

FRUIT - GROWING

BENJAMIN WALLACE DOUGLASS

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FRUIT-GROWING



These are among the finest of the Winesap family — if not of the apple family.

FRUIT-GROWING

By

BENJAMIN WALLACE DOUGLASS

Author of

ORCHARD AND GARDEN
EVERY STEP IN BEEKEEPING, ETC.

Illustrated

From Photographs



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To

*Some Thousands of Human Question-Marks,
Whose Letters I Have Loved and to Whom
I Have Tried to Be of Service, This
Book is Dedicated.*

INTRODUCTION

The reader will discover that this book is intended to answer some of the multitude of questions that are continually arising in the minds of even experienced fruit-growers. If it claimed to answer all of them it would be unworthy of consideration, for such a task is beyond the ability of any one—and always will be—for the reason that new questions come up every year and almost every day.

Nor has it been possible in the description of methods or the suggestion of spray or cultural programs, to adapt the recommendations to every section of the country or to make them fit all orchard conditions. A spray schedule that would be effective in Northern Michigan might fail to accomplish results in Maryland; one that was good in Indiana might fail in Illinois.

From this it will be seen that the business of growing fruit is one that is tremendously affected by local conditions, and in the preparation of these pages I have endeavored to lay down basic principles upon which the whole business rests.

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The skill with which the individual grower adapts these principles to his own problems will mark his ultimate success or failure, and as he grasps the fundamentals of his work he should be able to answer his own questions better than any one can answer them for him.

The experienced grower may find in the book some things that are new to him. It sometimes happens that one does find new things in books—even in books on horticulture.

If some of these new things appear to be contrary to what we have believed in the past, I can only say that all of them have been given the test of trial. Where new methods are mentioned they are based on experiments confined not to a few trees but to some hundreds of acres, and cover not months but years of work.

To those who may wonder why there are no pears in this book I would explain that years ago, as a boy, I won first prize at the state fair on some "Vicar" pears grown in my father's yard. For the last twenty years, however, the word "pear" has inevitably been associated in my mind with the word "blight." This disease has been so prevalent, so destructive and so difficult to control that in my own orchards I have eliminated the pear as a practical fruit. To me it is almost in the class with the red cedar tree, which harbors the fungus of the rust on apples,—a thing to be got rid of rather

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than cultivated. If this sentiment should offend any one to whom the pear is dear let him remember that it may enjoy an immunity from blight in his locality that is not vouchsafed to the rest of us. I enjoy a fine pear in the proper stage of maturity as much as any one living—but I prefer that it be grown in some other neighborhood.

Throughout the book I have not hesitated to draw upon the experience of others. To do so was inevitable and I have ranged far. I particularly desire to acknowledge the help that I have had from Professor U. P. Hedrick, of Geneva, New York, whose work in connection with the deciduous fruits stands second to none in this country.

B. W. D.

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FRUIT-GROWING

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CHAPTER I

LOCATING THE ORCHARD

“The hills,
Rock-ribbed, and ancient as the sun.”
—BRYANT.

As AN explanation of this book, I wish to say that it is written in self-defense. Every so often, meaning several times a week, I receive letters asking for all sorts of fundamental information on fruit-growing. All of these letters are from fruit-growers, either actual or embryonic, and most of them show a decided lack of the basic ideas that underlie the business of fruit production. Here is a sample:

Dear Sir:

I hesitate to encroach on your time, but the article you wrote, “Why Orchards Fail,” makes me believe that you could help me to get a better crop if you would answer a few questions.

You say that Uncle Billy used to kid you about the codling moth. Can you tell me what is the codling moth and could it hurt my apples? He never saw an adult, you said, is it worse than the male, also could you tell me what is the flat headed borer, the San Jose Scale and a scab. Could they hurt too? Some time I wish you would write a lot about orchards that don't fail and I will be awful thankful if you can help me.

Yours truly,

.....

This, I must confess, is an extreme case but it is an actual letter; "the original is on file in my office," as the patent medicine men say.

Therefore, if the experienced grower reading these pages, should feel that I have dwelt too long on subjects with which he is already well acquainted, I can only ask him to remember his own beginning and be patient. If the man who wrote the above letter should read this book I hope that he will learn that all adults are not females and that the San José scale, the flat headed borer and the scab can all "hurt," for I shall try to answer just as many questions as possible as I go along.

If, through accident or design, the expert grower should find here some point that will help him in his work, let him consider it in the form of a gratuity, thrown in for good measure.

Before a man decides *how* he is going to grow apples he must first decide *where* he is to grow them.

We hear a great deal about "ideal apple land" and "orchard sections" and "favored localities," and sometimes we are inclined to think that perhaps there are only a few places where apples can be grown. In spite of the fact that I grow apples myself, I am not of the opinion that Brown County, Indiana, is the one best place on earth for this business. Of course I admit that we have a wonderful soil and a fine climate for apples and that our land "lies well" and all of that—I am only human. On the other hand, I know of many places where apples are grown—yes, nearly as good as we grow here in "Brown." You see that I am not prejudiced.

But when a man writes to me and asks me to tell him which of the three states, New York, Pennsylvania or New Jersey, is best for starting an orchard, I am up a stump. As a matter of fact no one of them is best. To one grower better results may be had in New Jersey, to another in New York, while a third may pick the old Quaker state for his success. Good orchards are found in all of the states named and they are also found in many other states. If we should follow the belt of established commercial orchards we take in New England,

New York, south along the mountains to the fine orchard section just coming into its own in north Georgia, and the Carolinas and Tennessee. Westward we would go through Pennsylvania, southern Ohio, Indiana and Illinois and on into Missouri and Arkansas. Then we would jump the Plains States for the most part to the great orchard districts of the Northwest. It is in the states mentioned that we find the bulk of the commercial orchards of the country. Wait a minute! I forgot Michigan; unkind of me, but she was off to one side as I came west and I did not notice her. Mighty good orchard state too, Michigan. Ordinarily, when we think of orchard sections where apples are produced in quantity, we think of the states and parts of states that I have mentioned, but this does not necessarily mean that apples can not be grown in other places. As a matter of fact they can be grown in nearly every state in the Union. Florida, perhaps, might have some difficulty in producing an apple that any one would relish, but then Florida can do so many things that the rest of us can not even attempt that she should not feel the slight.

Through all of the Central and Eastern States we find the wrecks of old orchards around farm homes even in districts not now known as apple producing centers. These old

wrecks testify to the fact that apples were once grown in these places. If you ask any old man in such a neighborhood you will receive the information that apples once grew thereabouts but that here lately they haven't appeared to do much good. "The trees died and the apples got knotty and wormy and we jest didn't pay any attention to 'em anymore." The last part of the statement is quite correct. If they had paid attention to them the apples would not have been knotty and wormy and the trees would not have died. Apples in such localities are a failure because they are neglected, usually not because of any deficiency in soil or climate.

Joe Glasburn was a corn belt farmer who got tired of growing corn and decided to give the apple game a whirl. His home was a tolerably fair Johnson County, Indiana, farm. It was not in the "apple belt," but Joe had an inspiration,—it was certainly not less than that,—and planted a good-sized orchard. His neighbors laughed at him because they all knew exactly what apples would not do in that neighborhood. They all had trees of their own that occasionally produced a few punk specimens of the apple tribe, none of which could be identified as to variety after the bugs and diseases got through with them. Apples simply would not grow there. Joe, however, knew what he

was doing and took care of his trees as they should be taken care of and to-day has an orchard that is making him more money than he ever made out of corn in his life—yes, making him more money than his neighbors made on corn at war prices.

Of course it was all wrong because he was out of the “apple belt,” but then he did it anyhow.

Often I am asked whether the East or West is better for apple-growing. Of course the diplomatic answer to a thing of that sort is “No.” But then I am about as diplomatic as a wildcat, so here goes.

Personally, I feel that the East offers better opportunities for the apple-grower. Otherwise, I would be located in the West. The markets are closer to the eastern grower than they are to the one on the Pacific Coast. Neither section has any advantage on the other when it comes to climate, freedom from disease or insect enemies. I have always thought, and still feel, that our eastern apples have a better quality, that is, they taste better, than the western fruit. I know that we can grow in the East, just as handsome apples as ever came from a tree, because I have grown them. On the other hand, the western growers have something that we in the East lack and sadly need, and that is some form of Growers' Organiza-

tion which will assist in marketing the crop. The western men have the edge on us there, and as a result their business organizations are each year putting their crop on the market to far greater advantage than we have ever done in the East. In 1920 the majority of the New York growers had big crops and nearly all of them lost money. Had there been some sort of organization among them the crop might have been marketed at a profit instead of being dumped at a loss. Eventually the Pacific markets will take larger amounts of the western crop and at that time the two sections may well be considered equal as to their respective advantages.

After deciding on the geographical location of the orchard the prospective grower must run the gauntlet of sundry and various real-estate dealers who will assure him that they know apple land when they see it. Selling apple land to suckers has been a pleasant and profitable pastime for years past, in many sections. Several years ago we had an epidemic of "orchard companies" that proposed to plant orchards in blocks of a few acres and to care for these blocks until the orchard came into bearing. Many such orchards were sold and many uninformed city people bought "individual tracts" as a sort of old-age insurance. With the prospectus of the company before

them they could figure out an independent income after the trees were five or six years old and with an increasing income every year after that. The methods of some of these companies were outrageous in the extreme. I know of one case where the planters repeatedly sold the same tract to one buyer after another. It was the best ten-acre block in their whole development scheme and was so attractive that every "prospect" wanted it for his own. Each thought that he had bought it until he visited the place years after and found that "through an error" he owned quite a different block of orchard.

Few, if any, of these tract propositions ever came anywhere near fulfilling the promises of the promoter's literature. Most of them were failures from the start and a few never got beyond the paper stage.

About ten years ago a company was formed to start one of these tract orchards near where I now live. At that time I was living in the city. I secured a copy of the prospectus, which I still have, and investigated the concern, not with any idea of investing, but because "Cherry Heights" was near the place where I expected to live.

It was a beautifully finished booklet. It would make almost any one want to own a "tract" just to read its pages and to look at

the pictures. One of the pictures, by the way, was one that I had taken myself years before, in another state. How the land artists ever got hold of a copy I have never been able to find out, but they used it with good effect to show "what our orchard will be like in a few years." It was a good picture. Their orchards, however, never materialized, and I have been unable to find any record of the fact that they ever owned a single acre of the land they proposed to develop.

In securing orchard land it is usually best for the prospective owner to go on a still hunt for it. He should form his own ideas of what he wants and then seek land that fulfills in some measure his previously formed opinions of what good land should be. If a reliable real-estate man can be found who is familiar with the chosen locality, he can very often purchase the land to better advantage than can some "outsider" who is unfamiliar with the country. It is human nature for the seller to desire to get all he can when he sells property and the minute any one offers to buy a farm the average farmer adds several dollars to the price he would have been glad to get a minute before.

Good apple land is worth more than good corn land, because it will yield a higher return acre for acre, year in and year out,—but it can usually be bought for much less than corn land.

There are some sections, of course, where apple land is held at a high figure. A friend of mine paid nineteen hundred and fifty dollars an acre for a tract of ten acres planted to young trees. He paid too much. I have bought good apple land for as little as seven dollars per acre and can buy more even now for less than twenty-five dollars per acre. These prices represent the two extremes of course, but on an average one ought to obtain land suitable for apples at a price of not to exceed one hundred dollars per acre. (Then one wants to have an amount equal to about two hundred dollars per acre up his sleeve to pay for planting the place and bringing it into bearing.)

It is now time for you to ask, "Just what is good apple land and how will I know it if I see it?"

That's a tough one, but I will do the best I can to give you some ideas, or ideals, by which to judge any orchard land you may think of buying.

Just what it is in the soil that makes a bit of land suitable for apples, no one knows. We do know that fruit will grow and thrive on a great variety of different soils. I have seen wonderful apples produced on the almost pure sand soils of certain sections of Michigan and I have seen others just as good grown on heavy clay. I think we may say that nearly all sandy



A well located Michigan orchard near a large body of water.



An orchard in the hills of Southern Indiana.

soils are suitable for apples but apparently not all clay soils are so congenial. The intermediary loams are often not suitable at all.

In all the older sections of the country we can usually take the old orchards or the old individual trees as a guide as to what that particular soil will do in the way of producing apples. If we find old trees around every farmhouse we can generally depend upon it that young trees can be grown in that neighborhood. If there are bearing orchards in the locality, their record can be consulted as a guide to future plantings.

In any event we do not want a soil that is rich. Neither should it be poverty-stricken. One that we might describe as being in just "moderate circumstances" will come nearer providing the foundation for a successful orchard.

Trees on rich land will grow beautifully but unfortunately they won't bear that way. The apple tree is a curious creature in some respects, but when we come to understand it we realize that it is only living up to certain natural laws that were laid down at the beginning of creation.

One of these laws is to the effect that any organism that is threatened with destruction tends to reproduce itself. How I wish that every fruit-grower could have that law pounded into

his consciousness for all eternity. It goes hand in hand with success in fruit-growing and is as absolute in its sway as the sun in the heavens.

A fruit tree planted in rich soil is not "threatened with destruction"—not by a long shot. It is a pampered darling and just goes on growing indefinitely. Maybe some wise guy will come along claiming to be a "tree man" and tell the owner that the tree needs iron and he should drive nails into the trunk to make it bear. The nails are driven—and if there are enough of them the tree does bear—it has been "threatened with destruction." Any similar injury will do the same thing—such as taking out strips of bark, slight girding, etc. Therefore we want to plant our apple trees on soil that is not too rich. We don't want the trees to get the idea that they are going to have things easy all their lives. A moderately poor soil will enable the tree to make a good enough growth, but at the same time it will encourage the habit of producing fruit.

On the other hand, we must not make the mistake of planting trees on land that is too poor to produce fruit. Old fields that have been cropped until they will no longer produce grain are not satisfactory locations for orchards, although land that has been farmed carefully for a number of years often makes a better orchard site than does a newly cleared tract which

still contains the decaying roots of the forest trees.

The physical character of the soil often gives us a clue as to its fertility content, particularly in the case of clay and clay loam soils. Worn soils frequently develop what is called a "shotty" condition. A handful of such soil will not crush smoothly between the fingers, but will resolve itself into small hard pellets resembling shot. In an ideal apple soil the red, yellow or gray color of the clay base is always tempered by the presence of a greater or less amount of humus which gives the soil a darker, richer color than that of the raw clay. Where the humus has been burned out of the soil the raw ground color will glare forth its warning note and old washed fields will always show their worn condition as far as they can be seen. The character of the soil can be more easily determined in the spring of the year than at any other time, but in any event do not buy an apple farm, or any other kind, when the ground is covered with snow.

The contour of the land for an orchard should be carefully considered when buying the site. Level land should be avoided as much as possible in order to secure good natural drainage. An apple tree does not like to stand with its feet in the water. It is not related to the pond lily family in the least.

Another advantage in locating the orchard on a slope is to secure the benefit of "air drainage." Many persons do not realize how easily cold air slides down-hill. It goes down, of course, because it is heavier than warm air, and on a quiet night one can go out on a hillside and feel the current of cool air rushing down into the valley. I suppose in this motor age every one has experienced the sensation of riding in a machine at night along a road leading from a hill into a valley and noticed the difference in the temperature between the elevations.

This difference in temperature is of a very practical value to the orchardist and frequently makes all the difference between a full crop and no crop at all.

Here at Hickory Hill we have a government weather observation station with recording thermometers both on top of the hill and in the valley. The difference in elevation is one hundred and sixty-eight feet and on still nights the temperature will vary as much as fifteen degrees. Frequently I have seen the peach crop a failure below a certain definite altitude on the hills. One spring when the peaches bloomed we could see a regular contour line following around the hills. Below this line there was no bloom while above it the trees were filled. The line was so sharp and distinct

that in many cases it passed directly through a tree, leaving bloom in the top branches and none near the ground.

On another year the apple crop below a certain line was imaginary, while the trees on top of the ridge were laden to the breaking point. The actual elevation above sea level is of minor importance compared with the elevation above the surrounding country. The important thing to remember in regard to frost drainage or air drainage, is that the orchard must be higher than the surrounding land—the higher, the better.

The direction of the slope is not of so much importance as was at one time supposed. Formerly we were advised to select north slopes for orchards because it was thought that the north slope remained cold in spring longer and thus delayed the period of bloom until after the danger from frost. As a matter of fact the soil in north slopes does remain cold longer, snow clings to the north slopes after it has all vanished from the more exposed locations, but this has absolutely nothing to do with the time of blooming. The ground may remain frozen hard, but if the air could be warmed to the right temperature the tree would bloom just the same. In our orchards we have slopes in every direction and after years of observation I can not say that I have ever noticed the slight-

est difference between the time the trees bloom on the north and south slopes.

