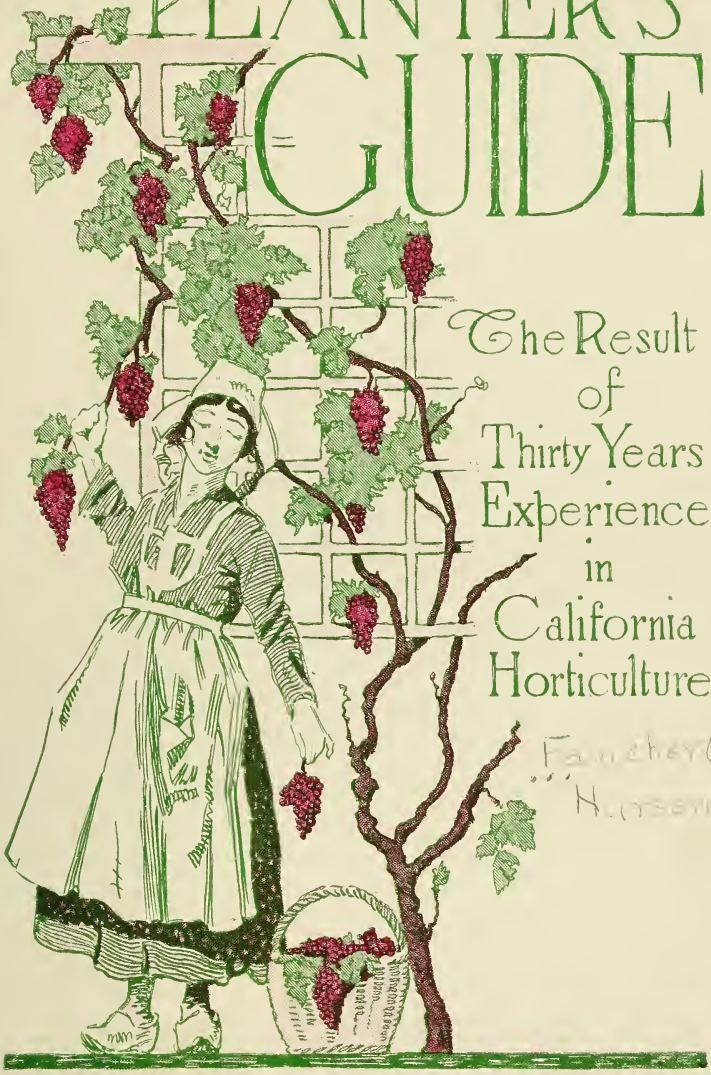
ROEDING'S PRACTICAL PLANTER'S GUIDE



The Result of Thirty Years Experience in California Horticulture

By Geo. C. Roeding.

Price 25¢

THE FOREWORD.

This booklet is issued primarily for the use of our customers—for the help and guidance of those who plant or have planted

ROEDING'S TRUE TREES

The matter contained herein is the result of over thirty years' successful experience in California Horticulture, and it is hoped will be of considerable assistance to those who are interested in securing the best results from their planting.

To build a house it is considered as a matter of course that one must have a firm foundation; and this also is necessary if you wish to have a profitable orchard. The right trees must be planted to start with and the matter contained herein is therefore based upon the supposition that you plant or have planted the right stock.

The expense of compiling and printing this booklet has been so great as to prohibit indiscriminate distribution—therefore the price of twenty-five cents. We will be glad to send extra copies to any address at the rate of three for fifty cents, postpaid.

OTHER PUBLICATIONS

In covering so wide a range of subjects as is contained in this booklet, it has been necessary to make the descriptions and directions as brief as possible and we therefore call attention to our other publications. More complete information on special subjects will be found in **"Roeding's Practical Horticulture,"** which we publish from time to time as occasion demands, in the shape of bulletins. These cover such subjects as "The Olive", "The Fig", etc., and will be mailed free to interested parties upon request.

We also issue annually a complete

ILLUSTRATED CATALOGUE

containing brief descriptions and prices of all stock carried by us, including over 2,000 varieties of citrus and deciduous fruit and ornamental trees, vines, plants and roses.

We grow practically everything that grows and our nurseries are located in the choicest spots of California, under ideal soil and climatic conditions. During the more than thirty years that we have been in business, the name "Roeding" on nursery stock has come to be synonymous with the "best." Our illustrated price catalog will be mailed free to any address upon request.

FANCHER CREEK NURSERIES, Inc.

PAID UP CAPITAL, $200,000

GEO. C. ROEDING, Pres-Manager

FRESNO, CALIFORNIA

RADICAL differences in soil and climate are often to be met with in the same orchard, hence local horticultural conditions are of prime importance when planting for profit. Indeed, it is our experience that it is the very keynote to the successful prosecution of fruit culture as applied to California and the Pacific Coast.

It is of the utmost importance that the land be put in first-class condition to receive the trees. This is accomplished by thorough plowing followed by harrowing until the soil is friable as an ash heap. Nothing is so beneficial to soil as sub-soiling, though planters are often deterred from incurring this additional expense, but where time and conditions will permit, it will do more to promote a fine deep root system and an unusually heavy growth, than any other one thing that can be done in the preparation of the soil.

Where irrigation is practiced grading must be resorted to, so that all spots will be accessible from the laterals running from the main ditch. Grading does not necessarily mean leveling, for the less the surface soil is moved the greater will be the ultimate success of the undertaking. No greater mistake can be made than to cut down the surface of the land for several feet in order to bring it under a ditch. It is far better under such conditions to pump the water from a ditch to the higher level and thus preserve the land. The slight additional expense of pumping will be more than counterbalanced by the growth of the trees and their fruitfulness as compared to the poor growth and lack of fruit when the surface soil has been removed to any depth. Drainage should be given consideration, particularly if the land is low and liable to have water stand too closely to the surface during the spring and summer months.

TIME TO PLANT

Fall planting is never desirable in California, because the growing season often extends into the month of November. It only very rarely occurs that frosts are severe enough toward the latter part of the month to check the growth. A part of the roots of trees dug before they have fully ripened up, turn black and the tree either starts very slowly in the Spring, or does not grow at all. The best time to set deciduous trees is from January to April 1st, with the preference very much in favor of the first three months. All evergreen fruit trees should be planted from March 15th to July 1st, although in many localities, particularly sections of the State where the summer climate is cool, planting may be continued later than this, but we do not recommend it.

A safe rule to follow is to plant deciduous trees when dormant and those which are classed as evergreens as soon as the sap commences to rise in the Spring.

SELECTING NURSERY STOCK

Never forget one point in buying trees and that is, that when purchasing "Roeding True to Name" nursery stock, you are buying from a firm that has devoted over thirty years to the practical study of growing the very best trees that money, study and an inherent love for perfection in a tree, can develop. Remember also that, buying trees is different from the average merchandising. It is not today or the morrow that tells the story, but it is three years of hard work, in cultivating, irrigating, pruning, etc., before your fond hopes are realized. Then why not have Roeding Trees growing, and budding and thriving, and finally rewarding your efforts with a wealth of delicious perfect fruit which Roeding grown trees always bear.

Our aim is to supply well grown, straight and healthy trees, with a strong, vigorous root development free from disease, and true to label. From the planting of the seed to the time our trees reach our patrons, every care that human ingenuity can devise is carefully observed.

TREATMENT WHEN RECEIVED

The trees when received at point of destination should be immediately unpacked and the roots laid in a trench and well covered with soil which should then be thoroughly wet down. If delayed in transit, thereby becoming dry and suffering from exposure, (the bark showing signs of shriveling) it is a good plan to immerse the trees in a tank over night and the following day bury root and top completely in damp soil for a few days until they become normal, when they may with safety be planted out. Should trees be frozen while in transit, place the package in a cellar or some other place free from frost until thawed out, when they can be unpacked and heeled in, preparatory to planting. Trees treated in this manner will not be injured by having been frozen.

In localities where the seasons are very much later than ours, due to higher elevation or to the difference in latitude, it is far better to permit us to forward stock while in the dormant condition. If purchasers will be kind enough to call our attention to the fact that extreme cold weather will not permit of early planting, we will defer shipping their order as late in the season as it is safe for us to do so. The shipment on arrival at destination should be examined by removing a board from the case, and if the roots appear to be in good condition, the contents should remain undisturbed and the case should be placed in a cellar or in a cold storage plant where the temperature should be maintained at about 35 degrees fahrenheit. This method of handling trees is thoroughly practicable, so much so that we have found it possible to ship trees to the antipodes during our winter season and have the shipment on arrival there placed in cold storage until the opening of the planting season.

Experienced orchardists are becoming forcibly convinced of the one fact that better results are obtained by following along lines of simplicity in planning an orchard and for all practical purposes the square system seems to meet all the requirements.

The very fact that there is considerable confusion over the several other methods, leads us to believe that this plan should be used exclusively except where the economy of the ground is the first and only consideration.

PREPARING TREES FOR PLANTING

Just immediately before planting, be sure to examine the roots carefully, and cut away to a smooth surface all bruised, lacerated and broken roots and rootlets with a sharp knife. The tree can now be said to be ready for its permanent orchard home.

If planting is delayed through circumstances beyond the control of the orchardist and a warm spell should intervene in February or March, causing the buds of the trees or vines to start, remove them from the trenches, shake out all the dirt from the roots and expose them for two hours in the morning on a calm day to the rays of the sun. This will cause the small white rootlets which have started, to dry up, and if the trees are heeled in, (wetting them down of course) in a shady place their dormancy may be prolonged several weeks. In setting out, one person should hold the tree in an upright position against the notch in the tree setter, while another shovels or fills in the loose soil around it, first spreading out the roots and rootlets in as natural a position as possible. The surface or friable soil should be put in first among the roots, care being taken to fill in every interstice, thus bringing all the roots in direct contact with the soil. When the hole is two-thirds full, firm the earth thoroughly about the roots, but before doing this draw the tree up to its permanent position. The top three to four inches of soil should not be tramped. A basin should be scooped out around the tree which will hold at least 15 gallons of water, and unless heavy rains should intervene to fill it up, water should be applied either by bucket or by irrigation. The following day draw in loose soil to fill up this basin, reducing it to a fine condition of tilth and do not tramp in. Guard against setting too deeply but allow for the settling of the soil, so that when once established the tree will stand about as it did at the time of removal from the nursery rows, or at the outside not more than three inches below the surface of the soil. In the hot interior valleys of this State, it is also very important to protect the trunks with tree-protectors until they can supply their own shade.

HOW TO PLANT

As has been suggested previously in this introduction, above all things have your ground in the very best condition of tilth. The importance of this one point cannot be dwelt upon too forcibly, for it not only insures more rapid work on the part of the men setting your trees, but in addition to this, not having any clods to contend with, the fine loose soil packs around the roots, when tamped in, and if for any reason there should be no opportunity of settling the trees with water after planting there is very little danger of their drying out.

Before proceeding with the planting of an orchard or vineyard the land should be laid off having one side and end of the field at right angles. When there are no regular subdivisions to work from, and particularly where extensive plantings are to be carried on, these base lines should be established with a transit. Nothing is more unsightly than to have your trees or vines out of line, and by following out the suggestion of having these base lines at right angles, there is very little probability of this occurring. A stake about half an inch square and one foot long, split out of redwood, will be found to be a very convenient size as a marker for the setting of the trees. Dip about six inches

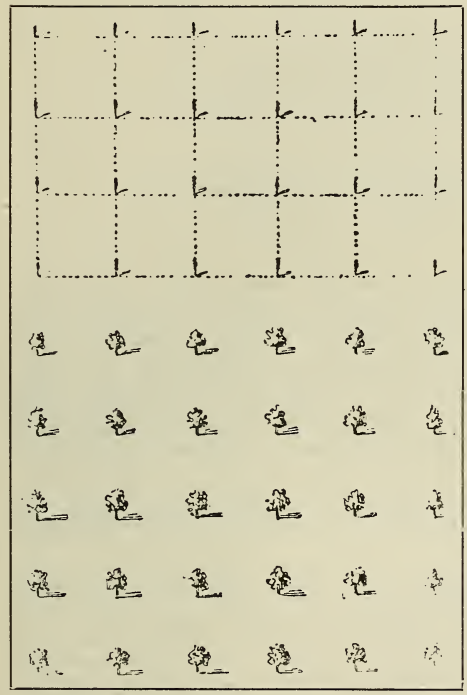
of one end in whitewash, as they can then be readily seen, and should any of the stakes be out of line it will be noticed at once. Before digging the holes it is necessary to have a tree setting board. This is easily made out of a piece of 1x4-4 feet long with an inch hole at each end and a notch in the center. Place the notched center against the stake where the tree is to be planted and push a stake into the ground through the holes at each end of the planter and remove the center stake. The hole may now be dug and this should not be less than 18 inches in diameter and 18 inches deep. After the hole is dug, replace the board over the end stakes in its former position, then plant the tree with the trunk resting against the center notch in the board and it will be in identically the same place as the stake which was removed to dig the hole.

BLASTING THE HOLES

Much interest has been manifested of late years in dynamiting the holes prior to the planting of the trees. It is absolutely necessary to do this in hardpan soils in order to plant trees at all. On the Roeding place, we have a ten-acre tract in our 200-acre Calimyrna fig orchard in which the hardpan varied in depth from 6 inches to 2 feet from the surface. The trees in this orchard are now 12 years old. They have made a remarkably fine growth and have by far outstripped the trees in another part of the orchard growing on a sandy, loam soil.

It has been the practice not to blast where the hardpan came within 3 feet of the surface, but actual experience has demonstrated that not only striking and remarkable development in the growth of trees had been secured by blasting where hardpan was found, but in any soil of a heavy, compact nature. It does not take much of a stretch of the imagination to comprehend the fact that a thorough disintegration of the soil, permitting the roots to ramify in every direction, will promote a rapid root and top growth.

A little booklet giving detailed information how to do it, will be mailed free on application.



Trees Planted on the Square System.

This method is largely practiced on the Pacific Coast

METHODS OF PLANTING
SQUARE METHOD

Having the corners fixed, the next necessary step is to lay off the ground. In order to fully understand the matter, we will suppose the trees are to be planted 24 feet apart. To set stakes for ten trees for each stretch of the wire, it will be necessary to have the wire 240 feet long with a short 2 foot link at each end for a 3 inch iron ring, through which the iron pegs are pushed into the ground after it is drawn taut, to hold it in place. Use a number 19 galvanized clothesline wire and at each 24 foot point, have a small button soldered into place. By opening up the strands, if it is not practical to put on a

button, a piece of colored cloth can be tied into the wire at the proper distances apart for the markers. It is important to stretch the wire well before putting on the markers otherwise it will vary more or less while being stretched in the field and the stakes for the base lines wil be out of line.

Before proceeding with the laying out of the ground, set stakes 24 feet apart along one of the base lines. Having set the stakes along the outside line, start at the same end of the field again and set another line of stakes, parallel with the first line and the length of the chain distant from it. Follow out this method until the entire field is laid out in checks. With the check lines established, it is only necessary now to set stakes at the 24-foot marks on the wire where the trees are to be planted.

No. of Trees or Plants on an Acre of Ground

Distance	Square Method	Equilateral Trian. Method
1 ft. apart each way	43,560	50,300
2 " "	10,890	12,575
3 " "	4,840	5,889
4 " "	2,722	3,143
5 " "	1,742	2,011
6 " "	1,210	1,397
7 " "	888	1,025
8 " "	680	785
9 " "	537	620
10 " "	435	502
12 " "	302	348
14 " "	222	256
15 " "	193	222
16 " "	170	196
18 " "	134	154
20 " "	108	125
25 " "	69	79
30 " "	48	55
35 " "	35	40
40 " "	27	31

Square Method—Multiply the distance in feet between the rows by the distance the plants are apart in the rows, and the product will be the number of square feet for each plant or hill; which, divided into the number of feet in an acre (43,560) will give the number of plants or trees to an acre

Equilateral Triangle Method—Divide the number required to the acre "square method" by the decimal .866. The result will be the number of plants required to the acre by this method.

