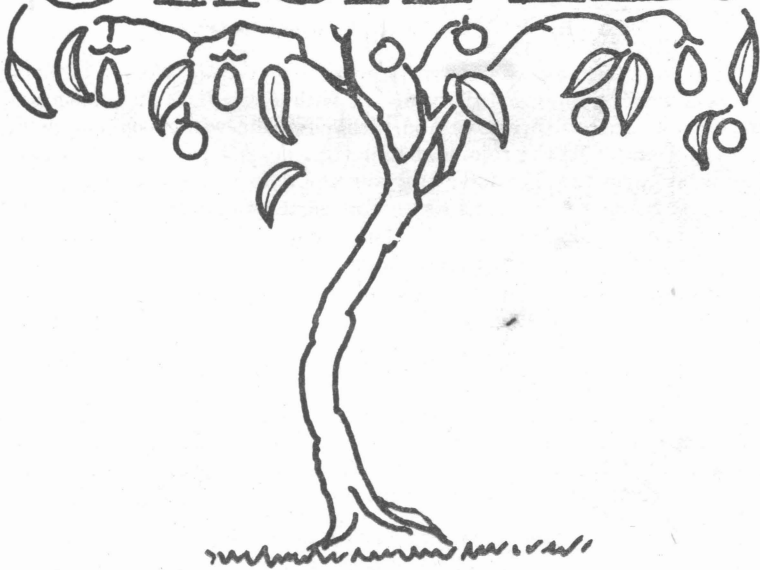


# HOME ORCHARDS



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# Home Orchards

By J. F. Rosborough, Horticulturist

One-half to one acre planted to a variety of fruits chosen to ripen in succession will supply a family of six with fresh fruit in season and a surplus to dry, can, preserve and pickle for the winter pantry in most parts of Texas. To the rejoinder that fruit doesn't pay it may be replied that most farm families have to grow their own or go without, and on this basis fruit growing is as remunerative as life itself, for without fruit in the diet there can be no health. Most people, however, would really enjoy an orchard, grape vineyard and berry patch, and are frequently prevented from having them because of local superstition which solemnly avers that "fruit doesn't thrive here."

It costs only a few dollars to prove that Texas can produce fruit on a small scale, at least, as well as cotton. One must, of course, have some land, either of his own or a willing landlord's. With this as a start, and with a willingness to spend a few odd hours during the year pottering around the trees and plants, almost any Texas farmer or farm wife may easily learn to raise fruit.

Some spots on the farm are better than others for fruit growing. Certainly the orchard should be located within easy reach of the house if possible, and laid out so as to add attractiveness to the home grounds. A slope steep enough to drain off water and give circulation to the air is important, for low, flat places collect water and cold air. One rots the roots and the other freezes the buds. Livestock quickly ruin trees, which suggests that some places should be avoided as orchard sites, and most places fenced. Healthy soil should be hunted for a site, and old orchard sites avoided, for the remains of old trees serious disease may often be found.

Choose Your Location Carefully

Fruit trees will grow in many types of soil, but if it can be found a deep, sandy loam is the choice. Heavy soils bake, crack, and become very dry while loose soils of reasonable fertility hold moisture more uniformly throughout the season to promote root, top and fruit development. Heavy soils may be made reasonably good by plowing under a green crop of some sort, even of weeds, and by spreading manure before the trees are set. This treatment should be repeated every two or three years during the life of the trees. Most orchard sites should be terraced, and where the land is badly washed at least one or two soil-building crops such as sweet clover or cowpeas turned under before the trees are planted. Trees on terrace tops do especially well, and such planting should be the aim, even if one or more rows of trees have to be set in between the terraces.

**Look For A Light Soil**

The first consideration in buying a tree is to get a healthy one. The second is to get one grafted on to the right kind of root stock. The cheapest and most profitable trees, in the long run, are those of medium to large size, thrifty and free from disease when planted. Runtly or weakly trees are expensive at any price. No better general suggestion for buying fruit stock can be given than to get it from a recognized, reliable nurseryman.

**Buy From Reliable Nurseryman**

In selecting varieties for the home orchard consider (1) varieties adapted to local conditions of soil and climate, (2) fruit preferences of different members of the family, and (3) a succession of ripening fruits. So wide is the range of climate and soil in Texas that the choice of varieties to plant is an important factor of success. The table of varieties given below has been proven by experience and is safe to follow.

**What Varieties Shall I Choose?**

The state has been arbitrarily divided into seven sections, and varieties of fruit of these sections can hardly be defined by clear-cut lines, because the governing factors of temperature, altitude, rainfall and humidity over-lap each other on the map. The following designations have been made :- (1) Panhandle and Plains (2) Davis Mountains and El Paso (3) Lower Rio Grade Valley (4) Winter Garden (5) Upper Gulf Coast (6) North and Northeast Texas (7) Central Texas.

As far as possible, the varieties are listed in order of ripening and not in order of importance. Not all of the varieties will succeed equally well in the section where recommended, but for a home orchard, it is advisable to plant several varieties of most fruits.

Except in the Panhandle and Plains, and Davis Mountains and El Paso sections, trees should be planted in the latter part of December, unless the season is extremely dry. In the two above mentioned regions planting should be delayed until the drying winds are over and the spring rains have started. In the South, root growth takes places during the winter, and the trees, if planted early, will be well established by spring.

To furnish a guide to hardiness one of the numerals "1", "2" or "3" ("1" hardy; "2" medium hardy; "3" less hardy) has been placed at the head of each regional section in the following tables:

### FRUIT VARIETIES FOR DIFFERENT TEXAS SECTIONS

Kind of Fruit	Panhandle & Plains	Davis Mountains	Lower Rio Grande Valley	Winter Garden	Upper Gulf Coast	North & Northeast Tex.	Central Texas
	(1)	(1)				(3)	(3)
<b>Apples:</b>	Helm Early Harvest Yellow Transparent Jonathan Delicious Kinnard Stayman	Helm Early Harvest Yellow Transparent Jonathan Delicious Golden Delicious Grimes Stayman				Helm Red June Yellow Transparent Early Harvest Delicious Stayman	Helm Red June Early Harvest Jonathan Delicious Golden Delicious Kinnard Stayman Arkansas Black
<b>Pears:</b>	(1)	(1)		(3)	(2)	(2)	(2)
	Bartlett Garber Bosc Hardy Keiffer	Bartlett Garber Bosc Hardy Keiffer Seckel		Garber Keiffer Pineapple	Garber Keiffer Pineapple	Le Conte Garber Keiffer Pineapple	Garber Keiffer Pineapple
<b>Cherries:</b>	(2)	(2)				(3)	
	Early Richmond Montmorency	Early Richmond Montmorency				Early Richmond Montmorency	
<b>Peaches:</b>	(3)	(2)		(2)	(3)	(1)	(1)
	Early Wheeler Carman Elberta Crawford Salway	Early Wheeler Carman Elberta Crawford Salway		Japan—Dwarf— Blood Pallas Smith Honey Carman	Honey Pallas	Mayflower Early Wheeler Mamie Ross Arp Beauty Slappy Carman Elberta Augbert Salway	Mayflower Early Wheeler Mamie Ross Leona Slappy Pallas Elberta Schilo Augbert Salway