A friend of mine, in order to prove this theory, cut a hole in the side of his house and brought in a branch of a rose-bush, the roots of which remained outside in the frozen ground. In due time the bush bloomed inside the house although it remained zero weather outside. While the direction of the slope exerts no influence on the time of blooming, it frequently represents a decided difference in the depth and quality of the soil.

In all forested districts we may make it a definite rule that the best soil lies on the slopes that face away from the prevailing winds. The reason for this is that through the ages the prevailing winds have carried the annual crop of leaves over the crests of the ridges and deposited them on the comparative quiet, protected slopes. Even as I write, the southwest wind is hurrying a procession of fallen leaves past my window to deposit them on the northeast slope. By spring our southwest slopes will be swept bare of leaves, while every nook and corner on the north and east sides of our hills will be packed deep with fallen leaves. This process, going on through the past centuries, has materially changed the character of the slopes in our section.

In any hill section, too, the south and west

slopes are more inclined to "wash" than are those of the north and east. The reason for this is that the early afternoon sun, even in winter, will often thaw the surface to the point where it will begin to slip. This softening of the exterior, followed by warm rains, causes greater surface loss on the south and west slopes than on the others.

In locating the orchard do not forget that you will need water to spray your trees. A high hill is often a mighty attractive place for fruit, but don't become too enthusiastic until you are sure that water will be available. High hills have a way of becoming dry in summer and what may be called a "livin' spring" in the showery month of April, may be as dry as the Volstead Act by July. A dependable water supply is absolutely essential to an orchard and the older the trees become the greater will be the need. You have no idea how much dope it takes to spray even a ten-year-old orchard—but you will if you are patient enough to follow me through this volume.

Do not plant an orchard too far from a good market. Our railroad freight rates are high and they may go higher. Concentrated production will be a thing to avoid in the future whether the product be apples or manufactured articles. During the past year apples rotted in

the orchards of New York. They were good apples to start with, but it was a physical impossibility to move them to distant cities profitably. On the other hand, small commercial orchards in districts not largely devoted to growing apples, sold their crops at an advantage and could in most cases have sold more fruit.

I know of one man who has a profitable orchard near a thriving city in Ohio. His county is not an "apple" county. There are in fact but few orchards of any size in the county. This man sells his entire crop at home and frequently has to import apples from other states to take care of his orders. He is not bothered with transportation problems.

Then, too, the question of transportation should be carried a bit further when we consider the location of the orchard. The initial transportation of the fruit from the orchard to the railroad should not be overlooked. With good roads an apple orchard might be located ten miles from a station—or twenty. Truck transportation would take care of the distance. With bad roads, about the only solution of the problem would be to have the railroad run right through the orchard.

In our own section the roads are gradually improving—oh, not with any great rush you understand, but they are slowly reaching that

stage where we can run a "hootin' nannie" car any month in the year—at least on certain days in any month. Time was, however, when our roads were unspeakable. I recall that when we once loaded a car of apples to ship to Cincinnati, it cost us seventeen cents a barrel to ship from our station to the big Ohio city. It cost us exactly twenty cents a barrel to haul those apples three miles to the station. At present it costs us from four to ten cents per barrel to make the same haul by truck—depending upon how the road happens to feel when we are hauling.

I had intended saying that in selecting an orchard site one should consider the labor supply—but what's the use? If any one knows of any place where labor conditions are any better than they are any place else I wish he would tell me. I would like to go there. Perhaps, however, all of this about locating a desirable orchard site does not apply to your particular case. Perhaps you already have a farm of your own and can not move around at will but must plant your trees on the ground you have available. That is all well and good, simply apply to your own farm the points that I have been bringing up, as closely as the limited geography of the place will allow. Only remember this—don't go and plant that orchard away off in some neglected corner of the place

where you will not think of it again until the fruit is ripe.

If the orchard is to be only incidental to the rest of the farm, plant it close to the home, where it will be a constant reminder that it needs attention. Then, on your way to the cornfield you may notice it and remember that you have not yet applied that much-needed spray. Perhaps you will let the corn wait a day while you look after the apples—perhaps.

When the orchard near the house reaches the age when it will bear fruit, the proximity of the dwelling will serve as much needed police protection. It is surprising how many apples silently steal away from any and all orchards.

The trees near the house will be convenient too when it comes to marketing the fruit. The roadside fruit business is constantly growing in volume and even large commercial orchards are now beginning to recognize the fact that this is one of the best ways of selling the crop.

After you have located the site for your orchard you can begin to send for the nursery catalogues and figure out whether the square or the triangular system of planting is best and how to plant the trees and a lot of other interesting dope. All of that, however, we will leave for the next chapter. It's a big enough job just to select the land.

CHAPTER II

SELECTING THE TREES

“Every tree is known by his own fruit.”—LUKE, VI:44.

AN ORCHARD consists of a tract of land planted with fruit trees of some definite kind. Trees and “dirt” are the two component parts on which the whole thing is based. A failure in the selection of either means that the foundation of the entire structure is weak and the ultimate results are quite liable to fall short of what the planter had in mind.

In my first chapter I tried to give a few suggestions regarding the selection of the land for the orchard. The problem of selecting trees is just as important and much more complicated than that of selecting the location. Moreover it is one that the beginner will have greater difficulty in mastering.

Too many new orchard planters fail to realize that in selecting their trees they may make an almost fatal error. They do not understand that fruit trees vary in quality just as much as

do some of the manufactured articles on which we have an established basis of judgment.

A good mechanic knows a good tool when he sees it. Usually he does not have to look for the trade-mark of the reliable manufacturer with which it is branded. He knows too that such quality tools are "expensive"—at least in first cost. One can go to the "5 & 10" and purchase a saw or a pair of pliers for a few cents, but the good mechanic would know that such tools were only a makeshift and would not give them room in his kit. Sooner or later, he would know, the pliers would fail him or the saw would buckle just at a time when he would need it most.

Even a person who is not a good mechanic would know better than to buy a pair of pliers with cracked jaws or a saw that had lost a few teeth or any tool that was eaten with rust.

"Certainly," you will say, "that is only common sense." And yet, persons with supposedly "common sense" make just such bargains when they purchase certain kinds of nursery stock. Time after time I have seen planters unpack stock that was fit only to adorn a brush pile. They planted it cheerfully under the hope that it might "grow out of it." Its low price was the only attraction it had and that had been enough to procure a sale.

Most orchard planters really desire to ob-

tain good trees to start their orchard, unless they are planting the place in the hope of selling it quickly. (I once saw a property that had recently changed hands. A beautiful hedge of Norway Spruce along one side of the driveway, died under circumstances that seemed to demand the attention of the tree coroner,—meaning me. An inspection showed that the beautiful hedge consisted of a local dealer's leftover stock of Christmas trees, each with its supporting base still neatly nailed to the trunk and covered with enough earth to hold it upright.)

In order that the buyer be able to judge something of the quality of the tree he purchases, he should first know something of the methods by which that tree has been produced,—just as the good mechanic should know how tools are made.

Apple trees are not grown in the nursery from seeds. Some planters seem to think that the production of an apple tree is very much like the production of a tomato plant—simply a question of planting seeds of a certain variety and later securing plants that bear fruit more or less closely resembling the parent fruit.

If that were the method employed fruit trees would not be so scarce on the market as they are to-day, but unfortunately the process is somewhat more complicated.

All apple trees are grown on the roots of young seedling apple trees, that is, the tops are changed in variety by grafting or budding. In the past practically all of the seedlings used for this purpose have been grown in Europe, with France and Belgium producing most of them. These seedlings are shipped to this country in large cases and are unpacked and inspected at the nursery where they are to be used. Not infrequently diseased and insect-infested stock is sent in and this has resulted in the Department of Agriculture throwing many impediments in the way of the receipt of this stock. Some of the Department's rules are such as to cause a very great increase in the cost of handling these seedling stocks with the result that most nurseries have cut down their imports to the lowest possible estimate. Consequently the production of stock has fallen off in the past few years and we to-day face a very serious shortage. That this shortage will continue seems to be reasonably certain as no nurseryman cares to risk the investment of too much money in a commodity that may not find a sale.

The seedlings, called "stocks," are taken to the propagating houses of the nurseryman and there are grafted, during the winter months. They consist of a finely branched, vigorous root system and usually a single, straight top of a foot or two in length.

The top is cut off near the soil line. In doing this the workman makes a long slanting cut which leaves the end of the stock with a large cut surface. This cut surface is then split with a sharp knife so that the split extends down toward the roots. The scions that are used to start the top of the trees consist of twigs of last year's growth of any variety that it may be desired to propagate. A small section of one of these twigs is selected, cut square at the top end and slanting at the bottom end. This slanting end is then split to correspond with that of the stock and the two are fitted together and tightly bound in place with a bit of waxed yarn or light string.

The assembled stocks and scions are called "grafts" and are usually prepared in winter, packed in moist sawdust and later planted out in the rows where they are to become nursery trees. When they are planted only the top bud of the scion is allowed to extend above the soil line. It is this bud that later forms the tree.

By the time growth starts the union between the stock and the scion is partly accomplished, but as the season advances this union becomes so perfect that it is impossible to tell just where it was made. Further than this, the scion also develops roots of its own on that portion which was placed under ground at the time of planting. Frequently these roots from the scion be-

come dominant and the original roots of the seedling may entirely disappear or at least become only rudimentary. They serve their purpose in giving the tree a good start and after that the tree grows, really, on its own roots. If this were not true we would not be able to differentiate between the root system of various varieties of trees. As it is we know that the Delicious, for instance, makes a splendid root system and that the Grimes has a very weak one. Some expert nurserymen have claimed that they could in many cases tell the name of a variety simply by looking at the roots.

Another method of growing apple trees is to plant the seedlings in the nursery row without removing the tops. In early summer these seedlings are "budded." The bud which is inserted lies dormant until the following spring when the top above the bud is removed and new growth forced through the inserted bud. This practice, of course, produces a tree on seedling roots. Some growers claim that such a tree is more vigorous than one "on its own." Good orchards have been grown from both sorts.

Perhaps the best method of producing nursery stock is a combination of these two systems; that is, to bud a weak-rooted variety on a tree of known root quality. It is in this way that Grimes is almost always propagated to-day.

The best nurseries probably use Delicious as a stock for this purpose. Of course when a tree is known to have a good root habit of its own, nothing would be gained by such double working.

It will be seen from this brief description of the method of growing apple trees that the whole process is simply a means of extending the growth of any particular tree. The scion is nothing but a twig of a certain variety. Nothing has been done to it to change its character. If it had been cut from a Baldwin tree it would still be a Baldwin twig and would in its turn produce another tree of that variety. All that has happened is to provide the physical conditions for that twig to grow into another tree like the one from which it was cut. Nothing can possibly change the behavior of that twig except the soil in which it is ultimately planted. If it is planted in a friendly soil it will produce good fruit and if it is placed in poor soil or neglected, it will probably yield only knotty apples.

In the past few years some nurserymen have attempted to secure high prices for what they called pedigreed trees. Any one who understands how a tree is grown will readily understand that there can be no such thing as a "pedigreed tree." The claim is made that such trees are propagated from parent trees

that produce fine, large, highly colored fruit, and the inference is that such fruit will invariably be produced on all nursery stock so propagated.

This inference is not true. The "parent" tree produced that fine fruit, not because of any inherent quality of the tree itself but only because it was planted in a congenial soil, had a congenial climate and was well cared for. A Rambo tree that produces little knotty, worthless apples may be the "parent" of a fine Rambo tree just as easily as could a tree that bore only fine fruit. In other words a Rambo tree is a Rambo regardless of what you may do to it or where you may plant it. In some soils it may be better and in others worse, but the variety does not change—it remains staple. And that rule applies to any other variety you may name.

We have varieties of apple that have been known for nearly two hundred years and the first printed description of the fruit conforms exactly to the fruit as we know it to-day. The variety has not changed. It has varied, no doubt, in the hundreds of years that it has been grown in different soils, but the unknown quality in the wood which determines whether a tree is a Ben Davis or a Stayman does not vary. Therefore there can never be a "pedigreed" nursery tree and if you ever find any one who

tries to sell you such trees you can decide at once that he is a good man to avoid.

I am not asking that you take my word entirely on this question. There are crooked nurserymen who will assure you that I know nothing about the subject. They will offer proof that they know all about pedigreed trees and may even show you orchards grown from their trees to prove that they are right. Nevertheless, I am warning you and if you get "stung" for high prices and get ordinary trees in the end, don't blame me.

Further, let me tell you about an experiment that was carried on by my friend, Joe A. Burton. Mr. Burton wanted to find out for himself if there was anything in this talk about pedigreed trees. He felt about it just as I do, but he wanted to know. He has a particularly well developed bent for wanting to know things anyhow.

Consequently he secured scions from a tree of a certain variety that produced very fine large apples, just such a tree as the pedigree nurserymen would select to grow their pedigreed trees from. Then he hunted around and found another tree of the same variety, but this tree produced only small, knotty, misshapen fruit, a poor subject for the eugenic nurseryman. Scions from these two trees were grafted in the top of a third tree. Their nourishment

was provided by a common root system—that of the tree on which they were grafted. If there was any difference in the two “parent” trees it would certainly have shown up there. But it did not, for when the two grafts produced fruit you could not tell which was from the fine tree and which was from the poor one. Burton repeated this experiment with several varieties—until he was entirely satisfied that the question of pedigreed trees was all bunk. It is a simple experiment. Any one can try it any time. If there was the least doubt in my own mind that Burton’s work had not been carefully done I would repeat the experiment myself or refer to other workers in other states who have done the same thing. Personally I know that pedigreed trees are a fake. I would never consider planting them myself and give them this much attention in this chapter only because I know that new planters too often “fall” for such misleading advertising.

Grafted trees usually are allowed to remain in the nursery either one or two years. If they make a quick vigorous growth they will be ready to plant at the end of the first season’s growth, but if the season is unfavorable they are often allowed to stand for two years. Budded trees, of course, remain in the row at least two seasons—the bud does not develop the first season. As a result a one-year

budded tree always has a larger root system than a one-year-old grafted tree. This additional root system is not necessarily of any advantage to the orchardist, but it does enable the nurseryman to produce a larger and more vigorous specimen—which sells for a higher price. If a budded tree remains in the nursery until the bud has made two seasons' growth we have a two-year-old tree with a three-year-old root system. In any event the root system of the budded tree is always a year older than the top. I have planted many apple trees grown by both methods and I can not see that there is any difference in the bearing trees which they produce. A medium-sized, one-year-old tree, either budded or grafted, is more readily transplanted than is one two years of age or older. Also the younger trees, being smaller, can be sent by freight or express at much less expense.

Regardless of the age of the tree, however, its physical condition will bear evidence as to the method that has been used in producing it. If it is a stunted runty specimen, it has been grown on poor soil or it has had bad cultivation. In either case its natural growth has been interfered with, and if it is planted in an orchard it will hesitate some time before it makes any effort to show what it can do. These weak trees always make me feel that they have been frightened in some way in the nursery and

as a result are shy about stretching their young limbs and going about their business of making fruit-bearing trees. I feel sorry for them, but I would rather not have them in my family.

The ideal young tree is one with a clean straight trunk, unbranched if it is a yearling, well branched with sturdy limbs if it is two years old. The root system should not be too large but it must be perfect. There is absolutely no advantage in a great sprawling mass of roots, but there is a decided disadvantage if the roots, regardless of their size, have been torn or broken either in digging or packing.

I remember that I once selected some young trees in a small nursery for a friend of mine. They were well grown specimens, free from insects and disease. When they were delivered to my friend they were worthless for planting as they had been "pulled" instead of being dug and the roots were all badly damaged. What had been exceptionally fine nursery trees had been ruined by the carelessness of the nurseryman in removing them from the ground. All nursery stock grown in this country is supposed to be inspected by the proper officer in the state where it is grown. I use the word "supposed" advisedly. As a matter of fact much of the so-called nursery inspection is a farce, and the planter will do well to do a little inspecting on his own account.