EQUILATERAL TRIANGULAR OR HEXAGONAL METHOD

By this method of planting all the trees are equally distant from each other and the ground is equally divided in all directions. The arrangement admits fifteen per cent more trees to the acre than the setting in squares and the ground can be worked in three different directions. Objections are urged to it, however, in that it does not admit of thinning trees by removal of alternate rows, as is sometimes desirable, and that one has to take a zigzag course in driving through the orchard.

In planting tracts of any size we do not recommend it. The system should be confined to planting small parcels of land where it is necessary to use every foot of available space.

BRINGING AN ORCHARD OR VINEYARD INTO BEARING

Fruit growing is a business pure and simple and in its successful operation is quite as apt to call forth the best energies of brain and brawn of those who are in the business, as in any other line of commercial activity. Just in the proportion that the orchard receives intensive and intelligent care, will it give corresponding returns for the investment of capital, time and labor. Above all things, do not plant too many varieties if you desire to be a factor among the commercial fruit growers. As an illustration, it is a mistake to have a different variety on each acre for when this orchard comes into bearing there are so many varieties and so limited a quantity of each, that the commercial packer of dried or canned fruits does not feel inclined to pay what the fruit is worth, because there is not enough of any one kind to make it an object for him to handle it.

Growers in new localities are often concerned over the fact that there will be no outlet for the product. The handling and marketing of fruit has assumed such vast proportions that there are always commercial institutions eager enough to enter a new field, and exploit it as soon as the

production is large enough to encourage the building of packing houses for the handling of any particular product. Another serious mistake on the part of many growers, is to endeavor to harvest enormous crops when their trees are only two or three years old. The result of this unwise policy is in many cases to sacrifice the tree to such an extent that just when it should be bringing profitable returns, it was burdened too heavily when young, and in consequence either dies when it should be in its prime, or it takes years of extraordinary care to restore it to its proper vigor. It is just as much a mistake to expect too much from a young tree, as it is to require a child to do a man's work. The care bestowed for the first two or three years in cultivating, pruning and irrigating, where the rainfall is insufficient to carry the trees through the long dry summer months, is the foundation for the upbuilding of a plant, which will redound to the credit of the owner and give him ample returns for his intelligent care and years of hard work.

The tendency toward overproduction in young trees is easily eliminated by pruning. Next to thorough cultivation there is nothing which is more vital to the life of a tree than this one thing. It is difficult to lay down specific rules on this point, but there are basic ones which can generally be observed in the handling of most deciduous trees, with some exceptions, and instructions pertaining to such cases will be dwelt on under proper heads.

After a tree is set never fail to cut it back. This is now the general practice among the most successful orchardists throughout California, and is the result of years of experience. The following winter from three to four branches, properly distributed around the body of the tree, should be allowed to remain to form the head and each one of these branches should have at least one-half of their growth removed, cutting away all laterals from them also. These leaders will eventually form the frame work of the tree. Above all things do not shorten in a lateral starting near the terminal point of any of the branches, unless you wish to have a hideous crook in your tree. It is a great mistake to think that if these small laterals are allowed to remain, the tree will not start. The result of the first year's pruning will cause the trees to make an immense growth and will also induce them to grow stocky. The second winter heavy thinning will have to be followed and the pruning should be done with a view of causing the frame work branches to spread out. After thinning, two-thirds the growth of the current season should be cut off. To the novice this severe cutting seems suicidal, but the results obtained in our own orchards have been so very satisfactory that the soundness of this method can not be questioned. The third year leave from two to three laterals properly distributed on each of the main stems, but they in turn should be cut back at least one half, or even more, depending on the growth. It is safe to assume that the trees in the fourth year have reached an age when they should bring ample returns, still pruning should be carefully followed out each season. Failure to prune severely when the trees are young means that there will be a lot of long spindling branches, with practically all the new growth at the tip ends. A heavy crop may be harvested the third year, but the branches will bend down under their heavy load, become sunburned and even break off in some cases, thus sacrificing a tree to the rapacity of a grower, who in his eagerness to harvest a crop has killed the "goose that lays the golden egg." The many advantages of this method of pruning are (1) It makes a low crowned and a more stocky tree, affording an umbrageous head, and thus protecting it from the hot rays of the scorching summer sun; (2) it enhances the carrying capacity of the tree, thus avoiding artificial props when maturing a crop of fruit; (3) it expedites the harvesting of the crop, by rendering it more accessible to the pickers, thus economizing time and expense; (4) it prolongs the life of the tree by reason of conserving its vital forces, and rendering it less liable to damage in the breaking of limbs and taxing its strength by carrying its fruits "close in."

THE APPLE

In the temperate zone no variety of fruit is so widely distributed or has been more extensively planted than the apple. The list of varieties is amazing. "Downing's Fruits" alone lists about 3,500 sorts. Following out the rule, we have scaled down our list of varieties, cataloging only such kinds having distinct characteristics and of value either for home use or from a commercial standpoint. New varieties are never added to our list, unless we are convinced they possess points which make them worthy of cultivation. Varieties are variable as to localities and in planting in sections where apple culture is pursued commercially, the advice as to the best varieties to plant should be sought from experienced growers. Broadly speaking, the hot interior valleys are not suitable for commercial apple culture on a large scale, as the very rapid

and early maturing of the fruit does not seem to be conducive to long keeping, as found in tried localities where conditions are favorable for perfecting fruit having long keeping qualities. Nevertheless it is a fact that where moisture is readily maintained in a soil by either irrigation or by sub-irrigation, many varieties are of such exceptionally large size, present so fine an appearance and are of such excellent flavor, that more attention should be given to their culture.

The best soil for this fruit is a deep, rich loam which will allow the free extension of the roots and is exempt from stagnant moisture. An extremely light soil should be avoided. Apples do exceedingly well in all the coast counties, as well as in the upper foothills and mountains of the Sierra Nevada. In adjacent States and Territories to the North and East, apple culture is more general, and may be safely followed wherever the soil and climate is favorable. The keeping qualities and the flavor and coloring of our mountain-grown apples at elevations of 3000 to 5000 feet or more, are indeed hard to surpass.

A Well Pruned Three-Year-Old Bartlett Pear Tree.

Observe the leaders are shortened in and distributed on the frame work branches to open up the tree; also that many of the laterals allowed to remain, are cut back. These will eventually enlarge the fruit bearing capacity of the tree, as well as making it more symmetrical.

It is the consensus of opinion among commercial growers that trees should be planted from 25 to 35 feet apart in orchard form. Trees should be cut back to 20 inches from the top of the ground after being set, except in the higher altitudes, where the snow in settling would cause the branches to break off, thus making it advisable to head the trees at not less than 2 feet from the ground. Apples are very much subject to sun scald and to the attack of the flat headed borer, the first few years after trees are set out. When headed low, protected with tree protectors, permitting of free circulation of air, and by giving the stem a coating of whitewash to which has been added soap and crude carbolic acid, little danger need be apprehended from either of these evils. The wash is made in the following manner: Dissolve one-half gallon of soft soap in one-half gallon of hot water, adding one-fourth pint of crude carbolic acid. When mixing add five gallons of hot water and enough lime to make a mixture the consistency of paint.

All shoots starting out from the body of the trees, which are not required to form the head, should be rubbed off, excepting those starting 12 inches from the surface of the ground, which should be allowed to grow unmolested. The following winter they should be cut back at least one-half and thinned out so as not to leave more than four branches to form the framework, and these should be distributed in such a manner as not to crowd one another as the tree develops. Each one of these branches should be regarded as a subdivision to maintain the wood supply to eventually form a perfectly vase formed tree. The second winter not more than two laterals should be allowed to remain and if there is a tendency to crowd, not more than one on the

frame work branches, and their growth should be again shortened very severely. The tendency as far as possible, should be to prune to an outside bud for the first two winters' pruning. With the head now practically formed, the orchardist must shape the tree in accordance with its development, leaving and shortening in the inside laterals if they show a tendency to spread out, or if the inclination is to assume too upright a form, cause them to spread by leaving the outside laterals. The cutting back of the trees and judicious thinning prevent the long bare branches so noticeable in trees, which have not been systematically pruned every winter. The effect of this method of pruning is to cause the structural branches to be larger in proportion to their length, the load of fruit is carried closer to the trunk and even with a very heavy crop of fruit the necessity of propping is eliminated very largely. Props are an expensive item and they also interfere very materially with the harvesting of the crop so that a method of pruning which will dispense with them is worthy of very careful consideration.

A Well-Balanced Six-Year-Old Bartlett Pear Tree.

The object in mature trees should be to thin and to cut back the leaders and laterals to promote an abundance of short fruit spurs so typical of a well balanced pear tree.

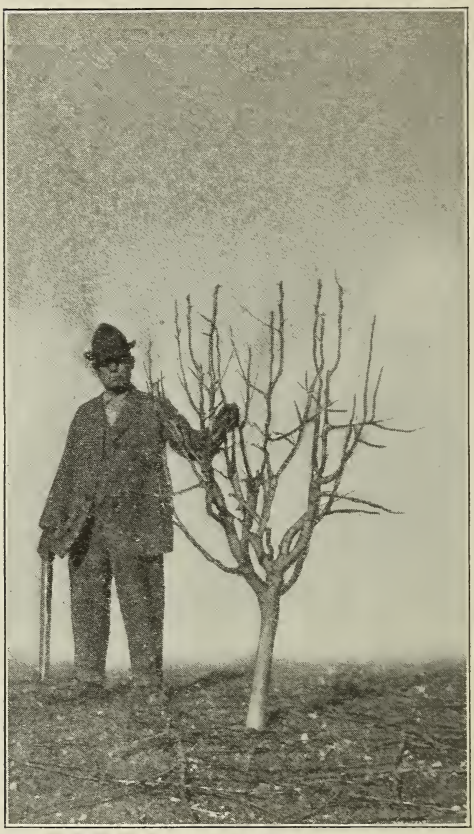
Storing Apples. Fall and winter apples for shipment or storing should be picked just when the seeds commence to darken and when the fruit yields to pressure. If allowed to remain on the trees until fully matured, the fruit will not keep. Apples can be kept in the very best of condition for months by storing them in a cool, dark place, where the temperature is even and the air is not too dry. The fruit can be piled three to four feet deep. When large quantities are piled together in this way, the fruit will heat and sweat, and air must be allowed to circulate through it for several days until it dries, when both light and air should be excluded. Never rub apples before storing and avoid packing them in straw and hay as these only impart a bad flavor to the fruit. In many localities in California, apples keep well and sound until spring by simply piling under the trees and covering them with leaves.

THE PEAR

The pear is a fruit cultviated throughout California and the Pacific States generally, extending into Mexico. It does well in all soils, but succeeds best on a heavy loam. Of the whole range of commercial fruits it seems to thrive in alkali soils and is being largely planted in vineyards and orchards where the vines and trees have been

killed. The trees are usually planted 20 to 25 feet apart. The practice of cultivation is much the same as with the stone fruits. Pruning is usually to the vase form of tree. The fruit should be thinned out on heavily loaded trees or else it is liable to run to small and unmerchantable sizes. The fruit of summer and autumn sorts should be gathered at the first indication of ripeness, the first sign being the tendency of the stem to part from the spur when the pear is gently raised. Late pears should hang as long as possible; a slight frost will not injure them as much as premature gathering. They should then be placed in a dark cool place, where they will ripen, acquiring a delicious aroma, fine flavor, and a melting characteristic pleasing to the palate when eaten. The demand for this fruit both in the green and dried state is increasing yearly, and there seems to be no ground to fear over production.

Follow the instructions given for pruning the apple and you can't go wrong in pruning the pear. The trees



The same tree pruned. Note sturdiness of the branches and the typical goblet form

Here is indicated an even and well balanced distribution of branches, capable of sustaining a heavy crop without undue propping.

should be cut back to 20 inches from the top of the ground after planting. The form of the tree will be a sufficient guide as to what plan to follow to develop a shapely tree in future years. Prune every year. No tree responds so readily to the pruning shear as the pear; it assumes the characteristic vase form as if shaped by a magic hand. The tendency to allow the trees to grow unpruned, and as a result to send up a lot of straight shoots so closely crowded that they can not develop and are entirely devoid of laterals, is a common and reprehensible practice among many growers, and in consequence of this the fruit is all in the tops of the trees. If they do happen to have a heavy crop, unless very carefully propped, they break off. Pruning the tree regularly each year, causes it to not only become stocky, but also develops a bearing surface, which starts where the branches diverge from the main stem, to the very top of the tree. The tree in addition to this, becomes self supporting and it will carry a crop of fruit through the season with hardly a prop to support the heavy laden branches.

DWARF PEARS

The man who wants fruit in a hurry will have his wishes fulfilled by planting pears worked on quince root. Trees will come into bearing two years after being planted out.

The quince root dwarfs the growth of the trees, promotes the development of fruit spurs and makes it possible to grow pears on any town lot or small garden. Picture a pear tree not over four feet high, loaded with perfect specimens of superb fruit and satisfy your longing by having a few trees for yourself. Some people do not fully understand that there is a lack of affinity of some varieties of pears for the quince and this is very pronounced in the Bartlett. To overcome this fault, the Beurre Hardy, which makes a remarkable good strong union on the quince, is budded first and then the pear budded or grafted on this pear stock the following season. This is known as double working. The pruning of the pear on the quince is practically the same as for standard pears, except that it should be more severe.

THE CHERRY

The popularity of this, the initial stone fruit of the season, is unquestioned. The firmness of the leading shipping varieties permits of their being packed when almost ripe for eastern shipment, and this accounts for the enthusiasm with which our cherries are received in the eastern markets. California has every reason to be justly proud of its large, highly colored and luscious cherries. The tree thrives best in the coast counties, but also does well in some sections of the interior where the soil is of a deep rich alluvial nature, retentive of moisture, and also well drained. The cherries of Washington and Oregon are also famous, although they ripen somewhat later than in California. Plant the trees 25 to 30 feet apart and, on exceptionally good soil, even further than this distance is advisable. Low heading is important as the tree is subject to sunburn, the bark being very sensitive. The trees should therefore be headed back to 18 inches. Three branches should be allowed to grow to form the head of the tree and these should be distributed in such a manner as to prevent forks, as the tree has a tendency to split as it grows older. The first winter, these branches should be cut back one-half and the following season not more than one to two branches should be allowed to grow from those left the first year. The third season the new growth should be shortened in about one-third, and some of the laterals appearing near the point of divergence from the main stems should not be cut off but merely shortened in, for the shade they furnish is one of the essential features in the development of the young trees. This same method of pruning should be followed until the fifth year. In after years the cutting should be confined to the removal of branches which are interfering and overcrowding.

The soil in which our trees are grown is particularly well adapted to the development of a perfect root system. Our trees are principally worked on the Mazzard root, as it is adapted to the soils of the Pacific Coast. The tendency of the Mahaleb root is to dwarf the trees, although the very opposite effect is apparent in the one year buds in nursery rows.

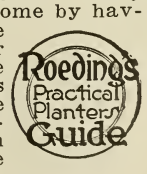
The cherries are classified under two heads, the Hearts or Bigarreaux, which are the sweet cherries, the trees being strong, vigorous growers; the Dukes or Morellos are the sour cherries. The latter trees grow more slowly, the branches are more slender and of a darker hue, the leaves are thicker, more erect and of a deeper green.

THE PLUM AND PRUNE

Plums and prunes are so closely allied that remarks pertaining to one fruit are equally applicable to the other. Practically speaking the prune is characterized by its sweet, firm flesh and has the property of drying and curing without the seed being removed, making an excellent fruit, recognized as having great value in the commercial world.