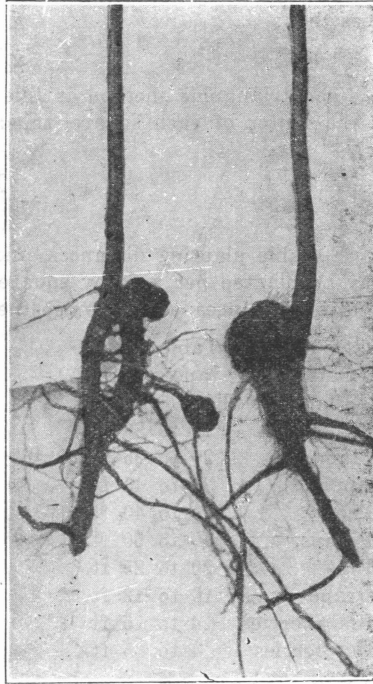
Kind of Fruit	Panhandle & Plains	Davis Mountains	Lower Rio Grande Valley	Winter Garden	Upper Gulf Coast	North & Northeast Tex.	Central Texas
<b>Plums:</b>	(2) Bruce Burbank America Golden Wild Goose	(2) America Green Gage Tragedy Climax Wickson	(3) Methley Bruce Munson Six Weeks Burbank Satsuma Texas Beauty	(2) Methley Bruce Munson Burbank Satsuma Santa Rosa Excelsior Shiro Happiness Dunlap	(2) Methley Excelsior Bruce	(1) Shiro Six Weeks Texas Beauty Burbank Munson America	(1) Methley Munson Six Weeks Burbank Texas Beauty Gonzales America Botan
<b>Grapes: (on American stock)</b>	(2) Edna Champanel Last Rose Carman R. W. Munson Fern Munson	(2) Tokay Thompson Seedless Muscat Black Emperor Carman	(1) Tokay Thompson Seedless Muscat Black Emperor Carman	(1) Bailey Thompson Seedless Ellen Scott Edna Carman R. W. Munson Tokay Muscat	(2) Carman Niagra Black Spanish Herbemont R. W. Munson	(2) Deleware Brilliant Rommel Catawba Herbemont R. W. Munson	(2) Delaware Brilliant Rommel Catawba Herbemont R. W. Munson Fern Munson Champanel Carman
<b>Berries:</b> (Black) B (Dew) D (Straw) S	(3) (B) Early Harvest Dallas McDonald (D) Austin Mays (S) Klondyke Lady Thompson Ever Bearing	(3) (B) Early Harvest Dallas McDonald (D) Austin Mays (S) Klondyke Lady Thompson Ever Bearing	(3) (B) Early Harvest Dallas McDonald (D) Austin Mays (S) Klondyke Thompson Missionary	(2) (B) Dallas McDonald (D) Austin Mays Rogers Noten (S) Klondyke Missionary	(2) (B) Early Harvest Dallas McDonald (D) Austin Mays (S) Klondyke Lady Thompson Missionary	(1) (B) Early Harvest Dallas McDonald Lawton (D) Austin Mays (S) Klondyke Lady Thompson	(2) (B) Early Harvest Dallas McDonald (D) Austin Mays Haupt (S) Klondyke Lady Thompson Missionary

Kind of Fruit	Panhandle & Plains	Davis Mountains	Lower Rio Grande Valley	Winter Garden	Gulf Coast	North & Northeast	Central Texas
Pecans:	(3) Burkett Halbert Texas Prolific Kincaid	(3) Halbert Burkett Texas Prolific Wester Schley	(3) Moore Schley Success Stuart	(2) Burkett Success Texas Prolific Halbert Western-Schley	(2) Success Money maker Moore Odom Stuart	(2) Success Schley Moore Burkett	(1) (East) Success Delmas Schley Burkett Halbert Western Schley
Figs:		(3) Celestial Brown Turkey	(2) Celestial Brunswick Brown Turkey White Genoa Black Mission	(2) Celestial Brunswick Brown Turkey White Genoa Black Mission	(1) Celestial Brown Turkey Magnolia Brunswick White Genoa	(1) Celestial Brown Turkey Magnolia	(2) Celestial Brown Turkey Magnolia Brunswick
Citrus: (Oranges)			(1) Parson Brown Pineapple Washington Navel Lue Gim Gong Valencia	(1) Parson Brown Pineapple Washington Navel Lue Gim Gong Valencia	(2)		
(Tangerines)			(1) Willow Leaf Spice Dancy	(1) Dancy Temple Satsuma	(2)		
(Pomelo)			(1) Marsh Foster Duncan	(2) Marsh Foster Duncan	Satsuma		
(Lemons)			(2) (rather tender) Meyer Eureka	(3) (rather tender) Meyer			
			(1) Limes and Kumquats	(2) Limes and Kumquats			
Persimmons:		(3) Eureka Tane Nashi	(3) Eureka Lone Star Tane Nashi Triumph Hachiya Tamopan	(3) Eureka Lone Star Tane Nashi Triumph Hachiya Tamopan	(2) Eureka Lone Star Tan Nashi Triumph Hachiya Tamopan	(1) Eureka Lone Star Tane Nashi Triumph Hachiya Tamopan	(1) Eureka Lone Star Tane Nashi Triumph Hachiya Tamopan

## Preparations for Planting

Trees should be unpacked immediately upon receipt from the nurseryman. Every precaution should be exercised to prevent the roots from becoming dry. If the trees cannot be planted at once they should be "heeled in" by digging a trench sufficiently wide and deep

to receive the roots. In covering the roots with soil, care should be taken to work the soil into the spaces where the roots are massed together; otherwise, there is danger of drying out, even though the tops of the roots are apparently well covered. If the soil is dry, a few pails of water poured into the trench may prevent the trees from drying out. Occasionally the trees may be frozen in transit. Upon arrival such trees should be completely buried (tops and roots) in moist soil, that they may thaw slowly. Avoid wet spots where the soil is poorly drained as a site for healing in trees.