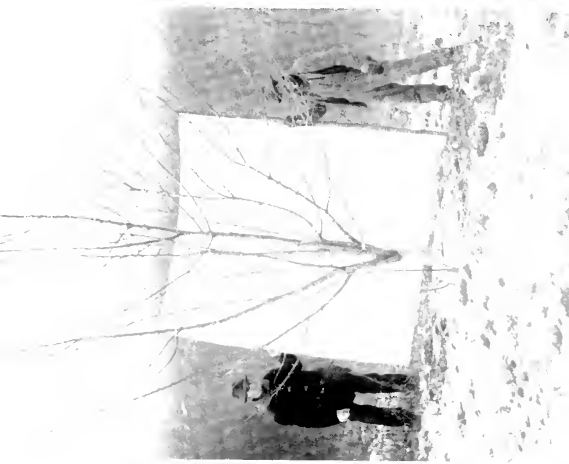


Figure 1. This tree is six years old. It stands only a few feet from the tree shown in Figure 2. The two pictures were taken without moving the tripod of the camera. It was a first-class tree when it came from the nursery and will remain so.



Figure 2.—This tree is eight years old. It was a "cull" when it left the nursery. It will never make a good orchard tree. Compare with Figure 1.



An inserted bud.



A "root graft" ready to be bound with



Cleft grafts showing the inserted scion before and after waxing.

In examining nursery stock as it arrives in the hands of the planter there are several insects and a few diseases that should be watched for, aside from the purely physical condition of the trees. The San José scale has perhaps created more excitement than any other one pest. It is one of those Asiatic contributions that have done much to create unrest among our fruit-growing population. It is not so fatal as has been supposed, but there is no need for any one deliberately to plant trees infested with it. The individual scales are readily detected by the eye and on young trees will more frequently be found clustered around the buds. They are to be distinguished from any other scale you are liable to find by the fact that they are perfectly round in outline and the center is slightly raised in the form of a small cone. Crushed, they are found to contain a yellowish juice although the color may not be very apparent. If the tree has been infested for some time the bark beneath the scales will be stained red under the surface.

The scurfy scale is often found on nursery stock and often is a cause of alarm but usually can be ignored. It is a whitish elongated insect, closely pressed to the bark.

The oyster-shell scale is a native and found on many native trees and shrubs. I have found it along the borders of the Great Lakes up to

the Canadian line. Its name describes it, as the individual scales are somewhat like an oyster-shell in shape. It is a formidable pest and where it once becomes well established it is far more difficult to fight than its Chinese rival for entomological attention. However, it is quite conspicuous and should be readily detected on young trees even by an inexperienced person.

Apple trees as they come from the nursery are seldom infested with boring insects. As a rule borers attack only trees that have been weakened, and a nursery tree that can be grown to a salable size within one or two years is not liable to be a favorable hunting-ground for any of the insects that make their attack below the surface.

Various egg masses of moths are sometimes found on the twigs, but these are usually so obvious that they would attract the notice of any one planting the trees. One should always be on the watch for the egg masses of the gypsy moth, however, and for the tenacious, cobweb-like nests of the brown-tail moth. These last are liable at any time to appear on nursery stock from almost any part of the country as there has been abundant opportunity for them to have been introduced into the neighborhood by nurseries in the last ten years.

There are several diseases that may appear on apple stock but it is difficult to name and

define all of them in this brief space. In general one should watch for any dead areas on the bark. Apple diseases will show themselves in the form of "cankers"—which are simply more or less circumscribed areas of dead and usually sunken tissue. Crown gall is a disease that attacks the roots, forming unsightly warty excrescences usually just at or below the soil line. No reputable nursery will sell stock so infested (it is against the law anyhow).

Crown gall should not be confused with another gall-producing pest, the woolly aphis. This is a plant louse, covered with white wool, which causes small galls on both the roots and on the trunk and branches of the tree.

Nurserymen have long contended that neither the woolly aphis nor the crown gall was injurious to trees. To prove it they have in the past planted orchards using only infested and infected trees. They claim these orchards are a success. Maybe so. However, I wish they would tell me what is the matter with a few trees we have. I know the trees have crown gall, but I can't find anything else wrong—still they have failed to grow or to bear as have healthy trees on the same soil and with the same treatment. I am inclined to think that the nurserymen who made the claim are mistaken. At any rate I plant no trees bearing either of these pests—not if I know it.

The problem of selecting varieties for either the commercial or home orchard is a perennial one. At present we are in the midst of such a problem ourselves and it is just as interesting as it was during the winter before I planted my first apple trees. During the intervening years I have planted quite a number of different varieties, usually in small numbers, chiefly to test out new sorts or to experiment with old varieties in a new environment. It may be interesting to know that in our own case we are practically settled on planting the three leading sorts that formed the first orchard. Thus does history repeat itself.

As a rule it is well to avoid varieties that are too new. Usually they have not been sufficiently tested to enable one to judge what they will do in the future. Also new and unknown varieties frequently find a poor sale on the market even in competition with decidedly inferior but better-known sorts.

I was recently in the sales room of the largest apple dealers in Indianapolis, and was surprised to find that three barrels of "Doctor Matthews" apples had just been returned by some purchaser (a small grocer) because he had been unable to sell them. You probably never heard of the Doctor Matthews. Neither had the customers of the small grocer. Consequently they would not buy the fruit, but

eagerly took Romes that were offered beside them. Now, be it known, the Doctor Matthews is a local variety, grown only by one man who "discovered it." It is probably a new sort entirely although there is a Doctor Matthews listed by the Pomological Society. This apple that I am discussing, however, is a wonderfully fine dessert fruit. I doubt if any other apple equals it for this purpose, not even my beloved Stayman or the widely known Delicious.—Still, it would not sell. You may say that if it is so good it will create its own market. Perhaps—ultimately, but I prefer to plant something that either has a market or will be sufficiently advertised that its market will be made for it. This situation is admirably illustrated in the case of the Delicious. To begin with it was a good apple but if its introducers had not backed it up with a tremendous campaign of national advertising it would not be to-day the leading market apple of America. If you doubt that it is the leading market apple I would only refer you to any government market report—they are published daily—where you can look up the figure for yourself. Without exception you will find this variety selling for more money than any other sort listed. Its success is due to that unbeatable combination of a really good thing combined with the right kind of publicity. The Doctor Matthews might be just as popular

if it had been introduced by a firm with the courage and cash to give it the proper send-off—provided it had been given a name that was more suited to a fruit.

Take time to decide the question of what varieties you are to plant. It is a big question. If you want the fruit for your own use, plant what you like. If you expect to sell it, plant what you can grow, provided always that there is a market for it. One can always grow Ben Davis but when it comes to selling them “that is something else again.” Study the nursery catalogues. You will have a lot of fun out of it at least. Next, see what varieties are grown successfully in the neighborhood of your orchard location. Then find out if your markets can dispose of such varieties at a profit. In other words make a study of the whole game before you buy your trees. And be sure of two things: first, that you can produce apples of the particular variety you are planting; and, second, that you can sell them after you have them in the barrels. If you will just pay attention to these two points it will save you a lot of worry in the years that we are coming to—when that young orchard of yours begins to bear.

CHAPTER III

PLANTING THE TREES

“Come, let us plant the apple tree.
Cleave the tough greensward with the spade;
Wide let its hollow bed be made;
There gently lay the roots, and there
Sift the dark mould with kindly care.”

—BRYANT.

POSSIBLY there are persons who would order a lot of building material, have it delivered to their farms and then proceed to see what sort of houses they could assemble from the pile, without first working the thing out on paper. I say there possibly are such persons but I doubt if they are numerous enough to be really dangerous. On the other hand, I suspect that the majority of American orchards are planted on no particular plan whatever. The owner orders a bunch of trees—about what he thinks he needs—and after they arrive he goes to the field to see what sort of an orchard he can make out of them.

Orchard plans are seldom worked out in such detail that the owner knows beforehand exactly how many trees he will need. This in fact

is such a common failure that at least one large nursery has for years made a practice of sending quite a number of "extra" trees with each large order. I have talked with hundreds of purchasers who have received these extra trees and with one exception I have never heard any grower intimate that it had interfered with his planting plans. The one exception was a man who is a very careful grower and his complaint was that the extra trees did not work in with his prearranged plan for his new orchard. As in the case of the plans for a new building, orchard plans may be either simple or elaborate, but in any event some definite plan should always be decided on and reduced to paper in such a way that it can readily be referred to in the field at planting time.

It may be a simple outline of the field to be planted, drawn to scale and with the varieties indicated, or it may be an elaborate system which will check every tree as it is planted and make sure that the right sort goes in the right hole.

Such a plan was carefully worked out by Mr. H. H. Ink, of Canton, Ohio. Several years ago Mr. Ink decided that he wanted to go into the apple business. He had never grown apples, having "made his money" in the drug business. One of the secrets of his financial success in the business world was that he had reduced

everything to a systematic basis. He told me he thought that the same ideas that had gone big with drugs would fit in with apples.

Consequently he planted his orchard twice, once on paper and once in the field. His plan is worth more than passing notice as it not only helps the grower to get his trees where he wants them, but in after years gives him a complete record of every tree he owns. To begin with he had a surveyor prepare a careful map of the fields that were to be planted and on this map he laid out the orchard as he wanted it. Then a series of "planting cards" was designed. Each card represented one row in the orchard and contained a ruled line for every tree to be planted. On this line was recorded the variety, the class to which it belonged, (permanent, semi-permanent, or filler), and a space left for the name of the planter and the date on which the work was done. Notations at the top of the card indicated the particular block in the orchard that it represented, the number of the row in that block and a key to the varieties used.

When it came to actual planting, these cards were fastened to the side of the wagon in which the trees were hauled and as each tree was set it was checked off the card. At the end of each day the owner had a complete record of the work that had been done. He also had a per-

manent record of the man who had done the work—and believe me that is some asset. When it comes to passing the buck nothing can equal a crowd of tree planters when the quality of their work is questioned. I do not believe that I was ever able to fix the responsibility for the planting of any particular tree in our orchards—that is, of any tree that was badly planted and that died as a result. Those that are well planted and thrive are claimed by every one who ever used a spade on the place.

After Mr. Ink had finished planting his orchard he used his field planting cards to compile a small pocket record book in which every tree is recorded by number. By the use of a key which he has worked out to go with the book he can at once identify any particular tree in the orchard and refer to the variety, age, treatment and name of the planter. Each year these book records are revised to show the additions that are made to the orchard and to indicate those trees that are replanted.

While I personally admire the wonderfully systematic way in which Mr. Ink planned and planted his orchard I do not believe that the average grower need go to quite that much trouble. I would not do it in my own work because it would multiply details in a job which I prefer to simplify just as much as possible.

One of the things to be worked out on paper



Pruning the roots before planting.



Dig the hole deep and broad enough to accommodate the roots.



Work the top soil carefully about the roots.

is the size and shape of the given field to be planted. With this plot as a starting-point one can determine the best distance to plant and the best system of spacing to use. Growers are generally of the opinion that apples should be planted about forty feet apart in permanent orchards, but this distance is by no means a fixed quantity. It may be varied in either direction to suit local conditions and to accommodate dwarf or large-growing varieties. Not all sorts of apples make the same size trees, nor do all varieties have the same habit of growth. It would be absurd to establish a standard planting distance for Baldwin for instance, and then claim that such a distance was the correct spacing for Yellow Transparent. In the case of the Baldwin we have a very large growing variety with a natural inclination to spread its branches over a great area, while the Yellow Transparent is of a decidedly upright growth and never even in maturity makes a large tree. To give definite examples, I would say that the following sorts demand the greatest distance for planting: Arkansas, Baldwin, Banana, Delicious, Esopus, Spy, Rome, Stayman and Winesap. Even in this list are some sorts such as Esopus which do not as a rule make large trees, but their soil requirements are such that they should be allowed plenty of space if they are to produce the best of fruit. Medium grow-

ers are: Boiken, York, Duchess and Wealthy. Varieties that will stand even closer planting are Akin, Jonathan, King David (perhaps), Liveland, Red June and Yellow Transparent. Several varieties in the last class might easily be planted at distances not greater than twenty-five feet while those of the first group should stand not less than forty feet apart in the permanent orchard.

Speaking of permanent orchards suggests the use of filler and semi-permanent trees. Probably few horticultural practices have provoked more discussion than the use of fillers in an apple orchard. A filler tree is simply one that is put in temporarily to fill space between the permanent trees during the development years of the permanent planting.

At some time or other I have tried a good many systems of planting and quite a list of trees for use as fillers. First it was peaches, then plums and finally apples. Peaches as fillers in an apple orchard are a perfect success if the grower has the nerve to pull them out at the time they begin to crowd the apples for room. (Provided of course that the orchard is located in a section in which peaches may be grown for profit.) For several years some of the men in our Experiment Station "have pointed with pride" to my own example in this respect. I have been shown as an example of

an apple grower who had the nerve to pull out his peach trees when they got large enough to interfere with the apples. I hereby acknowledge all compliments but disclaim any title to them because the year in which we pulled our peach trees was preceded by a very severe winter that killed most of them anyway. It has always been a question in my mind whether I would have pulled those trees with such enthusiasm if they had been in perfect health and with a nice crop of promising buds. (The word "promising" is used advisedly in connection with peach buds.) That temptation to "leave them for another year" is the great objection to the use of peaches in an orchard. If it was not for the potential damage they might do by remaining too long they would be ideal fillers in an apple orchard that was so situated that it could be regularly cultivated. I would not advise their use in an orchard that was to be handled by any of the sod mulch systems. The reason for this will appear later. For the present, take my word for it.

We have used plums as fillers with considerable success. A small portion of our orchards is still provided with fillers of this class and they have not interfered with the apples in the least. On the other hand, they started to bear at a rather early age and have continued to do so with considerable regularity regard-

less of weather conditions and predictions to the contrary. As they are for the most part planted among Yellow Transparent trees that were spaced too far apart in the beginning, I suspect that our plums will remain with us for a number of years before their root space is needed by the apples.

For the last six or eight years, however, we have used nothing but apples for fillers in apple orchards. The results have been so encouraging that I do not believe we would ever be induced to use anything else as a regular practice. To begin with, the use of apple trees simplifies the care of the trees, it allows uniform practice in regard to spraying, cultivating and pruning. One trip across the orchard does the job when all the trees in the row are of the same sort. When they are of mixed classes the spraying is complicated, the pruning varies from tree to tree and the cultivation is with difficulty adjusted to suit both sorts.

Most of our permanent varieties are of the large sorts, consisting chiefly of Delicious, Stayman and Winesap. These are planted on the "square" system at a distance of forty feet. These permanent trees occupy the four corners of the square. Midway between each of these trees, on the lines forming the sides of the square, are planted filler trees. In the exact center of the square is planted a tree which we

designate as a "semi-permanent." This gives us a uniform planting at a distance of twenty feet and at first glance it might seem that we simply had a solid apple orchard planted with trees twenty feet apart, each way. In practice, however, the filler trees will be the first ones removed, as soon as they begin to interfere with the permanent trees. Just when this will be is difficult to say, but probably in our case when the trees are from twelve to fifteen years old. The first orchard planted in this manner is now eight years old and there is as yet no crowding.

After the fillers are taken out the tree in the center of the square will still have plenty of room and may remain for several years longer. For that reason we designate it as a "semi-permanent." With the orchard consisting of the permanent and semi-permanent trees, our planting system has been changed from the "square" to a modified "triangle" plan, which in turn will revert to the square plan at the time that the semi-permanent varieties are removed. For a time there was quite a little discussion about the relative value of planting trees on the square and triangle systems. The latter affords the planting of a few more trees to the acre, but the increased difficulty of staking such an orchard, the greater chance of confusion in orchard operations and the lack of uni-

formity in appearance seem to offset the advantages claimed. In any event the modified forty-foot-square system outlined above seems to me to combine any advantages that the triangle system may have and to offer none of its objections except during the comparatively short period between the removal of the filler and the semi-permanent trees.

The preparation of the soil for orchard planting may either precede or follow the making of the paper plans. I am taking it up at this point merely as a matter of convenience.

If the orchard is to be planted on virgin soil the removal of the forest will constitute a job of considerable magnitude—considerably greater than the average planter realizes. I have often heard land agents claim that the timber standing on a certain tract would pay for clearing it. This is no doubt true in some cases—where the timber is of good quality and the market accessible. In the majority of cases, however, the timber will fall far short of paying the cost of clearing if the job is to be done as it should be.

The ideas of different men too will vary as to what constitutes “clearing.” The removal of trees and brush, leaving the surface covered with stumps, does not provide a satisfactory preparation of the land for an orchard. It is of course much cheaper than the removal of

stumps and roots, so far as first cost is concerned. In the end, however, the cost of growing an orchard in stump land is so much greater than the cost of the same work in cleared land that the expense of dynamite and elbow grease is always justifiable. A part of the Hickory Hill orchards was planted among the stumps as soon as the forest and underbrush could be removed. While this block has made a very satisfactory orchard it has been at very great expense. It would have been cheaper to have removed the stumps in the first place so that the surface could be cultivated more easily and spray machines would have been saved the annoyance of dodging stumps. And believe me, annoyance is a mild term when a loaded spray wagon strikes a stump on the up-hill side. We never actually upset, but all that saved such an accident was the united effort of the spray gang until the obstruction was passed.

