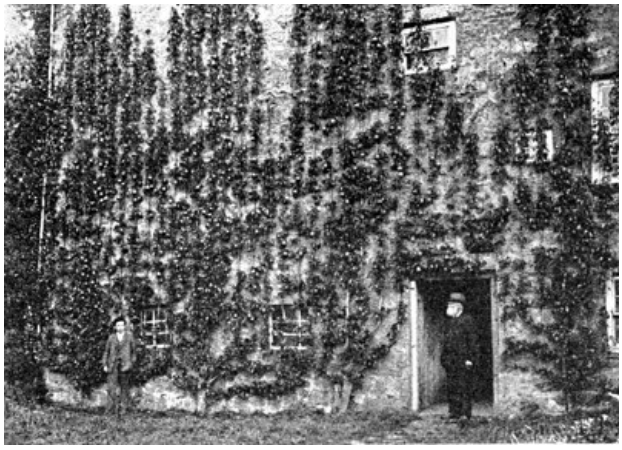

FIG. 19—OLD ESPALIER PEARS ON FARM HOUSE WALL

VI

[Pg 51]

GENERAL MANAGEMENT

The general management of dwarf trees is naturally very much like the management of ordinary standard trees. As dwarf trees are grown more often in gardens rather than in orchards they will receive garden treatment. Heavy tools and extensive methods of culture will hardly find application.

Good soil culture may be regarded as essential. Whatever some American fruit growers may be saying about the propriety of growing apple orchards in sod, no one has yet undertaken to adapt the sod system into the kitchen garden. The close planting which is customary with dwarf trees makes culture comparatively difficult, yet not unreasonably so. Apple and pear trees planted six feet apart each way can be worked for several years with a single horse and cultivator. In fact if the trees are kept carefully headed in, the time need never come when the cultivator will have to be abandoned. When cordons or espaliers are planted in a garden large enough to warrant horse cultivation under ordinary circumstances then the rows of trained trees should be set six feet apart, which will be enough to permit the continued use of the horse and cultivator between the rows.

FIG. 20—HORIZONTAL CORDON APPLE AND OTHER DWARF TREES
With cover crop of hairy vetch

However, the horse cultivator is certain to be definitely crowded out of some dwarf fruit gardens. Many of the men who have greatest reason for growing dwarf fruit trees are those whose backyard gardens were never large enough to justify the [Pg 53] presence of a horse or horse tools. In such cases the spading fork and the hand cultivator are the ready and proper substitutes. Our extensive methods of farming in America have bred a strong prejudice against all sorts of hand labor like this, but [Pg 54] experience will show that under some conditions it is quite worth while. A very common mistake in all kinds of agriculture is to allow prejudice to rule experience.

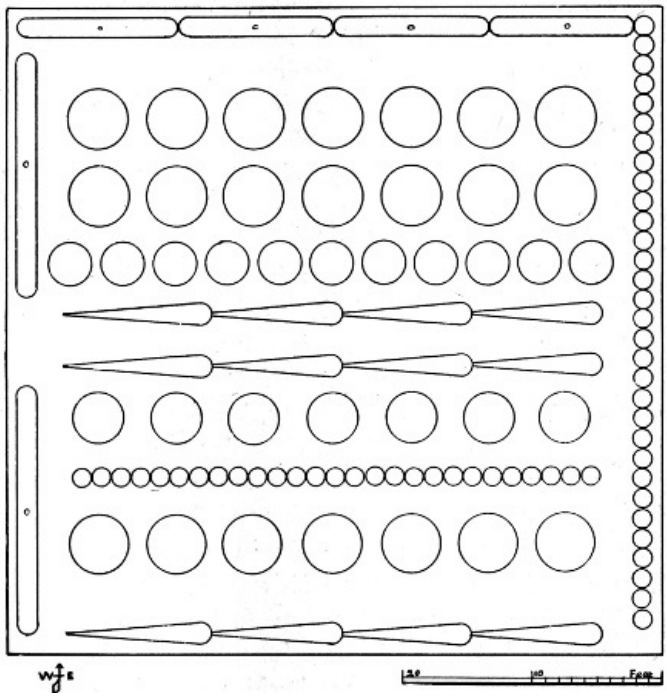

FIG. 21—DESIGN FOR A BACK YARD FRUIT GARDEN 50 FT. SQUARE

North fence (top of map), peach espalier (4); Row 1, bush apple (7); Row 2, pyramid pear (7); Row 3, currants and gooseberries (11); Row 4 and 5, horizontal cordon apples, with grass walk between; Row 6, raspberry bushes (7); Row 7, strawberries; Row 8, plums in bush form (7); Row 9, apples in horizontal cordons (4); East fence, apples as upright cordons (31); West fence, pears in espalier.

Garden culture means not only good tillage of the soil, but good treatment in other respects. It means good feeding and good spraying. As for spraying we need make only two observations. First, the treatment to be given is almost precisely the same as that which is given to standard trees of the same species; second, the work is much more easily performed because the trees are smaller. If one happens to have a considerable block of dwarf trees closely planted. There may be difficulty, it is true, in driving in with a spray pump. This difficulty is overcome by having long runs of hose on the spray pump, so that the cart may stand on the borders of the garden while the operator carries the nozzle in among the trees. In case of large plantings of dwarf trees alley-ways should be left every one hundred feet, or better, every eighty feet, between the blocks. These alleys will be useful for other purposes besides spraying.

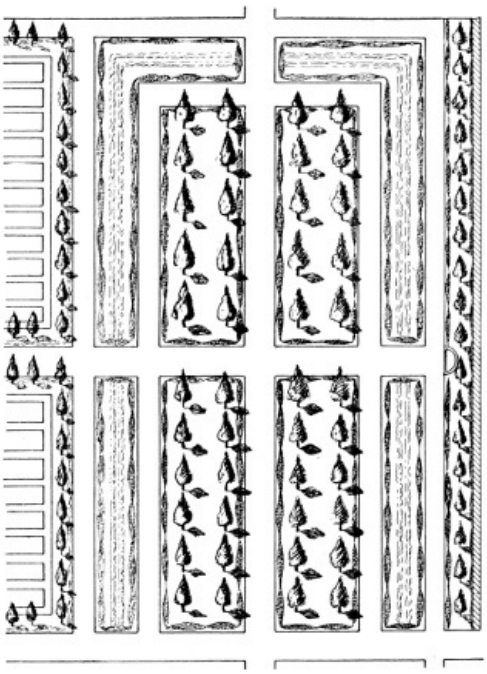

FIG. 22—DWARF FRUIT GARDEN 111 BY 144 FEET

From Lucas' Handbuch des Obstbaues

In the management of a small garden the gardener is expected to be liberal in his allowance of fertilizers. While it is true that dwarf fruit trees should be liberally fed there is a possibility of overdoing it. It has already been explained that the dwarfing of the tree depends in a certain way on its well-regulated starvation. If the tree top could get all the food which its nature calls for it would not be dwarfed. The rule in feeding dwarf fruit trees therefore should be to give enough fertilizer to keep them in perfect health and in good growing condition, but not enough to force unnecessary growth. Fertilizer rich in nitrogen should be especially avoided, and, as the object in view is to secure an early maturity of the tree and to produce fruit always in preference to wood, a larger proportion of potash would naturally be substituted for the diminished proportion of nitrogen. Of course the amounts and proportions of the different elements (nitrogen, potash and phosphoric acid) to be applied will vary greatly with different conditions,—with the nature of the soil, the age of the trees, etc. As a sort of standard we may say that under normal conditions of good soil with dwarf apple and pear trees in bearing there should be given annually for each acre: [Pg 56]

400 pounds ground bone
400 pounds muriate of potash
100 pounds Peruvian guano

Peaches and plums require more nitrogen during early growth, and more potash when in full bearing. For a new plantation of these trees the following amounts should be given annually for each acre:

300 pounds ground bone
400 pounds muriate of potash
150 pounds nitrate of soda

For peach and plum trees in bearing, the following formula may be suggested:

400 pounds ground bone
500 pounds muriate of potash
100 pounds Peruvian guano

Inasmuch as many owners of dwarf fruit trees will have so much less than an acre for treatment it will be best to repeat these formulas, reducing them to a smaller unit. Making this reduction somewhat freely, in order to avoid long and useless decimals, we may compute the quantity needed annually for each one hundred square feet of land as follows: [Pg 57]

FOR APPLES AND PEARS IN BEARING

1 pound ground bone
1 pound muriate of potash
¼ pound Peruvian guano

FOR PEACHES AND PLUMS NEWLY PLANTED

¾ pound ground bone
1 pound muriate of potash
⅜ pound nitrate of soda

FOR PEACHES AND PLUMS IN BEARING

¼ pound Peruvian guano
1¼ pound muriate of potash
1 pound ground bone

Cherries should be treated like plums; gooseberries, currants, and most other fruits, like apples.