The plum in its geographical distribution on this Coast, and particularly in California, covers a wide range of soils and climates, being thrifty along the Coast regions, in the Coast and interior valleys, and well up in the foothills. Indeed, so wide is its range that it is safe to say that every county in the state boasts of its plum orchards, excepting perhaps the city and county of San Francisco. This adaptability is undoubtedly due largely to the various stocks on which the different sorts are budded or grafted. Twenty to twenty-five feet apart is a standard distance to plant the tree.

Being a sprawling grower, the tree should be pruned quite severely when young and headed back to 18 inches from the surface of the ground. The tree, like the cherry is subject to sun scald, and this is readily overcome by having the branches start down low to give ample shade to the body of the tree. The first four seasons following planting, practically the same method of pruning as directed for other fruits should be adopted. After the fourth season, the pruning should be confined to removing interfering branches, dispensing with the shortening in of the laterals, for experienced growers have



learned that this really promotes the growth of an immense amount of young wood; which does not produce fruit. When it is noticed that the trees no longer present a healthy appearance and fail to produce profitable crops, some cutting back will have to be resorted to in order to rehabilitate the tree to its former vigor.

Our trees are worked on Myrobolan, Peach and Almond roots to suit the varying soil conditions met with, not only in California, but in other countries as well. The Peach root will thrive on loamy soils, which either through actual rainfall during the winter months or from irrigation are retentive of moisture. The Almond root thrives on deep gravelly soils. The Myrobolan root seems to possess a greater affinity in the matter of forming a perfect union and exercising an influence on the longevity of the tree. The trees do not grow quite as rapidly, but the fruitage is not affected except in a beneficial way by this root. We do not recommend it for extremely sandy soils but for any ordinary soil or for localities subject to overflow and to standing water, this root is invaluable.

The Oriental varieties are coming more into favor. The trees grow rapidly, are heavy and regular bearers, and adapt themselves to a wide range of territory. The fruit is very showy and highly flavored and its shipping qualities are unexcelled.

A One-Year-Old nursery grown Peach Tree and the same topped and root pruned for planting.

THE APRICOT

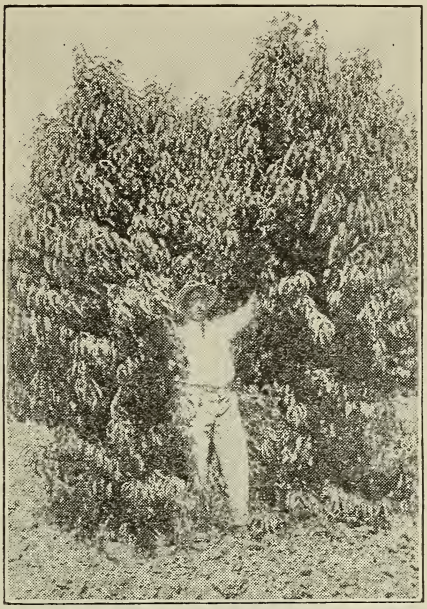
The apricot is a native of Asia Minor and the higher regions of Central Asia. As a commercial proposition, Caliornia has practically a monopoly in apricot culture as no other section of the Union produces it in quantities at so small an expense and so little risk of failure in crops. In appearance it is perhaps the handsomest of all stone fruits and contains less acid. For canning, evaporating and drying purposes, as well as for use in the fresh state, the fruit can hardly be excelled. It seems particularly adapted to the Coast counties, where the fruit attains the largest size and the highest flavor. In the interior valleys it has the distinct advantage in that it ripens its fruits fully a month earlier than in the cooler sections of the state.

Owing to the success with which it can be budded on different stocks, it adapts itself to a wide range in the matter of soil, moisture and climate. In the production of our trees, we have given particular attention to the different root stocks, and their adaptability to various soils. Our trees are budded on peach, apricot and Myrobolan plum roots. Apricots on almond should never be planted as there is no affinity between the two stocks and the trees will break off at the bud even when several inches in diameter. The only practical way to have the apricot on almond is by budding a peach on this stock and then rebudding the peach with the apricot. The peach root is well adapted to a light, well drained, warm, sandy soil and it has the natural tendency to develop a sturdy magnificent fruitful tree. The Myrobolan root withstands a surplus of moisture, is rather free from sour sap, has a tendency to cause trees to be longer lived, adapts itself to moist and very heavy soils. The trees are compact growers and the pruning shears and saw must dance attendance on the trees every winter and relieve them of much of their wood. The method recommended for the peach applies to the apricot and the only exception is that it has been a custom to resort to summer pruning of the apricot. To this the apricot responds readily by sending out where the branches have been cut, a fine growth of new fruit bearing wood. This pruning should commence as soon as the crop is harvested and at least a half or even more of the new growth must be cut off. When apricots have been properly and systematically pruned, they are filled with fruit spurs and probably more than any other tree carry out our ideal of bearing fruit evenly distributed from the very crotch of the diverging main branches to the top of the tree. Is there anything more inspiring to the man who loves trees than to see such a sight?

THE PEACH

The Peach, like the prune and apricot, is indeed a fruit of commercial importance to economic horticulture, and finds

wide distribution not only in California, but throughout the length and breadth of the Pacific slope. For size, flavor, color and shipping qualities the peaches grown in this State have a national reputation. The tree prefers a light, deep, sandy loam, preferably inclined to be dry rather than too moist, but well drained. It should be not less than three or four feet deep, the more depth the better.



A typical Two-Year-Old Peach Tree in one of our orchards. The view was taken in August.

This tree was cut back to a point on a line with the man's belt in January. This is the kind of pruning that makes perfect trees and rich, luscious fruit.

The general cultural directions for the handling of deciduous fruit trees in the introductory chapters should be closely followed in the case of the peach tree. Nothing will bring a peach tree to a premature end quicker than not to prune. The trees as they stand in nursery rows have the limbs removed to a point about 12 inches from the ground. Instead of removing all these limbs when topping the tree at 20 inches, they should be cut back to about two inches long, so in case the buds on the main body do not start in the spring, the buds and smaller branches will. If the buds do start on the main body, the branchlets may be clipped off with a shear. **This is a very important point, particularly with peach trees, and if followed by planters generally would in many cases obviate the necessity of growing a new stem, where the buds happen to be blind and fail to start out at the proper height from the ground.** From three to five branches should form the head of the tree, and these should be cut back to 12 inches the first winter after planting,

The same tree pruned six months later, to induce compactness, a vase shaped form, and a frame work capable of carrying a heavy crop evenly distributed over the entire tree.

and distributed in such a manner on the body of the tree so as to prevent crowding and the development of forks.

The aim of the pruner should be to open up the tree and cut out any central leaders. The second year a severe heading back again should take place, and not leaving over one-fourth of the new growth. Thin out the numerous small laterals, allowing only a few to remain and remove any which are close to the point where the framework branches have been topped. If such laterals are allowed to remain, the new growth in the spring will force its way through them instead of forcing buds out where they belong, making an ugly crook in the tree. The third season two shoots should be allowed to start from the branches of the year before, and they in turn should have their growth shortened in two-thirds. The head of the tree will in the third season

A Ten-Year-Old Peach Tree which has been developed by proper methods of pruning

No fruit tree responds more readily to intelligent pruning than the peach; want of courage to cut back sufficiently is one of the besetting sins of orchardists with this tree.

be fully formed and a medium crop of fruit may be expected. The fourth year the multiplication of new branches should be allowed to develop from those of the year before in about the same ratio, at the same time following out the shortening in method. Never neglect to follow up the pruning and thinning of a peach tree every year no matter how old. Topping without thinning in after years causes the development of immense amounts of barren wood, which has a tendency to smother the tree. Trees should never be set closer than 24 feet apart, unless in extremely light soil where 20 feet is permissible. To obtain large firm fruit, thinning should be resorted to if the trees are heavily laden. This should be done when the fruit has set well and before the kernel has hardened.

Most growers become frightened when they find the ground under a tree literally covered with fruit and get cold feet. Forget your imaginary troubles and keep at it until your peaches are not closer than four inches apart, and try to have most of them six inches from each other, and then your crop will be heavier no doubt than your tree will carry without having a prop to support the over-burdened branches. Less pits and more pounds of actual fine large luscious, perfect peachy peaches should be the desideratum for which every grower should strive.

THE NECTARINE

The nectarine readily adapts itself to California conditions, but reaches its greatest perfection in the interior valleys. It is nothing more nor less than an accidental variety of the peach with a smooth skin. Some varieties are even inclined to be slightly downy. Nectarines are of exceptionally fine flavor and when dried their amber translucency renders them very attractive, which added to their superior flavor

to the peach when cooked, should cause them to be in more general demand. As to their shipping qualities, there is much to be said in their favor over the peach, so pronounced is this that they have been shipped to England and successfully marketed there, where they are much sought after and regarded as a luxury. The culture of the nectarine is in all respects precisely similar to that of the peach, its habits being the same.

THE NUTS

The irresistible desire of people in every walk of life to join the brigade and grow something in the fruit line is quite the thing as far as nut culture is concerned in California. Today the walnut and the almond predominate but who will deny that the Chestnut, Filbert, Pecan, Pistachio will not all be factors to be reckoned with before many years go by? We know positively from observation in Europe that all of these nuts have a future before them, and the progressive nurseryman who is far-sighted enough to realize all this, is cataloging all these nuts, introducing the leading varieties from Europe and educating our people to the possibilities of their culture.

Twenty-five years ago California produced 150 tons of almonds, the average annual output now is 3000 tons, in walnuts 400 tons as compared with 10,000 tons now. Our imports of almonds are close to 9000 tons and 16,000 tons of walnuts. These figures appear to be all out of reason but they are quite true just the same. Figures don't lie and the people of these United States want more of our nuts and will buy them in preference to the imported article as our production meets the requirements of quality. The old story that this or that fruit will not do in California, has been worn threadbare and although we cannot grow everything where climatic and soil conditions are against us, every variety of fruit grown in Europe and Northern Asia will adapt itself to California conditions. We must not be overburdened with the thought to let well enough alone, but must be striving to improve the varieties of nuts already grown and aim to increase our scope of operations until we stand supreme as the nut center of the world.

THE ALMOND

Almond trees are budded on almond and peach roots. Never on apricot root. The almond root should be planted on sandy gravelly soils where there is an absence of moisture during the late summer months. The peach root should always be given the preference on loamy compact soils, which are retentive of moisture. There are many sections throughout the great Sacramento Valley which have fully established their adaptability to almond culture and the orchards have been very profitable indeed. There are many other sections in California where the almond can be successfully grown and where opportunities present themselves for widening the scope of this industry which is so promising. It has without question a wonderful future; for the home markets are far from being supplied judging from the imports which are increasing. There is no reason why California should not only grow all the almonds necessary to meet the consumption of this country and should also supply the export demand.

All of our almonds are one year buds. Long years of experience have demonstrated that the yearling tree grown under our favorable conditions is fully equal to two and three year old trees grown elsewhere.

When planting almond trees the instructions relative to planting other trees as given in the introduction should be followed. The trees after being set should be headed to twenty inches from the ground. During the first year allow the numerous shoots to grow without any interference and in the early winter months thin out the laterals so that the lowest ones will not be closer than ten inches from the ground, not leaving more than four to form the head of the tree. Even if they have made a growth of from three to four feet, cut them back to 12 inches from the main body of the tree. Because almonds should not be pruned much in later years, do not hesitate to prune when they require your trained eye and hand to shape them properly, and create a form and a head which can only be secured by severe cutting. **If there is any one object that this booklet has in view, it is to impress the man who aspires to be a fruit grower to remember that his success for at least the first eight years of his undertaking is dependent absolutely on the few essentials, and the pruning of his trees is one of the most important for at least the first four years of their existence.**

The second and third winters cut the trees as directed in the pruning of the peach. The fourth winter, the tree now having become sturdy, and assumed the goblet form which is ideal, confine your pruning to the thinning out of objectionable branches, and remove laterals where there is a tendency to overcrowding, to permit light and air to circulate through the trees. This method of pruning should be followed for at least fifteen

years when, if the trees give indications of losing their vitality, cut off the entire top within four feet of the ground, leaving one branch to care for the exuberance of sap, and cut this off the following season.

The sweet almonds are divided into the following grades. The hard shell variety has no commercial value except for raising stocks for budding and grafting other varieties. These have 6 ounces or less of kernel to the pound of nuts. There is one exception to the list of hardshells, and that is the famous "Jordan" with its fixed type of elongated kernel and a flavor superior to all other almonds, with the exception of the Eureka, which is of California origin. The softshell requires the use of nutcrackers, while the paper shell can be broken between the fingers.

Cross pollination is one of the interesting phases in connection with almond culture, and although no exhaustive experiments have been made to determine how far reaching this is, alternating three to six rows of a variety has a very marked effect in improving the yield.

THE CHESTNUT

Bearing trees in many sections of California with widely variable soil and climatic conditions, give ample evidence of the possibilities of the culture of this most delicious nut. California should supply not only our home markets, but also nuts for export, and although chestnut trees have been planted in a limited way for a number of years, practically no commercial groves are in existence. California, therefore imports chestnuts from Italy and Japan to meet her requirements. Chestnuts thrive fully as well on a heavy clayey soil as they do on a sandy loam, providing it is retentive of moisture and is deep enough to allow the roots to penetrate without hindrance. In the interior valleys they should be planted in river bottoms, or they may be planted on the plains, providing the soil conditions are satisfactory, either sub-irrigated or the moisture being supplied by surface irrigation. As a rule all failures to successfully grow them in the interior can be traced to the sunburn of the exposed high pruned body of the tree. Low heading is therefore one of the important points in connection with their successful culture in the interior. As the trees do not bloom until all likelihood of frost has passed there is no danger of injury from this source, and bounteous crops are harvested from them annually. Preference should always be given to the grafted trees by the orchardist; such trees will commence to bear within the three years after planting. The nuts are of a uniform size and quality and the increased cost of the grafted trees over the seedling will be more than repaid with the first year's crop. Beyond its economic value for its fruits, the tree possesses advantages for avenue planting, and makes a very striking ornamental tree with its dark, glossy green leaves, when planted singly. Where solitary trees fail to bear, it usually arises from the fact, that the staminate and pistillate blossoms do not mature at the same time. Trees should be planted from 30 to 50 feet apart in a square.

After the head of the chestnut tree has once been formed, very little pruning, except to remove interfering branches, will be found to be necessary.

THE FILBERT

As a family, they may be described as large shrubs or low trees. They thrive best in a warm, moderately moist, loamy soil with a dry subsoil which will retard an excess of wood growth. The wild Hazelnut does well in the coast counties and in the Coast Range Mountains, and is indigenous in the lower mountains and foothills through Oregon and Washington to British Columbia, and also in the Sierra Nevada Mountains at elevations of five to six thousand feet growing along the banks of small streams of water. All are unisexual having the staminate blossoms in catkins, which make their appearance on the wood of the previous year, being quite visible as early as August. The pollen does not scatter until May of the following season. The pistillate or female blossoms compose a star-like tuft of crimson stigmas, pushing their way out in the young spring growth. The pistillate blossoms sometimes bloom later in the spring than the staminate blossoms, and in such cases it is necesary to supply pollen from other sources at the proper time, to secure a crop of nuts. The Hazelnuts make very attractive dessert fruits and they have a peculiar, pleasing flavor found in no other nuts.

With so many sections possessing climatic conditions favorable to their successful culture, there is no reason why they should not become of commercial importance on this coast.

In England Filbert culture is a very important industry. In the County of Kent, famous for its Kentish Cobs, there are 10,000 acres devoted to the culture of this most delicious nut. There the shrubs are inter-planted between apple trees and it is a common sight to see the terminal branches extending into the apple rows. In such orchards the cultivation is all hand work. These immense shrubs, many of which are fifty years old, are trained with stems 18 inches high and many of them are of same diameter. The lateral branches radiating from this stem are trained by pruning and pinching so that they are well supplied with numerous fruit bearing laterals, and the shrub has the appearance of a great punch bowl. The method of planting is fifteen feet each way, except where planted among orchard trees. The trees are carefully pruned in the winter and in July the tender growth is broken off, but never cut, as this has a tendency to send out too much new wood. A heavy calcareous soil with rocky substrata seems to be conducive to their highest development. The Cob is distinguished from the Filbert by being larger, heavier and broader, the Filbert is smaller, narrower and earlier.