We have cleared a good many acres of forest ranging from that which might be termed "virgin" to that which had lost all title to that term, being, in fact, only a second growth thicket. The hardest job we tackled was clearing a strip of land covered with mixed oak timber. The trees stood very close together and were large enough to have substantial stumps requiring blasting but were not large enough to make good saw logs. Consequently

there was no salvage on this job. The expense in this case ran very close to two hundred dollars per acre, but when we had finished there were no stumps and very few roots left in the ground. Perhaps this might be taken as a maximum cost in such operations, but it will suggest that the cost of such work will vary greatly according to the character of the standing timber.

Another illustration I would like to offer at this time is that of a tract of beech timber we once cleared for orchard. The trees were very large and fairly numerous. In blasting the stumps it was difficult to get them out without breaking them up very badly. If we secured a good charge directly under the stump the usual result was to crack the stump and bend the two or more parts backward against the surface roots. It was impossible to place a second charge under such stumps and as a result the shattered pieces had to be grubbed out by hand. At that time we were using the ordinary fuse for blasting, making it impractical to place more than one shot under a stump. Later we purchased an electric blasting outfit enabling us to fire up to ten shots instantaneously. With this method we can place ten small shots under a stump if need be and when we push the button (at a safe distance), there is little more to do except to pick up the pieces.

All of this, however, is written with a view of emphasizing the fact that it costs money to clear land. Remember this when the real-estate agent talks about doing it for ten dollars an acre. Of course if he wants to take the contract at that price, that is another matter.

It has been claimed that orchards planted on "new ground" are more liable to be attacked with the disease known as the root rot than are those planted in old fields. This is no doubt true. It is certainly logical to suppose that such a disease, living as it does on the dead roots of trees, might be more common in newly cleared land than in old fields. It may attack trees in both situations, however, but by careful planting much of it may be avoided even on virgin soil.

After the forest is cleared away, or if the orchard is to be planted on old fields, the ground should be thoroughly plowed. Many growers prefer to do this in the fall and then harrow it just before the time to plant in the spring. In any event it should be plowed as deeply as possible as this is the last deep plowing it is liable to get for some time. Just before planting time the ground should be harrowed level and it is then ready for staking, preparatory to planting the trees. Many growers desire to set a stake for every tree, but if you have a thousand or more trees to plant you

will be surprised at the number of stakes required. A thousand stakes make quite a pile—enough to keep the kitchen range going for several days, even in cold weather when the whole family tends fire. I have always thought that a stake for every tree was a refinement that was scarcely worth the trouble and expense which it costs, and after having planted a good many thousand trees I am still of that opinion. If the men who are planting the trees use their wits they can get the trees planted a lot straighter than the staked trees will be at the end of five years. In any orchard there are always trees that will lean one way or another, and one that is out of line an inch or two will never be noticed at the time the trees bear their first fruit.

It is necessary to have some sort of a base line for the planters to work from, and I have not been able to get away from the use of a double row of stakes which are used by the planters in “sighting” the trees as they go in the ground. To establish these base lines I use a surveying instrument to locate the position and direction of my first line of trees. These trees are all staked with a pole six or eight feet high,—a straight “bean pole” answers nicely. A second row is then located parallel to this. The planter is then furnished with a measuring-rod cut exactly ten feet long which

he carries with him. Measuring twenty feet, (two rod lengths), from his first stake and sighting until the two stakes are in line he can locate the third tree row. We have had some pretty stupid planters in our planting gangs and I admit that they have sometimes "gone wrong," but never so badly that we could not easily correct the mistake. As a rule the men take to this system very readily and it is surprising how accurately they can plant an orchard and how quickly it can be done.

When the nursery trees arrive at the orchard they should be unpacked at once unless the weather is so cold that the ground is frozen. In that case the boxes containing the trees should if possible be placed in a cellar until they thaw out. Lacking a cellar they should be covered with straw and left unmolested until the weather moderates. Frozen trees may not be damaged if they thaw out slowly, but they should not be handled while in that condition.

When they are unpacked they should be "heeled in" just as quickly as possible after removal from the package. All reputable nurseries use every care to see that their trees reach the planter in good condition and the majority of failures are due to carelessness or ignorance on the part of the man who plants them. In no case should the roots be allowed to become dry, even for a few minutes.

If the trees are to remain for some time before planting, a great deal of care should be used in heeling them in. A trench should be dug wide and deep enough to take in the roots of the largest of the trees, and in this trench the trees are actually planted—temporarily. See that the earth is worked in around the roots so that no air spaces are left—and if the trees are to stand over winter they should be arranged so that the tips of the branches point to the southwest. The reason for this is that the southwest sun in winter comes at the warmest part of the day and as a result it warms up and thaws out frozen objects which are not touched by the warmth of, let us say, the eleven o'clock sun. It is highly desirable that the frozen tissues of the young trees should not be thawed suddenly by this hot southwest sunshine. It is always the *sudden* freezing and thawing that injures wood tissues and fruit buds. Consequently by placing the trees in the trench so that they point to the southwest we avoid much of the direct effect of the sun in the early afternoon.

Again, if the trees are to remain long in the heeling-in trench it should be dug at a place where water will not stand. It is not a good thing to permit fruit trees of any sort to stand with the roots in water for any length of time.

If the trees are to be heeled in for only a short

time satisfactory results can be obtained by spreading the roots out on top of the ground and shoveling enough earth over them to protect them thoroughly from drying out. This is much easier than placing them in a trench and is sound practice—provided the trees do not remain too long. I would not advise you to try to carry them over the winter in that position.

When planting-time arrives the trees are removed from their temporary resting-place and the roots and tops are pruned before planting. Some growers do not trim the tops until after the trees are planted, but it saves time to do this part of the work in advance. Great care should be used in pruning the roots as by doing so a considerable freedom from root rot can be insured. Root rot is a disease that enters the apple roots only through dead roots, and by avoiding any chance of planting such roots, or roots that will die after planting, the disease can largely be prevented. In order to accomplish this it is necessary to remove most of the very small fibrous roots, leaving only the stronger ones. A sharp knife should be used for this purpose and the fibrous roots cut off smoothly, leaving no strings of root tissue which are certain to die. The reason for taking off the small roots is that these frequently are injured without showing it and also they frequently occur in such abundance that they

become matted together in the ground and consequently perish. It has been found that by following this system trees can be replanted even in the same places where other trees have died of the disease and the trouble does not recur.

After the roots are pruned they are dipped in a mixture of mud and water stirred until it is of the consistency of thick paint. This forms a coating over the roots which, although it may dry out itself, protects the roots from the injurious effects of the dry air. Some planters haul the trees to the orchard in a spring wagon on which is mounted a barrel containing this mud mixture and the trees are handed out to the planters as they are needed. I have found it conducive to more rapid work if the trees are carried from some central point in bunches of ten. Such a bunch can be protected with an old burlap sack until the planter has placed them in the ground.

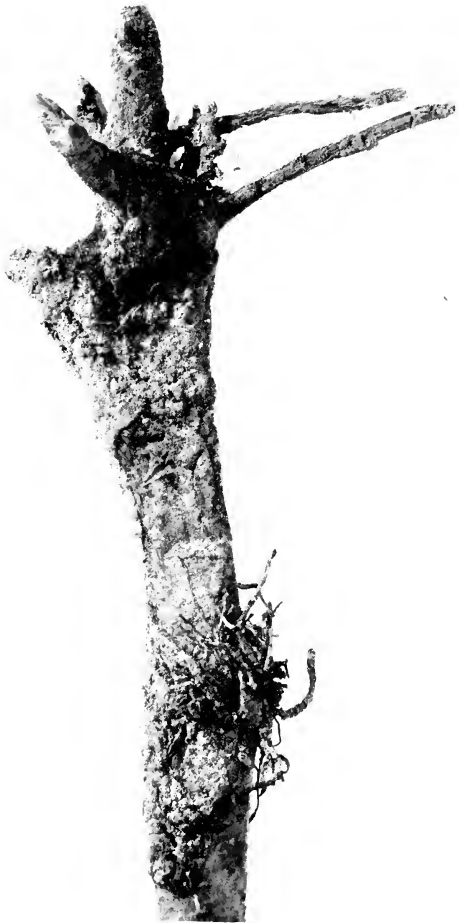
Digging the hole for the tree is a simple job, but like all other orchard work it contains possibilities for error. To begin with the hole should be made large enough to take in all of the roots without crowding and deep enough to permit the tree to stand a trifle deeper than it stood in the nursery. The bottom of the hole should not be a hard surface, but should be worked up with the spade so as to offer a soft



Tramp the earth firmly about the roots.



Leave the surface loose and do not tramp it.



Root rot a disease that may be at least partly prevented by careful planting.

bed for the roots. In digging, the top soil from the hole should be placed at one side and the bottom soil at the other side of the hole. After the tree is in place and has been "lined up" with other trees or stakes, the planter should first shovel in the *top soil* thus getting the richer material next to the roots to provide them with material to give the young tree a quick start. After the roots have been carefully covered the soil must be tamped down firmly. Get into the hole with both feet and tramp the earth down as vigorously as possible. If the roots are much branched you may even need to work it up under the arch of the roots with your hands, but in any event get it in firm contact with all root surfaces. The last soil which goes in should not be tamped but should be left in a loose layer over the surface. After planting, the tree should stand so firmly in the earth that it can not easily be pulled out with one's hands. Last year in a planting of five hundred trees one tree died and this, on examination, proved to be so loosely set in the earth that I pulled it out with two fingers.

There has been a great deal of interest in the subject of planting trees with dynamite. There is no doubt that dynamite has its place in the preparation of the soil for planting, but to advise its use under any and all conditions will lead to certain loss. The only place where any

advantage in the preparation of planting holes will be had from dynamite is in cases where the soil is underlaid with a stratum of hard material. Even here it is doubtful if the dynamite will be of much permanent use for it is not often that there is any material of food value under such a stratum.

In such a case, too, the dynamite should never be used except when the ground is perfectly dry for if it is the least bit moist it will pack at the point of explosion and as a result a hard walled pocket will be formed. This pocket may be compared with a flower-pot with baked walls. For a few years a tree planted in such a pot would grow vigorously. It might even bear earlier, but when the roots struck the hard walls they would be slowed down and the tree would go through a period of slow growth from which it might not recover.

On good orchard soil there seems to be absolutely no advantage from the use of explosives. We have one block half of which was planted in spade-dug holes and the other half in dynamited holes. If anybody can tell me where the one leaves off and the other begins I shall be glad to meet him, because I have forgotten the location of the dividing-line myself and can't find it again from the appearance of the trees.

Both portions look exactly alike. Dynamite has its uses in the orchard, but when it comes to planting trees I prefer the common garden variety of spade. But then, I am old-fashioned in many ways.

CHAPTER IV

THE SOIL

“When tillage begins, other arts follow.”
—DANIEL WEBSTER.

OLD DANIEL had a way of hitting the nail on the head and when he made the above statement he certainly “said a mouthful.” The history of agriculture, and of civilization, is the history of tillage—of cultivation. Before the time of civilization, men depended upon animals and wild plants for their food. Wild apples, wild wheat, wild oats, all were harvested where they were found. Now, only the latter crop remains as a factor in our life, all of the other cereals and fruits having in one way and another been brought under some measure of control.

The first cultivator made a great step forward when he discovered that by planting some of his wild wheat instead of eating it all, he would have a supply another year. Through the ages one step has led to another in the progress of agriculture. For a time men were content to grow wild things in much the same

way that nature grew them, trusting to chance that the harvest would be sufficient. This period lasted a long time and the improvement in methods and results was slow because it was a natural evolution not marked by any great incentive on the part of the cultivator. It runs parallel to human history from the beginning of the last century, several thousand years back. In this long period of time men progressed in agriculture just about as slowly as they did in the "art of living together" which we call civilization.

Then, by leaps and bounds, our agricultural development grew, keeping pace with our other progress in discovery and invention. Men had learned to experiment and through experimenting had learned in years what would have taken centuries of natural evolution to teach them. Through experiment, too, some of the half truths of former centuries were broken down and were replaced by whole truths. The age of superstition had passed.

The history of apple-growing is an epitome of the history of agriculture. For years, centuries in fact, men had eaten apples. For the most part they were inferior fruit as we look upon it to-day. Then, the natural improvements made by nature were noted and perpetuated in a half-hearted way which marked our fruit culture of a century ago. Even fifty years

ago orcharding was a business marked more by what men thought than by what they knew. Certain things were supposed to be true, but few things were known to be. While we can not claim that we know everything about fruit-growing to-day, still, we feel that some progress has been made. To-morrow, of course, our little airplanes may develop wing trouble and our gas motors may refuse to run, but taken as a whole the apple business begins to look like a really civilized branch of the farming industry.

With the exception of the progress made in spraying nothing has contributed more to orchard progress than has our increased knowledge of the best methods of handling the soil. While these methods are still the basis of argument it can not be denied that we know a great deal more about the soil requirements of fruit trees now than we ever did before. One of the first things that we learned was that an apple orchard must be well drained. I have indicated in a previous chapter that the location for the orchard should be on land providing good natural drainage. Personally I would always prefer such a location, but in some cases it is not possible to secure such a "lay of the land." Where the surface is at all flat the grower must resort to tile drainage to remove the excess moisture. Lacking tile drainage, some growers have made a fair success by plowing their

tree spaces in such a way that a dead furrow came in the center of each space, thus providing an artificial surface drainage. While this treatment is a makeshift it is certainly better than allowing the trees to stand in cold wet soil. I have in mind one particular orchard that was bought by a friend of mine several years ago. It occupied a tract of particularly flat land and had never been a financial success. On my advice the land was plowed in the manner mentioned and in the second year began to look like a different place and what was more important it began to produce fruit in astonishing quantities.

The term "orchard cultivation" has been used to mean so many things that I hesitate to use the term lest I confuse my readers. It may mean almost anything from a rough plowing of the land once a year to the establishment and maintenance of a dust mulch throughout the season.

Some orchardists have maintained that cultivation was useless and that just as good apples could be grown in sod as under any method of soil manipulation. Some claimed that the fruit was even better in the sod orchards and that cultivation reduced the color and quality of their product. There is a reason for such diversity of opinion about two widely different methods, and I believe that when we realize the

truth back of our cultural methods we will find the cultivators and non-cultivators are in fact not so very far apart.

The real reason for cultivation is to conserve moisture and we must first realize how this is accomplished. Real orchard cultivation contemplates not simply the plowing of the land in spring and perhaps working it down with a harrow of some sort. It means more than that. It means that we must stir the earth not deeply but thoroughly, very early in the spring. This can best be done by shallow plowing, or, as I prefer, with a very heavy cutaway disk harrow. We have such a harrow with disks twenty-four inches in diameter which we use on the tail of one of these little measuring worm tractors, and after that implement has gone over the ground the effect is equal to a pretty good plowing and at the same time it is not so liable to cut and drag to the surface any stray apple roots that may be encountered.

After the ground is broken in the spring, as early as possible, it must be kept stirred at regular intervals until well into the summer. In dry weather the soil must be gone over with some surface cultivating tool (we use an Acme harrow), which breaks up the clods and forms a surface layer of fine dust. It is not enough that the surface be simply broken into clods the size of hickory nuts. It must be absolutely

pulverized if the real benefit of cultivation is to be obtained. I have had men from the city in the orchard when we were "dust mulching" and they expressed surprise that such work could conserve moisture. "Why," they would say, "you are simply turning that dirt over and over and causing it to become drier and drier every minute. You are helping your moisture to escape instead of conserving it." I admit that—on the surface—it did look like that. But under the surface there was a different story.

You may go into a dust mulched orchard in the driest time in summer and with the toe of your shoe you can scratch down to moist earth, only a few inches under the surface. Go ten feet away from that mulched surface and dig in the "big road" where the earth is hard and baked and you may dig for half a day without finding any trace of moisture.

The layer of dust acts as an impervious stratum through which the moisture of the soil can not escape. Most soils possess what we call capillarity. That means that they can draw moisture from deep sources by the action of the tiny spaces which exist between the individual soil particles. If you will take a broken thermometer tube and insert it in a dish of water you will see that the water rises in the hair-like (capillary) chamber of the tube. This is one of the irresistible forces of nature and plays a

tremendous part in our existence which fortunately, I suppose, we hardly realize.