In the home of dwarf tree culture, that is, in Europe, trained trees are extensively grown upon walls. The gardeners utilize for this purpose not only the walls of stables and outbuildings, and of the enclosed gardens, but long ranges of brick are built for the special and exclusive purpose of accommodating fruit trees. In southern Germany, in Switzerland, in Belgium, in France, and especially in the neighborhood of Paris, there are hundreds of miles of these walls. The walls may run north and south or east and west. Both sides of the walls are used, even when one side faces the north. Currants and gooseberries are expected to thrive on north walls. West walls are considered especially favorable for pears and plums. The walls are nearly always built of brick. They should have a height of ten to fourteen feet. Each wall usually has a coping at the top with a projection of ten to eighteen inches, which sheds the rain, protecting both the wall and the fruit trees. Where extreme pains are spent on the culture of fancy table fruits there are curtains hung from rods along the outer edge of these copings, and the curtains are drawn to protect ripening fruit from too hot sunshine, or to protect the blossoms in the spring season from late frosts. [Pg 58]

Brick walls, with all their appurtenances, are less important in America than in Europe and the advantages to be expected from this particular method of culture are decidedly less. Walls would more probably be useful for peaches and nectarines in northern latitudes than for any other fruits.

Cordons and espaliers require some sort of support, however, and where walls are not used trellises are necessary. These may be of wood or wire. There is a belief current that the wooden trellises are better because they reflect less heat, but wire is so much cheaper and more durable that it will usually be chosen.

Five or six wires are needed to make a good trellis for upright cordons. These should be placed twelve to fourteen inches apart, with the lowest wire thirty inches from the ground. All wires should be tight, and to this end stout, well-set posts are necessary. The wires should be loosened in the autumn, before freezing weather begins, and should be tightened again in the spring.

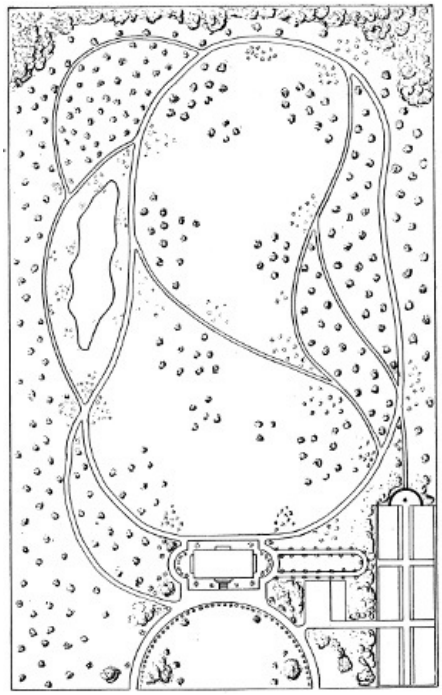

FIG. 23—FRUIT GARDENING AND LANDSCAPE GARDENING COMBINED
From Lucas' Handbuch des Obstbaues
The entire planting, exclusive of the borders, is made up of fruit trees and bushes. Dimensions, 752 × 1,362 feet.

For espaliers the woven wire fences are better. In fact, the woven wire fencing is excellent for all sorts of fruit trellises. Poultry netting makes a cheap and convenient trellis, but it is neither so strong nor so durable as the better grades of woven wire fencing. On the whole it is very poor economy to buy a cheap trellis or to put it up on poor posts. [Pg 60]

These trellises will need to be comparatively high. Nothing less than eight feet will be satisfactory, and for upright cordons a trellis ten to fifteen feet high will be much better. Of course, this entire height is not needed the first year, but upright cordon apples will cover a twelve foot trellis in five years. Peaches or Japanese plums will cover the same trellis in three years.

In the selection of varieties for growing in a garden of dwarf fruit trees the horticulturist will naturally be guided by principles altogether different from those which control him in the selection of varieties for a commercial orchard. He must, of course, consider which varieties are best adapted to the special stocks on which they have to be propagated. He must also bear in mind that certain varieties are better adapted than others for the special forms in which he may wish to train his dwarf trees. Beyond all this lies the great consideration that in the very large majority of cases dwarf fruit trees are grown to secure fancy fruit, not to produce a large quantity for a general market. All varieties of inferior quality would therefore be eliminated from consideration at the beginning, no matter how productive they might be, nor how famous for other things.

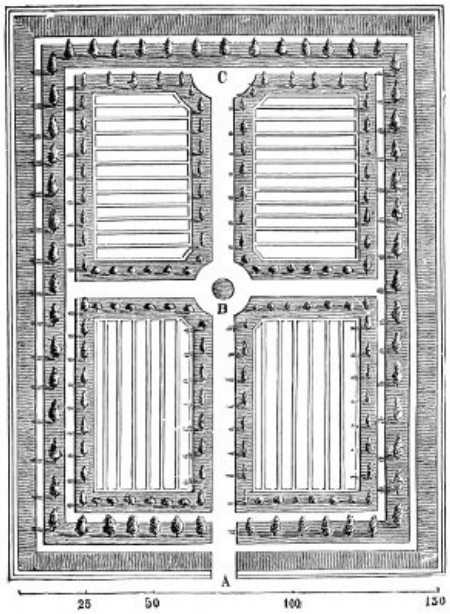

FIG. 24—A FRUIT GARDEN CONTAINING MANY DWARF TREES
A is the entrance; B, well or cistern; C, space to turn a horse and cart.
From P. Barry's "Fruit Garden"]

Varieties of specially good flavor would be given special thought, even though they might lack in hardiness or productivity. The special favorites of the man who owns the garden should be chosen, no matter whether they are popular or not. Then for similar reasons a comparatively long list of varieties will be chosen instead of the very short list always held to by the commercial grower. From first to last one should remember that the growing of dwarf fruit trees is essentially the enterprise of an amateur, not of a man who grows fruit for money. [Pg 62]

VII [Pg 63]

DWARF APPLES

Dwarf apples are the most interesting and valuable of dwarf fruits. We have become so thoroughly accustomed to the standard apple tree in this country, however, and it so fully meets all the apparent requirements, that there seems to be no call for dwarf apples. Nevertheless dwarf trees have some real advantages under certain circumstances. Some of these have already been pointed out in the general discussion in previous chapters, and some of them will bear reiteration here. Where so much interest is taken in apple culture as in America, the advantage which dwarf trees offer for the rapid testing of new varieties cannot be overlooked. Still more important is the value of the dwarf trees in producing extra fancy specimens. Thus in growing very fine apples for exhibition or for a particularly fastidious market, one would naturally choose the dwarf trees.

Inasmuch as dwarf trees are recommended chiefly to the amateur and are grown generally less for cash profit than for other considerations, the great and obvious advantages of standard trees quickly disappear. For men who like to play at fruit growing, nothing can equal a selection of apple trees on Paradise stocks. They are the most engaging of all dwarf trees, in fact of all fruit trees whatsoever.

The general matter of selecting stocks has been referred to under the head of propagation, but the statement should be repeated here that the French Paradise stock is preferable for very dwarf garden trees, and is almost necessary for cordons and espaliers, while the Doucin (sometimes called the English or broad-leaved Paradise) may be chosen where only a moderate amount of dwarfing is desired. Some of the most expert apple growers of North America are beginning to think that the Doucin may be required for the commercial orchards in the future, when spraying for the San José scale becomes an established routine and smaller trees are an accepted necessity. [Pg 64]

Dwarf apple trees may be cultivated in nearly all the artificial forms ever given to fruit trees. Undoubtedly the simplest is the bush or vase form. This requires less care and attention and probably gives as much fruit to the same area as any other. The pyramid form is somewhat difficult to produce. It can be secured successfully only

with the varieties which have a tendency to grow strong, straight branches, as for instance Sutton, Gravenstein and Northern Spy. On the whole the pyramid is not to be recommended for dwarf apples.

Apples succeed very well as upright cordons and in all the simpler modifications of this form. As these trees can be planted very close together—as close as fifteen inches certainly—thus occupying very little room, a large number of them can be planted in very limited areas of the city lot or backyard. They are especially adapted to stand on the property line where they seem to use no space whatever, and where in fact they do occupy space which otherwise would be lost. The upright cordon can be bent into the form of an arch in order to make delightful arbors along the walks. [Pg 65]
The illustration, Fig. 2, shows a good example of this sort.

FIG. 25—DWARF APPLES ON PROF. L. H. BAILEY'S FARM, NEW YORK

Nearly all varieties of apples—indeed all as far as I know—succeed in this form. The trees are not very long-lived, however. That is they cannot be maintained in good presentable form and prolific bearing indefinitely, because it is difficult to reproduce the fruit spurs on the lower part of the stem. Nevertheless the trees are inexpensive and can be cheaply replaced. As they come into bearing the first or second year after planting, this task of replacing worn-out trees is a small one. Very fine specimens of fruit can be produced on these upright cordons. Indeed this form is superior to the [Pg 66]
bush form in this respect.