Crown Gall  
Don't Plant Trees With Such Roots

The soil where the trees are to be planted must be thoroughly prepared, even though the planting be delayed in order to do so. Deep plowing is advocated, and should be done in the fall or early winter, at which time a cover crop such as oats or rye may be sown. If dynamite is used to dig the holes the work should be done when the soil is dry, so that it will be thoroughly loosened. If the soil is too wet when dynamited, it may be pushed out and packed rather than loosened. The hole should be wide and deep enough to easily accommodate the entire root system of the tree. Broken or torn roots should be removed before the tree is set in the hole. Place the tree two or three inches deeper than it was in the nursery row. In filling in the hole, spread the roots of the tree normally and pack the soil firmly around it.

Plow Deep. And  
Dig Big Holes

In laying out even a small orchard, spacing between trees should be decided carefully. There are two common methods used either of which may be recommended. The square planting method arranges the trees thus:-

X X

X X

The triangular method is like the square except a tree is placed in the center of each square, thus:-

X X

X

X X

Suitable planting distances, and the number of trees or plants that may be planted per acre by square or triangular methods according to planting distances, are shown in the two accompanying tables.

Spacing Tables		Number of Plants Per Acre	
Suitable Distances for Planting. (Each way)	Feet	Square Method (Trees)	Triangular Method (Trees)
Peach .....	25 to 30 ft.		
Plum .....	20 to 25 ft.	10x10	435
Apple .....	30 to 40 ft.	15x15	194
Pear .....	30 to 40 ft.	20x20	108
Pecans .....	40 to 60 ft.	25x25	69
Figs .....	20 to 25 ft.	30x30	48
Grapes .....	10 to 12 ft.	35x35	35
Blackberries .....	4 to 5 ft.	40x40	27
Dewberries .....	4 to 5 ft.	60x60	12

### Pruning At Time Of Planting

It is most convenient to cut the trees back at the time they are planted. Most trees are pruned back to the height the permanent branches are expected to develop. (Exceptions to this rule are pecans, figs, citrus trees and grapes.)

Trees coming from the nurseryman as "single whips" should be pruned at planting time as follows:—

**Apples**—Cut back to 30 inches

**Cherries**—Cut back to 18 to 26 inches

**Citrus**—(Bare root trees)—Cut back to 26 to 30 inches

**Figs**—Cut back to 10 to 18 inches (train to bush type)

**Grape**—Cut back to 2 to 3 buds

**Peaches**—Cut back to 18 to 20 inches

**Pears**—Cut back to 30 inches

**Pecans**—Cut back one-third of top of tree

**Plums**—Cut back to 18 to 20 inches.

Trees coming from the nurseryman with side branches should be pruned at planting time as follows:—

**Apples**—Cut back to 30 inches leaving 3 to 5 lateral branches of 3 bud length on alternate sides



**Citrus**—Cut back to 26 to 30 inches leaving 3 lateral branches with 3 to 4 buds on each branch

**Cherries**—Same

**Figs**—See single whip column

**Grapes**—Cut back to 18 to 20 inches leaving 3 to 5 lateral branches cut back to 2 to 3 bud lengths on alternate sides of trees

**Pears**—Cut back to 30 inches leaving 3 to 4 lateral branches to 2 to 3 bud lengths

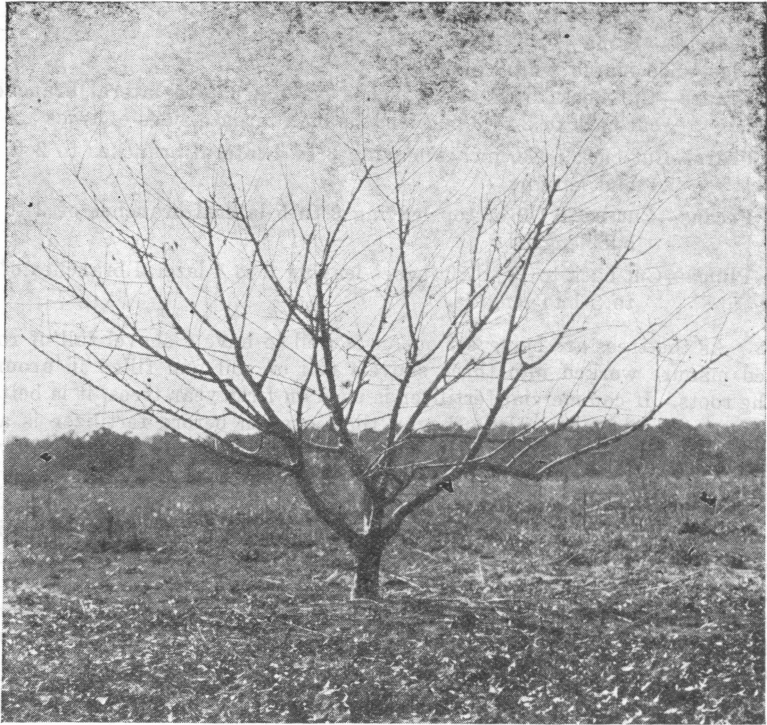
**Pecans**—Cut back 1-3 of top leaving 3 to 5 lateral branches of 2 to 4 bud lengths

**Plums**—Cut back to 18 to 20 inches leaving 3 to 4 lateral branches of 2 to 3 bud lengths.

As the trees are being set out, it is well to have a shovel full of rotted manure worked into three shovels full of soil and filled in around the roots. If commercial fertilizer is used on first year trees, it is better to wait until the trees have begun their growth before fertilizer is applied. In using commercial fertilizer to stimulate growth on one-year trees,  $\frac{3}{4}$  to 1 pound per tree of a 6-12-6 or a 6-9-3 commercial mixture may be worked into the soil within a radius of 18 inches from the body. For second and third year trees, 1 to 2 pounds per tree of a 6-12-6 or 6-9-3 mixture should be applied within the shade line of the trees at the time the buds begin to swell. A side dressing  $\frac{1}{2}$  to 1 pound per tree of a quickly available nitrogenous fertilizer applied May 1st to 15th can usually be relied upon to stimulate additional growth.

When fruit trees come into production, the demand and need for plant food is greatly increased. Frequently the trees have become too large for inter-cropping with legumes or cover crops, and manure or straw must be relied upon to furnish the essential supply of humus. Stable manure, to which has been added 100 pounds of superphosphate per wagon load (a ton) applied at the rate of 1 to 10 tons per acre is recommended. Commercial fertilizer mixtures such as 6-12-6 or 6-9-3 applied to each tree at the rate of 1 to 2 pounds per inch diameter of the body of the tree are also recommended.

Cultivation is essential, not only during spring and early summer but throughout the entire period the foliage is on the tree. Probably the most critical period for cultivation comes during July, August and early September, when the evaporation of moisture is most rapid. If thorough cultivation is not carried on at this season, the soil will bake and crack, causing unnecessary loss of moisture. Most fruit trees have a shallow root system, and if deep cultivation is practiced during the growing season, many of the feeder roots will be cut and the trees are certain to suffer. It is not advisable to plow deep in an orchard with a turning plow during the growing season. A disc, spring-tooth or spike-tooth harrow is a desirable implement for preparing and cultivating orchard soil.