The small spaces which exist between particles in the soil act just as does the broken thermometer tube; they draw the moisture upward from the supply which soaked deep into the ground during the period of winter rains and melting snows. If this capillarity existed clear to the surface of the ground, as it does when the soil becomes crusted and bakes, the soil moisture would be drawn to the surface and evaporated. When the surface is covered with a layer of dust, the moisture works its way through this dust with great difficulty and as a result water is retained for the use of the trees.

You can demonstrate this theory any morning at the breakfast table. Take a lump of loaf sugar and place it in a saucer. Then on top of the lump put a little pile of powdered sugar. The lump represents normal uncultivated earth. It consists of small particles of sugar more or less firmly pressed together, while the powdered sugar represents our dust mulch. Now pour into the saucer a small amount of coffee and watch how quickly it rises through the lump until it reaches the "dust mulch." Remember too that the coffee is rising not through the substance of the sugar itself but through the tiny spaces which exist between the individual grains of sugar. You will find that it will take

some time for it to soak through the little pile of powder sugar at the top of the lump.

If a shower should come during the dry weather our dust mulch would be ruined and a crust formed. This must be broken up as quickly as possible and the mulch restored, otherwise the moisture produced by the shower will get out of the soil as quickly as it got in. Also, soil which crusts and bakes usually cracks in an irregular fashion, and each crack that is formed means just that much more surface from which evaporation can take place.

Some stress has been laid on the fact that cultivation is also beneficial because it keeps down the weeds. This is true, but in the case of an orchard weeds are harmful chiefly because they themselves help to deplete the moisture of the soil. Every plant that grows must have moisture to continue living. Consequently every weed in an orchard is using just that much moisture which might be going into the production of wood or apples.

Any system of cultivation, however, should be combined with some form of cover crop as it is bad practice to allow an orchard to remain bare in winter. There are several bad results to be expected from such practice. In the first place the surface is much more liable to wash than if it is covered with vegetation. In the second place the bare soil does not offer the

protection to the roots that they should have. Bare ground always freezes much harder and deeper than land that supports some sort of protecting vegetation. Also the cover crop will offer resistance to the snow, holding it in place like a warm blanket over the face of the earth. Probably the most important function of the cover crop, however, is that it returns to the soil some of the humus that has been burned out of it during the hot summer when it was constantly being cultivated. It is an admitted fact that an orchard soil must contain some humus if it is to produce the best results and I can assure you that clean cultivation quickly eliminates this quality in our soils.

The best cover crop is the one that will produce the most humus, the most plant substance for a given amount of cost and care. I think that rye probably answers this description better than any other plant that I know. Certainly it has given us the best results by all odds, though we usually combined it with some legume such as winter vetch or crimson clover. Planted in combination with one of these hardy legumes the rye furnished an admirable winter protection and it started to grow so early in the spring that it produced a tremendous amount of plant material to be turned under as "green manure." In fact, if there is any objection to the use of rye, it is the fact that it is

liable to get out of bounds in this respect. I recall that one year we were delayed in starting our cultivation and before we got around to it some of the rye was beginning to head out and was all of seven feet tall. It was some job to wrestle that crop of rye under ground. We had to cut it and then go over it with disk harrows and after that plow it under. Some of it we even had to haul off before we could cultivate at all.

Oats, buckwheat, millet and other annuals have been used as cover crops, but they are not satisfactory for this purpose because they die in winter and often leave little to be turned under in the spring. Rye, wheat, crimson clover, winter vetch, rape, all these live through the winter and all start into growth quite early in the spring.

The cultivation as I have said should begin as early as possible and should be kept up until about the first or at the latest the middle of August. Prolonged cultivation may be harmful in that it does not allow the new wood and the fruit buds to ripen properly before winter and it shortens the growing season in which the cover crop is getting established. I always like to see a vigorous cover over the ground by the middle of October at the latest. Some of your neighbors may object if you plant rye or wheat at such early dates, thinking that you

are encouraging the Hessian fly, but the fact that you plow under your crop early in the spring should reassure them. You are really planting a trap crop which will protect their wheat-fields.

Men who advocate the use of some "sod mulch" system of growing apples often have ideas greatly at variance with one another. One man may mean by the term merely the cutting of the natural growth of weeds and grass, while another implies the use of considerable quantities of straw, hay or manure to reinforce the mulch supplied by the natural growth. In any event the object of the mulch is to conserve moisture, just as that was the object of the dust mulch in our system of cultivation.

Often the only practical form of this sort of mulch is the simple mowing of the weeds and allowing them to lie where they fall. If the growth is heavy this protection may be enough, but if it is poor and light then the moisture that will be held by such a covering will be small indeed.

The ideal grass mulch system would be one where a very heavy growth of grass is cut and allowed to lie so as to protect the whole surface. But even then there would be disadvantages for in such an orchard there would certainly be a good many ground mice to every tree. It is the one pest for which we have no

adequate control. We may trap them and poison them, place wire protectors around our trees and make mounds of cinders at the base of the trunks, but the cursed mice will always find a way of avoiding all our precautions and getting at the roots of our choicest trees. Since we changed much of our orchard from a clean culture system to a grass mulch system we have been bothered more and more with mice each year. We have also been too free about killing snakes, owls, hawks and skunks, all of which are natural enemies of the field mice. Recently we have avoided killing any of these mouse enemies except poisonous snakes and I have even been known to pay a small boy a quarter for a nice healthy, black snake brought from another farm and turned loose in the orchard.

I mentioned the fact that we had changed from clean culture to grass mulch in our own orchards. There was a reason. In the first place the Hickory Hill orchards are planted on hills that are quite steep,—uncomfortably steep in places and quite irregular in outline. For several years after they were planted they were not cultivated at all except by hand hoes and then in little circles around each tree. That was before I became a part of the landscape.

When I entered the scene the first thing I did was to begin “tearing up the earth.” I

guess the neighbors thought I was a good deal of a raging lion in those days and that I was due to ruin the whole place in short order. But it refused to be ruined and those steep slopes refused to wash to any injurious extent. However, after several years of reasonably clean culture, I say reasonably clean advisedly because I was never particular about catching every weed and choking it to death, I thought I saw signs of restlessness in the soil on some of our hills. I decided to quit the cultivation for a while and let the weeds and the clover which I planted, get their hand in for once. There are still portions of the orchard, younger than the part of which I speak, and much more level, which we cultivate, but in time these too will be turned into the sod mulch system.

For my own part I believe that this combination of cultivation in the early years of an orchard combined with sod mulch in its fruiting years will be an ideal method of orchard management in hill countries. In a more level section I believe that I would stick to cultivation with heavy cover crops and with an occasional year of no cultivation in which a crop of cow-peas or other rank growing plant could be produced to add humus to the soil. So far as the quality, size and color of the fruit are concerned I doubt if they will vary greatly under either system. It is claimed on good authority

that apples from sod orchards have a higher color than those from cultivated blocks. Maybe so. About ten years ago, C. G. Woodbury, at that time of the Horticultural Department of Purdue University, Experiment Station, instituted a series of orchard experiments to test out the various systems of cultivation. This series is probably one of the most comprehensive demonstrations of the sort that has been undertaken and the results at this date are interesting for many reasons. The orchard in which the work was done, and is still being done, is located near Laurel, Indiana, on hill-sides typical of much of the hill land in southern Indiana and Ohio. The land was originally cleared of a heavy growth of timber about the year 1840 and from 1848 until 1871 it was farmed with a more or less irregular rotation of corn, wheat, oats and pasture. In 1871 it was plowed and sowed to oats, timothy and blue-grass with the purpose of obtaining a blue-grass sod. It remained in sod, used for pasture, until the orchard was planted and the experiment begun in 1910. Without going into details regarding this experiment I shall only say that the two plots which have given the greatest return and which have developed the largest trees are those under clean cultivation and under a system of heavy straw mulch.

Unfortunately, neither of these systems is

entirely practical under the conditions existing in the particular orchard where the experiment is conducted. The clean culture plot has shown a tendency to wash badly and while no serious damage has as yet been done it is perfectly evident that the soil is gradually getting away from that particular plot. The results with a heavy mulch of straw have been comparable to those secured by cultivation, but this orchard is located in a county where no great amount of straw is produced—and this is true of many orchard sections. As a result baled straw has been imported and used around the trees at a cost which would be prohibitive to the average commercial grower. “What then,” you may ask, “is the answer?”

As I see it the answer is to cultivate a young orchard as long as is possible without too much loss of soil from washing and then to seed it to grass or clover and try to grow your mulching material in the orchard. This opinion is borne out by Mr. Joseph Oskamp, who has had charge of the actual working out of this experiment.

“Straw mulch,” said Mr. Oskamp, “gives excellent results, but the stumbling-block is the cost of the straw. Of course you do not have to use straw—shredded corn fodder will be equally as good if you can get it, or you may use any other similar material. If you are so situated that you can not get such material to

put around your trees, the next best thing is to depend upon the land on which the orchard is planted to produce its own mulching material. In other words fertilize the grass so that you get a good growth.”

The cultivated block in this experiment showed that the trees made forty-three per cent. more growth and produced eleven times more fruit than did the trees that were in sod.

Commenting on this condition, Professor Laurenz Greene, now head of the Horticultural Department at Purdue, said: “Had it been possible without completely upsetting the plan of the experiment to adequately fertilize the cover crop in the cultivated plot, and if proper fertilizer had been applied to the sod plots in order to produce a greater growth of mulching materials the wide variations found between the sod plot and the cultivated plot would have been materially reduced.

“It should, however, be emphasized that no one experiment on a single type of soil can give conclusive evidence as to the best methods of orchard soil management that might apply to orchards on a totally different soil type and in a different region.

“These experiments do indicate, what we have long felt to be true, that moisture is one of the most important limiting factors in orchard soil management.”

All of which brings us around to that nice scrappy question of orchard fertilizers. I have a beautiful collection of booklets put out by various fertilizer concerns all tending to prove that an orchardist who does not use plenty of some particular brand is simply committing financial suicide. I also have a nice collection of bulletins, not quite so ornamental but just as interesting, which alternately convince one that fertilizer in an orchard is essential—and useless. These bulletins hail from several different states and sometimes their authorship moves around from one state to another like a missionary carrying the gospel from the Congo to the Yangtsekiang.

Just what is the truth about orchard fertilization?

Much as it pains me to say so, gentle reader, I do not know. Further I confess that I don't know any one who does.

There are numbers of men occupying greater or less positions of importance in some of our experiment stations who profess to know that it is not necessary and quite a number of others that profess with equal earnestness to know that it is all important. Usually conclusions have been based on limited experimental evidence. We learn in agriculture only by experimenting and by keeping our eyes open, but there is always danger of learning too fast.



Beans grown as a field crop in a recently planted orchard in Michigan.



Tractor cultivation in an Indiana orchard.



When branches are cut off flush with the trunk, healing takes place perfectly and rapidly.

Professor Greene's statement in regard to the Laurel cultivation experiments applies with great strength to this subject of fertilization—"no one experiment can give conclusive evidence."

By reviewing all of the experimental work that has been done, however, we can begin to draw some general conclusions and one of these is that, as a rule, fertilizers applied on orchards in grass gave results while they did not give results when applied to cultivated orchards. Even here you notice that I tied a string to my statement when I said "as a rule."

We know, of course, that a crop of apples takes certain elements out of the soil. We know, roughly, what these elements are and something about the quantities in which they are removed, but unfortunately the experimental evidence has so far failed to hitch up with what rough facts we possess. Applying fertilizers in carefully calculated amounts has in many cases failed to produce the results that might have been expected from them. Where they have produced results (in sod orchards), is it not possible that the results were in some way connected with the influence which the fertilizers had on the growth of grass and weeds beneath the trees? It may be possible that fruit trees require their food in something other than the raw state in which it has been

offered to them. It may be, too, that the resources of the soil are greater than we have supposed and that an apple tree in some way provides for its wants on a diet which would mean starvation to a corn-field. During the last few years nitrate of soda has reached a position of some prominence as an orchard fertilizer both in experiments and in practice. Its use is increasing steadily year by year and there seems to be well grounded reasons for this popularity. We have used it for three seasons—first in a spirit of investigation and later as a part of our regular practice. When I first applied it around the trees in a seven-year-old block I could not see any great difference in the trees themselves except that the foliage was greener, heavier and hung on the trees later in the fall. The effect on the grass and weeds around the trees was very marked for the fertilizer produced a rank growth of vigorous dark green grass. I reasoned that the more grass we could grow the better mulch we would have under the trees—just as the Laurel experiment later indicated. The second year in which we used the nitrate we could begin to see results that could not easily be attributed to any other factor. Consequently for the present at least we expect to make the application of nitrate of soda a regular practice in the orchard.

Other growers have had similar results with

sulphate of ammonia, a material that costs more than nitrate but, being stronger in nitrogen, goes farther in actual use. Whether its beneficial action is a direct influence on the plant or whether it (and nitrate) get in their work by producing more grass mulch, will be hard to say. It seems to be true, however, that when these nitrogenous fertilizers are used on cultivated orchards no benefit can be noticed.

We have gone a long way in our experimenting and observing and we have found out a few things about the soil more quickly than if we had never started any experiments but had simply left the whole business to nature. When we come right down to brass tacks, however, we really do not know much about the use of fertilizers in orchards. What we think is wisdom to-day may be proved to be folly to-morrow and the old earth remains almost as much of a mystery as it ever was. But with Daniel's "other arts" following after, we may expect some day to know what makes an apple red, and whether nitrate of soda is a necessity or a humbug.

CHAPTER V

PRUNING

“.....they shall beat their swords into plow shares and their spears into pruning hooks.”—MICAH IV:3.

THIS quotation might form the basis for two entirely different dissertations. In the first place it shows that the idea of disarmament was considerably ancient before President Wilson made his justly famous journey to Paris. In the second place it indicates that pruning as a horticultural practice must have been common in Bible days—and that was a long time ago. There is nothing in the Bible (that I can find at least), about spraying fruit trees, but pruning was evidently a regular part of the fruit-grower's job even in that early day.

It has continued to hold an important place, but, though one of the most ancient arts of the husbandman, it is still a subject for dispute and argument between fruit-growers. There have been volumes written on the subject to prove contending sides in a controversy and verbal combats have been legion. To add to the con-

fusion already existing on the subject an experiment station professor now comes out with a bulletin in which he shows that we have not even understood the term "pruning" or what it really meant. To quote from his introduction:

"In the first place it seems desirable to distinguish clearly between pruning and what may be termed training. Many, if not most, growers fail to draw the line between them, and here their troubles begin. They often *train* their trees very well and then think that because they have been trained they are likewise pruned, when, as a matter of fact, little or practically no *pruning* has been done. Training has to do primarily with form, with shape. Pruning has to do primarily with function, with activity. Training determines how the tree looks; pruning determines what the tree does." Webster defines pruning as follows: "The act of trimming or removing what is superfluous." But then Webster was not supposed to be a technical fruit-grower, so let us see what Bailey says about it. Here is his definition: "The methodical removal of parts of a plant with the object to improve it in some respect for the purposes of the cultivator."

But go back to this recent bulletin that I mentioned. After the author clearly indicated that pruning is really not pruning at all but

something else, and after he has us all tangled up about work that we thought we were beginning to understand, he proceeds to write a very excellent and perfectly orthodox bulletin on the subject of pruning. Personally I am unable to see that he has carried his distinction between pruning and training into his actual practice and I think that he, like too many growers, has overlooked the fact that the production of leaves and wood is a perfectly proper "function." In pruning, of course, we influence the production of wood tissue—in fact this is the chief end gained by the practice, although later the production or removal of wood tissues may have an indirect effect on the production of apples.

Pruning is a perfectly natural process for it is a part of the life experience of all trees. The giant sequoias of California have trunks towering high in the air without a branch, but those clean trunks were pruned just as certainly as my apple trees were pruned last spring—and will be pruned again. The young forest tree did not start and continue as a single whip with a tuft of leaves at the top. Every little seedling that you ever saw had side branches on it if it was more than a year or two old. Left to shift for itself that little branched seedling would, if grown in a forest, produce a tall straight trunk from which all vestige of the

youthful side branches had long since vanished. In the forest the tree prunes itself. The lower branches, being deprived of light, and air, simply give up the ghost, die, and in time fall on account of their own dead weight. In horticultural practice we anticipate this natural pruning because it is a waste of energy for the tree to produce a lot of wood that is to die and fall off later. You may prove this matter for yourself more easily with a peach tree than with an apple because life processes are somewhat more rapid in the peach. Neglect a peach tree for a few years, or visit the neglected orchard of a neighbor, and notice how the branches in the center and on the under parts of the tree are either dead or dying. In most cases they are simply "shade killed." Perhaps some fungous disease has helped but that disease would thrive only in the shade. Consequently one of our first reasons for pruning is to remove wood that is not needed—wood that is in some way interfering with the functions of the tree. In this work we can supply more intelligence than the tree would use if left to take care of the job all by itself. (And do not smile over the inference that the tree has intelligence. I wish that all pruners had as much.) Instead of depending on the natural selection of the branches to be cut off we can often have our choice as to which of several to take. Often this choice will

remove a branch, not from the bottom but from the top of the tree, letting in air and light so that the lower, more easily picked branch may live and produce fruit.