The apple is the best of all trees for horizontal cordons. In this form it becomes the most entertaining plaything in the garden, as well as one of the most rewarding trees in its product of fruit. Either the single arm or the double arm cordon can be used with success. These horizontal cordons are naturally used along the borders of walks, flower beds or plots devoted to vegetables. They may sometimes be used along foundations of buildings, where it is not desired to grow upright cordons or espaliers against the walls. The fruit produced by horizontal cordons is probably superior in size, color and finish to that produced on any other form of tree. In climates where the summer's heat and sunshine are apt to be meager, this advantage of the horizontal cordon will be comparatively greater. Conversely it will be less in places where sunshine and heat are very abundant during the summer. It is probably true that on the plains of Arizona and Texas the horizontal cordon will not be a brilliant success.

Dwarf apples need practically the same care and cultivation, aside from pruning, as standard apples. The soil should be cultivated during the early part of the summer and allowed to rest during the latter part of the year. Cover crops may be sown during June or July, according to the custom practised in the usual orchard management; but the advantages of a cover crop in a small garden are less material than in a large commercial orchard.

FIG. 26—UPRIGHT CORDON APPLES
18 inches apart; in author's garden

The formation of the tree is discussed under another head. It remains to be said only [Pg 68]
that careful and intelligent pruning are required to keep any dwarf apple tree to its work. The more complicated and the more restricted the form of the tree, the more careful and continuous must be this pruning. The general system may be outlined in comparatively few words, and may be explained in its simplest form as applied to the treatment of a horizontal cordon. Each horizontal cordon, perfectly formed and full grown, should have fruit spurs throughout its horizontal length, which may be from three to fifteen feet. The upright portion of the trunk, from the point where the graft is set to the angle made by the bending down of the stem, should be kept clean and bare. Constant care is required to remove the sprouts from this portion of the tree, especially such as come up from the stock. At the further end of the horizontal portion there should be one, two, or three strong shoots allowed to push forth each year. These may be called leaders. They represent the principal wood growth in each tree. They draw up the sap from the roots, their leaves elaborate this sap, and from them the digested material is sent back for the support of the tree and the ripening of the fruit. They are allowed to take an upright or nearly upright position and their growth is encouraged. On all other portions of the tree growth is sternly restricted, when not altogether repressed.

There is a constant tendency for strong shoots to start into growth all along the horizontal part of the stem and especially near the bend. If any of these shoots are allowed to make headway, the form of the tree is spoiled. Even if they are cut out [Pg 69]
after a year's growth, thus retaining somewhat the form of the tree, the fruit spurs are thereby lost. It is the business of the fruit grower, therefore, to pinch back these shoots which start along the horizontal stem, and this pinching is done at a comparatively early stage of their growth. Usually the first pinching should be given when the stems have grown long enough so as to have seven or eight leaves. These shoots are then cut or pinched back to three leaves. If the tree is in good vigorous condition, these shoots will soon start into growth once more. Again they have to be pinched. This time the pinching comes a little earlier, taking the shoot when it reaches only about five leaves and the pinching is still more severe. The shoots may start into growth a third time or even a fourth time, but each time they are pinched back sooner and more severely than before. In most cases two or three pinchings will suffice. These constant repressions of growth tend to secure the formation of fruit spurs and fruit buds along the horizontal trunk of the tree.

Some slight modifications of the plan here outlined will develop themselves in experience. In particular it will be found that different varieties require slightly different handling. Some form fruit spurs more readily than others. With certain varieties it is very difficult to repress the rampant habit of growth and to secure a proper formation of fruit buds. These differences, however, are of minor importance as compared with the general management of the tree.

The system just outlined has in view the summer pruning of the horizontal cordon [Pg 70]
apple. The upright cordon is pruned in almost exactly the same manner. Various forms of espaliers are handled in much the same way. Strong shoots or leaders are allowed to grow at the ends of the main branches to keep up a proper circulation and elaboration of sap, while the growth of fruit spurs is encouraged along the sides of the stems by frequent and regular pruning.

In a somewhat less precise manner the same system of pruning can be applied to bush and pyramid forms. Each bush, for instance, is made up of a certain number of fruiting branches. The fruit is borne on spurs on the sides of these branches, while the woody growth is made by the leaders appearing at the ends of these branches. These leaders are annually cut back and the constant formation of fruit spurs is encouraged by pinching whatever shoots are on the sides of the main stems.

It will be seen that the whole business of pruning falls into two general categories, viz., winter pruning and summer pruning. The winter or spring pruning is given any time after the stress of winter is over and before the sap starts running in the spring. This is the time when the ordinary fruit trees are customarily pruned. The work at this season consists chiefly in cutting back leaders. These are pruned off short, that is the whole stem is taken off down to within two or three buds of where it started growth the previous year. In some cases it is worth while to cut even further back, going into wood two or three years old. At this spring pruning the defective or diseased branches are of course removed wherever they are found. Cases requiring [Pg 71] such treatment always occur even on the best trained cordons and espaliers. Whenever it becomes necessary an entire branch, sometimes composing half the tree, is taken out. Usually such branches can be replaced without great loss of time.

FIG. 27—HORIZONTAL CORDON APPLE TREES

After this winter or spring pruning comes the summer pruning which has been outlined above. This usually begins May 15-25, and continues until July 25-31, differing, of course, in different latitudes.

Practically all varieties of apples can be grown as dwarfs, though some succeed on [Pg 72] Paradise roots better than others. Some varieties also are better adapted for special forms, as for cordons, than are others. Such requirements are not very strict, and a careful gardener can grow practically anything he wants to. Patrick Barry, in his "Fruit Garden," recommends "twenty very large and beautiful sorts for dwarfs," having in mind American conditions, and especially his own experience in Rochester, N. Y. His list is as follows:

Red Astrachan	Porter
Large Sweet Bough	Menagere
Primate	Red Bietigheimer
Beauty of Kent	Bailey Sweet
Alexander	Canada Reinette
Duchess of Oldenburg	Northern Spy
Fall Pippin	Mother
Williams' Favorite	King of Tompkins County
Gravenstein	Twenty Ounce
Hawthornden	Wagener
Maiden's Blush	

In Europe, where greater attention has been paid to these matters, the opinion has settled down to a comparatively limited number. For example, Mr. George Bunyard in "The Fruit Garden" recommends the following varieties for cordons:

Mr. Gladstone	Aug.	Mother	Oct.
Devonshire Quarrenden	Aug.	Calville Rouge Precoce	Oct.
James Grieve	Sept.	Cox's Orange Pippin	Oct., Feb.
Wealthy	Oct.	St. Edmund's Pippin	Nov.
Margil	Oct.	Ross Nonpareil	Nov.
King of Pippins	Oct.	Fearn's Pippin.	Very late
Duchess of Oldenburg	Aug.	Lord Derby	Nov.
Pott's Seedling	Sept.	Bismarck	Dec.
Lord Grosvenor	Sept.	Lane's Prince Albert	Jan., March
Adams' Pearmain	Dec.	Lord Suffield	Sept.
Hubbard's Pearmain	Dec.	Grenadier	Sept., Oct.
Allington Pippin	Nov., Feb.	Golden Spire	Sept., Oct.
Scarlet Nonpareil	Jan., Feb.	Seaton House	Sept., Oct.
Norman's Pippin	Jan.	Sandringham	Feb.
Lord Burghley	Feb.	Alfriston	Feb., March
Duke of Devonshire	Feb.	Calville Malingre	Feb. to Mch.
Rosemary Russet	Feb.	Calville Rouge	Feb. to Mch.
Sturmer Pippin	Very late		
Allen's Everlasting	Very late		

[Pg 73]

The same authority recommends the following varieties to be grown on Paradise stocks as bushes:

Beauty of Bath	July, Aug.	Golden Spire	Sept., Oct.
Red Quarrenden	July, Aug.	Cox's Orange Pippin	Nov., Feb.
Lady Sudeley	Sept.	Beauty of Barnack	Nov.
Worcester Pearmain	Sept., Oct.	Allington Pippin	Dec., Feb.
Yellow Angestrie	Sept.	Gascoigne's Scarlet	Dec.
Duchess' Favorite	Sept. to Oct.	Christmas Pearmain	Dec.
King of the Pippins	Oct.	Winter Quarrenden	Dec.
Early White Transparent	J'ly.	Baumann's Reinette	Jan.
Lord Suffield	Aug., Sept.	Lord Derby	Oct., Nov.
Pott's Seedling	Aug., Sept.	Stone's Apple	Oct., Nov.
Lord Grosvenor	Aug., Sept.	Tower of Glamis	Oct., Nov.
Early Julien	Aug., Sept.	Warner's King	Oct., Nov.
Ecklinville Seedling	Sept., Oct.	Bismarck	Oct., Nov.
Grenadier	Sept., Oct.	Lane's Prince Albert	Dec., Mch.
Stirling Castle	Sept., Oct.	Bramley's Seedling	Dec., Mch.
		Newton Wonder	Dec., Mch.