Peach Trees Should Be Kept In This Condition By Pruning

### Pruning

The pruning that a tree receives at the time of planting and during the next two or three years thereafter has much to do with its future. Pruning is done to maintain a perfectly balanced tree that is easy to spray and from which fruit may easily be picked, and very important, to stimulate new growth. Except in the case of one, two and three year trees, pruning should generally be done during the dormant season. When a branch appears at the wrong place, it is well to take it off at once, even though it be in the growing season.

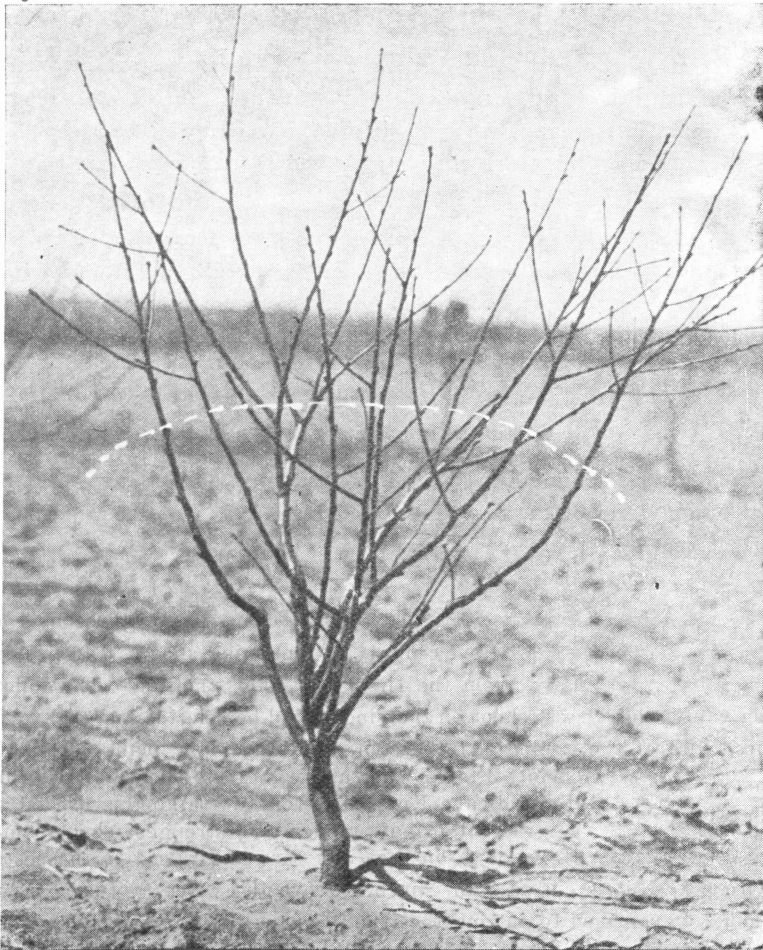
In orchard work the exact number of branches that may be used in forming the head is a matter of importance to the beginner. The heads of first year trees should be developed with from three to five branches. The first of those branches should be eight to ten inches above the ground, with the others alternating on opposite sides to the top at a height of 18 to 20 inches. During the dormant period between the first and second year, if the growth has been vigorous, the young trees should be cut back rather severely, leaving a framework of limbs. To insure a well balanced openheaded top, it may be necessary to remove some of the smaller secondary branches.

Prune To Shape  
Head

Second and third year pruning does not vary widely from the first year, except perhaps in the extent of pruning. The cutting back done at this time requires that particular attention to be given to thinning out lateral branches that are too close; keeping the top open; and shortening in branches that have grown too long and out of proportion to the other branches on the tree.

When peach or plum trees come into bearing at three or four years of age, the growth is slower and there is less need for severe pruning. However, in the case of older trees, it is essential that some pruning be done each year. Young bearing trees should make at least ten inches of growth annually, for where the growth is limited to a few inches there is usually a diminished number of fruit buds. A general rule for pruning bearing trees is to remove approximately one-third of the current season's growth each fall.

Pruning Peaches  
and Plums



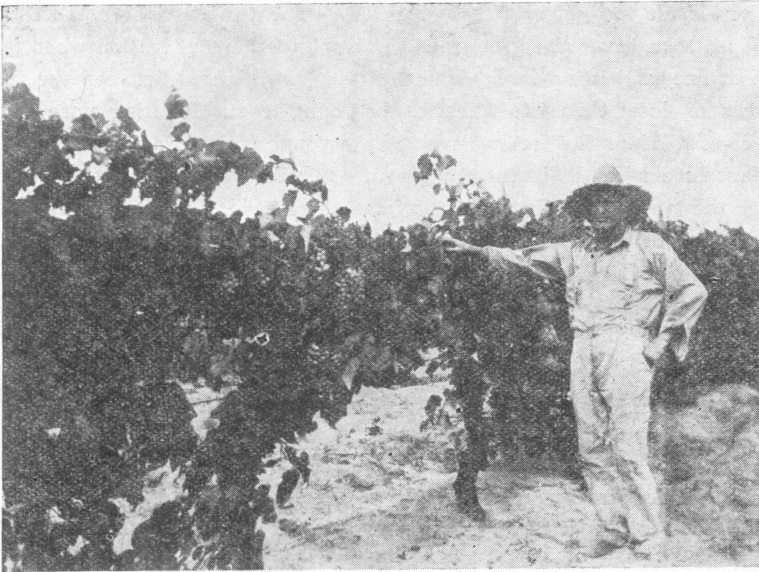
The White Line Indicates Where To Cut In This Two-Year-Old Peach Tree

In pruning apple trees we do not aim toward an open center as in peach trees. In unpruned trees the central limb is apt to run up twenty-five feet. Therefore, it is best to cut the central leader branch to a height of 10 to 12 feet, in order that the side branches may develop in proportion to the central leader, thus making a better balanced and a more symmetrical top. Shaping a tree in this way necessitates that some pruning be done each year to both the central leader and the side limbs, but the central limb should always be left a little longer than the side branches. Heavy pruning causes the fruit spurs to grow into leafy branches. Pruning old trees consists mainly in thinning out dense growths and removing rubbing limbs.

Young pear trees run up very tall, and the branches are inclined to crowd each other. It is advisable to remove the limbs that cause the crowding. To encourage the spreading of the tree, cutting back should be done where only there are outside buds and shoots.