I once was talking to a farmer who had a neglected orchard of tall apple trees. I suggested that if they had been properly pruned in their early years that they would not be so hard to harvest. "I don't know whether that is a good suggestion or not," he said, "I have always noticed that the only good apples I had were in the tops of the trees." In his case that was entirely true. Those apples in the tops were the only ones which had had a normal amount of light and air. Both of these elements act as a preventive of many fruit diseases and while his trees were choking for want of air at the lower points the disease-producing fungi were causing the lower apples to rot and become ruined with the scab. Had he pruned in such a way that an equal amount of light and air reached all parts of the trees, the fruit on the lower branches would have been just as good as it was in the tops.

I have said that one of the first reasons for pruning was to remove wood. Paradoxical as it may seem, another reason is to produce wood. Pruning an apple tree in the dormant season promotes the growth of new wood. Frequently by taking advantage of this fact we can cause

a tree to produce a useful branch at a point where one is lacking. Or we can cause a general increase of growth over the entire tree.

In winter, a tree's surplus food supply is stored chiefly in the roots, the trunk and the main branches. This supply is intended to start the tree on its next season's growth and in a normal case it will consist of enough reserve food to give the tree a reasonable start on its leaf and wood production. There is, in other words, enough reserve food to supply every twig and branch of the tree for the first few weeks of the growing season. You can note this in the case of willow trees more readily than you can with apples. Most any one has seen willows that were cut down in winter but promptly issued forth a crop of green leaves as soon as warm weather returned. Those leaves were the product of the tree's reserve food supply—in that case stored in the trunk. Now, if we remove a portion of the twigs and branches of a tree we do not remove proportionately as much food as we do wood, for the food supply is, wisely, stored farther down in the tree. Consequently the tree finds itself with a surplus supply of reserve food and with it there is an attempt to replace the wood area that has been removed. This new growth may consist of a few main branches, in the case of very young trees, or it may consist of a diffused

growth consisting of lengthening of many twigs all over the tree.

It has been said that pruning was closely related to bearing, in an apple tree. The relations between pruning and bearing are not well understood. No one knows why it takes a young apple tree from five to ten years to "come into bearing." Theoretically the young tree is simply a scion from an older tree inserted on a root and made into a new individual. If the scion had remained on the original tree it would have produced fruit in a year or two at the most. Why, then, does it not produce fruit in a year or two after it is inserted in the root in the nursery? Probably because the insertion in the new root, the provision of a new supply of sap, the new environment in the soil, all combine to promote a vigorous growth of new wood—which in time forms our new tree. And we know that as long as new wood is being formed in large quantities the tree shows little inclination to bear fruit.

The formation of wood is what we call vegetative growth and any plant in which vegetative growth is taking place vigorously will not reproduce itself by fruiting. It is only when the period of great vigor of vegetative growth has passed that any plant begins to turn its attention to the production of seeds. This is as true of the apple as it is of the lowest forms of

plant life. Consequently, if by pruning we urge the tree into more vigorous growth, we can not expect a prompt return in the matter of fruit. On the other hand, we know that old trees are sometimes brought into bearing by a fairly severe pruning. How then can those two seemingly contradictory statements be brought together? In the first place there must have been some reason for the old tree to cease bearing. If this reason is that the fruit spurs were being starved by the lack of light for the leaves, then the use of the pruning saw would correct the condition and a crop of fruit might be the result.

The pruning of an apple tree begins at the time it is planted. Usually only two types of trees are used for planting in an orchard—either one- or two-year-old trees. (We should bear in mind, too, that in speaking of nursery stock we refer to the age of the top of the tree. Often a one-year-old tree will be on two- or even three-year-old roots. After the tree is planted in the orchard we count its age from the time it is planted and do not include the years it stood in the nursery.)

A one-year-old tree will consist of a single stem—a “whip”—from three to six feet tall. The pruning of such a tree is a simple matter as it consists of shortening the whip to a stub two or three feet long. Probably the ideal dis-

tance will be from thirty inches to three feet as this allows for a development of strong branches extending over a foot or eighteen inches of the top of the stub, which later becomes the trunk of the tree. It is not desirable to have the main branches originate closer than eighteen inches from the ground. In spite of the advantages of low heads other things must be considered and if the branches come too close to the surface of the ground it will be an almost impossible task to protect them from the attacks of rabbits.

The two-year-old trees as they come from the nursery are usually more or less branched. The branches may be well arranged in something like the way that we would like to have them or they may be simply a cluster of weak shoots from which we can not expect much in the way of foundation limbs for future trees. Consequently the pruning of such a specimen becomes much more of a problem than it was in the case of the one-year-old tree. Also at this time we should decide whether we desire our tree to be of the "leader" type or whether we want it to grow into a tree with an open top.

The leader type of tree consists of a central stem with a whorl of branches originating about two feet from the ground and with other whorls of branches variously spaced on the trunk. Such a method of pruning certainly de-

velops a very large bearing surface, but unfortunately trees of this type are expensive to maintain. We once leased an old orchard which had several of these sky-scrappers in it. I ache now when I think of spraying those old trees with a sixteen-foot extension rod—and then missing most of the tops. When we came to harvest the fruit I estimated that it cost us a dollar and twenty cents per bushel to gather those apples. After I made the estimate we shook off what apples remained unpicked and made cider. (This of course should be dated B. V.—before Volstead.)

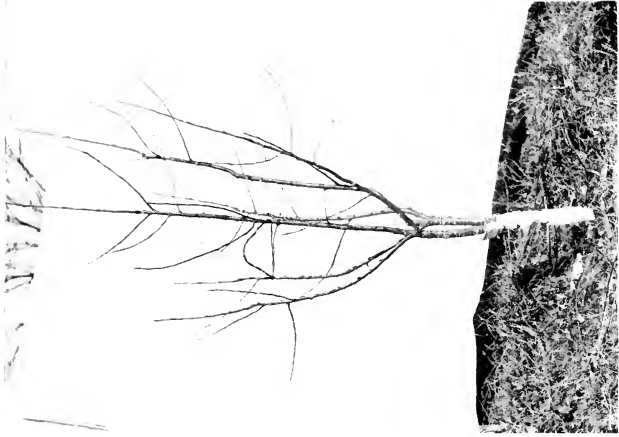
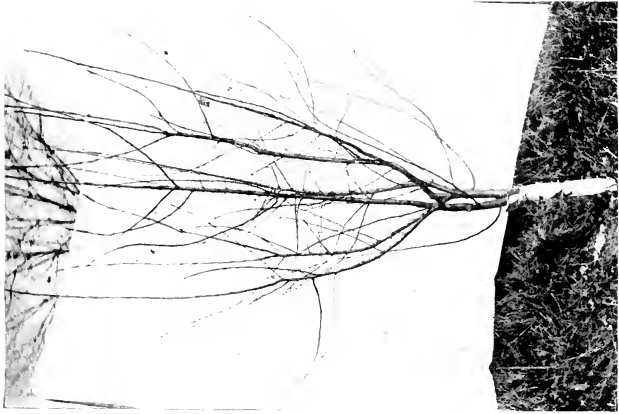
The open top form of trees provides a reasonable fruiting surface with a shape requiring the minimum of expense to maintain. Orchard trees of to-day resemble nothing so much as big bushes, easy to spray, easy to prune, easy to harvest. They represent the sensible shape for a fruit tree. To develop such a tree the grower must discourage any tendency toward the formation of a central stem at the earliest possible moment. While leader trees may be converted to open topped trees even fairly late in life they never are quite what they should be. If you can catch a Chinaman when he is a youngster you may convert him into a practical, working Christian, but I doubt if any old Chinaman is ever quite happy with a Bible.

In developing the open top form of tree we

must first have a few scaffold branches to form the basic framework of our structure. These should start as strong vigorous sprouts from the main trunk and should be so distributed on the trunk that no bad crotches are formed. (I am idealizing this, of course, because every grower has some trees with bad crotches. Like the poor they are always with us and we must have charity for them—and for the grower who starts them.) If the two-year-old tree does not have these foundation branches already well formed I would favor pruning it to a stub in much the same way that we pruned the yearling. You may be told that to do this is impractical because the stub has no buds from which to form new branches. Don't worry about the lack of buds. They will show up where you least expect them and you will eventually get what you desire in the way of a scaffold on which to hang your fruiting limbs.

How many scaffold branches should we have on an apple tree? You can ask that question and get quite a variety of answers, but my own judgment in the matter is to plan for not less than three nor more than six. Five is perhaps an ideal number and while three may seem to leave a pretty spare framework still such a start will often result in a most excellent tree.

Of course, in planting a two-year-old tree, the scaffold branches that are left should always be



A five-year-old apple tree before and after pruning.



High headed trees are to be avoided in all cases.

shortened to at least half their length—just as the main stem of the one-year-old was shortened. After growing a season in the orchard the yearling will consist of its main trunk with a variable number of sprouts. The best of these are to be left to form our framework and the rest are to be removed. Those that are left will more or less resemble the tree that was planted the year before. In pruning we shall treat each branch exactly as that tree was treated, that is, we shall shorten them just as we shortened the yearling when it was placed in the ground. I have always liked the idea of thinking of each new year's growth as being just that many new trees and I have sometimes found that it simplified my pruning problem considerably. After the second growing season the young tree becomes a more complicated problem, but we must not forget the effect for which we are working. We must persistently watch for development of a central stem and we must, for a few years, keep each season's growth headed back anywhere from one-third to one-half.

This rather severe pruning is to be practised on what we might describe as a decreasing scale as the tree grows older, but the necessity for it in the first years of an orchard is twofold. In the first place we are forming the shape of the tree and this, as I have already indicated, is of

very great importance to the grower who expects to make any money out of his plantation. Remember, too, that we are shaping it not alone by taking away branches but also by pruning in such a way that branches may be formed as we need them. In the second place we are stimulating the growth of the tree. By removing all the surplus wood that we can in the winter, we use the food reserve to form as much additional wood as possible and in this way secure as large a tree as possible at bearing age. The bearing age of a tree is, of course, a variable quantity, depending upon the variety and also on the environment—and comparatively little on the pruning treatment given. In other words, when a tree reaches the age where nature desires that it produce fruit, it will do so. The *amount* of fruit produced, however, may be greatly influenced by the methods of pruning.

As I have said, pruning severely tends to promote wood growth and as long as a tree is making abundant growth it is less inclined to expend any energy in the formation of fruit buds. Some fruit may be borne, but only as an indication of maturity on the part of the tree in question. Just as soon as the effort of the tree toward the making of wood is checked, the tree begins to prepare to reproduce itself. This preparation goes forward with greater energy in proportion to the check on the growth of

wood. Consequently, by the time our tree has reached the age when it should begin to produce fruit, our annual pruning should be reduced to a minimum. In practice this age is from six to eight years, and by pruning vigorously the first years of the life of the tree we should have at that time a framework capable of holding a good-sized crop. I have repeatedly had seven-year-old Winesap trees that produced seven boxes to the tree. By pruning the trees had been urged to grow vigorously in their early years, then by slowing down on the pruning we had checked wood growth and induced the formation of fruit buds.

During the bearing life of the tree the question of pruning is one that resolves itself about the general principles which I have already touched upon in several places. It is not a process that can easily be made plain in the brief limits of a short chapter. Books have been written on the subject, books which if taken into the orchard and studied by the hour will not make the whole process plain to you unless you use your own brains a little. If you try to learn about pruning only by reading books you are liable to make a sad failure of the whole business. There are a few simple rules, however, that it is well to know. Many persons can give you these rules, but no one but yourself can ever apply them for you.

In the first place a bearing tree should, if correctly pruned in its younger days, require very little pruning. This is contrary to the advice you will find in some of the older books but it is true nevertheless. Occasional branches may die, or may break from the load of fruit or through accident. Such branches must be taken off, of course, and as the tree grows older it may develop so many small branches that the sunlight and air are excluded and the fruit in the center of the tree suffers. Such trees need pruning, but if they are gone over every year you will find that the total annual removal from each tree will be a very small amount compared to the amount of wood removed from the young trees each season for the first six or eight years of their growth.

Too often the grower finds himself confronted with a number of old trees that, through some other person's neglect, have become far too dense to be profitable fruit machines. The pruning of such trees is a separate problem and is not to be confused with the pruning of the normal bearing tree in a properly managed orchard. The average old apple tree in the farm orchard usually belongs to the neglected class. As a rule such trees suffer either from too much or too little pruning—usually too little. I have seen so many of this kind that are simply immense brush piles with their branches

tangled and interwoven in such a way that sunlight never penetrates to the inside of the tree. Pruning such specimens resolves itself into a general thinning out process which often requires the removal of many large and small branches. There are two ways in which such a tree can be made useful. The easiest method is to select large branches and remove them, thus allowing the remainder to get a proper exposure. If the work is carefully done such methods are capable of producing good results, but too often the pruner will make mistakes as to the proper branches to remove and in the end may have only a choice example of tree butchery on his hands.

A slower but more certain method is to go over the tree very carefully and remove many small branches, selecting them with care in relation to those that are left. Branches that are crossed in such a way that they rub on one another should be separated. Other branches, which if loaded would bear down on the branch below, should be taken off. Over the whole tree some thinning must be done in order to let in the air and sun and enable the grower to get his spray material in to the center of the tree instead of just on the outside foliage.

When large branches are removed certain precautions must be observed in order to prevent permanent damage to the tree. All

branches, whether large or small, must be cut off flush with the trunk or branch on which they originate. Do not leave stubs as they are certain to die and as they rot they carry the rot-producing fungus into the branches or trunk of the tree. Where the stubs are cut off clean the bark will quickly heal over the wound, making it impossible for rot to enter. I recall one orchard in which the owner had left stubs about a foot long all over his trees. I diplomatically suggested that it might be better if he would cut them off flush with the trunk. "Maybe it would, Perfesser," he replied, "but you ain't got no idea how handy them stubs is when it comes to climbin' over them trees pickin' apples." If you want to grow ladders, leave the stubs. If you are growing fruit, take them off. The orchard above mentioned is now dead. In cutting off a large branch it is often advisable to make two cuts in order to prevent breaking. The first cut, removing the branch entirely, should be made about a foot from where the final cut is to be. This takes the weight off the stub and prevents any chance of splitting the wood down into the tissues of the trunk.

Be careful in removing dead branches. They may have been killed by blight, a bacterial disease which can easily be carried from tree to tree on the pruning tools. When working with such branches it is always well to carry a bot-

tle of solution of corrosive sublimate of one to one thousand strength. This is a powerful disinfectant (and poison), and is to be used to sterilize the pruning tools after having used them in removing any suspiciously dead tissues. It is well to paint some of this same solution over large wounds to prevent blight infection.

A still better method of treating large wounds is to paint them with good lead paint which has been rendered antiseptic by the addition of corrosive sublimate at the rate of one ounce to the gallon of paint. The chemical should first be dissolved in a little turpentine before mixing with the paint.

There is some difference of opinion about the proper time to prune the apple. Some growers insist that the work may be done at any season of the year. While this is true we might also say that we could spray at any season of the year—we can, if we do not care about the results. Some experiments have tended to show that wounds healed equally well if made during any month, but experimental evidence is not always conclusive. Theoretically the best time to prune is late in the winter and just before growth starts in the spring. Wounds made at such a time should be expected to heal better and more quickly than if made at any other season and I have found this to be true in practice.

A good friend of mine, who is one of the most expert growers that I know, prunes very early in the spring just after the buds have swollen but before they have opened. He says that at this time he can determine which are fruit-bearing branches and which are not and when he has a choice between two branches he takes off the one having the least fruit. All of which sounds logical, but in doing the same stunt myself I have found that the average pruner would destroy enough fruit buds at that season more than to compensate for any he had saved by the selection of branches. When the fruit buds have started to swell you will find they are very easily broken off and if an awkward workman is allowed to browse around a tree very much at that season he will knock off a peck or two of fruit buds without half trying.