Max Loebener in his book on dwarf fruits recommends the following varieties for dwarf apples:

[Pg 74]

Red Astrachan	July, Aug.	Belle de Boskoop	Nov., May
Yellow Transparent	Aug., Sept.	Virginia Rose	Aug.
Charlamowsky	Aug., Sept.	Red Peach Summer Apple	Aug., Sept.
Transparent de Croncels	Sept., Oct.	Lord Suffield	Aug., Oct.
Prince Apple	Sept., Jan.	Cellini	Sept., Nov.
Danzig	Oct., Dec.	Alexander	Oct., Dec.
Dean's Codlin	Oct. to Feb.	Gravenstein *For moist soils, bears late*	Oct. to Jan.
Landbury Reinette	Nov., Feb.	Yellow Richard	Nov., Dec.
Cox's Orange *Requires good soil*	Nov. to Mch.	Bismarck	Nov., Feb.
Winter Gold Pearmain	Nov., March	Yellow Bellflower *Requires good position*	Nov. to April
Ribston Pippin *Good warm soil*	Nov., April	Baumann's Reinette	Dec., May
Canada Reinette *Hardy*	Nov., April		

Inasmuch as the advantages of the dwarf trees apply especially to the growing of fine fruit, only the better varieties should generally be propagated in this way. On this

basis, therefore, rather than on the basis of adaptation learned from experience, the following varieties may be suggested among the well known American sorts for growing in dwarf form:

Baldwin	Yellow Transparent
Esopus	McIntosh
Mother	Red Astrachan
Williams' Favorite	Alexander
Sutton	Wolf River
King	Ribston Pippin
Northern Spy	Wealthy
Grimes	Wagener
Winesap	

Of course, one propagating dwarf apples would always select his own favorites. It should be noticed that in the list given above are some varieties which are notable for beauty of appearance rather than for superior quality. They are recommended on the former consideration. Certain varieties in the list, for instance Alexander, are known to succeed especially well as dwarfs. [Pg 75]

VIII [Pg 76]

DWARF PEARS

Pears are the fruit most largely grown in dwarf form in America. There are a few well established and successful commercial orchards of pears, especially in western New York and Michigan. The pear is the fruit most assiduously cultivated in dwarf and trained forms in Europe. At the same time it is the one with which I confess I have had the least satisfaction. This is perhaps because I have always experimented in a country where pears do not naturally succeed, and because, further, my fancies have run more to other kinds of fruit. [Pg 77]

FIG. 28—YOUNG ORCHARD OF DWARF PEARS IN WESTERN NEW YORK

It is probably true that the pear is improved more in quality than any other fruit by being grown in dwarf form and trained as cordons and espaliers on a suitable frame or wall. This is emphatically true in cold and inclement climates, where indeed some of the best varieties of pears will not succeed at all unless given this advantage. A west wall is recommended as giving the very finest results. It should be noted, however, that some varieties do better on walls than others. Those which grow vigorously in bush, pyramid, or standard forms receive comparatively less benefit from wall training. [Pg 78]

FIG. 29—DWARF PEARS IN THE OLD AND PROFITABLE YEOMANS ORCHARD, NEW YORK

The pear is the best of all trees for training in pyramid form. Sometimes very tall slim pyramids are made, becoming almost pillars of foliage and fruit in their old age. These may be in fact upright cordons which are trained with strong stems and allowed to support themselves without a trellis. Some of the less upright growing varieties are difficult to form into pyramids, and such may be pruned in the ordinary bush or vase form. In growing dwarf pears commercially, as is sometimes done, it is probably best to give most varieties the bush form. The pyramid is rather harder to maintain.

The pear succeeds well as a cordon tree. Perhaps the best form is the oblique cordon, one placed at an angle of about forty-five degrees with the horizon. The upright and horizontal cordons may also be used, though neither of these forms is specially well adapted to pears.

All of the better types of espaliers are suited to pear trees. Probably the Palmette-Verrier is the best, although the old fashioned espaliers are often used. The U-form and the double U-form also succeed if well built.

The pruning of the pear tree is substantially the same as that of the apple. Where pear blight is a factor in the problem, due allowance must be made for it. It sometimes happens that entire branches or arms have to be cut away on account of blighting. The system of pruning therefore should furnish a means of renewing such members promptly when necessity requires. [Pg 79]

FIG. 30—ORCHARD OF DWARF DUCHESS PEARS, LOCKPORT, N. Y.

The quince root prefers a fairly heavy and even moist soil. A heavy clay loam is best, although a strong clay will answer. Light sandy soils or loose gravelly soils will not give such good results. On the other hand any clay soil which holds water to a considerable extent will answer. As these are the requirements for quince roots, they become also the requirements for dwarf pears. Any attempt to grow dwarf pears on a light loose soil is almost certain to prove a failure. [Pg 80]

FIG. 31—PYRAMID PEARS IN A GERMAN ORCHARD

It is often said that dwarf pears should be planted deep in the ground when they are set out. The rule is to put them deep enough so that the bud union will be buried beneath the surface of the soil. With such treatment the pear itself often throws out roots and eventually establishes a feeding system of its own, becoming independent of the quince stock. It is then no longer a dwarf tree except by the authority of the pruning knife. It is probably true that many varieties of dwarf pears are longer lived when treated in this way. In planting, therefore, it becomes a question whether one desires chiefly a long-lived tree or a strictly dwarf one. The ease with which dwarf trees are replaced makes longevity a less important factor than in commercial orchards of standard trees. [Pg 81]

Of course, it is understood that if the dwarfest form is to be maintained, the tree must be planted high enough to leave the union out of the ground, thus preventing the pear from throwing out roots of its own.

The varieties principally grown in this country as dwarfs are Angouleme, Bartlett, Anjou, and Louise Bonne.

In European nurseries the list of pears propagated on quince roots is much larger. The following varieties are recommended for England by Mr. Owen Thomas, and are said to be particularly good for training on walls:

Buerré Giffard	La France
Clapp's Favorite	Buerré d'Anjou
Jargonelle	Buerré de Jonghe
Williams' (Bartlett)	Doyenne d'Alençon
Buerré d'Amanlis	Glou Morceau
Fondante d'Automne	Marie Benoist
Triomphe de Vienne	Winter Nelis
Buerré Bosc	Buerré Diel
Buerré Hardy	Nouvelle Fulvie
Buerré Brown	Buerré Sterckmans
Comte de Lamy	Easter Buerré
Louise Bonne de Jersey	Le Lectier
Pitmaston Duchess	Olivier de Serres
Seckel	Passe Crassane
Conference	Ne Plus Meuris
Doyenne du Comice	Bergamotte Esperen
Marie Louise	Buerré Rance
Thompson's	Josephine de Malines
Duchesse d'Angouleme	

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IX

[Pg 83]

DWARF PEACHES

The peach as a dwarf tree is almost unknown in America. It is not very often grown as a dwarf even in Europe, except when it is trained on walls or grown in houses. The species, however, is easily dwarfed and makes a good tree in various forms when well propagated. The methods by which dwarf peaches are propagated are fully described in the chapter devoted to that subject.

Peach trees growing on plum stocks and formed in vases or bushes make excellent garden trees. Naturally they should be headed low, best within three to six inches of the ground. They then make fine, regular, well balanced tops which are easily kept opened out in the desired vase form. Such trees usually come into bearing one or two years earlier than those propagated and trained in the usual way. In a country like New England where peach growing is largely a system of gambling against cold weather, and where the business largely resolves itself into a race for getting a crop before the trees freeze back, the smaller stature and the earlier bearing of the dwarf tree are obvious advantages. It has not yet been shown that this may be turned to account on a commercial scale, but there seem to be possibilities in it. In case the peach grower undertakes the method of laying down his peach trees and covering them during the winter to save them from freezing, the smaller growth of the dwarf trees would prove a decided advantage. This method of handling peach trees has proved a practical success under certain conditions.

[Pg 84]

FIG. 32—DWARF PEACH IN NURSERY
Headed back and formed into bushes

The peach does not succeed as a cordon. The nearest that this form can be successfully approached is the U-form. The double U-form is probably even better. The fan form of training is the best of all methods of training for the peach. The tree makes wood so rapidly that considerable space has to be provided for the annual growth. The fan form being less definite in its makeup can be more readily adapted to the exigencies of rapid growth and severe cutting out.

[Pg 85]

FIG. 33—ESPALIER PEACH, HARTFORD, CONN.

On account of its more vigorous growth the peach demands even more drastic pruning than that already described for apples and pears. The method of managing a peach tree, however, differs in some details. There is not such a distinct establishment of leaders at the end of the shoot; and since the peach never forms fruit spurs like those of the apple, the pruning of the fruit-bearing wood is necessarily different. The best fruit buds are formed on the strong clean shoots of the current season's growth. These must be allowed to grow far enough and vigorously enough to ripen good fruit buds. If they make too much growth, however, the side buds start secondary branches and the fruiting prospects are reduced. The management of the tree must be such as to keep this growth of new wood in just the proper balance. [Pg 86]

In order to carry out the idea thus outlined, an early spring pruning is given while the trees are dormant, and several successive prunings are administered during the growing season. At the spring pruning a considerable amount of wood is cut out from all portions of the tree, the amount thus removed being much greater than that from the pear or apple trees at the same season. The old decrepit and diseased branches are taken first for removal, and then one year old wood is cut back where necessary, so as to leave two or three buds at the base of each branch.