If the grower wants a fig tree of the "tree form" (from a single trunk), the main stem should be cut back to a height of 12 to 18 inches. If a "bush form" is desired, the lower limbs should not be removed but cut back enough to be of uniform length. Very low heading tends to induce branching from below the ground and the development of sprouts from the roots. Magnolia figs should not be pruned as severely as formerly thought necessary. Removing one-third of the top is enough to encourage early and heavy fruit production. The Celeste and other varieties should be pruned even less than the Magnolia: one-fourth of the branch area may be removed. Upright and in-curving limbs should be cut to keep the top fairly open.

After a grapevine is planted, cut it back to two or three buds on the most vigorous shoots and remove all remaining shoots. No pruning or training is usually given the first year after planting. The following winter the largest shoot on the vine should be selected and tied to the first wire of the trellis. At the same time the plant (cane) should be cut off 3 to 4 inches above the height of the first wire, if the 4-cane Kniffin system of training is used. During the following summer, the strongest shoot should be selected from the growth on the first wire and raised to the second wire, where it is cut to 3 to 4 inches above the wire. Future pruning should be confined to cutting the vine back to 4 side branches.



Grapes Are An Entirely Practical Fruit Crop In Texas

In constructing a 4-cane Kniffin system trellis (suggested because it is the simplest) set posts well into the ground, 12 to 14 feet apart. Tack a heavy wire to the post, or run the wire through the post 30 inches from the ground. The second wire should be 56 inches from the ground. It is important that the post be well set into the ground and the wire stretched tightly to insure permanence.

Very little, if any, pruning should be given dewberry plants the first year. The second growing season, after the crop has been harvested, cut the plants back to 5 or 6 inches from the ground. The growth that comes from this time until fall, produces the berry crop the following spring. Blackberries should not be pruned the first year. The plants should be thinned the second season, leaving 3 to 4 to a hill. After the second year, as soon as the berry crop is harvested, remove all old canes and thin the new ones to 3 or 4 in each hill. If this is done, the remaining canes will be larger, the berries improved and the picking made easier.

Pruning Dew-  
berries

### Inter-Cropping

Inter-cropping has its advantages, in that an income is realized in return for the expenditure of time and labor given to the young trees before they begin to bear. The crop planted should be one that needs the same type of cultivation the trees should have. Such crops as field peas or beans are desirable for inter-cropping, and row truck crops such as onions, carrots, beets, tomatoes are often used. Corn or grain sorg-

hums are not desirable, because they grow to such a height that they often shade the young trees. Vine crops such as cucumbers and cantaloupes soon cover the ground and prevent further cultivation when it is most needed. In no instance should the crop planted between the tree-rows be closer than 4 to 6 feet to the young trees. Planting close to the tree-row brings the feeding area of the young trees into competition for plant food with the inter-crop grown. Besides there is danger of injuring the trees in cultivation. A winter cover crops of oats, rye or wheat may well be planted in the early fall and disced into soil in the spring to add humus and plant food to the soil.

## Common Insect And Disease Pests

### Apples

The larvae (worm stage) of the codling moth is commonly found in apples of all sorts before and after the crop reaches maturity. The moth lays eggs on the fruit and leaves early in the growing season. They soon hatch and attack the young apples. Fruit attacked by this pest have little market value. Careful spraying with a lead arsenate spray mixture as indicated in the spraying schedule is recommended as a control.

San Jose Scale which attacks apples, peaches and plums, is a small sucking insect that gives an ashy appearance to the parts infested, ordinarily the bark of the tree. It multiplies rapidly and the entire tree may be covered in a single season. It is first noticed on the body of lower branches of the tree, and then spreads from these points over the entire tree. Oil emulsion or concentrated lime-sulphur is used as a spray to kill scale. Thoroughness in applying the spray material is essential. Where the work is carelessly done, enough scale may be left to quickly reinfest the tree and damage it before the summer is over. The control of San Jose Scale is made more difficult because spray materials used for its control can only be applied during the dormant period. Should one or two trees in an orchard become infested with scale during the summer, it is advisable to mix up an oil emulsion or lime sulphur wash and "scrub" the body or branch of the tree, taking care the solution does not come in contact with the foliage of the tree.

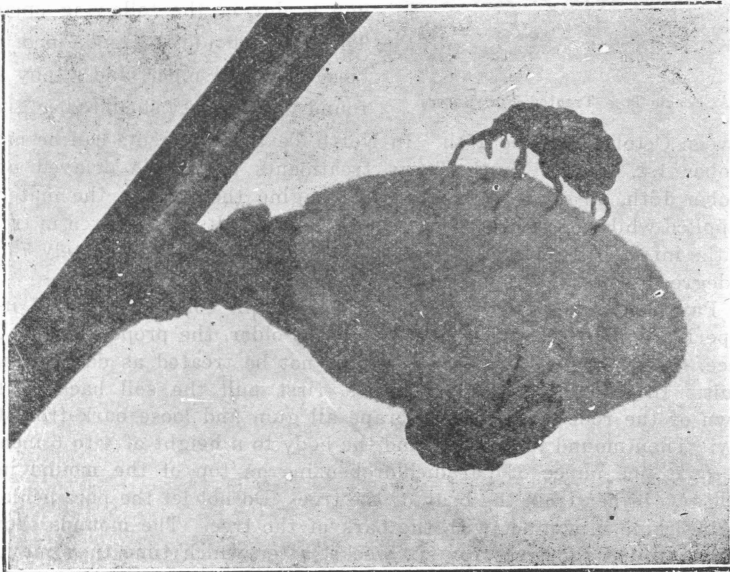
Apple blotch appears as irregular spots or blotches on the surface of the fruit. It also attacks and causes cankers on the twigs and branches. Light brown spots on the leaves followed by early shedding are further symptoms of this trouble. Spraying the trees with lime sulphur or Bordeaux spray as indicated in the spraying schedule will control this disease.

Fire blight attacks apples, pears, and quinces. The disease is caused by bacteria which work largely in the tender parts of the twig. The infection usually takes place at the time of blossoming and the tissues of the bark assume a water soaked appearance, finally blackening and drying. The bacillus multiplies rapidly in tender tissues and in the nectar of the flowers. The disease is spread by insects that go from tree to tree. The organism winters over in the tissue of the affected bark. It is recommended to prune off all dead wood from the tree during the dormant season. In the early spring just before the blossom or leaf buds open, the tree should be sprayed thoroughly with 5-5-50 Bordeaux.

### Pears

Pears are relatively free from major insect pests. Insects of minor importance attacking pears are blister-mite, and thrips. Spraying the trees with dry mix lime sulphur, 6 pounds to 50 gallons of water, in the early spring and later if necessary, will control the blister-mite. Thrips are controlled by spraying with  $\frac{1}{4}$  pint of nicotine sulphate to 50 gallons of water at the first appearance of the pests.