Summer pruning is said to stimulate the production of fruit, but to do this the operation must be done at exactly the right time. The theory is that the branches should be taken off at the time when the reserve food supply has run very low. To reduce the leaf area of a tree at such a time gives it a very severe shock and brings into action that old biological law that I have mentioned before. The tree is "threatened with destruction" and as a result the reproductive processes are set up and a crop of

apples is more nearly certain. All this, I say, is theoretically true. Furthermore it will work in actual practice if you can determine the exact time when the tree is at its low ebb in food supply. As actual orchard practice the value of summer pruning is overestimated, because if the trees have been planted in soil suitable to growing apples and if they have been otherwise well cared for they will bear when the proper time comes.

Now just a word about pruning tools. You will not need a wheelbarrow to carry your outfit around. Use simple tools and not many of them. A pair of good strong hand shears is perhaps the best pruning tool. These should be strong and well made and capable of cutting a branch an inch in diameter if necessary. If the tree has been well pruned from the start it is not often that larger branches will have to be taken off. I do not like to use long handled pruning shears. Those with handles two feet long are much easier to use than are the little hand pruners, but they do not make good clean cuts and it is impossible to do careful work with them.

A good saw is absolutely essential if large branches are encountered and a curved "draw-cut" saw is far the most efficient that I have ever found. The old "York State" pruning saw is simply a good hand saw with a rather

tapering point to it. It is effective but slow in action. The newer types built on the order of a "meat saw" are an abomination. When they were first introduced I thought they would be good for working in close places, but I soon found that they quickly lost their set and that the blades were so flexible that it was almost impossible to make them run straight. On the other hand the curved saw that I speak of, making its cut not when you push but when you pull, is capable of very rapid work, and its shape allows it to be used in close quarters. It is also capable of very accurate work.

In spite of the length of this chapter I have not told all there is to know about pruning for two reasons. In the first place I do not know that much about it. In the second place no man even if he knew could tell it all for it is work requiring judgment, like fly-fishing or playing poker or making bread.

You know, one of the differences between a man and a monkey is that a monkey, if he is cold, will sit by a fire and warm himself but when the fire goes out he is through. He will not add another stick to the pile. He will not originate although he may have all the materials for creation ready to his hand. Some men are like that; they take life very much as they find it and they add mighty little to the fire.

A good pruner can never be a "monkey man"

because his job is a creative one demanding the use of judgment and care. He must have vision to picture the results of his work and as he selects this branch or that to be removed, he must have in his mind a good reason for his selection. By the process of selection and elimination he is creating a new tree, and what this tree will be like depends on the ability he shows as a creator.

CHAPTER VI

SPRAYING

“Indeed, what is there that does not appear marvelous when it comes to our knowledge for the first time? How many things, too, are looked upon as quite impossible until they have been actually effected?” —PLINY THE ELDER.

SOME ten years ago I was visiting in the hill country in southern Indiana, a section at that time known far and wide for the frightfulness of its dirt roads. One night at supper, I noticed that the two “hired hands” were absent and inquired of my host where they were. “Oh,” he replied, “they’s a debate over to Needmore to-night and they’ve went over there.” Next morning I asked one of the boys what the debate was about and was astonished when he replied that it was on the question of “Whether or not gravel roads are a good thing for this country.”

That was ten years ago. Since then the introduction of the flivver has so changed the public opinion that to-day even in the section of the worst roads in the country one would have some difficulty in finding any opponents to

“gravel roads.” But at that time I found there were many who would argue the question just as there were many who argued that spraying was of no benefit to an orchard. When we first came to Hickory Hill our trees were too young to bear much fruit and in the summer we gave the orchard proper attention and still had time on our hands. Consequently I conceived the idea of leasing all the old unsprayed orchards in the neighborhood. My idea in this was twofold: first to train a gang of green hands who never before had seen a spray machine, and, second, to educate the neighbors to the value of spraying. The idea of making money from the leased orchards was of very secondary importance to the value of the first two considerations—and it is a good thing, for we certainly never made any profit on our various deals.

At that time I had had some years of experience in teaching fruit-growers the best horticultural methods and most of my efforts had been received so warmly that I was more or less puffed with the idea that I had pretty thoroughly spread the gospel of spraying over the whole of my state. I was very quickly disillusioned on this point, however, for nearly every orchard owner whom I interviewed was decidedly skeptical of the value of spraying—and if the owner was not skeptical, his wife

was. It required no small amount of persuasion to induce these old time "fruit men" to part with half of their crop in return for the care I proposed to give the trees. Most of them granted that their crops had been falling off in quantity and quality pretty regularly for a good many years, but they nearly all claimed that the trees "still produced enough for me and the old woman." However, in nearly every case we managed to convert the owner and after the first conversion their faith grew strong with the advance of the season for they saw upon their trees such crops as they had never had before.

There are still unsprayed orchards in the country, not only in my state but in every state where apples are grown. There are, however, comparatively few owners but will admit that spraying is a necessary measure if one is to grow fruit. Where that step is neglected you will usually find the owner one who is busy with other crops. With him apples are a secondary consideration to be accepted as a gift of the gods if it is a good fruit year or to be bought from some commercial grower if the season is unfavorable. No commercial grower would think of trying to produce a crop of apples without spraying any more than he would attempt to mix concrete without cement. Many of these commercial growers, however, spray in a

wildly haphazard way that makes one wonder if something has not been misplaced in their brain boxes. Some of them seem to think that the only essential is to get some dope on the trees regardless of the season and almost regardless of what the dope may be. They do not know often what they are spraying with, and more often what they are spraying for. Still another class covers its ignorance by the most lavish use of material in a way that brings joy to the heart of the chemical manufacturers.

As a matter of fact the business of spraying is one of the most simple and easily understood of all of our horticultural operations. To many it is a new thing, and, being new, must of course be mysterious, when it is in reality decidedly simple. One must know first what he is spraying for. Knowing this he must know what sort of material to use against those particular enemies. That is really all there is to it.

Pests against which spraying is effective may be classified in three groups: sucking insects, chewing insects and fungous diseases. For the first we must use spray materials which will kill the insect by contact as it is obvious that a sucking insect is not liable to go browsing around over a tree eating material which might contain poison. It obtains its food from below the surface where we can not slip any knock-out drops into its tea. If there was a

method of poisoning the sap of the trees without killing the tree we would have an easy means of eliminating these little oil prospectors which set up their derricks on our fruit trees. The chewing insects are more easily handled as they feed from leaf to leaf and have many chances of connecting with the poison we put out for them. The fungous diseases are perhaps the worst of the lot for they are passed around from tree to tree by means of minute spores so small that we can not see them. They are the invisible enemy that lurks for us in the shade of every leaf and on the twigs of every tree.

Sucking insects comprise the whole list of scales, the various plant lice, the apple red bug and other insects of its kind. The scales have perhaps attracted more attention than any others of this whole group because their method of attack is so spectacular that they are not easily overlooked. We have many native scale insects most of which are of minor importance because we also have parasites which feed upon them and thus hold down their numbers. It is the imported pests that we fear most and justly too, because they as yet seem to have little parasitic control. Chief of these is the San José scale, the "yellow peril" of the fruit-grower. It was introduced from China many years ago and has become widely distributed over the

whole of the fruit-growing districts of our country. Being small it never attracted much attention until the trees on which it was feasting began to die. They continued to die with very considerable regularity for some years and many orchards were wiped out of existence by the pest. It was distributed by the growers of nursery stock and is still conveyed from place to place by that method in spite of our nationwide inspection service. Where it is once established in the orchards it is more or less scattered by the birds upon whose legs the insects will crawl and be transported to new feeding grounds. Only the very young insects have this power of moving about, however, for after they once attach themselves to their food plant they "stay put" until they die, or in the case of the male, until the breeding season. At this time the male only is set free and emerges with his delicate wings to fly about for a brief time before he too passes away. The young scales are born alive and appear as tiny sulphur-yellow mites actively crawling about over the twigs and branches on which their parent is attached. When they locate a good "claim" they promptly settle down, start drilling their little wells and become permanent residents in that place. Soon after attaching themselves they develop thin, hard round shells or scales over their bodies, and it is this characteristic which

gives them their common name of scale insects. The shape of the scale varies with different species and different genera, but in the case of the San José scale it is round and marked with concentric circles about a raised center. The male scale of this species varies from the female in being somewhat elongated and very much smaller. It is chiefly the females, usually fertilized in the fall, which carry the generation over the winter and these may be observed throughout the season closely adhering to the twigs, often sheltered in cracks or in the protecting spaces at the base of the bud.

The insects themselves are tender, "juicy" mites easily killed by contact insecticides, but the fact that they are protected by their hard covering gives them immunity against all except the most drastic sprays that we can use. Consequently our work against insects of this class must be done in the winter season when the tree is devoid of foliage. To use an efficient material against the San José scale in the summer would mean that we would ruin the foliage on the tree. The presence of the foliage, too, would render it almost impossible to do effective work as every part of the tree—the trunk, the branches and every twig—must be thoroughly soaked with the spray material if we are to expect one hundred per cent. efficiency from our work.



A cluster of apple blossoms ready for the first spray.



Full bloom do not spray.

In the last few years one of our native scales has been causing considerable trouble among fruit-growers. This is the oyster shell scale, so called from the shape of the scale covering which it secretes. Formerly but little attention was paid to this pest because it seemed to limit its attacks to only a few shrubs and to be more or less perfectly controlled by native parasites. In the last five years, however, it has become a real factor in orchard work in several sections. I have seen apple trees killed by it in northern Michigan, and Mr. Frank N. Wallace, State Entomologist of Indiana, reports that his inspectors are finding it more and more frequently in their orchard inspections. It is a larger and more conspicuous scale than its Chinese relative and its life-history is different in that it passes the winter in the egg stage rather than as an immature female. These eggs are deposited by the female late in the fall, under the scale cover which has been her own protection during her lifetime. Consequently the insect is doubly protected—by the scale and by the tough egg-shell—thus making it particularly hard to kill with ordinary spray solutions.

The scurfy scale, another native, also passes the winter in the egg stage much as does the oyster shell, but it seldom becomes an important factor in the orchard.

With the present practice of using lime sulphur solutions in a very strong mixture for winter spraying we have no trouble in killing even the eggs of the oyster shell scale, although the old method of using a more dilute solution for the San José scale often allows the native pest to escape destruction. (The various insecticides will be mentioned only briefly in connection with the insects but will be taken up in some detail later.)

The plant lice are often troublesome in apple orchards. There are three common forms, popularly known as the grain aphid, the green apple aphid and the rosy aphid. The first one is a frequent cause for alarm when it first appears on the opening buds in the spring. At this stage in its life-history it is almost impossible to distinguish it from its relative, the green aphid. One year our trees in one end of the orchard were simply covered with this pest and we sent a hurry-up call to the city for all the nicotine sulphate that we could get, this being the standard remedy for all plant lice. Before the material reached us the aphids had entirely disappeared, having gone back to a neighbor's grain field from whence they had migrated the fall before.

The aphids mentioned pass the winter on the twigs of the trees in the form of small, oval, shining black eggs. Commercial lime sulphur

diluted at the rate of one part to five parts of water will kill most of these eggs as well as all scale insects with which it comes in contact. Consequently many growers are now dispensing with the use of the expensive and extremely disagreeable tobacco solutions that were formerly used. I have no objection to tobacco as such, having been the means of consuming a great deal of it by fire during the past several years, but the concentrated extract as presented in nicotine sulphate is just a little too powerful to be attractive.

The chewing insects in an orchard are legion, but fortunately only a few of them are of any importance. Some that might very easily be important are "taken care of" incidentally by the regular spraying of the orchard. Probably the one chewing insect that orchard men know best is the codling moth. The insect itself is not particularly well known as many experienced orchardists have never seen a specimen of the adult (full grown, mature) moth. The "worm in the apple," however, is known to every one and in most cases this worm will be identified as the larva of the codling moth—whether it is or not.

It was formerly thought that the moth laid its eggs in the calyx end of young apples but this has been shown to be a mistake although the young worms of the first brood frequently

do enter the apple at that point. The eggs are laid any place on the tree—the bloom and leaves probably securing the great majority of them. When the worms hatch they migrate to the fruit, lunching on any green tissue they happen to find along the way. If the tree has been well sprayed these wandering worms will quickly be attacked with a violent and fatal stomach-ache and the fruit will be able to pass muster at packing time—provided it escapes a few dozen other highwaymen that lie in wait for it between April and October.

The second brood of codling moth appears usually in early July, but this date can not be given with any exactness owing to variations in season and latitude. In the far northern districts there may be no second brood; in the South possibly more than two. The careful orchardist should select a few wormy apples in June and confine them in glass jars over the mouth of which he has tied a bit of thin cloth. When the moths hatch it is time for him to get into action with his spray machine. The wormy apples as I have said are usually attributed to the codling moth but another similar insect, the lesser apple worm, causes in some sections even more damage than does its better known relative. It gets in its best work late in the season after the grower has begun to feel that his troubles are over. Unlike the codling moth it

shows no preference for the calyx end of the apple nor for the point where two apples touch—as does the second brood of the codling moth. On the contrary, this lesser apple worm will eat right into the red cheek of an apple with no more modesty than a suffrage picket on the White House steps. They are positively brazen about the way they go after the fruit,—the worms I mean, not the pickets. Also this pest will frequently make a little tour of inspection just under the skin of the apple, as though it were exploring the quality before it decided to go to the heart of things. More than that, it will, in storage, leave one apple that it has ruined and shamelessly attack half a dozen perfectly sound fruits that are near. For this reason all fruit sent to storage should be inspected with extreme care for any signs of this pest. Its characteristic “mines” under the skin of the fruit usually betray its presence with considerable prominence, but sometimes these mines are absent and the entrance point is so small that it may entirely escape observation.

The plum curculio, in spite of its name, is a serious apple pest and one that requires very thorough spraying to control. It does its damage not by eating but by making little crescent-shaped slits in the skin. These slits form a tiny flap of tissue in which the egg of the beetle is

laid. The mark produced seldom ever is outgrown and often so many eggs are laid that the whole fruit is disfigured from growing in the most grotesque form.

The adult beetle is not a heavy feeder, but in the course of its wandering about it does eat some green tissue and this gives us our chance to slip him, or her to be exact, a dose of poison before the eggs are laid.

The fungous diseases are a vast tribe, low, cunning and treacherous, and it requires all of our best efforts to elude them. The most prominent and widely distributed of the whole gang is the apple scab, a disease that lives over the winter on the last year's leaves. With the first warm winds in spring these old infected leaves in which the fungous has wintered, give off minute spores and these seed-like bodies falling upon the fresh green tissues at once set up a new generation of trouble. The fruit, leaves and leaf stems are all attacked and very serious trouble results. Old unsprayed orchards that bloom every year and seldom set any fruit are almost invariably badly infested with this disease. It has, in them, reached one hundred per cent. efficiency and its prompt attack on the stems of the fruit causes the "failure to set" that is too often complained of.

Since the spores are developed so early in the spring it is essential that the spraying for

this disease be done very early. So important is this trouble that growers usually designate their first spray as the "scab spray" and put it on just when the pink is showing in the clusters of bloom buds. For this purpose any good fungicide is used, but most commonly a dilute lime sulphur solution.

Bitter rot is a disease wintering in old cankers which it has formed on the branches of the trees. The spores are produced rather late in the season and it becomes a disease of the mature fruit. Late summer spraying with Bordeaux Mixture is the stock treatment for this trouble, but the grower will also do well to examine his trees for branches containing the source of the trouble and cut them out. The same precautions should be taken against black rot which is very similar.

Cedar rust is one of those curious diseases which must pass its life on two different host plants. One season it produces the peculiar excrescences which are called "cedar apples" on the twigs of the red cedar tree. The next year these cedar apples produce many spores which in turn pass the trouble back to the orchard. The disease causes a curious orange spot on the foliage and the leaves that are so affected fall off in mid-summer leaving the tree bare. Where there are no cedar trees this disease can not exist, but if it is impossible to remove

the cedars then the growers must resort to thorough spraying with Bordeaux.