THE PECAN

Of the eight or nine species of hickories the one which produces the most marketable fruit and in the most profitable quantities is the pecan. A native of the southern states, it is today the only nut grown there and to a limited extent in the middle states, which has any commercial importance. Texas is probably the largest producer of pecans, the crop aggregating several millions of pounds and gathered almost exclusively from seedling trees. The business of cracking pecans and selling the meats put up in attractive packages has created a demand for the nuts, which is increasing at a very rapid rate. It is largely due to the impetus the industry has received in recent years that has encouraged the planting of trees on a commercial scale of the improved papershell types. The difficulty of extracting the meat from the hard shell seedling nuts has been one of the causes for their not being more popular as a dessert fruit. The thin shells of the improved types, the ease with which the meats are removed and the noticeable absence of the fibrous segments found in the hard shell nuts, which possess a peculiar acrid taste, will do much to make it popular.

The lack of information regarding pecans in California has been due to the fact that an impression has prevailed among our horticulturists in general that our climatic conditions are not favorable to their successful culture. That this is an error is quite evident, for old seedling trees are found growing and producing heavy crops annually in the Sacramento and San Joaquin Valleys. A number of seedling trees, two feet and over in diameter, are growing one mile north of Fresno, bearing abundant crops.

It is only within the last ten years that pecans have been regarded of sufficient commercial importance to cause groves to be planted in the middle and southern states, and the condition of affairs has been brought about by the unexcelled merit of the Papershell Pecan. In California only a very few Papershells are to be found; none of these are over fifteen years old, with the most complete assortment of varieties on the Roeding Place.

The trees thrive in a great variety of soils, doing well in a stiff clay or porous sand, and in Texas they are said to do well on soils underlaid with hardpan, provided proper precautions are taken to blast it before planting. The planting of trees should be confined to soils where moisture is either supplied by natural means or irrigation. Pecans will prove a valuable acquisition to our list of nut fruits in the warm interior valleys of California, Oregon and Washington. In the coast counties, although the tree grows well, it does not mature its nuts, due to the cool, foggy weather, which does not seem conducive to the proper development of the fruit before the dormant season sets in.

The advisability of planting only named varieties of grafted or budded trees is conceded by experienced planters. When trees are grown from selected Papershell seeds, they are liable to produce nuts of variable character in shape, size, thickness of shell, and quality of meat. The additional cost of growing named varieties either by budding or grafting is caused by the very small percentage which a nurseryman succeeds in growing. If the orchardist will only bear in mind that the increased outlay for budded or grafted trees is offset by the fact that they will come into bearing in less than half the time that seedlings do, and that the nuts will sell for four times as much on the market, their economy is at once obvious.

The Pecan, like the walnut, is unisexual, that is the male and female organs are not in the

same blossom. It sometimes happens that the male blooms (catkins) mature and release their pollen grains before the pistillate or female bloom is in the receptive stage and when this occurs the nuts are hollow shells and it is therefore advisable in planting a pecan grove, to plant the two or three varieties and alternate with several rows of each. Trees should be planted not closer than 40 feet and on rich bottom soils 50 feet is better. It is entirely practicable to plant some other variety between temporarily until the Pecan commences to bear profitable crops, when the other trees can be dug up. The oft repeated remark that only trees which have never had their tap root cut will bear, has time and again shown to be fallacy, in fact no harm will result from the shortening in of the tap root, for the tree is really benefited by the more spreading root system. The difficulty of securing a uniform stand and protecting the trees from injury; the marked variation in the size of the trees when the nuts are planted in the orchard where the trees are to grow, has further discouraged this method of procedure by practical men.

In setting a Pecan tree, a hole 24 inches in diameter and 30 inches deep is usually large enough. The trees should be set at least two to three inches deeper than they stood in the nursery rows, proper precaution being taken to have the reddish, brown tint which is the crown of the root, underground, and it should never be exposed even after the earth around the tree is settled. When set the trees should be cut back to within 3 feet of the ground. The head of the tree should be restricted to about three framework branches.

As a general rule the Pecan requires comparatively little pruning. Moderate pruning of the main branches for the first three years, will promote stability in the entire tree. After this about all the pruning necessary is to remove dead or injured branches and cut back those which have a tendency to run beyond their neighbors.

The harvesting of the nuts is very simple. They mature in November. In most cases, unless the nuts in very large trees are beyond reach, it is better to gather the nuts by hand rather than threshing them off with poles. As soon as the hulls are removed, dry the nuts on trays, spreading them out about two inches deep, stirring them occasionally for a week, when they are ready to be sacked for market. Seedling pecans are polished by putting the nuts with a little dry sand in a barrel, fixed so that it can be rotated like a revolving churn, and turning until the nuts receive the desired polish. The markings on the named varieties of papershells should not be interfered with, as they are rendered far more attractive with their natural marks, dots and streaks.

THE WALNUT

Among the edible nuts grown in California, none equal in commercial importance the walnut. Under favorable conditions of soil and climate the tree attains an immense size, specimens some sixty feet high, with a spread of fully one hundred feet, being often conspicuous features of the landscape. It prefers a rather loamy, deep, rich soil, finding its greatest luxuriance in such lands. No nut yields larger and more profitable returns than the walnut; the tree is practically free from insect pests, and when once established it requires little care as far as pruning is concerned. Good and thorough cultivation is necessary for activity in the growth of the tree, causing it to respond with bountiful crops. The planting of seedling walnut trees has been generally abandoned on account of the many advantages of grafted trees, which may be summed up as follows: (1) they usually commence to bear profitable crops much earlier than of seedlings; (2) they reproduce the variety from which buds and grafts were taken, so there is an absolute certainty that the character of the parent tree will be transferred to the young stock; (3) perpetuation of the bearing qualities of the parent tree with nuts of identical quality. These points form the basis of success for the grower, for the extra price realized for the product of the grafted trees in connection with their early bearing qualities more than offsets the additional first outlay. In addition to other facts mentioned, the California Black Walnut (Juglans Californica) root which is used as a stock has a decided influence in causing the graft to grow more vigorously and it will also adapt itself to a wider range of soil conditions than trees on their own roots.

For commercial planting, trees are usually set 40 feet each way, although in some instances where the soil is exceptionally fertile, trees are set 50 feet apart, for as the tree matures, it makes a wide spreading top, so that it is no uncommon sight to see branches even at the latter distance interlacing.

All the talk that the cutting of the tap root of the walnut interferes with its bearing qualities is nothing more or less than twaddle. Numbers of commercial orchards and very profitable ones too are transplanted trees. The walnut even if trees are ten feet high, should be cut back to 3 feet

A Grafted Walnut Tree.

Same tree topped and root pruned for planting.

from the ground after being set. In the interior valleys growers have even found it expedient to cut trees down to 18 inches and train up a new stem. If there are any advantages in this plan of procedure, they are evidenced by the tremendous vigor and the prevention of sunburn of the new shoot, which must of course be staked the first year. The coined expressions that this tree or that should not be pruned because it would be ruined, has had the tentacles of misapprehension more closely interwoven around the walnut than possibly any other tree. Which is preferable the tree with all its fruit bearing wood in the very top or the one that is liberally supplied with laterals from as nearly as it can be obtained from the point from which the head is started?

If you can secure a more striking tree with a broad bearing surface, is it not common sense to suppose that you are not going to reach the goal you are aiming at, if you don't do something to check the main trunk from striving heavenwards.

No person of intelligence will deny the fact that one's arm held at length has not the strength to resist the same strain as when the forearm is held at right angles to the arm. The same principle applies to the main limbs of the tree. The development of elbows promotes strength, increased bearing surface and a perfect tree. Is there anything more to be desired? Cutting back the framework branches one-half the first winter after planting; pruning the laterals in the same manner the second winter and thinning out when there is a tendency to overcrowding, followed by a more moderate treatment in the third winter, and the checking of rampant growing limbs in the

fourth season when they have a tendency to outstrip their neighbors, and following out this last recommendation in subsequent years, are requisites easily carried out to make a perfect tree.

The holes for planting should not be less than three feet deep and two feet in diameter. Cut the tap root off at about twenty-four inches and trim off all bruised and broken lateral roots before planting. A liberal application of thick whitewash, in which some salt or glue has been dissolved, is very beneficial as it prevents sunburn.

The walnut like the Pecan is unisexual, that is the flowers of both sexes although produced on the same tree, do not occur in the same flower. The male flowers are called catkins and in the spring are distributed throughout the tree and look like tassels; the female flowers are like two little horns at the terminal ends of the new growth.

One of the striking peculiarities of the French type of walnuts, is their late blooming. This peculiar feature of these walnuts was no doubt developed in Grenoble, France, where the Chaberte, Franquette, Mayette, and Parisienne originated to overcome the nipping of the blossoms by late frosts in the spring. When the French walnuts are planted among such varieties as Santa Barbara, Placentia Perfection and others the difference is very striking, for they very rarely have a bud swelled by the middle of April while the California varieties will be clothed with all their foliage

A fine type of top grafted walnut tree. Top growth six years old. If pruning the walnut tree is unwise, one would not believe so from this tree. Pruning from now on will consist only of thinning and cutting back over ambitious branches.

Deep alluvial soils should always be selected for planting walnuts, and a liberal supply of water should be available, either by surface irrigation, or the soil in which the trees are planted should be of a moist nature.

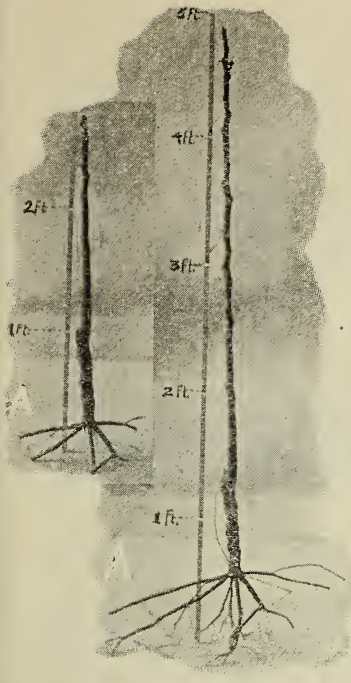
It is only recently that the San Joaquin and Sacramento Valleys have been found to possess climatic and soil conditions, making the culture of the walnut a very profitable undertaking, particularly for the French varieties grafted on California Black Walnut root.

THE FIG

Figs grown in the United States either for eating fresh or for drying are of one species, viz: Ficus carica. There are an endless number of varieties of figs. In many instances on account of the wide distribution of this fruit throughout the world, the same variety may be blessed with any number of synonyms. This is the case with several sorts grown in California today. Not over six varieties comprises the list of commercial varieties for all purposes in California.

LOCALITIES FAVORABLE FOR THE FIG

It is safe to say that no deciduous tree grown in the semi-tropic and temperate zones, will adapt itself to a wider range of climates and soils than the fig. Figs can be used for such a variety of purposes, namely: drying, canning, preserving, shipping in the fresh state and for home use, that a wide range is open for their successful exploitation. To produce the finest dried figs, with the thinnest skin and rich in sugar, a warm dry climate is an important factor. They will withstand a temperature of 18 degrees Fahrenheit in the winter months, without being injured. Hence their geographical distribution is very wide, embracing all portions of this State, the sheltered sections of Arizona, New Mexico and southwestern Texas, the extreme Southern States, Old Mexico, the Hawaiian Islands and Australia.



A nursery grown Fig Tree and the same tree cut back ready for planting.

Bear in mind that the fig tree is of a spreading habit and is also a great surface feeder, and therefore avoid planting the trees too close together. On the general run of soils 30 feet on the square system is a good standard distance which may be increased if soil conditions warrant, but trees should never be planted closer for commercial purposes. As the fig tree is long lived and will in time occupy a large area, it is practicable to plant trees 40 feet apart, alternating with other fruit trees, or grapevines may be planted between the rows which may be removed in later years. **As a border tree for inclosing orchards and vineyards, or for aligning avenues, it not only makes a striking effect but is also very profitable.**

Although the fig will stand all kinds of neglect after it is established, too great emphasis cannot be laid on the close attention which must be given in transplanting the trees from the nursery to the orchard. The roots of a fig tree are very susceptible to exposure, hence should be carefully covered in transferring from the trenches to the field. It is surprising what effect the puddling of the roots will have in preventing their drying out even in cases of severe winds, and we cannot emphasize the importance of this too strongly. As an illustration of this point, we wish to say we have taken trees which were in leaf and after puddling the roots thrown them into the open air for a couple of hours and not a leaf would wilt, while trees not treated in this manner would dry up, root and top, in ten minutes exposure. To make a puddle dig a hole eighteen inches deep, two feet in diameter, fill it partly full with heavy soil, mix with water until you have a muck the consistency of a heavy paint. Dip

A One-Year-Old orchard grown Fig Tree with the frame work limbs well divided and cut back.

A Two-Year-Old Fig Tree commencing to grow a shapely head.

The Third Season. The head of the tree has broadened out and it has numerous fruit bearing laterals. This is a result of proper pruning.

the roots into this, and give no further concern about their drying out even if exposed to the direct rays of the sun for a short period.

Before planting cut off all bruised and lacerated roots and make a fresh cut on all other roots, so they have a smooth clean surface. The tree when planted should not stand over three inches deeper than it stood in the nursery row. Never neglect to settle the earth around the trees with not less than fifteen gallons of water. After the water has soaked away fill in with fine soil without tramping. No greater mistake can be made than to wait for rain or for water to be turned into the irrigating ditches. After the tree is planted, cut back to twenty inches from the ground, and cover the wound with rubber paint, or grafting wax.

The first winter cut the branches of the one year trees back to about twelve inches, leaving not more than four to make the head of a tree. Have these distributed in such a manner that there will be sufficient room for them to expand without crowding as the tree grows older. The second season cut not less than two-thirds of the new growth, leaving not more than two shoots on each of the frame work branches. Any branches on the underside of the limbs having a tendency to droop to the ground should be removed. The third season shorten in the new growth about half, leaving the same multiple of branches on each of the previous year's shoots as were left the year before. In after years the pruning is limited to the removal of branches which cross or interfere with each other and checking the growth of branches making an excessive growth. Young trees should always be protected with tree protectors to prevent sunburn. The fig tree is just as responsive to good care, thorough cultivation, as any other variety of fruit tree, and the bearing capabilities will be commensurate with the care bestowed on the trees while young. But very little fruit is to be expected till the trees are four years old.

CROP SURE—NO FAILURES

The absolute certainty of the crop is indicated by the policy pursued, in many sections of California, by the packers of dried figs who make it a practice to purchase the entire output of an orchard extending over a period of years at a fixed annual sum. The prices paid depend largely on the size of the trees, and range from $1.00 to $5.00 per tree. It is no unusual thing for these contracts to involve sums as high as $5000.00 per annum. The contractors assume all the expense of harvesting, the grower merely prunes and cultivates his orchard under this arrangement. The very fact that our importations of Smyrna Fig are constantly increasing, the annual amount averaging not far from 13,000 tons, is in itself sufficient indication of the possibilities in store for the building up of a great industry under the favorable condtions presented in many sections of our Pacific Coast States.

Talk about living, or rather luxuriating, under your own vine and fig tree beneath our balmy skies; if this is not a truism expressing the delight of going beak to the soil in the glorious climate of California, what is?

For detailed information giving concise and explicit directions as to caprification, curing, etc., write for a copy of "Roeding's Practical Horticulture," entitled "The Fig."