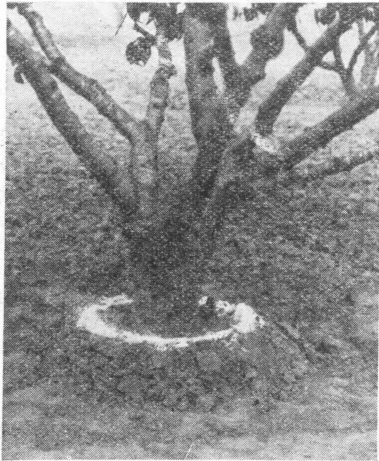
Fire Blight—(See Fire Blight under Apples.) The Keiffer and Pine-apple varieties are resistant to this disease.



Plum Curculio May Be Controlled By An Arsenate Of Lead Spray

## Peaches

The adult curculio closely resembles the common cotton boll weevil. Following the shedding of blossoms the curculio attacks the tiny fruits, making a crescent-shaped scar in which an egg is laid. The eggs soon hatch into a small white worm (larva), often causing the fruit to be deformed on one side. Fruit falls before it has had a chance to mature, although this is not always the case. Arsenate of lead spray, using 1½ pounds to 50 gallons of water, should be applied when the blossom petals begin to fall and a second application made in two weeks.



A Peach Tree Treated For Borers

The peach tree borer is a yellowish-white worm about an inch long usually found under the bark around the ground-line of the trees. Its presence is indicated by a gummy or jelly like substance oozing out of that area. The adult is a moth which resembles a wasp, and

Peach Tree Borer

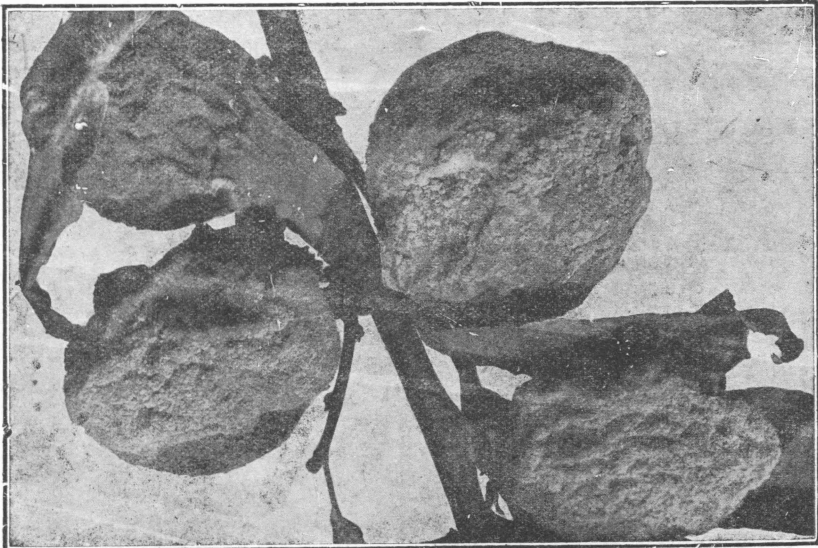
lays its eggs on the body of the tree near the ground-line in July and August. They hatch in a short time, burrow into the tree, and here they live during the winter and early spring. The time of greatest damage is during the following spring. The tree should be examined for borers in September, and if any are found treatment should be given between October 1st and 15th. In North Texas treatments can be made October 1st, but in South Texas treatments should be delayed until October 15th, as there is danger of damaging the trees if the material is applied while the weather is still hot. Best results are secured in treating the infested trees when the daily temperature is approximately 70 to 80 degrees Fahrenheit.

Paradichlorobenzine is a chemical that will control borers if it is properly applied. For trees three years or older, the proper dose is one ounce. Trees under three years should not be treated as damage may result. In treating trees for borers, first pull the soil back to the crown of the root system, and scrape all gum and loose bark from the body. Then mound the soil around the body to a height of 4 to 6 inches, and pour one ounce of paradichlorobenzine on top of the mound in a circle two inches from the body of the tree. Do not let the paradichlorobenzine come in contact with the bark of the tree. The mounds should remain around the trees for six weeks, after which time they may be pulled down to the surrounding soil level.

San Jose Scale—(See San Jose Scale under Apples.)



Brown rot may be characterized by deep brown spots appearing on immature and mature peaches, plums and other stone fruits. It is most serious in warm, moist weather and several applications of lime sulphur applied at the proper time is the best insurance policy to protect a good crop of fruit. The disease is carried over during the winter season in the mummified or dried-up peaches or plums. It is a good practice to remove and bury deeply or burn all dried or diseased fruit that remain on the trees and on the ground, when the regular winter pruning work is done. Dry lime-sulphur dust may be used to control this disease. As designated in the spraying



Brown Rot Is A Common Fungus Disease Of Stone Fruits

schedule, dry lime sulphur 6 pounds to 50 gallons of water is recommended.

Scab fungus attacks peaches and apricots, causing small black spots on the entire fruit or on one side of the fruit. The skin of the affected fruit cracks and shrivels. Peaches attacked by scab do not ripen uniformly, and have little market value because of their sooty or scabby appearance. Lime sulphur, 6 pounds to 50 gallons of water is recommended as a control measure. The same applications of lime and sulphur used to control brown rot will also control scab.

Peach leaf curl is a fungus disease that attacks the leaves and twigs of the trees in early spring, causing them to turn a yellowish color, followed by curling or wrinkling of the foliage. The leaves usually drop off early in the growing season thereby weakening the tree. The crop of fruit carried rarely reaches maturity, nor do the trees set fruit the following year. Peach leaf curl is easily controlled by spraying with 16 pounds dry mix lime-sulphur in the winter or early spring prior to the swelling of the buds.

Plum Curculio—See Curculio under Peaches.

San Jose Scale—See San Jose Scale under Apples.

Plum Jsanger—Treatment same as for Curculio.

Brown Rot—See Brown Rot of Peaches .

Scab—See Scab of Peach.

## Grapes

Black rot attacks the fruit, leaves and twigs of the plants when the grapes are about grown. Soft brownish spots appear first on the berries in the cluster, soon involving the entire berry which becomes black and shriveled.

The disease spreads rapidly, and unless an effort is made to control it, usually takes a heavy toll. Bordeaux mixture is used for control. See spraying schedule for the time of application and proper strength spray to use.

The leaf hopper is a yellowish colored insect about one-eighth of an inch long and half as wide. It is very active and if the vines are disturbed it flies out quickly. Plants

attacked by this sucking insect are greatly weakened and do not produce normally. Nicotine sulphate ( $\frac{1}{2}$  pint to 50 gallons of water) ap-



Bordeaux Prevents Black Rot Loss

plied as a spray over the vines will kill the immature insects. It is sometimes necessary to spray again. This may be done by adding nicotine to the Bordeaux spray for grape disease and applying both at one time.