The first summer pruning is given about May 15th to 20th, after the growth has well begun. A vigorous tree will start more shoots than there is room for, and these are thinned out until all have sufficient space. A few of the most vigorous ones are pinched back at this time. One week to ten days later the trees are gone over again, at which time the principal pinching back is done. The shoots which are making too much growth, especially on the interior of the tree or on the main arms, are stopped. A third pruning is given about June first, and consists chiefly in removing weak shoots or those which are crowding one another, and cutting back those which are growing too far. [Pg 87]

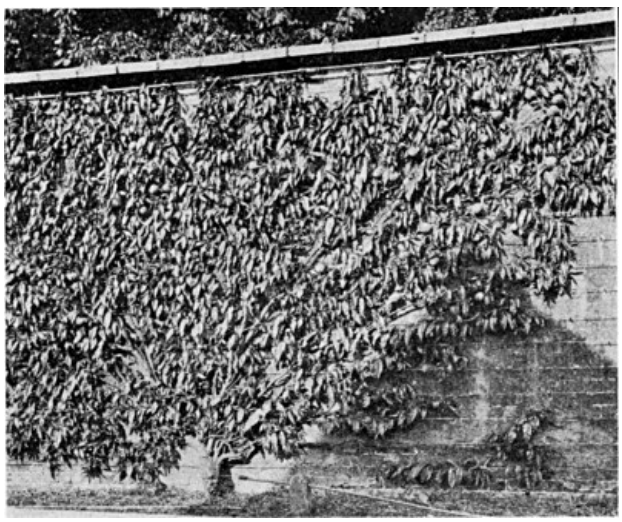

FIG. 34—PEACH IN FAN ESPALIER ON WALL, ENGLAND

The peach usually requires a comparatively light soil and a warm exposure. The plum root upon which a dwarf peach is budded will usually succeed in a considerably heavier soil, and the method of budding on plum is therefore sometimes practised with the specific object of adapting the peach tree to heavier soils. Inasmuch as various kinds of plums succeed in all soils on which any crop can be grown, from light sand to heavy clay, it is not difficult to meet any reasonable requirements in this respect.

All varieties of peaches and nectarines seem to succeed equally well as dwarfs. Those varieties which are grown as dwarfs in Europe are naturally the ones which are favorites there. In this country the favorite varieties are almost altogether different and we would expect to choose such sorts as Late Crawford, Foster, Old Mixon, Belle of Georgia, Champion, Waddell, and other choice American varieties for our use. [Pg 88]

FIG. 35—PEACH TREES TRAINED UNDER GLASS

The nectarine is in large favor in Europe and is much more extensively grown than in America. The merits of this fruit seem to have been strangely overlooked in this country. When nectarines are properly grown under glass, they are one of the most delicious and beautiful fruits known in this world of limitations and disappointments. The nectarine is a fruit which will in general bear more extensive cultivation in America and which is to be especially recommended for dwarf fruit gardens. This is not to say that it should supersede the peach, or even that it should take equal prominence, but simply that it should be well represented in every selection of fruits for an amateur's collection. [Pg 89]

[Pg 90]

X

DWARF PLUMS

Most amateur and professional fruit growers are less interested in plums than in other tree fruits. Perhaps I am prejudiced, but I feel that this is not fair to the plum. Plums yield some profit when rightly cultivated commercially, and no end of satisfaction when cultivated for the gardener's own entertainment. The large assortment of varieties which one may secure is in itself a claim to interest, and a source of much delight to the collector. The fact that different types of plums furnish fruit of very diverse characters makes the collection more valuable from every standpoint. So far as the writer knows dwarf plums have seldom been grown to any extent in America. They certainly have no present claim based on experience for recognition in commercial orchards. Nevertheless they have possibilities even for the growing of market fruit, and for cultivation in the garden, dwarf trees are altogether worth while.

In the chapter on propagation, reference has been made to the stocks used for plums and that subject need not be discussed here.

FIG. 36—PLUM TREES TRAINED AS UPRIGHT CORDONS

When plum trees have been secured budded on suitable dwarfing stocks, as, for example, Americana or sand cherry, they may be trained in a variety of ways. Probably the ordinary bush form is the best. Most varieties of plums do not form either a satisfactory pyramid or a strictly vase form. Some of the better growing [Pg 92] Japanese varieties of plums approach the latter form fairly well. Red June, Satsuma, and Chabot may be mentioned as particular examples. With such varieties a true vase form can be maintained as well as with peaches. In dealing with a majority of varieties, however, a simple bush-like head without a mathematically constructed frame work is about the best that can be secured. In most cases the head should be formed low, preferably not more than six inches from the ground. Still considerable latitude has to be allowed the gardener's fancy in dealing with dwarf trees, and the writer can easily imagine a garden design which would require trees to be high headed. It would be practicable and excusable in some cases to form heads four, five, or even six feet from the ground. This is often done in England and Germany with all sorts of fruit trees, this form being referred to as a "standard."

A head can be secured at almost any point on a plum tree of good growth, by heading back at the desired height. Four to six branches should be allowed to grow the first year and in course of time these will be increased to eight, twelve, or even more. That is, there will be this number of what we might call main branches because they are all of approximately equal importance.

At the end of the first year after the tree has been headed back the main branches, which have now formed, are to be cut back in turn. With all strong-growing varieties it is best to remove from one-half to two-thirds of the annual growth from these main branches, if the tree is to be restricted to a comparatively narrow spread. A [Pg 93] considerable number of strong shoots will put forth the next year. These should be thinned out as soon as they start to a number approximately twice that of the main arms. These new branches should be distributed as symmetrically as possible. The tree top is now formed and subsequent pruning consists essentially of a severe heading in during the latter part of the dormant season, that is, about March, followed by two, three, or four summer prunings somewhat after the manner described for the peach. At the time of these summer prunings the young growing shoots should be thinned out enough to prevent any choking of the tree top and should be headed in wherever it is necessary to retain the symmetrical growth.

The manner of forming the fruit buds or spurs is so diverse in the different kinds of plums that no general rule can be given for encouraging them. Close observation of each variety will soon enable the gardener to direct his pruning in such a way as to assist in this important process of fruit bud formation. In a rough general way it may be said that the Domestica and Americana varieties of plums form distinct fruit spurs along the sides of one and two year old branches, and that, for the encouragement of these, considerable light should be admitted and the growth of the interior shoots rather rigidly checked. The Japanese and Hortulana varieties on the other hand fruit best from very short spurs or clusters of buds which form along from the strong one and two year old branches. The main object, therefore, with these latter varieties is [Pg 94] to maintain a succession of clean, sound, well matured shoots. This is done by a

moderate thinning of the main shoots early in the year, resulting in the forcing of those which are left. These strong growing shoots are checked late in the summer in order that they may ripen up thoroughly, but the pinching which is done to this end is delayed long enough so that the pinched shoots will not start into growth again. Moreover, this pinching is done well out to the ends of the shoots.

Certain varieties of plums succeed fairly well as vertical cordons. The varieties least adapted to this purpose are the Hortulana offspring and their hybrids and a few of the rank-growing Japanese, like Hale and October Purple. In the dwarf tree garden at the Massachusetts Agricultural College the writer has a row of plum trees containing a large assortment of varieties and species. These trees were picked out at random from various sources and very few of them were propagated on dwarfing stocks. On this account the trees were set two feet apart, which is more than is usually recommended for upright cordons. They have now been growing three years, and they furnish much interesting testimony regarding the feasibility of growing plums in this form. Contrary to expectation such varieties as Red June, Abundance, and Burbank have done well under this treatment. These varieties all fruited the next year after planting. Some varieties of the Domestica group are bearing the third year after planting, which is unusually early. All of them seem to be fairly well adapted to this method of treatment. Varieties like Wildgoose and Wayland, and such hybrids as [Pg 96] Gonzales, Waugh and Red May, can hardly be controlled in the restricted space allowed them in a row of vertical cordons. They give very little promise of success. It is probable that all these varieties would make a better showing if they were propagated on some such stock as sand cherry.

FIG. 37—BURBANK PLUMS ON UPRIGHT CORDONS TRAINED TO TRELLIS

Plums are seldom—almost never—propagated as horizontal cordons. I have never yet undertaken it myself, but propose to do so at the first opportunity and with some expectation of moderate success with certain varieties. The slow growing sorts like Green Gage, Italian Prune, and Agen seem to offer special promise.