THE OLIVE

In California the olive has long since passed the experimental stage and is now being produced in quantities for pickling and oil purposes. The important position that it is destined to occupy as one of our leading horticultural industries, can no longer be questioned.

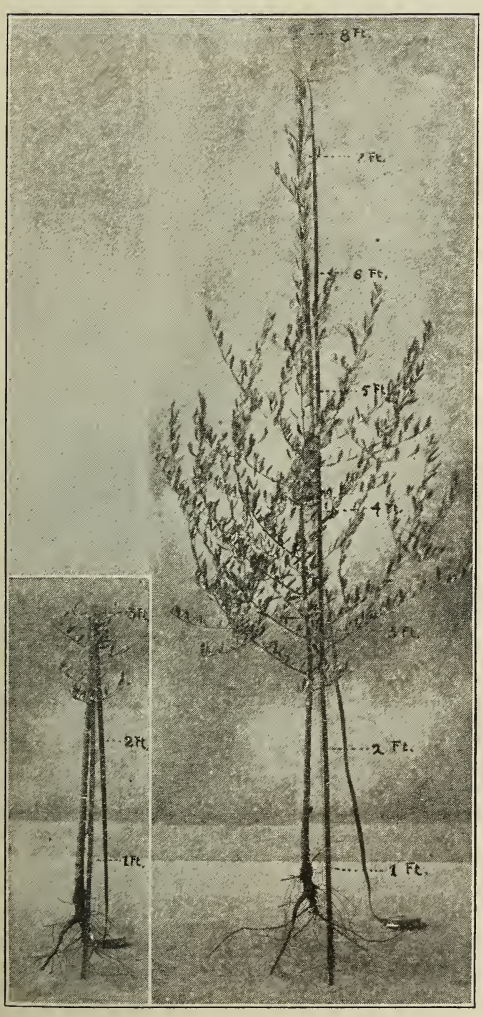
California possesses the same soil and climatic conditions in which the olive thrives in the countries of Europe, Asia and Africa, and there is absolutely no obstacle to prevent our supplying the demands of not only this country but becoming exporters of the numerous products for which the olive is noted.

PLANTING

Today the transplanting of olive trees is comparatively an easy matter to what it was twenty-five years ago when the industry was just beginning to attract the attention of horiculturists. At that time unless the trees were potted plants, they invariably died. After years of experimental work the cause of the trees failing to grow was found to be due to not topping the trees and shortening in the lateral branches when digging. This method of trimming overcomes much of the evaporation and loss of vitality through the foliage and much of the trouble formerly experiencd has been overcome. In nearly all cases where trees fail to grow the trouble can be traced back to not again cutting the trees back to twenty inches from the ground after they are set or to careless handling on the part of the planter after the trees are received.

In the first place we do not recommend that olive trees be transplanted until the middle of February, for it is only in a few places that the growing season starts in before this.

When received at destination take them out of the receptacle in which they are packed and heel them in a sandy, warm soil and then turn a hose loose in the trench so that the



A nursery grown Olive Tree.

To the left the same tree pruned for planting.

With the Olive tree it is essential to induce a strong growth when young, hence the importance of intelligent pruning.

The first season's growth of an Olive Tree in the orchard.

The importance of shortening in these branches cannot be overestimated. It is our observation that unprofitable trees are often the result of a want of pruning.

soil will fill in all interstices and exclude the air. After the soil is settled fill in with loose soil and tramp it down. The trench should not be less than fourteen inches deep and have your trees stand upright, rather than at an angle. Treated in this manner they will remain in perfect condition until the ground is in shape for planting.

As the roots of an olive are very sensitive to exposure as soon as they are taken out of the trenches and prior to planting, all bruised and lacerated roots should be cut off and a new clean cut made on all the other roots. Before taking out to the field, puddle the roots in the same manner as is recommended for the fig. This particular phase of the operation must not be overlooked. Dig the holes to receive the trees as recommended for the general run of deciduous fruit trees and follow the other directions faithfully. Do not fail to cut the tree back to twenty inches after being planted and shorten all laterals to two inches. If there should be no laterals, cut the trees back anyway, for the olive will always force out its blind buds.

Note how the branches have been shortened in and thinned out, and that as far as possible branches having an upward tendency, have been encouraged to grow.

The theory that olives can be grown successfully on poor rocky soils has been exploded long ago. It is a fact that olive trees are found growing in such soils in many countries of Europe, as the writer knows from personal observation, but this does not indicate that olive culture is a success in such soils, for it is not. The trees usually are scrawny, entirely lacking in the essentials which go to make a perfect tree, and would cause the orchardist accustomed to the fine luxuriant trees, as they grow in California, to have heart failure if he had such prospects before him.

It is not necessary for any man to waste his time attempting to grow olives in inferior soils, with the thousands of acres of fine land still available for cultivation.

Do not make the mistake of planting the trees too close together. The olive is a gross feeder and sends out a mass of small surface roots. Never plant closer than twenty-five feet apart on sandy soils, thirty feet in a good loamy soil, and it is practicable to plant trees forty feet apart on rich deep soils, with a deciduous tree

between, with a view of taking it out as soon as the olives attain any size.

Even in localities in which there is a bountiful rainfall, the trees should be irrigated not less than four times in the growing season for the first four years of their existence.

When the tree is planted it should stand at least four inches deeper than in the nursery rows. Allow the tree to grow without much interference the first year, for the more vigorous the new growth and the more of it, the stronger will be the root development. The first winter after planting trim

A Two-Year-Old Olive Tree. The pruning that it received the previous year is causing it to assume the goblet form.

all the growth off except 4 or 5 branches close to the head, and have these properly distributed, as they will ultimately form the main frame work branches. Cut off two-thirds of their growth. The second winter trim the tree in such a manner as to leave from one to two laterals on the original frame work branches, bearing in mind that these branches should have an upright tendency, and cut them in turn back at least one-half. In subsequent years this same method of thinning out and shortening in should be followed, and this cutting should be quite severe for at least four years. The workman should not always prune to an outside lateral, but should exercise some judgment to balance the tree by causing some branches to slope inwardly and force others to have

A Three-Year-Old orchard grown Mission Olive Tree, making a fine uniform and healthy growth.

The same tree with many of its branches thinned out and the laterals and top growth properly pruned to develop an ideal tree.

an outward tendency as illustrated in the cuts. This promotes sturdiness in the tree and a healthy uniform growth also a broad bearing surface, many small lateral fruit bearing branches, and naturally more fruit than an unpruned tree, the growth of which, if not checked, would consist of several straight, upright shoots with all the fruit-baring branchlets in the top. In case of a heavy crop, these branches being without any natural braces, which would have developed by pruning, would bend over and in many instances break off. After a number of years the shearing off of the small laterals will cause many so-called "crows-nests" to form in the trees, and the new growth will be rather weak. It will be at least

Manzanillo Olive Tree, six years old. Growing vigorously and giving promise of becoming a fine specimen

Observe that it is liberally supplied with an abundance of fruit bearing branchlets from the ground up.

15 years before the trees will reach this stage, but when they do there should be no hesitancy in cutting them back severely and thinning vigorously, to promote a strong, new growth. Even before this age the trees will have a large amount of inside growth, which, when it is no longer productive, should be cut out entirely. This does not mean necessarily that the trees should be thinned out like a peach, for this would be a mistake, but that wood which indicates by its appearance that it has lost its vitality should be removed, for it will soon be replaced by new wood.

Trees that have attained an age of thirty or even fifty years may be induced to clothe themselves with a wealth of new growth if the method of pruning which is here recommended is observed. The very fact that there are a number of laterals as well as leaders varying in diameter from two to six inches or larger makes it practicable to resort to extremes in severe cutting back, should it be necessary. The smaller limbs will be the first to start vigorously and conserve the vitality of the tree and afford protection to the larger limbs until the new wood starts to grow. One of the important points to be observed in this treatment of old trees is to cover the body and limbs with a heavy coating of whitewash, and shade with burlap in addition to this in climates where there are extremes of hot weather during the summer months. For the first few years following this cutting back of large limbs the new growth should be shortened in severely rather than to be thinned out, for the greater the shade the more responsive will be the vigor of the new shoots, and the less danger there will be from sun-burn. Of all things, every precaution must be taken to prevent this.

For further detailed information on the olive, write for a copy of our Bulletin on the olive. It is free.

THE ORANGE

Taking its inception in the warm belt of the Southern counties of the State, citrus culture has gradually found its way farther north, until at the present writing, oranges and lemons are grown within the very shadow of Mount Shasta; in Arizona—notably the Salt River Valley—and in many portions of Old Mexico. The sheltered nooks and interior valleys of the Sierras, the thermal belts in Placer, Kern and Tulare counties, the regions free from biting frosts in the great valleys of the San Joaquin and Sacramento, all furnish conditions in which the orange and the lemon luxuriate.

That citrus culture is one of the great and growing industries of California can no longer be questioned when it is borne in mind that the shipments are $40,000,000.00 and over annually.

Citrus trees are either dug with a ball of earth varying in weight from 25 to 40 pounds, or they are taken up with naked roots. The former method is usually followed in handling trees in California. Freight charges on stock handled in this manner are heavy, still the satisfaction of knowing that with ordinary care every tree will grow, offsets the slight additional expense incurred in transportation charges. Trees taken up in this way can if necessary be kept in a shed for several months before planting, if the balls of earth are watered occasionally. In taking up trees with naked roots the greatest care should be exercised on the part of the orchardist to avoid exposure. When set, the leaves should be stripped off to retard evaporation and loss of sap in consequence. In planting set the trees so that when the soil is settled the union of the bud with the stock will be at least four inches above the ground.

The same tree pruned and thinned out sufficiently to promote increased vigor.

This tree, with its abundance of well distributed laterals, will have a fine crop of fruit.

A One-Year-Old Orange Tree.

A tree showing a a year's development in the orchard. Notice these branches, which, if allowed to grow unchecked, draw the tree out of shape, all of the growth going into a few straggling limbs.

Be sure to settle the earth around the trees with water, whether planted with naked roots or balled. In filling in the hole around a balled tree, never tramp on the top of the ball, as it will break it, dislodge the fibrous roots and in many instances cause it to die. After the hole, in which a balled tree is planted, is partially filled, cut the cords by which the burlap is tied to the tree; the burlap need not necessarily be removed as it will soon rot.

Seedling trees should be planted not closer than 30 feet on the square method; budded trees from 22 to 24 feet, with the exception of such varieties as Satsumas, Limes and Kumquats, which are of a dwarfish habit, and should be planted from 12 to 15 feet apart.

The same tree correctly pruned to form a well shaped head.

TIME TO PLANT

Citrus trees being evergreen they can be planted at all seasons of the year, although the months of March, April, May and June are considered the most favorable. In the interior valleys where it is extremely hot and dry during the summer months, it is advisable to plant as early as possible in the spring, although planting should not commence until the ground is fairly warm, so that the tree will immediately start to grow. Trees planted too early, while the ground is still cold and wet, will remain in a dormant condition until the ground gets sufficiently warmed up so that they can make a start. When this condition prevails

for any length of time it causes the finer roots to decay; as a consequence of this, when the tree does start, it will make rather a slow growth until new rootlets are formed. For this reason it is advisable to defer planting until conditions are favorable for the tree to start to grow as soon as planted.

Along the coast where the summer climate is more moderate, citrus trees are planted with good results all through the spring and summer months. In fact, the trees planted during June and July seem to make nearly as good a growth as those planted in the spring. Where planting cannot be done before this time, it is our opinion that July or early August planting is preferable to waiting over until the following spring. Even though the trees do not make quite as vigorous a growth as those planted earlier in the season, they make sufficient growth to become thoroughly established, in consequence of which, they are all ready to start with the first touch of spring and are far ahead of any that can be planted at that time.

The only thing necessary to successful summer planting is to see that the trees are properly handled from the nursery to the orchard and are sufficiently well irrigated and cultivated. The prompt application of water to newly planted trees is very essential in late planting.

STOCKS

In order to meet soil and climatic conditions in different sections, we bud our citrus trees on the following stocks: Sweet Orange, (Citrus Aurantium Dulcis), Sour Orange, (Citrus Aurantium Amara), and Deciduous Orange (Citrus Trifoliata). On the first named sort the budded trees outgrow those on any other root, and practically all the old groves of the State are worked on this stock and are thrifty and healthy, except when situated on soils where there is an excess of moisture during certain seasons. Sweet orange seedlings are grown from the seed of the common sweet seedling orange. Sour Orange seedlings are grown from the seed of the sour orange so extensively grown in Florida as a seedling for budding practically all types of citrus trees. Although the buds do not grow as rapidly or attain as large a size in mature trees, this stock is very resistant to gum disease, hence it has been much in demand in recent years for heavy soils where water was apt to stand for any length of time either because of summer irrigation or a heavy rainfall in the winter months. The Citrus Trifoliata is a native of Japan and is the hardiest orange known. It is deciduous, its fruits are very bitter and of no commercial value, but its hardiness seems to exercise a decided influence on the budded tree. It is more resistant to cold than any other stock.

Orange Tree two years old, rather one sided.

An irregular development of branches in the Orange tree is to be avoided; it should present a compact, well defined growth.

The same tree pruned. Note that it was cut back severely. Shortening in the branches having an upward tendency, will cause the tree to round out uniformly.

Actual experiments have proven that trees grown on this stock come into bearing sooner, produce heavier crops when the trees are young, with no tendency to change in this respect as the trees attain age, and although the development of the tree is somewhat slower, it is indicated more by the close compact growth and not as is erroneously believed the trees will not grow into typical orchard shape. That the trees do bear regularly and heavily; that they do mature their oranges earlier, and that the orchards are up to the standard of those grown on other roots, we have actual examples of to prove our assertions from trees now in full bearing which were grown by us. In most cases where the tendency of a stock is to dwarf the tree on which it is worked, the stock will be smaller than the body of the tree. With the Trifoliata root the very opposite is the case.

PRUNING

Our citrus trees are headed at about twenty-eight inches from the ground, hence all that is necessary for the planter to do is to shorten the branchlets to about six inches and to thin them out, not leaving more than six if they have a tendency to be overcrowded.

Trees headed at four feet or more should be cut back to 28 inches for the purpose of forming a new head. High headed trees are always objectionable, for they not only expose much of the stem causing sunburn, but in addition to this the tree is retarded in acquiring a sturdy compact growth. In pruning, above all things do not be deceived into the idea that the trees must be thinned out to admit air and sun. The tendency of nearly all the budded varieties is to droop, so in shaping the tree cut to a lateral which has an upward tendency.

An orange tree for the first four years of its existence does not require thinning out as is the case with deciduous trees, but it does need systematic shortening in of the rampant growing branches which draw it out of shape. This cutting may be carried on in the summer months and then again in the spring just before the trees start to make their new growth. Although the principle of pruning the orange tree is the very opposite of that employed in shaping deciduous trees, we cannot too emphatically lay stress on the extreme importance of the free use of the pruning shears in the shaping of an orange tree. Unless lateral branches from the main body of the tree are actually interfering with each other, do not cut them out, but leave them alone to lend their aid, in forming a fine compact, well rounded head. It is no trouble to cut them out in later years when they cease to be fruitful. If you want to grow big crops of oranges don't expect it by having all of your fruit on the outside of your

tree. The natural tendency of an orange tree is to have its inside branches protected from the rays of the sun and every effort should be made to maintain this condition. During the formation period, any ambitious branches shooting skyward far beyond the others, should be cut off and forced to develop laterals which will gradually build the tree upwardly as well as outwardly.

Orange Tree three years old Notice the long leaders and the sprawling tendency of this tree.

A well pruned orange tree should present a compact mass of foliage with none of the branches exposed to view. Never neglect to protect the stems of young trees, for the first two years. Wrap with burlap, paper or tules, but the best and most serviceable tree protector is one made of yucca fibre. This allows the free circulation of air around the stem of the tree. The protection of the stem prevents the development of suckers and obviates the danger from sunburn, while the top growth is stimulated.