**Grape Leaf-Folder**—The caterpillar of this pest folds the leaf and then feeds upon the soft tissues between the veins of the leaf. Lead arsenate  $1\frac{1}{2}$  pounds to 50 gallons of water applied with the first signs of folded leaves will control.

**Downy Mildew, Powdery Mildew**—When a yellowish green or greenish white mildew causes the berries to shed and rot, and foliage to be spotted and fall off, mildew is usually the cause. The velvety felt-like fungus covers the leaves, cane tips and fruit. Bordeaux (4-4-50) applied as recommended in the spraying schedule will give control.

### Figs

Fig rust is a fungus disease attacking the foliage of the plant, causing the leaves to shed prematurely, and later impairing the quality of the fruit. Small reddish brown spots appear on the under side of the leaves, and under favorable conditions spread over most of the leaves. Spraying with a 4-4-50 Bordeaux at 30 day intervals, beginning in June and continuing through September, will control this disease.

### Citrus Fruit

Detailed information is given on citrus insects and disease pests in Extension Service Bulletin B-66, "Citrus Fruit Growing in the Lower Rio Grande Valley." This publication will be sent upon request.

### Spraying

Whether the orchard be large or small, a spraying outfit is essential for its success, because it is impossible to produce clean fruit without spraying for insects and diseases. An orchard of from one to five acres can be handled with a barrel sprayer. If the orchard contains as much as five acres or more, it is better to have a power sprayer that holds a large quantity of spray material, and from which two spray nozzles can be operated simultaneously.

A barrel type spray is the most practical for the average farmer, not only for its use in the orchard, but in the disinfection of poultry and hog houses and for painting out-buildings and fences. A complete barrel spray outfit is composed of a spray pump, a 50-gallon barrel, 25 feet of hose, a six-foot spray rod (with cut-off at handle to avoid waste of spray material in moving from tree to tree) and two 45-degree angle nozzles. This kind of sprayer can be purchased at from \$25 to \$50.

Barrel Spray Has  
Many Uses

READ DOWN

ORCHARD SPRAYING SCHEDULE

		1st Spray	2nd Spray	3rd Spray	4th Spray	5th Spray
Peaches & Plums	To Control	San Jose Scale	Peach Leaf Curl Leaf Spot	Curculio, Scab, Brown Rot, Leaf Spot	Same as No. 3	Brown Rot, Scab, Leaf Spot
	Time	During dormant season	Just prior to swelling of buds in spring	When majority of blossoms have fallen from tree	Apply 14 days after No. 3	3 weeks before fruit ripens
	Spray to Use	Oil emulsion 1 1/2 gallon to 50 gallons water	Dry mix lime-sulphur 14 lb. to 50 gal. water	1 1/2 lb. arsenate of lead, 6 lb. dry lime sulphur, 50 gal. water	1 1/2 lb. arsenate of lead, 6 lb. dry lime sulphur, 50 gal water	6 lb. dry mix lime sulphur, 50 gal. water
	Re- marks	Apply spray from tank containing 100 lb. pressure	Do not apply when buds have opened	Thoroughness in applying spray material at this time is essential	Same as No. 3	Fruit may be discolored if sprayed 10-14 days before ripening
Pears	To Control	Scab	Scab	Blight	Blight	
	Time	When blossoms begin to shed	14 days after No. 1	Before buds swell	As soon as leaves develop	
	Spray to Use	6 lb. dry mix lime sulphur, 50 gal. water	Same as No. 1	5 lb blue stone, 5 lb. hydrated lime, 50 gal. water	4 lb. blue stone 4 lb. hydrated lime 50 gal. water	
	Re- marks	Under most conditions sprays 1 and 2 are all that will be necessary		Does not control blight perfectly		
Apples	To Control	San Jose Scale	Apple Blotch	Codling moth, Apple Blotch, Fruit Spot, Aphids		
	Time	When trees have become dormant in fall	Before buds on trees separate	While blossoms are fading	About June 15	
	Spray to Use	Oil emulsion 2 gal. to 50 gal. water	12 lb. dry commercial lime sulphur to 50 gal. water	Arsenate of lead 1 1/2 lb. and dry mix lime sulphur 5 to 6 lb. and 1/2 pt. nicotine sulphate to 50 gal. water	Same, omitting nicotine sulphate	
	Re- marks	Apply spray from tank containing 100 lb. pressure	Cover surface of tree thoroughly	The most important single spray of the season		

		1st Spray		3rd Spray	4th Spray	5th Spray
	To Control	Rust	Rust	Rust	Rust	Rust
<b>Figs</b>	Time	January Dormant application of Bordeaux	May 15	June 15	July 15	Aug. 15
	Spray to Use	Bordeaux mixture — 5 lbs. copper sulphate (blue stone), 5 lbs. stone lime to 50 gal. water	Same as No. 1	Same as No. 1	Same as No. 1	Same as No. 1
	Re- marks	Apply from spray tank with at least 100 lbs. pressure	Same as No. 1	Same as No. 1	Same as No. 1	Same as No. 1
<b>Grapes</b>	To Control	<b>Black Rot</b>	<b>Black Rot, Mildew, Grape Leaf Folder, Grape Leaf Hopper, Aphids</b>	<b>Black Rot, Mildew, Leaf Folde, Leaf Hop- per</b>		
	Time	January, after vines have been pruned	Week before blossoms have opened	When majority of blossoms have fallen	Three to four weeks later	
	Spray to Use	Bordeaux Mixture— 5 lbs. copper sulphate (blue stone), 5 lbs. stone lime, 50 gal. water	Same as No. 1 4-4-50 plus 1 1/2 lbs. arsenate of lead and 1/2 pt. nicotine sul- phate to 50 gal. water	Same as No. 2	Same as No. 3	Grapes will be discol- ored if sprayed within 2 weeks of the time in which they are to ripen
<b>Citrus Fruits</b>		1st Spray	2nd Spray	3rd Spray	4th Spray	5th Spray
	To Control	Citrus Scab, Red and Purple Scale	Red and Purple Scale	Red Spider Rust Mite	Red and Purple Scale	Red Spider Rust Mite
	Time	March	May	June	July	September
	Spray to Use	Liquid Conc. Lime Sulphur	Oil Emulsion	Sulphur Dust	Oil Emulsion	Sulphur Dust
	Re- marks		Irrigate trees before spraying, if possible	Apply when air is Calm	Irrigate trees before spraying, if possible	Dust if Red Spider or Rust Mite is present