In the form of espaliers plums are often trained against walls. Indeed this is the favorite way of producing fancy plums in England, and the same practise prevails to a considerable extent on the continent of Europe. In this country walls are not required, and in most cases would be of no advantage. Where it is desired to cover back fences or sides of buildings, however, plum trees in espalier form can be confidently recommended. The Domestica varieties of highest quality such as Bavay, Jefferson, Victoria, Pond, Bradshaw, and Coe's Golden Drop would have first choice. The Japanese varieties can also be grown on trellises or walls, but the freer forms, such as the fan espalier used for the peach, are better suited to their habits of growth.

The following varieties of plums can be recommended for dwarf bush forms: [Pg 97]

Green Gage	Bavay (Reine Claude)
Jefferson	McLaughlin
Bradshaw	Pond

Agen	Bleeker
Grand Duke	Italian Prune
Cluster Damson (or other Damsons)	

Such varieties of the Japanese class as Abundance, Chabot, Red June, Satsuma, Burbank may be grown on dwarf stocks in bush forms, but they are not altogether satisfactory. There are two objections against them: (1) It is difficult to keep them in restricted bounds, such a result being dependent on constant and severe heading in. (2) They overgrow the dwarf stocks very strongly and thus do not have a very firm hold on the ground. They are apt to blow over or break off after a few years, unless carefully staked up.

The following varieties can be recommended for upright cordons, in which form they will give moderate success if properly managed:

Coe's Golden Drop	Bradshaw
Agen	Bavay
Victoria	Lombard
Grand Duke	Chabot
Abundance	Cheney
Burbank	Aubert (Yellow Egg or Magnum Bonum)

Also most of the clean-growing Americana varieties such as Smith, Terry, Stoddard, etc.

Mr. Owen Thomas recommends for growing on walls in England the following varieties: [Pg 98]

Green Gage	Brahy's Green Gage
Brandy Gage	Bryanstone Gage
Denniston's Superb Gage	Oullin's Golden Gage
Comte d'Athem's Gage	Golden Transparent Gage
Transparent Gage	Reine Claude de Bavay
Transparent Late Gage	Coe's Golden Drop
Jefferson	Kirke's Blue
Reine Claude Violette	Washington

[Pg 99]

XI

BUSH FRUITS

The bush fruits, so far as I know, are never cultivated as dwarfs. To speak more exactly I should say that no dwarf stock is ever used to reduce the size to which the plants grow. On the other hand, bush fruits are often systematically pruned back in order to restrict their size, and are sometimes trained in elaborate forms as dwarf fruit trees are. To this extent they are managed in the same way and might properly be treated in the same general category. What is more to our purpose, they are almost always included in the plan of any private fruit garden on a restricted area, such as we have had chiefly in view in this discussion of dwarf fruit trees. These reasons make it appropriate, if not indeed essential, that something should be said regarding these fruits here.

All bush fruits can be grown in such forms as cordons, espaliers, etc. Anything of this sort which the gardener wishes can become a part of his garden of little trees. Gooseberries and currants offer the most entertainment and remuneration when subjected to special pruning and training, and indeed they should not be omitted from any garden scheme of this kind. Raspberries are less amenable to this kind of education and should be introduced with some care. Blackberries are necessarily difficult to handle and no very complicated schemes of pruning and training can be successfully applied to them. Such other fruits as Loganberries, strawberry-raspberries, June berries, etc., may be introduced "at the owner's risk." Any of them will submit to a certain amount of correction with the pruning knife, and may add to the variety of fruits grown in the amateur's garden. Of course, it is distinctly understood that these special methods of treatment are not commercially recommended for any of the bush fruits in America. [Pg 101]

FIG. 38—CURRANTS AS FAN ESPALIERS ON TRELLIS, HARTFORD, CONN.

Probably the most interesting and practical way for handling gooseberries and currants in dwarf fruit gardens is the form known as standards. This form consists of a small round fruiting top of almost any desired variety grafted high upon a straight clean trunk or stem. This stem may have any convenient height from two to ten feet, the most common and practical height being about four feet. The stock used is the flowering currant, *Ribes aureum*, which forms a sufficiently strong and upright growth for this purpose. Nevertheless it is almost always necessary to support these standards with a convenient stake apiece. For the present these standard gooseberries and currants can be obtained only of the European nurserymen. At least the writer knows of no one who propagates them in America. There are several importers, however, who make a business of supplying European stock and who are always glad to import these on order.

The finer varieties are especially chosen for growing as standards. This applies particularly to gooseberries, which are more widely grown and which are more highly prized in Europe than in this country. The varieties grown in Europe are usually finer table fruits than the American varieties. It is generally understood that the finest fruits for eating fresh out of hand are secured from the standard gooseberries. [Pg 103]

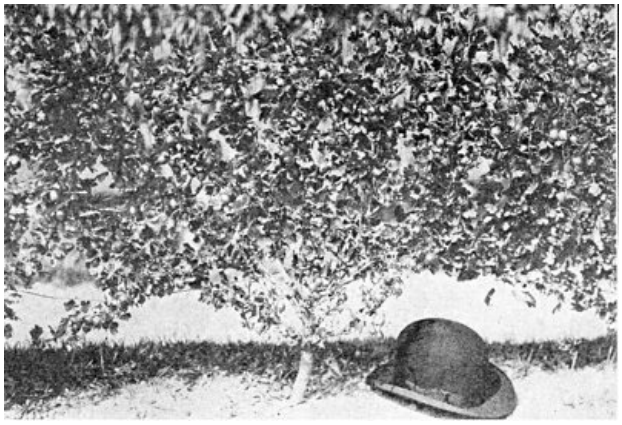

FIG. 39—GOOSEBERRY FAN ESPALIER
Variety Industry, trained on wire trellis

Gooseberries and currants are also adapted easily to the espalier form. The most elaborate palmettes and other geometrical designs can be worked out. Nevertheless the simplest and most practical form for trained gooseberries and currants is the fan shape. If a suitable trellis is provided, the vines may be easily tied out upon it in very attractive fan forms and these are found to be quite satisfactory, both as regards their looks and their product of fruit. They are also easily sprayed, which is a consideration worth mentioning when one has to fight the currant worm. In general, it is best in our latitude to run these espaliers north and south, because they receive too much sun when the trellis runs east and west. This rule, however, is not absolute.

Probably the most convenient and practical way for growing these fruits in the dwarf tree garden is to plant standards at regular intervals in a row, say six feet apart, and to plant a certain number of fan shaped bushes between each pair of standards in the row. If these standards were six feet apart, two plants for fan training would be enough between each pair. The top of the trellis on which the fan forms are tied,

would not be above four feet high, better only three. The heads of the standards then rise well above the top of the trellis. This furnishes some support for the stem of the standard and economizes space. Economy of space is one of the first principles of this style of gardening. [Pg 104]

FIG. 40—TREE FORM GOOSEBERRY

No list need be given here of the varieties of gooseberries and currants to be recommended for this class of planting. It may be said that any of the favorite varieties of currants grown in this country, as for example, Fay, Victoria, Red Versailles, etc., may be chosen, and that these are indeed the varieties usually preferred in Europe. With respect to gooseberries it may be remarked that the English, French, and German varieties are mostly very different from those grown in America, and that while they have some shortcomings in our climate, they are for the most part to be recommended for the purposes which we here have in view. [Pg 105]

XII

[Pg 106]

FRUIT TREES IN POTS

Those who are used to seeing large fruit trees in orchard plantations where each specimen has 1,000 to 2,000 square feet of space, with unlimited opportunities downward, find a fruit tree in a pot a curiosity. It seems remarkable to see a tree in vigorous health and bearing fruit with less than one cubic foot of soil. Nevertheless this method of handling fruit trees is entirely practicable. In some places it is practised extensively in an amateur way, and occasionally reaches almost commercial proportions. For those who grow fruit trees for recreation there could hardly be a more interesting experiment.

The pots mostly used are the nine, ten, eleven and twelve inch standard earthenware pots. With most trees it is best to begin with small sizes and gradually shift forward to the larger ones. A bearing tree may be maintained for several years in a twelve inch pot or even in a ten inch size. Sometimes wooden tubs are substituted for pots. These look better, but are not so good in any other way.

Trees may be grown in pots out of doors, although there is no particular advantage in doing this. If such practise is undertaken the pots should be plunged their full depth in good garden soil. Perfect drainage should be secured by having some broken brick or coarse cinders underneath.

Usually potted trees are grown under glass. They are kept in a cool greenhouse, that is one with little heat. Sometimes they are without artificial heat. In fact this is probably the best way. The houses which are purposely constructed for fruit trees may have a single line of pipe if this is convenient, so that the chill may be taken off the air in severe cold weather. To reach anything like real success, houses must be devoted exclusively to fruit trees. Occasionally trees may be grown with other plants, [Pg 107]

as in cold graperies, but the results are not the best and often come very close to failure.

In building houses for fruit trees exclusively, the even span construction is nearly always used. Houses eighteen or twenty feet wide, and five feet high at the eaves, will answer the purpose very well. The leading greenhouse designers are prepared to furnish plans for such houses and it is usually best to follow the advice of their experts.