In most localities during the summer months citrus trees must be irrigated every three or four weeks. In heavy adobe soils every precaution should be taken not to allow the water used in irrigating to touch the stem as it will cause gum disease.

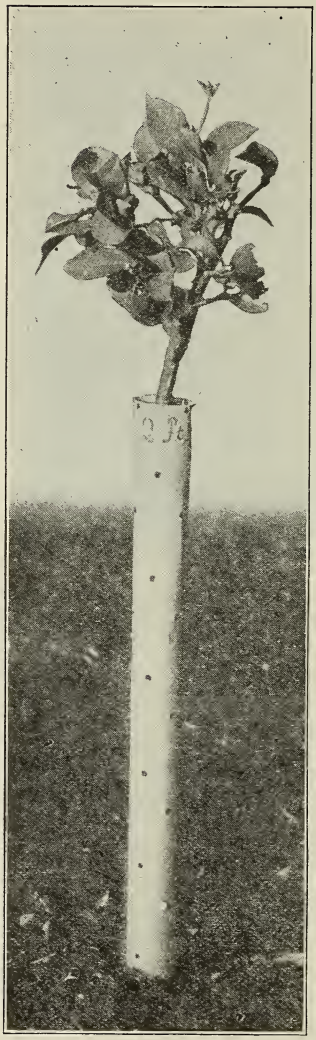
THE LEMON

It is generally understood that the lemon will not stand as low a temperature as the orange, hence its planting for commercial purposes is restricted to localities where the temperature during the winter months does not go lower than 24 degrees Fahrenheit above zero. The tree is a strag-

The same tree severely cut back. The pruning shear unhesitatingly applied, is the corrective measure to bring this tree into shape.

gling grower and the branches must be held in check by systematic annual pruning, for left to itself the fruit will be on the ends of the long unrestrained branches. There are many systems of pruning but the fundamental principle is back of all of them to produce compact but not too dense low headed trees with a large amount of bearing surface on easily accessible branches.

When the tree is first planted the same directions as given for the orange should be observed, but in the subsequent prunings the method of procedure is quite different. Not more than four branches are selected to form the framework of the tree. These in turn are persistently cut back and encouraged to assume a nearly horizontal position. Any branches showing an inclination to make a strong growth in a vertical direction are cut down and forced to develop laterals. This continuous pruning back has a tendency to produce a dense mass of branches and foliage, and as the tree grows, some thinning out is necessary. The result obtained by following out this system of pruning is a shapely broadened out tree, liberally supplied with numerous fruiting laterals and permitting the gathering of the greater part of the fruit without the use of long ladders.



Lemon tree just transplanted from the nursery to the orchard with its branches shortened in as they should be. Note that the crown is developed at about 28 inches from the ground. Citrus trees headed high should be cut back to a single stem, for the purpose of starting the frame work lower down, an important point.

THE POMELO

Commonly known as Grape Fruit. There is considerable confusion in the minds of many people as to what a Pomelo really is. From a botanical standpoint, the Shaddock, Grape Fruit and Pomelo all belong to the same species.

"Grape Fruit," the name usually applied to this fruit, is really a misnomer, but it has become so customary to designate it as such, it is not very likely that the proper name will be used. The name undoubtedly arose from the fact of the fruit being borne in clusters of from three to fifteen fruits in a bunch. The Pomelo is really an improved Shaddock. The Shaddock, except for ornamental purpose, is of no practical value, for the fruits are extremely large, coarse, and are lacking in every essential necessary to make an edible fruit. The Pomelo is much sought after for its medicinal qualities, and as a healthful breakfast relish it excels every other fruit.

Its popularity is constantly increasing, and the demand for it far exceeds the supply. The most popular variety in California is the Marsh's Seedless. As the seeds of the Pomelo are very objectionable, any new varieties which are originated will not receive very much recognition unless they are practically without seeds. The tree is fully as hardy as the orange, and the instructions for pruning the orange will answer admirably for the Pomelo. Trees should not be planted closer than twenty-four feet.

THE LIME

Valuable for its citric acid, which is extensively used in the concoction of summer drinks, and especially palatable as a lemonade. The juice is also used in medicine and in the arts. Its export from the West Indies constitutes an

important branch of commerce, great quantities being exported to Europe and the United States. Fancy limes, and especially the newer seedless sorts, command good prices in the leading markets of the Western States, the average being from $4 to $6 per box. The tree is more tender than the orange, hence should be planted only in the sheltered foothill regions of the state. Commercial orchards should be planted from fifteen to twenty feet apart. It likes a moist soil, and in California a lime grove should be liberally irrigated.

The tendency to form a dense bushy head should be encouraged by following somewhat more strenuously the instructions given for pruning the orange.

THE CITRON

The tree is even more tender than the lemon, and should therefore be planted where there is very little danger from damage by frost. The fruit is prepared for use by immersing in a brine for several months, and after washing it is placed in a hot syrup, remaining for three weeks. Later it is cooked with crystalized sugar dissolved in water, being cooked and cooled alternately until it has taken in sufficient sugar, when it is ready for the market.

The tree grows very much like the lemon, except that it if of more dwarfish habit. Best results are obtained by training the tree along the same lines as recommended for the lemon.

THE PERSIMMON

In this country there are but two varieties in cultivation, viz., the American and Japanese. The latter, on account of

A one year orchard grown Lemon Tree properly pruned for the annual production of a good crop of Fancy Fruit.

Here is shown the importance of a sturdy frame which later on will carry heavy crops without props.

A perfect Two Year Old Lemon Tree.

This outline should be preserved.

their attractive appearance and large size, are destined to be extensively planted as soon as their commercial importance is more appreciated. The impression that the fruits must be on the verge of decay before they can be eaten has militated against their sale. There is much variation in the character of the fruit. Some varieties are not astringent at all and are edible in early autumn, while still hard and green. Several kinds never soften at all till they decay; others are edible only when fully ripe and soft; still others lose their astringency only after they have been dried, and some so abound in tannin that their juice, when expressed, makes a valuable varnish for preservation of all kinds of woodwork. There is quite a distinction between the dark and light fleshed varieties. The former invariably contain seeds, are crisp and meaty, and are edible before they soften, although their flavor is improved considerably when they reach this stage; the light fleshed kinds are seedless (or mostly so), and cannot be eaten until they soften.

After the head of the tree is established, follow the same method of pruning as is recommended for the peach trees for the first three seasons. Very little cutting is necessary in after years, except to shorten in branches having a tendency to shoot far upwards.

An ideal lemon tree with an abundance of small laterals, well distributed from the ground to the very top of the tree. This type of a tree will produce quantity as well as quality fruit.

The geographical distribution of the grape is a wide one, and includes almost all countries coming within the tropical and temperate zones. It finds its most vigorous development in the warmer sections of the temperate areas, enjoying its greatest luxuriance at a point where the two zones meet, if such an experssion be allowable.

In California, and especially in the San Joaquin Valley, it finds ideal conditions, and in Fresno County, the raisin, table and wine sort constitute our leading industry, easily leading all others in money value and commercial importance.

LAYING OUT A VINEYARD

First establish your base lines. It is best to have this done with a transit, particularly if there are no established regular subdivision lines to work from. If the base lines are not at right angles, the rows will not be straight, and nothing is more unsightly. Add to this the difficulty of plowing and cultivating, and the advantages of straight rows will be readily understood. For planting, use a steel woven No. 19 galvanized wire, dividing same up into sections as recommended under the heading "Methods of Planting" on page 8.

The chain in general use by vineyardists is made of No. 10 galvanized wire with three-inch rings at each end, and at equidistant points on the chain a piece of fine wire is wrapped and soldered into place. It is necessary, of course, to change the markers to other points for planting at greater or less distances. It is best to have the wire the width of the check, the last link coming flush with the stake indicating the roadway. These roads should be at intervals of twenty-four rows for a wine and table vineyard and thirty rows for a raisin vineyard. Start at one corner of the field with the chain, which should have three-inch rings at each end for inserting the iron stakes, which should be made of one-half by two-inch iron, two and one-half feet long and drawn down to a point at one end. The stakes which are to be used as markers may be split out of redwood, or any other material for that matter, and at least six inches of one end dipped into a bucket of whitewash, so that the line of the base rows may be readily seen.

Having set the stakes along the outside line at the distance apart the vines are to be planted, start at the same end of the field again and set another line of stakes parallel with the first line and the length of the chain distant from the outside line. Proceed in this manner until the entire field is laid out in checks. With this preliminary work done, and having exercised care in the measurements to have the base lines parallel and the stakes in each block opposite each other, no difficulty will be experienced when planting commences to have the vines line up.

DISTANCE TO PLANT

This always gives rise to much discussion, and opinions vary so that the planter is often in a quandary as to what course to pursue. The prevailing practice is to plant wine grapes 8x8 feet, leaving out the twenty-fifth row for avenue. For wine and table grapes the avenues should not be farther apart than this. As it is necessary to carry out the grapes in lug-boxes to the avenue, the pickers (if the work of harvesting is done by contract) demand more per ton for the picking than where the checks are twenty-four vines wide. For types of raisin grapes which are to be short pruned and headed low, and where the drying is to be done on trays in the vineyard, any of the following distances are satisfactory: 8x8, 7x10, 6x12 feet, always leaving the wide rows east and west, so the trays shall get the full benefit of the sun's rays. In this case the checks may be thirty rows wide. For staked vines of raisin grapes, where the drying is to be carried on in the vineyard, 6x12 feet is undoubtedly the most economical distance to plant, as picking is much facilitated, the trays get the full benefit of the sun, and the raisins cure quickly, which is not the case where vines are closer together. Table grapes should not be planted closer than 8x10 feet, with the wide rows north and south. The grapes then have more exposure to the sun and mature more uniformly. This rule applies more particularly to the varieties which ripen rather late, like Cornichon, Emperor, Gros Colman, Black Morocco, etc.

PREPARING FOR PLANTING

All rootlets, excepting those starting from the base of the vines, should be cut off. Next shorten in all the roots radiating from the base of the cutting from two to three inches.

Then prune the top of the vine, leaving only one spur with from one to three buds. The vines should be pruned a day or so in advance of the planting, and the work should

One-Year-Old nursery grown Grape Vine. The figure at the left indicates the method of pruning roots and top before planting.

be entrusted to careful men. As soon as pruned, the vines should be heeled in and the soil either wet or tamped down to prevent the roots from drying out. The heeling-in ground should be centrally located, so that it will not be necessary to carry the vines too long a distance to the planters.

HOW TO PLANT

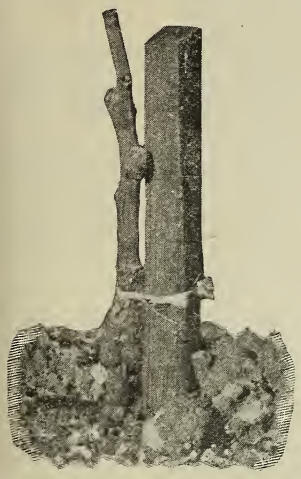
Each man should be provided with a bucket or five-gallon coal-oil can. A small quantity of water in the bottom will keep the roots moist. Each bucket should be filled with vines, and replenished from time to time with vines as they are needed by the planters.

The planting wire should be stretched across the first check to two stakes which should be directly opposite to each other. Each planter should have charge of two marks on the wire. As an illustration, figure on a basis of planting the vines eight feet apart each way and leaving out every thirty-first vine for an avenue. It would be necessary to have a chain 250 feet long over all, including a two-foot link at each end for the ring and to permit drawing the chain taut. To such a chain it would be nceesasry to have seventeen men, two to stretch the chain across the field between the two stakes set opposite each other in the check and fifteen to do the planting. The marks eight feet apart in the chain indicate where the vines are to be set. In planting the vine should be set so that the collar will be level with the top of the ground when it is settled, except with grafted vines, which will be referred to later. The soil in the bottom of the hole should be loosened up, and that used to fill in should be top soil, the first few shovels of which should be well tramped in, the top being left loose. Having set this line of vines, the chain is carried to the next two line stakes, and so on until the check is planted. Within two weeks after planting the earth should be settled around the vines either by hauling water to them or by irrigating, running the water in furrows along each row. This is important, for even with a good field boss over a crew of men, some of

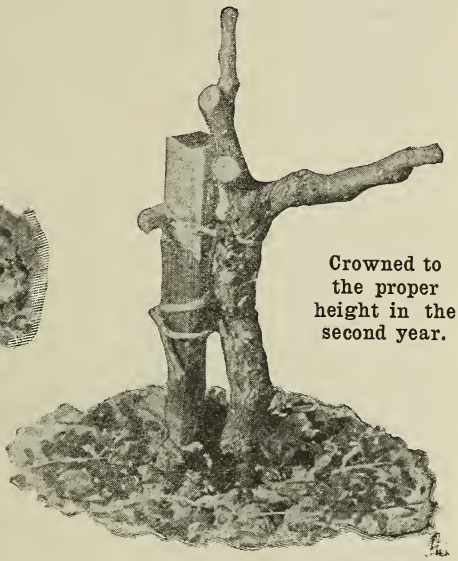
them will be careless, fail to tramp the soil around the roots, and unless a timely and heavy rain should cause the soil to settle, the vines will dry out and die.

CARE AND PRUNING THE VINE

Specific rules for cultivation and irrigation cannot be laid down, for this work is dependent on soil conditions, water, rainfall, etc. It goes without saying that thorough cultivation and careful attention to keep the vines in an active state of growth during the growing season will be amply repaid when the vineyard reaches its bearing age. Far better for the vines if they do not produce any grapes until they reach the third year.



Trained to a single cane, the first year planting, and cut back 12 inches.



Crowned to the proper height in the second year.

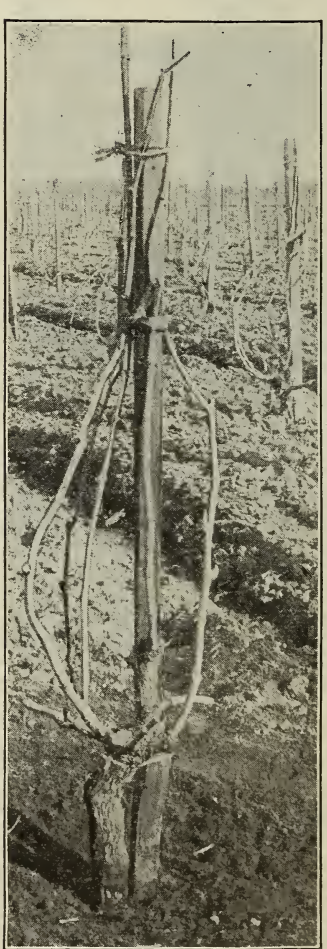
The training of the vine should be given careful attention the first year of its growth. In order that the plant may not form a head close to the top of the ground a short stake allowing it to be a foot above the ground should be driven beside each vine. These stakes should be about one and one-half inches square and two feet long. In July, before the growth of the canes has become lignified, they should be tied with three or four ply baling rope to the stake, and about one-third of the top growth cut off. This shortening in of the canes causes them to become stocky, and as a result of the tying up there are a number of straight shoots, the strongest of which may be selected the following winter,

This three-year-old is not only self-supporting, but it also has a fine crown with four healthy branches and spurs. An ideal vine.

the others being removed, to form the head of the vines. This cane is cut back to twelve inches, all lateral branches being cut away. This single cane is carefully tied up to the stake. The head should be formed from eight to ten inches from the top of the ground. The second year from two to three spurs with four eyes are left to form the head of the vine. The third season the vines will have become stocky enough to be self-supporting, and the short stakes may be removed if this is found to be the case. In the event that the vines are to be short pruned, four spurs should be allowed to remain with four eyes on the current season's growth. In later years a few more spurs are left each year on the original spurs forming the head, the number being largely a matter of judgment on the part of the pruner.