## How Much Spray To Use?

### APPROXIMATE QUANTITIES PER TREE OF DILUTED SPRAY SOLUTION FOR THOROUGH SPRAYING

Apple or Pear	Figs	Citrus	Pecans	Peach or Plum
Under 3 years	$\frac{1}{2}$ to 1 gal.	$\frac{1}{2}$ to 1 gal.	$\frac{1}{2}$ to 1 $\frac{1}{2}$ gal.	$\frac{1}{2}$ to 1 gal.
3 to 4 years	1 to 1 $\frac{1}{2}$ gal.	$\frac{1}{2}$ to 1 gal.	1 $\frac{1}{2}$ to 2 gal.	1 to 2 gal.
4 to 5 years	1 $\frac{1}{2}$ to 2 gal.	1 to 2 gal.	2 to 3 gal.	2 to 3 gal.
5 to 6 years	2 to 2 $\frac{1}{2}$ gal.	2 to 3 gal.	3 to 3 $\frac{1}{2}$ gal.	3 to 6 gal.
6 to 8 years	2 $\frac{1}{2}$ to 3 $\frac{1}{2}$ gal.	2 $\frac{1}{2}$ to 3 $\frac{1}{2}$ gal.	3 to 3 $\frac{1}{2}$ gal.	6 to 10 gal.
8 to 10 years	3 $\frac{1}{2}$ to 5 gal.	3 $\frac{1}{2}$ to 4 gal.	3 to 3 $\frac{1}{2}$ gal.	3 $\frac{1}{2}$ to 4 gal.
12 to 18 years	5 to 7 gal.	4 $\frac{1}{2}$ to 5 $\frac{1}{2}$ gal.	3 to 3 $\frac{1}{2}$ gal.	4 to 6 gal.
20 to 25 years	5 to 7 gal.	6 to 8 gal.	3 to 3 $\frac{1}{2}$ gal.	6 to 8 gal.
Over 25 years	5 to 7 gal.	8 to 10 gal.	3 to 3 $\frac{1}{2}$ gal.	6 to 8 gal.

### APPROXIMATE COST\* OF SPRAYING

Spray Used	Cost of Ingredients	Cost Per Gallon, Mixed Sprays
Oil emulsion	45c to \$1.00 per gal.	1.5c to 2.5c per gal.
Dry mix lime sulphur	10c to 12c per lbs.	1c to 1.5c per gal.
Bordeaux mixture	8c to 10c per lb.	1 $\frac{1}{2}$ c to 2c per gallon
Arsenate of lead	14c to 16c per lb.	2c to 2 $\frac{1}{2}$ c per gallon
Nicotine sulphate	\$1.00 to \$1.10 per lb.	2e to 2.2c per gal.

\* These figures are based on 1930 retail prices for spray materials in small quantities.

## How To Make Spray Materials

### CONCENTRATED LIME SULPHUR

Liquid concentrated lime sulphur is not largely used on the ordinary farm, because facilities are lacking to overcome the difficulties encountered in its making. It is used as a dormant spray for San Jose Scale and Peach Leaf Curl, but should never be used when the trees are in foliage, and it is made as follows:

Sulphur (Flowers)—80 lbs.  
Lime (Unslaked)—40 lbs. (Dehydrated lime may be used.)  
Water—50 gallons.

Slake the lime if stone lime is used, or if hydrated lime is used, mix it into the water and add the sulphur. Boil the mixture one hour. Some of the water will evaporate in boiling, so it will be necessary to add water sufficient to make 50 gallons. Eight gallons of this material mixed with 50 gallons of water should be used as a dormant spray. The stock solution may be kept in a tight barrel for several months, although it is possible for the solution to lose its strength while in storage. It is best to buy a hydrometer to test the strength of the solution when ready for use. A hydrometer can be purchased through local drug stores for \$1.00 to \$2.00.

### SELF-BOILED LIME SULPHUR

This spray material is commonly used as a fungicide on stone fruits. Brown rot and Scab are two common diseases for which this spray is used as a control measure. One and one-half pounds of arsenate of lead may be mixed in the spray tank which contains 50 gallons of self-boiled lime sulphur, and the mixture applied as a combination spray as curculio (worms in peaches or plums), brown rot and scab. It is made as follows:

Sulphur (Flowers) — 8 lbs.  
Lime (Stone) — 8 lbs.  
Water — 50 gallons

Put the stone lime in a wash-pot or barrel, and add enough hot water to start it slaking. Slowly add the sulphur, which has been previously mixed with sufficient water to make a paste. As the lime heats and the water is driven off, add more water, being careful not to add too much and cool off the process. Allow this self-boiling to continue for ten minutes or until orange-colored streaks appear. Then add enough water to make 50 gallons. Before using this spray solution, it is best to strain it to remove any particles of lime that may remain in the mixture.

When it is not possible to obtain stone lime, 8 pounds of sulphur may be mixed with 8 pounds of hydrated lime, and this material placed in a barrel and covered with 5 gallons of boiling water. Stir constantly for 10 minutes and dilute with enough water to make 50 gallons of liquid and apply.

## DRY LIME SULPHUR

Dry lime sulphur is prepared commercially by various insecticide firms. This material is convenient for use, because it can be mixed into the spray tank filled with water, and the spraying begun immediately. It may be used for either winter or summer spraying by the addition of different amounts of the powder to a given quantity of water to make the solution stronger or weaker, as the case may justify. Five or six pounds of dry lime sulphur mixed into 50 gallons of water is the usual strength when used for summer spraying. From 12 to 14 pounds of dry lime sulphur to 50 gallons of water is the proper strength for winter spraying. This material should be stored in a dry place from one season to another to avoid deterioration.

## SULPHUR DUST

80 lbs. of sulphur  
15 lbs. of hydrated lime

When sulphur dust is used instead of a liquid spray, the dust mixture can be applied as a substitute for the third and fourth applications of liquid spray. Superfine sulphur dust may be used for this purpose. Mix thoroughly.

## LUBRICATING OIL EMULSION

This spray used to control scale should be applied during the dormant season. Its low cost has a strong appeal to orchardists. It is best to prepare the spray before extremely cold weather sets, because when freezing temperatures prevail, the oil is apt to separate from the soap and water and damage the tree:

Paraffin base engine oil (light oil preferred)—1 gallon  
Fish oil soap—1 lb.  
Water— $\frac{1}{2}$  gallon

The oil, water and soap are placed in a pot, and mixture heated until it comes to a boil. When it begins to boil a brown scum will appear on the surface but within a short time the scum begins to disappear. At this stage and while the mixture is still hot, remove from the fire and pump it through a spray pump twice, under 60 to 100 pounds pressure. For the proper strength mixture, add  $1\frac{1}{2}$  gallons of this solution to 50 gallons of water for a dormant spray. In case hard water is used in making the emulsion, add  $\frac{1}{2}$  pound of sal soda to the 50 gallons of water before mixing with the oil solution. Precaution should be taken to prevent the stock solution from freezing, which will occur at 15 degrees Fahrenheit.

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