All kinds of fruit trees can be grown in pots. This includes apples, pears, peaches, plums, nectarines, and cherries. Those which give the best returns are plums and nectarines. Apples in pots are very interesting and furnish a superior quality of fruit when grown under glass. Apples, plums and nectarines take a finer finish and a higher flavor when grown in this way than when grown in any other.

All fruit trees to be grown in pots should be propagated on the dwarfest of dwarfing stocks. This means practically that apples should be on Paradise, pears on quince, peaches and nectarines on sand cherry, plum on sand cherry or St. Julien plum, and cherries on Mahaleb. [Pg 108]

FIG. 41—A FRUITING PEACH IN POT

The trees should be potted in good rich soil, preferably the best garden loam. This should have enough sand and gravel in it to insure good drainage. A considerable amount of drainage material should be placed in the bottom of each pot. The trees should be repotted in fresh soil annually in October or November. [Pg 109]

Trees in pots require liberal feeding. Besides being given well enriched earth at the time of repotting, they should be supplied from time to time with small amounts of fertilizer. Good soluble chemical fertilizers can be applied either dry or dissolved. A good formula is one part nitrate of soda, two parts of muriate of potash, two parts of high grade phosphoric acid. A very little sprinkling, say a tablespoonful, of this can be given on each pot once a month during the growing season which lasts roughly from December to May. In place of this, or alternately with this, moderate waterings with liquid manure may also be given. These small doses of food are especially useful at the time when the fruit is forming on the trees.

The trees are usually brought into the house at the time of potting, say November 1. If early fruit is desired, they are kept in a house with some heat. It is necessary only that the temperature should be kept constantly and safely above the freezing point. Rapid forcing with a high temperature is not desirable and is hardly possible. If kept simply above the freezing point, these trees will start into growth in January. They can then be kept somewhat warmer during February, the heat being slightly increased in March. Peaches and nectarines will stand fairly high temperatures after the fruit is well set and especially toward ripening time. By this method of mild forcing, plums, peaches, and nectarines can be brought into fruit as early as the latter part of May.

FIG. 42—A FIG TREE IN A POT

The main crop of potted fruits, however, need not be expected until June or July; that is not very much in advance of the outdoor crop. The object of growing fruit under glass is not so much to force it ahead of season as it is to improve the quality. Trees which are to be kept in a cool house without heat need no particular attention except to see that they are watered occasionally and that some plant food is given after growth begins. Even if the temperature goes down considerably below freezing during the winter months in this cold house where the potted fruit trees are, no damage need be expected. [Pg 110] [Pg 111]

Of course, special care will be given to prevent damage from attacks of fungi or insects which occasionally become troublesome in the houses. The small size of these trees makes such work comparatively easy.

The methods of pruning are the same as those recommended for pyramid and bush form trees. These forms are the most practical for pot culture, though pot trees are occasionally trained in cordon forms.

XIII

[Pg 112]

PERSONALIA

Many persons have a strong prejudice in favor of the concrete. On general principles they object to generalities. They choose rather the specific case. Personal experience, they say, means more to them than theory, even though the theory be the sublimation of all experience. For the benefit of such people I am going to set down an account of some of my own attempts at growing dwarf fruit trees, and to that I will add brief opinions and experiences of some friends of mine.

The first dwarf fruit tree that I ever saw, so far as I remember, was in the grounds of the Kansas State Agricultural College when I was a student there. This tree was an apple, on Paradise stock, and at two years after planting it bore six or eight very fine Yellow Transparent apples. It was one of several dwarf apples planted by Professor E. A. Popenoe, but the other trees did not much attract my attention. This particular specimen had a straight, clean trunk of about thirty inches, after the absurd style of heading dwarf apples practised in most American nurseries. But the crown was full and symmetrical, and the fruit was incomparable. That particular tree has always been a sort of ideal and inspiration to me.

Later, when I planted an orchard in Oklahoma, I put in some dwarf trees, particularly pears, but I did not stay there long enough to see what came of them. [Pg 113]

The next fruit garden in which I became interested was in Vermont. This had in it some dwarf pear trees, dwarf apples and dwarf plums, and my own personal experience had fairly begun. The dwarf apples proved to be an almost complete failure, for reasons which I can not now satisfactorily explain. A few years later I planted a few dwarf apple trees in another Vermont garden, where they did reasonably well. But, at any rate, the whole undertaking was unsatisfactory, for it did

not give me a vital understanding of the trees. I never got onto terms of real personal goodfellowship with them; and until a gardener does that his work is some sort of a failure.

The dwarf pears did somewhat better. They seemed to understand their business, and they kept about it without much attention from me. I never cared much for pears, anyway.

But the plums were the brilliant success, at least with reference to my own interior personal experience. Every plum tree meant something to me. A stub of a root and two scrawny plum branches would at any time arouse my imagination like the circus posters' appeal to a boy. In this Vermont garden which I adopted when it was about four years old, there were various plum trees, mostly of domestica varieties, growing on Americana roots. They had come from the Iowa State College, where they had been educated that way. They had been given those Americana roots, not primarily to dwarf them, but to insure them against damage from the cold winters. The tops had not been cut back, and the whole treatment was just such as would have been applied to standards. Later I saw the bad results of this treatment, for several of the [Pg 114] trees blew over in high winds. From subsequent experience I feel sure that if they had been headed low at first, if they had been kept closely headed back and otherwise handled like real dwarfs, they would have lived to a greater age and would have made everybody happier.

At this time also I began, on a somewhat comprehensive plan, the propagation of plums on all sorts of stocks, including Americana, Wayland seedlings, Miner root cuttings and sand cherry, all more or less efficient dwarfing stocks. By this time I was into it head over ears, as far as the plums were concerned.

This having been the largest chapter in my personal pomological experience, I suppose it ought to form the largest portion of this chapter in the book; but my plum work and my experiments in propagation have been so often and so fully reported elsewhere that it would be a vain repetition to go over them again now. They are all written down in the proper places where they may be consulted by the enthusiastic or ill-advised student.

And then I came to Massachusetts; and here the first project, almost, to which my hand was turned was the installation of a garden of dwarf fruit trees. From the following memorandum of the trees growing in this garden any reader may surmise the enjoyment I have found in it. There is one row of dwarf plum trees set six feet apart and trained, rather unsatisfactorily, into bush form. The trees were many of them too large when they came from France, and, though I cut them back severely, they did not form such low bushy heads as my ideal species. They are on St. Julien [Pg 115] roots, which serve the purposes in hand fairly well. Though the trees had a hard trip across the water only one out of forty-six has died in three years. Unfortunately these trees have not yet borne fruit,—not one of them. Next year many of them will bear. Earlier fruitage can certainly be secured on sand cherry stocks and under other methods of training.

Besides the bush plums, the garden contains a row of upright cordons. Most of these were not propagated on dwarf stocks at all, and were not expected to suffer any such drastic training as I have put upon them. They were taken from the college nursery and from the nurseries of several of my correspondents, just wherever I could find the varieties I wanted, and without reference to the stocks on which they were growing. A few are on Americana stocks, several are on peach roots (of all things), and probably a majority are growing on the usual Myrobalan roots. These trees are planted two feet apart in the row and are tied up to a trellis of chicken wire. There are about thirty varieties in the row, numbering most of the different botanical types more frequently cultivated in North America. Many of the varieties are totally and very obviously unsuited to this method of treatment, and presently I will replace them with more amenable varieties. But many of the varieties have fruited, especially the Japanese kinds, and some of them, like Burbank, have proved most unexpectedly docile. Altogether this row of unsuitably propagated and unsuitably selected varieties of plum trees has been one of the most interesting, instructive and entertaining elements in my dwarf fruit garden. [Pg 116]

Next there comes a trellis bearing some espaliers, including plums, pears, apples, peaches and cherries; but these have been recently planted, and as yet they have done nothing worth relating.

There is one row of twenty-three dwarf pears, mostly trained in pyramid form. These have not done well, but the reason is not far to seek. The soil is light and full of gravel, and quite unsuited to pear or quince. Pears never thrive on it. Several of the trees are bearing a crop this year, but some of the trees are also dead, and the whole row looks like the finish of a bargain sale on the remnant ribbon counter.

The row of upright cordon pears is a trifle better, but that is only an accident, I think. The varieties which are growing there seem to be rather better adapted to withstand the unpropitious surroundings. These trees also are bearing.

When we come to the two rows of horizontal cordon apples, though, the real fun has begun. Nearly all these trees are in bearing, and a few of them have borne every year since they were planted out. They are set only three feet apart in the row, which is not enough; and they suffered terribly the first year from a midsummer attack of aphides; and the pruning was neglected to allow them to recover from that scourge, so that the form was somewhat injured; but they have never ceased to be a joy to me and a wonderment to visitors. They are mostly of European varieties, but Bismarck is the showiest and most fruitful one in the collection, though far from the best to eat.