If the vines are of a class requiring long stakes and to be grown with canes, it is far better to defer driving these long stakes until the third year, so that the head of the vine will be fully established. Coast redwood stakes are the most satisfactory.

In staked vines from two to three canes are taken up the third year, and from three to four spurs with three eyes properly distributed around the head of the vine are allowed to remain, to furnish new canes in succeeding years. These remarks apply particularly to the Sultana and Thompson Seedless varieties. In such varieties as Emperor, Flame Tokay and Cornichon, it is customary to take up from two to three canes, allowing these to remain for a number of years, shortening in the spurs to three eyes each season.



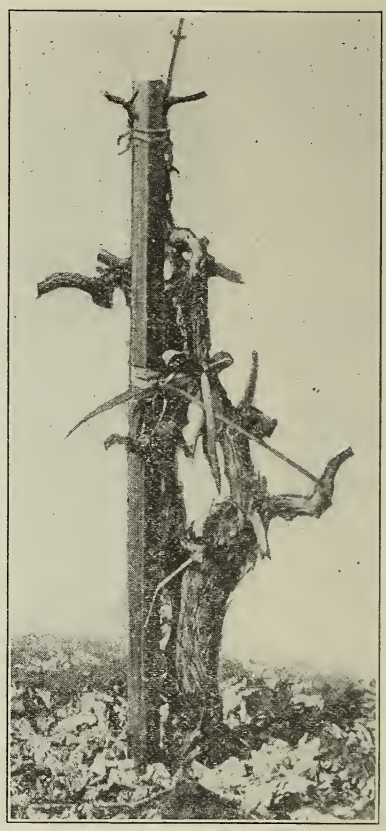
Thompson Seedless vine trained to a stake in its third year. Note particularly the spurs at the head of the vines, as well as the canes, which are well distributed and tied to the stake. The method of pruning is to leave one spur for every cane.

In tying up the canes do not draw them up close to the stake in the middle, but let them belly out, as this will cause the buds to push out better and render them more fruitful. **A great saving may be made in tying up vines having permanent canes like the Emperor, Flame Tokay, etc., by stripping up the leaves of the California Fan Palm (Washingtonia filifera) in place of rope. These strips are not only very strong, but are also very durable and cheap, particularly where the leaves are to be had on the place on which the vineyard is located. The leaves should be cut about two weeks before using and exposed to the weather to cure before tearing them into strips.** The number of spurs allowed to remain must be largely a matter of judgment on the part of the pruner, depending very much on the growth of the vine. Always maintain some spurs at the head of the vine, so in the event it is found necessary to cut out the old canes, new ones will be available to replace them. The very satisfactory results which have been obtained in recent years from growing the Thompson Seedless on a trellis will no doubt cause this method to be followed. Vineyards of this variety so pruned rarely fail to produce a good crop under ordinary conditions. The method of pruning should be the same as has been previously recommended up to the third year, when, instead of tying the canes to a stake, they are twined on wires. The usual plan of procedure with this variety is to drive 2x2-inch by 6-foot stakes to each vine and string two wires of No. 12 gauge, one 32 inches above the ground and the other 48 inches. The largest poultry netting staples are of sufficient

Ten-Year-Old trellised Thompson Seedless vineyard on the Roeding Place

size to hold the wire in place, or bore holes in the posts and pass the wire through them. To prevent the wire from becoming slack the end stakes at each row in a check are held in position by a 2x3-inch brace, which should be long enough to reach from the top of the outside stake to the

The same vineyard pruned. This method of annual pruning promotes vigor, heavy crops and an abundance of new wood for another year.



A Ten-year-old Emperor vine spur pruned. The canes were trained up when the vine was three years old and are permanent. The annual growth from the spurs on these canes, which are regularly distributed, are cut back to three eyes. Care is taken to maintain the spurs at the head of the vine about 10 inches from the ground, with a view of training up new canes, and cutting off the old ones should they lose their vitality.

Note that the upper tie is rope, and the lower one the palm thong.

base of the stake in the next row. This brace can be done away with by using a 3x3, 7-foot outside stake and slanting it. The canes are wound around the wires and tied in place with lath yarn, which is a name given to old hauser rope which has been unraveled. The old canes are cut away every winter and replaced with new ones, which shoot out from the spurs at the head of the vine. This method makes cultivation somewhat more expensive, as it only permits working the rows one way, so that the centers between the rows must be worked out with a hoe. It facilitates picking, and also prevents the crowding of the bunches, with the additional advantage of increasing the product of varieties inclined to be shy bearers.

RESISTANT VINES

The ravages of the phylloxera in the grape regions of France and the practical extermination of the French vineyards through this dreaded pest are too well known to require repetition here. Today France is producing more wine than she did in her palmiest days, prior to the time this pest was introduced. This wonderful change has been brought about by the grafting of the table, raisin and wine varieties, all of which are natives of Europe belonging to the Vitis vinifera class, and none of which, no matter how strong they are, but will finally perish when attacked by the phylloxera.

The resistant sorts were originally wild American grapes, natives of the Mississippi Valley. These were taken in hand by the French viticulturists, improved by hybridization and selection, until today a large number of sorts adapted to a variety of soils and locations have come into general use.

The destruction of vinifera vines is due to the roots rotting whenever the insect makes a puncture, causing the vine to perish in time. In the roots of the resistants, although subject to these attacks, the punctures do not extend deeper than the bark of the rootlets, and as this is sloughed off each year, the roots are left as healthy as before. The grapes of the resistants are worthless; they simply serve as a stock for the more valuable foreign varieties of wine, table and raisin grapes, all of which succumb to the attacks of the phylloxera on their own roots. The cultural directions already given for planting vines on their own roots may be applied to the resistants in so far as preparing the vines for planting. In planting the rootings, the vines should be set so the union of the stock is at least an inch above ground.

As soon as the vine is planted, cover it with soil, leaving only the top bud exposed. When the vines have a good strong growth, clear the soil away from them and cut off any roots which may have started from the scion. This is one of the important points in bringing a resistant vineyard into bearing, for if these roots are not cut off the resistant roots dwindle away and the vine reverts back to its own root. Suckers starting from the resistant cutting should also be removed.

It is necessary to follow up this root pruning for at least three years after the vineyard is planted, for the scion will invariably start out new roots if the soil from plowing gets banked up against it. In later years, after the wood of the vine becomes well hardened up, there is very little danger of the scion making roots. The same recommendations for training and pruning vines on their own roots may be followed with grafted vines.

THE SMALL FRUITS

This term usually applies to the berry family—Blackberries, Raspberries, Currants, Gooseberries, Strawberries, etc. The whole Pacific Slope, wherever fruit soils and sufficient moisture prevail, is adapted to their successful culture. In California there is almost a continuous growth, and intermittent cropping can be carried on almost during the entire year. Every family orchard should have a plot devoted to small fruits, and where the conditions are favorable and near to markets they can be made immensely profitable when grown along commercial lines.

The preparation of the soil should be thorough. The roots being close to the top of the ground and of a small, rather fibrous nature, the importance of having the soil in the very best possible condition to insure a good stand of plants and a satisfactory growth must be apparent to anyone engaging in the culture of berry plants. Thorough dressing with well-rotted stable manure will do much to promote a vigorous growth the first season, and having secured this, profitable crops may be expected the second year after planting.

Berry culture cannot be successfully carried on in California without irrigation, so that before planting the land should be graded, having the grade as uniform as possible so as to prevent flooding. A berry grower should be absolutely certain of water when it is required, and if there is any question about the supply from ditches, a pumping plant should be installed to have water available whenever it is needed. A delay of even a few days may mean the loss of the entire crop.

The Logan and Mammoth Blackberries are practically in a class by themselves, and the cultural directions for one apply to the other, we will consider them under the same head. They should be planted in rows six feet apart and eight feet between the rows. The best results are obtained by trellising the runners to wires on heavy posts which will hold the wire taut. As soon as the fruiting season is past the fruiting canes should be cut away and the new canes be bunched together and wound around the wire. At least two wires should be strung on the posts, so that as soon as one wire is covered the remaining canes may be wound around the other. By following this method from year to year a heavy crop of large, fine berries may be looked for annually.

A novel method of handling them is to plant in squares 8x8 feet. Drive three stakes one and one-half feet into the ground, using 2x2, 6-foot posts. Nail an old barrel hoop on the top of the posts, and another two feet from the top. The shoots are trained over these hoops. It is simply astonishing the amount of fruit which will be obtained by this method of handling. Another satisfactory plan is to set 4x6, 7-foot posts twenty feet apart and nail 2x2, 18-inch cross ties to each post. Set the posts three feet in the ground and string No. 12 galvanized wire on the cross ties, holding it in place with staples. The new shoots should be trained across, winding them around the wires from one wire to the other.

THE BLACKBERRY AND RASPBERRY

The most satisfactory way of handling blackberries is to plant in rows four feet apart, with eight feet between the rows. The first season all the shoots which have attained a height of two feet should be shortened in to twenty inches. This will cause them to send out many lateral shoots, so that instead of having the fruiting shoots confined to a few canes, there will be a number of lateral shoots from each of the main canes for producing fruit clusters. These laterals should have one-half of their growth cut off in the winter months. In the second year, as soon as the season's crop has been harvested, cut away the fruiting wood, so that all the energy of the plant will be forced into the new growth. The young shoots should again be cut back at the proper height to develop laterals, and these, as has already been directed, should be cut back in the winter months. This method of pruning has other advantages by making the canes sturdy and self-supporting, and causes the fruit to be distributed over the entire plant instead of being confined to the terminal growth.

By having the rows eight feet apart, cultivation can be carried on with a horse, a very important point. A good supply of water, thorough cultivation and liberal applications of rotted barnyard manure are important factors in the cultivation of the blackberry.

THE DEWBERRY

The improved varieties of Dewberry or trailing blackberry are very popular. They are enormous croppers, produce fruit of the very best quality, which ripens fully two weeks earlier than any of the blackberries. Plants should be set four feet apart, with rows six feet apart. When there is not sufficient rainfall to keep the vines in active growing condition, irrigation should be practiced. Immediately following the harvesting, all the old canes should be cut off, and the following spring the new ones should be trained to a wire two feet from the ground. The method of trellising is the same as for the other varieties of trailing vines, except that the canes are trained within two feet of the ground.

THE CURRANT AND GOOSEBERRY

Currants are usually planted in rows four to five feet apart; the plants standing two to three feet apart in the rows. They will not thrive in the hot interior valleys, being subject to sunburn. It is only practical to grow them in the coast counties, and they attain perfection when they get the benefit of the cool, moist air from the ocean .

Prune in winter, thinning out the new shoots when they are too thick, and remove the old unfruitful wood. Thorough cultivation, but not deep, is at all times advisable.

THE STRAWBERRY

Adapts itself to a wide range of soils and climates, and in this respect it differs from the other members of the berry family.

Strawberries bear almost the entire year in several of the coast counties, and the same may be said of the plants in the interior valleys, where they are properly mulched and irrigated. In laying off ground for strawberries, the first essential point is to grade the plot so it has a gradual fall, so that no part of the rows will become submerged in irrigating. There are a number of methods for laying out strawberry beds, but the one mostly followed by commercial growers is to plant in rows, hilled up and about two feet apart, with a ditch between for irrigating. Set the plants eighteen inches apart in the rows. The best time to set the plants is late in the fall after a heavy rain or any time in January or February. It is very important during the fruiting season to keep the plants in an active state of growth by irrigating weeding and cultivating. In order to obtain large, highly flavored fruit, pinch off the runners as fast as they appear, and this will cause the plants to stock out as it were, on which the very finest strawberries may be expected the following season.

THE ORNAMENTALS

No country in the world offers better natural advantages for the growing of ornamental trees and shrubs than California. With a variety of climates embraced in a limited area from the torrid heat of the Colorado Desert to the balmy and equable climate of the southern coast counties, thence extending to the far northern counties, with their abundant supply of rainfall during the winter months, and where the temperature rarely goes above 70 degrees F., conditions prevail in which nearly every variety of tree or plant from the temperate, subtropical and tropical zones finds surroundings and soils conducive to successful culture.

California people are lovers of trees and are becoming impressed with the advantages which nature has bestowed upon them so bountifully, hence there is a steady and an increasing demand for the very best that can be obtained in ornamental stock.

LAYING OUT GROUNDS

If there is any one thing which adds to the beauty of a home, be it in the country or the city, it is attractive grounds. No farm can afford to be without a few trees and shrubs around the house, and it seems strange indeed that ornamental planting is not more observed by those who wish to make life in the country worth while. Money expended in this direction is well invested, not only from the fact of its creating pleasant surroundings, but because the beautifying of a place enhances its value and renders it salable, often at a handsome advance. Money cannot buy the satisfaction which one derives from the realization of watching the growth and development of ornamental vegetation.

A grave mistake made by many people is to plant haphazard without any prescribed plan, with the result that when the plants reach maturity, they appear to be out of

place simply because they were not planted in a suitable environment to begin with. It is an easy matter to draw a rough sketch to a scale for modest grounds. Instances have come under our observation where thousands of dollars have been expended in an attempt to beautify extensive grounds, which, when acquiring age, possessed nothing to commend them to one's sense of the beautiful in plant life, simply because the planting had been done without a defined plan. Many handsome specimens, not being in harmony, are sadly out of place. It is not so much the plants themselves which add to the beauty and picturesqueness of a garden, as it is the grouping of them to obtain results. In order to secure this, a landscape gardener pictures in his mind the effect of his groups many years in the future, and his plans are drawn accordingly. Imitate nature, avoid having small beds of narrow walks with not enough of any one thing to bring out pleasing effects. Have a few open spaces planted to grass and obstruct the views of undesirable objects with tall growing shrubs and trees.

It will repay the intending home-maker who proposes to plant extensive grounds to engage a competent landscapist to draw the plans and select the plants. It is just as important to do this as to have an architect to design your house.

One of the decided advantages of working from a plan from the beginning is that the main features and details can be carried out in a single year, or may extend over a period of years with the prospect of eventually having a picture which will always prove a source of pleasure, enhancing in value every year as the trees, shrubs and smaller plants, with a little training here and there, combine to bring about both color and harmony.

Have the full grown tree, shrub or plant in your mind's eye as you plan for the young slender stocks from the nursery or from the plant bed. Street and lawn trees often stand so close that if one-half or two-thirds of their number were removed, the distance would be right for those remaining. Crowded trees will never develop into striking

A Locust Tree when taken from the nursery rows.

Many deciduous ornamental trees are even taller than this, and must be cut back. Less admiration for the tops of trees by shortening in both leaders and laterals, is what counts in causing a vigorous development the first season after planting.

Method of pruning this and other trees of a similar character. Do not fail also to root prune. Do not allow any branches to grow below the point where the man's hand rests on the tree. The following winter after planting, thin out limbs, allowing no more than five to remain. Two-thirds of their growth should be cut away. The second winter, thin the laterals on the frame work, leaving two cut back severely. The third winter the tree will assume a a symmetrical head; cut out and thin for several years; and as it grows older cut out straggling branches entirely, and where head becomes dense, thin

specimens. A stately tree monarch that has been allowed to develop unhindered by other trees is worth a dozen crowded together.

The fault of crowding is very common and leads to bad results in the culture of shrubs, vines and plants. In cases where it is desired to secure massive effects, close planting is advisable with a view of thinning out whenever there is a tendency to overcrowding.

WHEN TO PLANT

All varieties of deciduous trees should be planted in the dormant season from January to April, just as soon as sufficient rain has fallen to soften up the ground so that large enough holes can be dug to receive the roots readily. Evergreens transplant best from February to May, and in localities where there are no great extremes of heat during the summer months, planting may be done as late as July. Palms can be safely transplanted from September until June of the following year, but to successfully grow them during the winter months, they should never be dug fresh out of the ground from December to February, as they are dormant at that season of the year and will invariably "go back." We dig palms in the fall of the year and store them in our palm house. By handling them in this manner they can be safely transplanted during the months of inactivity.

HOW TO PLANT DECIDUOUS TREES

No matter how carefully a deciduous tree is taken up, there are always some roots which will be bruised or broken, and these should be cut off to smooth sound wood. All other roots should have a fresh cut made on them and shortened in so they will fit into the holes readily without doubling up. Before planting the ground should be thoroughly plowed or spaded, and the holes should be dug sufficiently large to accommodate the roots without cramping. Far better to dig the holes too large and fill in with surface soil than to err by having them too small. It is a safe rule to set the trees a few inches deeper than they stood in the nursery rows.

Don't try to preserve the top of a tree if you want your solicitous care rewarded by having your trees make a phenomenal growth. Don't be persuaded that pruning will spoil the tree. To secure a well balanced, vigorous tree prune both the top and root. To plant for success, look most to the root. A good proportion of roots and the top can be made whatever you choose. Trees twelve to fifteen feet high should be cut back to eight feet and all small shoots should be cut out clean except those intended for the frame work of the tree, and these should be cut back to at least six inches. These branches will eventually make the head of the tree. If all were left there would not be enough sap to develop such as would start into anything but weak twigs.

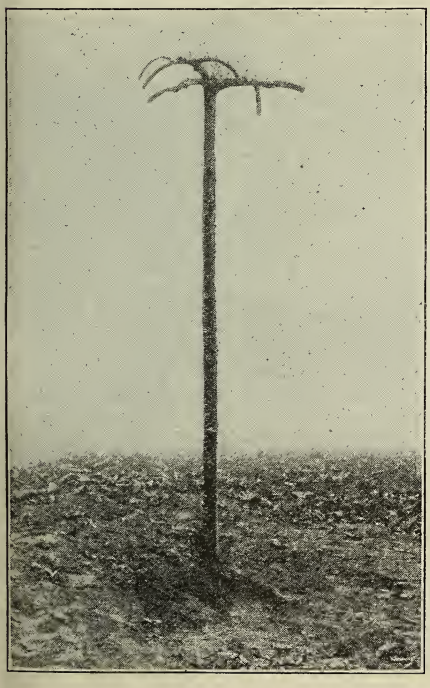
Older trees should be cut back more in proportion than younger ones; those having few roots more than those having many.

Prune the top back at least one-half and shorten in all the roots and be sure to cut out all bruised roots entirely.

The earth around the trees and shrubs should be well tramped. Leave a basin after setting to hold not less than

Tea's Weeping Mulberry showing growth in in the nursery rows.

fifteen gallons of water. The following day draw loose soil around the tree, filling up the basin. Subsequent applications of water will be necessary during the growing season, but if the rains are plentiful, it will not be necessary to apply water. Always hoe around the tree or shrub after each irrigation as this will help to not only keep the soil in a friable condition, but to retain moisture.



Same specimen with head pruned back. This method of cutting causes trees of this nature to grow vigorously. Systematic pruning makes it unnecessary to support the branches of weeping trees with a frame work. Shortening in limbs to an upper bud will secure the desired result. When pruning has been carried on regularly every year, the tree will be symmetrical and self-supporting

Very few balled evergreen trees would fail to grow if they were pruned like this Monterey Cypress.

EVERGREENS AND PALMS

These are invariably taken up with a ball of earth and should be handled with care so as not to break the ball. In planting the rope used in tying the sacking to the ball, should be cut, but the sack can remain or be allowed to drop to the bottom of the hole. It is of the utmost importance to retain moisture in the ball of earth and frequent watering is necessary.

The earth should be well tramped around the ball of earth, but care should be exercised not to break it. The idea of balling is to preserve the fibrous root system undisturbed, with the view of feeding the tree until the larger roots take hold.

It is very important to prune the side branches of evergreen trees and cut back the top, particularly if the tree is out of balance. Never prune the branches several feet up from the bottom, as this exposes the stem and destroys the symmetry of the tree. Anyone arguing that the cutting back of the leader in an evergreen tree prevents a new one from starting is simply lacking in practical experience. No evergreen will respond with a vigorous new growth, if the root system, two-thirds of which is cut away in digging, is compelled to retain the vitality of the original tree as it stood in nursery rows. Trees established in boxes will make immediate effects and need not be trimmed. Nothing has a stronger tendency to promote rapid and a vigorous growth in palms taken up with a ball of earth than the cutting off of all the leaves, except the center shoot. When established in boxes, it is not necessary to adopt such severe treatment.

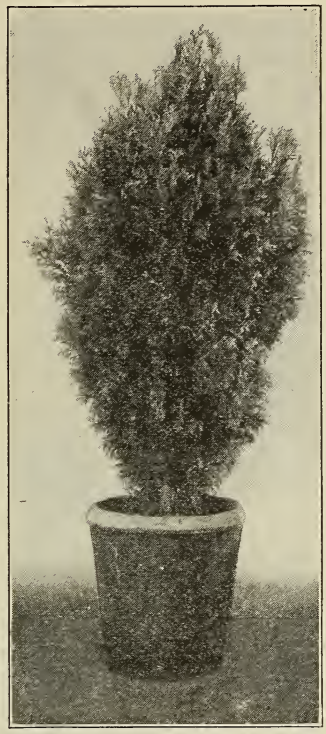
EVERGREEN SHRUBS

Round them into shape. If branches are long and spindling, very severe cutting back should be followed to promote a compactness of growth. We want to reiterate again that pruning and liberal application of water are the two leading factors to success. In our arid climate, anything that will have a tendency to retard excessive evaporation through the foliage until the root system has recovered from the shock of being taken up, is one point which should never be overlooked in transplanting evergreens.

THE ROSE

Among all the flowering shrubs that grace the garden or add to the beauty of hall or conservatory, none can compare to the rose. Of diverse color and character of foliage, of endless design and color of blooms, it lends itself to a wider range of decoration than any other single group of plants, being equally desirable as pot plants, for garden

culture, and for cut flowers. When to these qualifications are added ease of culture and quick and ample responses in flowers, it is explained why the rose has been aptly termed "The Queen of Flowers." In our collection of flowering and ornamental shrubs, it occupies first place; hence we have been careful to always have on hand a large stock of only the most vigorous plants, and only those sorts producing freely



A specimen plant of Thuyopsis Borealis in one of our attractive cement tubs.

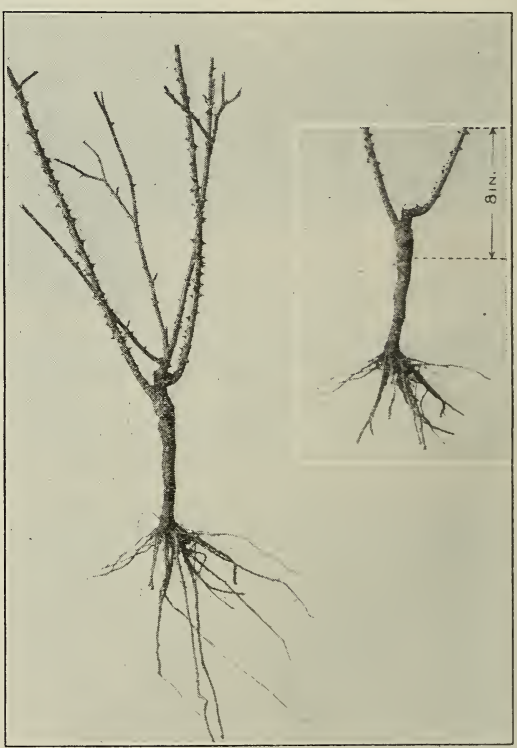
The failure of pot plants indoors or on porches is due to excessive watering. It is not necessary to have plants soaked to keep them growing. When soil is dry watering should be thorough. Fill the pot full, and repeat several times, and do not water again for a week, particularly in winter; more frequent waterings are necessary in summer. It is excess of water, (keeping soil water logged) which causes plants to turn yellow or die.

of blooms possessing good substance and strikingly individual characteristics. All our roses are field grown, thus insuring plants of strong constitution and robust growth. Some objections have been expressed to budded roses, owing to the fact that plants are apt to sucker. This is readily overcome by setting the junction of the bud with the stock under ground. If planters will observe to do this, much of this difficulty will be removed. These shoots or suckers

Myrtus Communis (Evergreen Myrtle) nursery grown.

Pruned back like this Myrtus Communis is sure to grow; failure to do so means the loss of the plant in many cases, or at best a weak and sickly growth.

are easily distinguished by their rampant growth and thorny and coarse like appearance. They should be cut off as fast as they appear close to the body of the plant. Budded roses grow far more vigorously than those on their own roots and are longer lived, so that the slight additional expense incurred to begin with, is more than compensated for in having superior plants.



A rose bush as taken from the nursery.

Plant to the right thinned and with main branches shortened in to 8 inches. To make you proud of your garden, prune like this. Set plants so that the soil will come flush with the branches at the point where they diverge. It is important that budded roses have the bud at least two to three inches below the surface of the ground.

PLANTING

The best season of the year for planting roses is from December 1 to March 15, with the recommendation in favor of early planting. In planting, the same care should be observed as with any other tree or plant, the ground

should be spaded thoroughly, and if any well rotted manure is available, it should be worked into the soil. Dig the hole large enough to receive the roots. Prune the top, cutting back the branches at least two-thirds and thin out more than three to form the head. The roots should also be cut back one-half, and all bruised roots removed. After planting settle the soil around the plant by watering freely.

PRUNING

No definite rule can be laid down for pruning roses except that Teas and their allied families do not require as severe pruning os the Hybrid Perpetuals and others of equally as vigorous growth. There is one fast rule, however, on the Pacific Coast and that is never to allow roses to go unpruned. The best time is from December 15 to March 1. The first winter after planting, thin to three main shoots and cut these back at least two-thirds. In after years with the frame work branches established. the laterals should be thinned out to prevent overcrowding, and those allowed to remain should be cut to spurs of about four buds each. If this method is followed regularly each season, a properly pruned plant will have the shape of a deer's antlers. With climbers the frame work branches should be trained up against the wall in the shape of a fan, not leaving more than three to four and these should be cut back severely the first two seasons to promote vigor and sturdiness of growth. In after years shorten in the laterals and thin out sufficiently to prevent overcrowding, otherwise the plant will be a mass of dead wood and twisted branches and its vigor will become seriously impaired.

When the roses have stopped blooming in the early summer, the faded buds should be cut and the plants should be given a light pruning, or more correctly a pinching back, which will have the effect of making them respond with a bounteous bloom in the summer and fall.

STANDARD ROSES

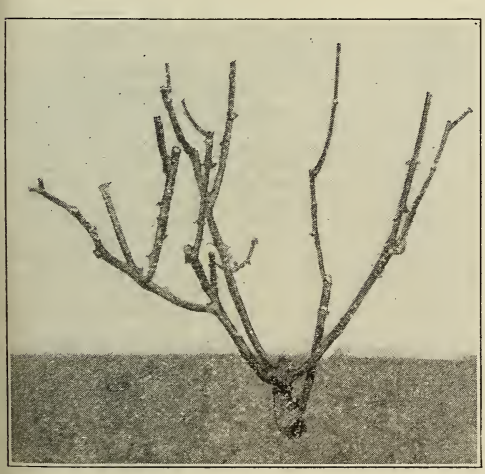
Commonly known as Tree Roses, are budded on a vigorous Manetti rose stock 3 feet from the ground. They are very effective and if the head is shortened in and thinned out the plant becomes very symmetrical and responds with a wealth of bloom which is surprising. The first two seasons, wrap the stem with paper or burlap to prevent the sunburn and cut away all suckers appearing below the crown.

DISTANCE TO PLANT

Set bush roses 2 to 2½ feet apart; standards 4 to 6 feet apart; for hedge purposes 2 feet apart except the Polyantha types which are more dwarf in their habits and permit of being more closely planted.

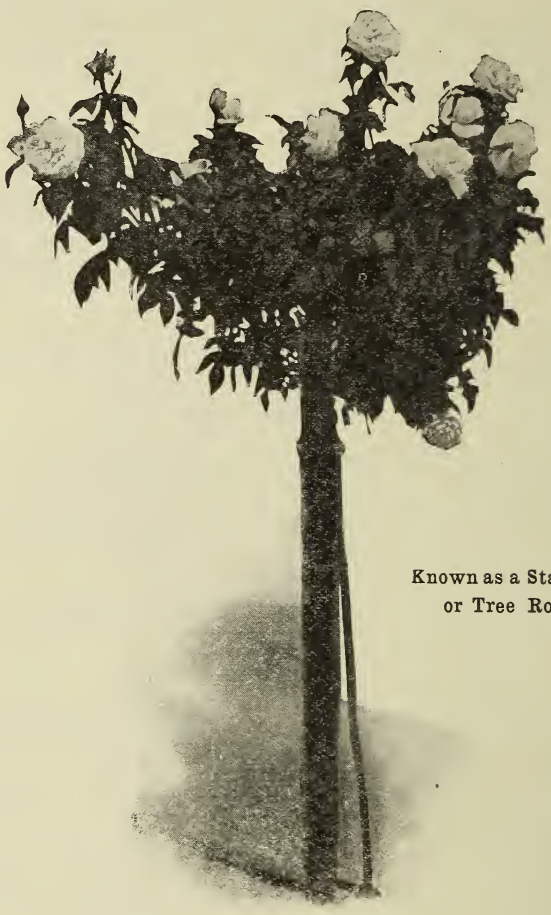
STREET AND AVENUE TREES.

Owing to the harsh conditions to which street and avenue, road and other public trees are often subjected, the matter calls for special treatment and careful consideration of varieties for prevailing conditions and environment. In a brief treatise like this, reference to the subject must necessarily be short and possibly in some instances rather incomplete. One of the greatest mistakes in the planting of streets in cities and towns on the part of the residents, is the inclination for them to be guided entirely by their own views as to what is to be planted, resulting in the streets having a hodge-podge appearance which, to say the least, never improves, but on the contrary, the older the tree gets, the more ragged they become and more unattractive is the street.



A well pruned rose bush with its branches properly distributed to promote not only a vigorous development, but a profusion of flowers during the season.

Reference has already been made in these pages to the advisability of utilizing along country roads some of the fruit and nut trees for this purpose. Among such the fig, the walnut, the chestnut, the pistachio, and the pecan among deciduous trees can be recommended, especially along wide avenues and boulevards. Among the evergreens, the olive, the carob, the loquat and sour orange. Among the so-called ornamentals the various varieties of eucalyptus, the acacias, the pepper, the oaks, and of the conifers, the Aleppo and Canary Island pines. Among the deciduous the oriental plane or sycamore, the silver maple, the Carolina and other poplars enjoy favorable consideration in California.



Known as a Standard or Tree Rose.

For narrow streets, and country lanes, the fan-leaved palms, dracaenas, Lombardy poplars, Eucalyptus creba, grevilleas and various species of cypress.

In the matter of planting, we advocate that the holes for the young trees be amply large, and where the soil is poor, or the conditions harsh, that some well rotted stable manure be incorporated. Follow the cultural directions for watering and care that are laid down for fruit trees, and when it comes to pruning do not be afraid to apply the shears during the first few years. For sidewalk and parkway planting, exigencies demand that the trees be pruned high so as not to interfere with pedestrians. As a general thing municipalities require that street trees be pruned up from eight to ten feet; on country roads the restrictions are less exacting, the only condition being that traffic shall not be interfered with.

Who can resist expressing admiration for a grand row of palms aligning a street or avenue of any such varieties as the Chamaerops excelsa (Windmill Palm) Cocos australis, Cocus plumosa, Erythea armata, Jubaca spectabilis, or any one of the numerous family of Phoenix, the Sabals, Washingtonias (filifera or robusta), which although natives of the great deserts of California, seem to find congenial conditions no matter where they may be planted. There is nothing more effective than avenues of palms interspersed with some striking flowering shrub like the oleander, laurustinus and myrtle.