Then there are standard gooseberries and currants, of which there is little to be said. [Pg 117] They haven't been there long, but they are at home and are going to stay. Next year I am going to put in some gooseberries and currants in espalier form.

FIG. 43—DWARF PEAR IN PYRAMID FORM
Two years planted; author's garden

Very few persons know what a medlar is. For the benefit of the ignorant and to increase the kaleidoscopic effect on my fruit garden, I have some medlar trees,— [Pg 118] Holländische Monströse,—which I bought of Louis Späth, Baumschulenweg, Berlin.

A wire trellis, built much like a grape trellis, only higher, carries the row of upright cordon apples. Some of these bore fruit the first year they were planted, and there has been a fair sprinkling of fruit every year since then. This has been one of the most satisfactory lots in the make-up.

There are two rows containing forty-six bush-form apples on paradise roots set six feet apart. Some of these have borne every year since planting out, many of them showing a good crop this year. Again Bismarck is the most fruitful, but the least pleasing to eat. Alexander has made a good record, and this year Calville d'Automne shows a very pretty crop. It is customary with visitors, especially those already interested in fruit-growing and those of a practical turn of mind, to depart with the judgment that "all those other schemes are curious and interesting, but the bush form apple trees look the most like business." I think so too. In fact my experience with dwarf apples might be summarized by saying, "bush trees for business, cordons for fun."

One row of peach trees on St. Julien plum roots set fruit buds in abundance the first year, but they were killed by the freeze of the following winter. The second year the experience was the same, except that the tops froze with the fruit buds. New tops were grown at once, however, and the following year nearly every tree bore a small crop of fruit. Dwarf peach trees are worth while.

This garden has also a row of cherry trees, including Morello, Richmond and [Pg 119] Montmorency; but these trees were set the second year of the garden making and have borne only a small crop of sample cherries.

The last planting in this garden consists of one row of nectarines, twenty-two trees.

This little garden, containing considerably less than a quarter of an acre of land, has now growing upon it 548 fruit trees of the kinds named. And I am not yet done

planting. There are various other things that I want to put in,—quinces, apricots, and perhaps raspberries, dewberries, and other bush fruits. In fact, I should like to make it a "Paradise" like good old Gerarde's or Dodoens', in which all the fruits "good for food or physic" might be brought together and represented in a little space.

It would be quite wrong to close this experience meeting without giving the observations and quoting the opinions of some other and better men. Patrick Barry, in his delightful "Fruit Garden," recorded his belief that dwarf fruit trees were well worth while. "The apple," said he, "worked on the Paradise, makes a beautiful little dwarf bush. We know of nothing more interesting in the fruit garden than a row or little square of these miniature fruit trees. They begin to bear the third year from the bud, and the same variety is always larger and finer on them than on standards." Speaking of pears, he said: "On the quince stock the trees bear much earlier, are more prolific, more manageable, and consequently preferable for small gardens."

The late Mr. E. G. Lodeman, who wrote the most comprehensive American monograph on dwarf apples, concluded his essay rather pessimistically in these [Pg 120] words: "From all the evidence which I have been able to collect, therefore, I cannot advise the planting of dwarf apple trees for commercial rewards, but it seems to me, nevertheless, that they are worth experimenting with for this purpose." Mr. Lodeman recorded and endorsed the common opinion "that apples grown on dwarf trees are handsomer and of better quality than those grown upon standards"; but he did not seem to consider that fact of much importance.

Those who are acquainted at the Lazy Club in Cornell University, and especially those who know Bailiwick, have heard of Professor L. H. Bailey's dwarf apples. (Fig. 44.) These were planted six or eight years ago, and most of them are now in bearing. There are a good many different varieties, nearly all French. My understanding of the scheme is that it was as much as half intended to be a commercial venture; but up to the present time little else but confusion and fun have been gathered with the fruit from those dwarf apple trees. When last I asked the proprietor for his experience with dwarf apples he said that he was having a lot of experience, only he didn't know what it was.

Dwarf pears have been planted frequently, especially in Western New York and Michigan. I asked Professor S. A. Beach for his observations of them, to which he replied: "With regard to dwarf pears I will say that the variety which is most generally grown in commercial orchards is Bartlett. Almost without exception this is grown as a standard. Other important commercial varieties are Seckel, Bosc and Winter Nelis. All these are generally grown as standards. The variety commonly [Pg 122] grown as dwarf is Angouleme. A few fruit growers of my acquaintance are making some money from orchards of dwarf Angouleme. The other varieties which are often propagated on dwarf stock as Clairgeau, Anjou and so forth, are seldom profitable. In fact I have heard it stated that outside of Ellwanger and Barry's orchard there is not a profitable orchard of Anjou in this State. From these statements I wish you to derive the conclusion that in New York State under present conditions there is little encouragement for planting dwarf pears commercially."

FIG. 44—IN PROFESSOR BAILEY'S ORCHARD
Chenango apple on Doucin stocks, interplanted between standard trees

Mr. E. W. Wood, for many years chairman of the fruit committee of the Massachusetts Horticultural Society, says that "under the right conditions the dwarf pear tree is a necessity for commercial pear growing. The growers in Revere and Cambridge would feel they could not get along without the dwarf trees. Putting the pear on the quince stock does not change the wants of the roots of the latter, and it is no use setting them on a light, dry soil, as the roots being confined to a small area of unsuitable soil, will make a feeble growth and finally die outright; or, if in an exposed situation, blow over. Most all the varieties may be grown as dwarfs. The Angouleme and Clairgeau, both good market varieties, cannot be successfully grown in any other way."

Recently Mr. M. B. Waite has written me the letter quoted below, giving some conclusions from his experience with dwarf pears in Anne Arundel County, Maryland. He says:

"I planted out 1,000 dwarf pear trees nine years ago. They were largely Duchess (Angouleme), but there are some Manning, Howell, Anjou, Louise Bonne and Lawrence. I have not been entirely satisfied with the results. We have not had the proper quantity of fruit. There has been some fruit every year since the fourth year, and two years ago there was quite a good crop, but nothing to compare with the yield per acre of Kieffer, LeConte and Garber, for instance. Of course, these are higher-priced fruit and large yields are not required for good returns. Only the Duchess and Manning, however, have produced sufficient to pay at all, and the orchard has not as yet really paid financially. We have a nice crop this year, however, more than the total yield up to this season, and perhaps from now on we may win out. My dwarf pears are on a soil too dry and sandy for the best results, and I think we are at Washington pretty near the southern limit, at least at low altitudes. In the mountains of Virginia and North Carolina they can be grown further southward. They require a moist, preferably clay-loam soil even in their naturally favored districts, such as New England, New York and Michigan, but such a soil is still more desirable when rather too far south for their normal range. They require high culture, manuring and fertilizing, and thorough pruning and spraying in any locality, and these requirements are still more exacting in Maryland. A slight neglect in cultivation, pruning or spraying in one season results in a mass of blooms the next spring, but little or no fruit set. Of course, this extra attention which has to be devoted to dwarf pears as compared with Oriental pears, peaches, apples, etc., to be profitable should result in larger yields, but does not usually do so in this latitude. On the other hand, we may say in favor of the dwarf pear that the quince root is a healthy, reliable root for the pear tree; that the trees attain their seasonal growth early, and therefore are not as susceptible to pear blight as standard pears. Furthermore, they are more easily sprayed, pruned, and otherwise handled than the high standard trees." [Pg 123] [Pg 124]

My friend, Mr. J. W. Kerr, of the Eastern Shore of Maryland, who owns one of the oldest and most picturesque orchards of dwarf pears I ever saw, says that Angouleme (Duchess) is the only variety that pays for growing in that form.

Thus the experience of many men in many parts of America sums up as we began. The conclusion of the whole matter seems to be about this: Dwarf fruit trees have not yet played any prominent role in American commercial horticulture; but they have been profitable in a few special cases, and the probability seems strong almost to the point of certainty that, with the development, refinement and specialization of our commercial fruit growing, a wider field of usefulness will be opened for dwarf trees. In the realm of amateur fruit growing, on the other hand,—a realm now daily widening,—dwarf fruit trees are of capital importance. The owners and renters of small grounds, the cultivators of little gardens—the great majority of American home-makers, in fact,—will find in them an unfailing source of pleasure, inspiration, and even of profit.

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In some cases illustrations have been moved from the original location in order to avoid breaks in paragraphs, and to place them more closely to the related paragraph. Full page illustrations have been moved to the nearest paragraph break, resulting in a few missing page numbers.

Obvious typographical errors in spelling and punctuation have been corrected without comment. One example of an obvious typographical error is on page 124 where the word "an" was changed to "on" in the phrase "... on the other hand...." Other than obvious typographical errors, the author's original spelling, punctuation, hyphenation and use of accents has been left intact with the following three exceptions:

1. On page 92 a hyphen was added to the term "one-half".

2. In the Index (page 125) an accent mark was added in the term: "San José scale".

3. In the Index (page 125) the entry "J. W. Kerr" was changed to "Kerr, J. W." to correspond with other similar entries.

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