Apple blotch is a disease that has become very prominent in the last few years. It forms splashy brown markings on the fruit, attacks certain varieties more than others and winters in the form of cinnamon brown cankers on the smaller twigs. For several years I thought that we had discovered a cure for this disease by winter spraying. I still think so. The experiment station workers in at least two states think I am mistaken. Perhaps I am, but I do know that in our own orchards we absolutely exterminated this disease by an application of commercial lime sulphur solution diluted at the rate of one to five. Frank N. Wallace, State Entomologist of Indiana, with whom I had the opportunity of working out this new method, has repeatedly controlled the disease in the same way. A few other growers who have tried it report varying success. Why the experiment station workers have failed I do not know unless they failed to apply the material so that every twig was covered. If that is done and the material used at the dilution of one to five, or perhaps one to four, I do not believe any one need fear this disease. I certainly do not fear it for I have repeatedly exterminated it in blocks where it had secured a start. Furthermore, with this treatment the disease is con-

trolled not for one year only but for several years—depending upon how close you may be to infected orchards. Where the winter spray is not used it is necessary to make repeated summer sprays to hold this disease in check.

Roughly these are the chief insects and diseases that the apple-grower must know. If he can claim a personal acquaintance with each of them he is in a fair way to become proficient in the work of spraying, but he must know also what he is spraying with.

The lime sulphur solution, as I have said, is a chemical combination of lime and sulphur. It is put out in convenient form by many spray material manufacturers and in this form is known as “commercial lime and sulphur” solution. It is an effective remedy for the deprecations of all scale insects when diluted at the rate of one to five or six. The makers’ directions usually advise its use at the rate of about one to eight or nine. At that strength the oyster shell scale will be only slightly inconvenienced and a few San José scales will manage to struggle through. For my own part I do not like winter spraying and when I have to do it I want to make such a thorough job that it will not have to be repeated every year. Consequently I use this solution at least as strong as one to five. It costs more of course, but in the end it is much cheaper than spraying

every year with a less expensive preparation. The manufacturers are also making the lime sulphur compound in what they call the dry form. This is convenient as it saves weight in shipment. Whether it is as good as the liquid preparation I do not know. I doubt it very much, particularly when the makers claim that one hundred pounds of it are equal to a barrel of the liquid. (A barrel of liquid contains solids to the extent of about one hundred seventy-five pounds.) When diluted at the rate of one to forty the commercial lime sulphur becomes one of our most useful fungicides and forms the basis of most of our summer sprays. In a few cases it is less effective than is Bordeaux Mixture.

Recently a mixture of barium and sulphur has been offered on the market to take the place of the lime sulphur and it appears to have some advantages over the old preparation. In recent tests it has seemed to offer greater fungicidal value and to produce fruit with a higher finish than could be obtained with either lime sulphur or Bordeaux. Whether this advantage will remain constant can be determined only by further trial of the material.

Nicotine sulphate has been mentioned as a contact insecticide for plant lice and other sucking insects that may attack trees in summer. It seems the safest preparation to be had for

this purpose and is diluted at the rate of one to five hundred or one to one thousand. Even at this great dilution the material is the most offensive spray mixture that I have ever worked with and the workman must use great care to keep it from his eyes. I use it only when absolutely necessary and then with the greatest reluctance. However, it is a valuable aid in many critical situations and its possibilities should not be overlooked.

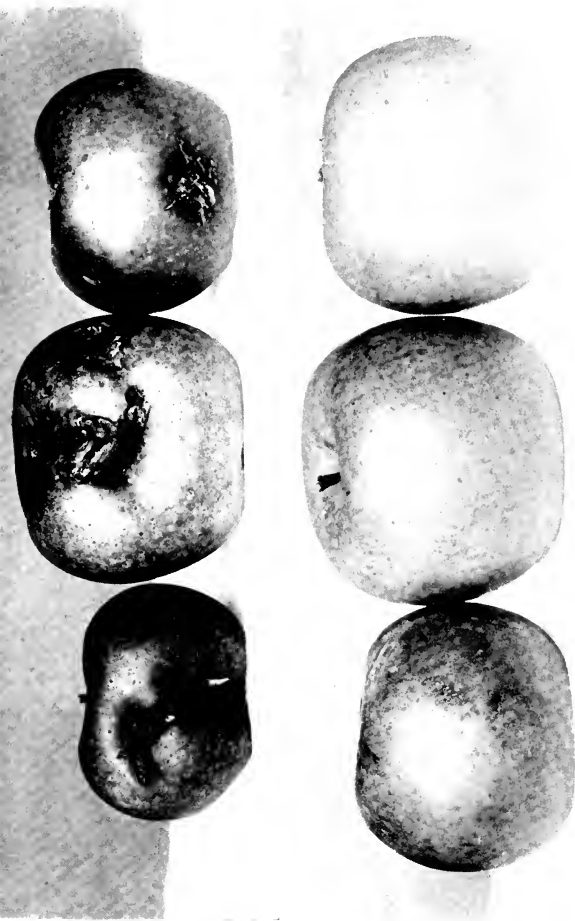
The sulphur solutions have been mentioned both as contact insecticides and as fungicides, but there is another important fungicide which has no relation to the insect problems of the orchardist. This is the ancient and honorable Bordeaux Mixture. For many years we knew no other remedy for the fungous diseases of our fruit and we know none better to-day. Its only objection is that it is troublesome to make and when used on apples is liable, if not almost certain, to cause a severe russetting of the skin and occasionally injury of the foliage. In both of these respects the lime sulphur solution (one to forty) is its superior. It is formed by dissolving four pounds of copper sulphate and four pounds of lime in fifty gallons of water. Ordinarily this is done by the preparation of stock solutions of both lime and copper and adding them to the proper bulk of water. In our practice we have simplified the method a

bit by making only one stock solution—that of copper sulphate. In this solution each gallon represents one pound of the chemical. The spray tank is filled nearly full of water and the engine started in order to agitate the contents of the tank. Then the correct amount of hydrated lime is poured into the tank—with the engine at work. This makes a very dilute lime solution to which the proper number of gallons of copper solution are added.

There is only one internal insecticide that the orchardist need keep in mind and that is arsenate of lead. At present this is furnished by the makers in the form of a white powder which is used at the rate of a pound and a half to each fifty gallons of water.

The winter spray in the orchard should be applied as late in the dormant season as possible, but before the buds have opened enough to show any green leaves. It should consist of commercial lime sulphur diluted at the rate of one to five (or four) if blotch is present. Such a spray will kill all scale insects, kill the eggs of plant lice and will prevent the development of blotch cankers.

The first summer spray should consist of lime sulphur diluted at the rate of one to forty and in addition should carry one and one-half pounds of arsenate of lead to each fifty gallons of solution. This must be applied just before



The apples in the bottom row represent the average fruit from a sprayed Grimes tree. Top row shows three average apples from an unsprayed tree that stood about one hundred feet from the first one. In each case an attempt was made to secure average specimens.



Just after the petals fall—the time for the second spray.

the buds open and while they are showing some of the pink color. It is used to prevent early infection by apple scab and to kill the adults of the curculio. It may be too that it will catch a few early individuals of the codling moth if the season is advanced.

The second spray is applied just after the petals fall—as soon after as possible. It consists of the same material as the first spray, and is directed primarily against the first brood of codling moth. In addition to being our chief attack on this insect, this spray also helps to control the curculio, apple scab, and many minor leaf-eating insects. It also probably has some effect on certain other diseases.

If the work is done thoroughly in these two first sprays the grower may put away his machine until the time to go after the second brood of codling moth, but if for any reason he feels that he has been careless it will be well for him to repeat the second spray in about two weeks. (Carelessness always exacts its price.) The third (or fourth) spray will usually come between June fifteenth and July fifteenth, depending on the season and the latitude. It consists of the same materials as the first sprays or Bordeaux Mixture may be substituted for the lime sulphur if you are located in a section subject to cedar rust—or if you failed to control blotch with winter sprayings. In hot humid

seasons this third spray must be repeated in two weeks if there is any sign of leaf troubles or if bitter rot or rust are very much to be feared. It is almost impossible to outline a spray schedule that will fit all communities. It is more to the point to have the grower learn exactly what his local conditions are and then work out a spray schedule of his own that will fit the case. No one can do this for him. Only I would urge that no one attempt to dodge the question by continuous spraying, thereby attempting to take care of all possible troubles that came along. I know of several growers who actually do this. One of them told me that he sprayed nine times. There could be no possible excuse for such enthusiasm. It is too expensive. Remember, there are only a comparatively few things that are liable to attack your apples. Learn what these things are in your particular neighborhood and then adjust your work so that none of them escapes. You will find that it can be done with far less than nine sprayings and you can pocket the difference in the cost of production.

That item of cost is one that every fruit-grower must constantly keep in mind anyhow. It is entirely possible that my friend of the nine sprayings would have secured just as good results with, let us say, eight sprayings. He was out of pocket the entire cost of the ninth

spraying simply because it failed to add any more merchantable fruit to his crop. These, however, are practical considerations that a grower must work out for himself, but unless he works them out he is liable to wake up some day and find that he is in a deluge of red ink with Noah far away from shore.

CHAPTER VII

HARVESTING AND MARKETING

“By their fruits ye shall know them.”

“The harvest truly is plenteous, but the laborers are few.”
—MATTHEW.

I HAVE always been astonished at the amount of horticultural information revealed in the Bible. Each of these texts deals with a subject that must have been fairly familiar to the people of that day or it would not have been used to illustrate a lesson.

It is still certainly true that we know a tree by its fruits. Once in a while of course we are at a loss to place accurately some particular tree as being the exact variety that we thought we had planted, but then little disappointments of that sort are common enough to most fruit-growers.

As to the second quotation—could anything be more true in our modern orchards than the condition mentioned there? What orchardist is there but that has had his labor troubles in the last few years—“and will have,” as Omar says.

There is no time of the year when it is so important to have an abundance of help in the orchard as at the harvest. All other orchard work can be handled with a comparatively small force, but at picking time one must have an abundance of labor for the work is there to be done and it will not wait.

Perhaps one of the most useful practices that has been introduced in many years is that of thinning the fruit. I expect that this has done more to increase the quality of our apples than any other one thing except the introduction of spraying. In some cases spraying was what made thinning necessary because without it there were not enough apples to thin—or in some cases to pick. Many growers who have never tried it are unable to see in just what way thinning will be of any help to them. They protest that they have worked hard to get the fruit on the trees—why pick it off and throw it away? The answer is that on a thinned tree we will have just as many pounds of fruit as we would have on the same tree if it were not thinned and all of the crop will be of a marketable size. The apples will all average more uniform in size and shape and be freer from any fungous injury. If the small defective apples and those which are perfect but too numerous, are allowed to hang on the tree until picking time all will have to be gathered. In

other words the small and imperfect fruit must be picked some time so why not get it off the tree and out of the way as early as possible? In that way we give the perfect apples a better chance to show what they can do.

Sometimes this thinning appears to be a pretty severe operation; looking at the discarded fruit under a thinned tree might lead one to suspect that too much had been taken off. One of the girls we had working in the orchard last fall remarked that she had twice "picked all the apples" off a certain tree and still it was laden at harvest time. That was the way it appeared to her when she was thinning the fruit in July and again in August. If thinning had not been done on that particular tree the fruit would have been smaller in size and more of it would have been imperfect. The small and imperfect fruit would all have gone through the packing shed, all would have been handled just as much as the good apples were—and it costs money to handle fruit. So thinning accomplishes really more than it seems. While it appears at first glance to be only a means of securing larger apples, it in fact does more than that because it simplifies the work of harvesting and of grading.

While apple picking requires a tremendous amount of work and long hours of labor, it is really the time that the grower lives for. Oc-

tober in the orchard pays for all the worry of the other months. Whether it pays the bills of the other months is still largely a question of the success of the commission man.

The methods of carrying on the work of picking apples will depend somewhat upon how the trees have been pruned in past years. If they have been grown as low-headed trees the work will be much easier than if they had been allowed to tower above the earth. The shape of the trees will not affect the ease of the work, but it will affect its cost and we fruit-growers must come more and more to consider the cost.

In almost any orchard a short ladder will be of use, for even with low trees it is sometimes impossible to gather all the fruit from the ground or from the first crotches. Ladders that taper to a point at the top are the easiest to handle as they are lighter in weight and are more inclined to "stay put" than are ordinary straight-sided ladders.

Growers often have their own ideas as to the proper receptacle in which to pick. Some prefer a sack of some sort, either one designed for the purpose or a grain sack tied with a shoulder strap. Others will use only baskets for picking and a few that I know insist that their pickers use only tin pails. They say that if a careless picker "throws" his fruit into the pail they can hear it and eliminate the picker—sort

of an automatic alarm. However, after a layer of fruit has covered the bottom this automatic feature ceases.

In our own orchards we have found that a special picking sack is the most convenient—meaning that it is the cheapest to use. The sacks with which we have had the best results are made in New York and are fitted with shoulder straps. The apples are put in through a comparatively small opening at the top, while the bottom is closed with a draw string which hooks up and fastens in a ring under the top of the contraption. We found that the pickers could use such sacks and harvest more apples in the same length of time than with any other picking device. Equipped with such a sack one girl picked sixty-four crates (a trifle more than a bushel to the crate) in a ten-hour day. Good pickers averaged upward of forty crates a day. When we changed sacks we found that the pickers were slowed down owing to the fact that the new sack we were trying out was less comfortable and the large wire braced opening at the top got in the way of the worker.

These may seem like small items, but it is only by watching such little things that production costs can be cut and, as I have said before and will probably say again, we must cut our costs. Pickers are usually paid either by the day or by the bushel. We have worked a

combination of the two that I think is productive of results. We pay a minimum day wage and for those who make the best records each day we pay a bonus. The fruit is picked and deposited in field crates and each picker is provided with a bunch of numbered tickets, one of which goes in each crate. When the crate reaches the packing house it is inspected as it is emptied on the grading table and a record made of the picker's number and the condition of the fruit. If any apples show bruises, or if they lack stems or have attached to them any twigs in addition to the normal stems, that is set down against the picker represented by the number on the ticket. If crates come to the packing house repeatedly in bad order the particular worker who is responsible for the neglect is "fired." In this way carelessness is punished and a premium is placed on good work. When the field crates are filled they are hauled to the packing house which should be centrally located. Here the fruit is first graded and then packed.

Apple-growers over the eastern part of the United States have much to learn about grading because it is not often that two men will have the same standards in mind when they are packing their best quality of fruit. In the West grades have been long established and the resulting packs are so uniform that the buyer

always knows what to expect when he purchases a standard box of western fruit. On the other hand, the buyer never knows what he will draw if he buys a barrel of eastern grown apples. Even the quality of the pack in the same orchard will vary from year to year and in some orchards the quality will vary greatly between the two heads of the barrel.

The old habit of fooling the public by putting all the little apples in the middle of the barrel has been so firmly fastened on a certain number of the fruit-producing citizens of the East that it is hard for them to shake it off. The best growers realize that their barrel packs must represent a more uniform standard of perfection and many of them pack barrel apples that are honest from top to bottom.

There have been attempts to pass laws regarding the packing of apples in barrels and several such laws are on the books to-day, but almost without exception they have failed to make very much impression on the market in general. The United States Standard Grade Law was never anything more than a joke. It required certain labeling on the barrels before they could be branded "U. S. Standard." If they were not so branded one could ship his fruit any place without let or hindrance. The "U. S. Standard," on the other hand, was worded so as to allow the grower ten per cent.



Apple scab.



Apple blotch.



A good type of picking sack.

leeway in the matter of defective fruit. That seems to me to establish a pretty poor standard of excellence and as a result we have never labeled a single barrel of our fruit with the "U. S." brand, feeling that our own standards were so much higher that we could not afford to enter the ninety per cent. class.

The "New York Grade Law" is an improvement in this respect, but no law will ever be a success unless it is mandatory and covers all fruit grown or sold in a given territory. There should be some sort of a law to require that all packed apples be of a definite grade and properly labeled. Such a law would force all defective stuff to be sold in bulk at a price commensurate with its value and would give the careful grower a price that would justify him for the care and money expended upon the crop.

In the best modern packing houses the fruit is poured on a grading table, usually an incline or a moving belt leading to the sizing machines. As the apples roll over the grading table they are carefully examined by the graders, in most cases girls or women, and all of the defective fruit is thrown out. It is here that the variations in quality of the resulting grade develop as the growers seldom agree on how far they shall go in excluding certain defects from their packs. Some years this lack of uniformity is excused on the grounds that to exclude all de-

fects would take too great a per cent. of the crop. This condition hit us last year when nearly every variety was badly affected with scab. In spite of good spraying the disease appeared to such an extent that it would have been ruinous to throw away every apple that showed a trace of it. Consequently our graders allowed fruit to pass to the sizing machine that ordinarily would have gone on the cull pile.

A sizing machine is simply a mechanical contrivance to grade the fruit for size—and for size only. Because a certain grower labels his fruit “machine graded” does not mean that it will be perfectly graded by any manner of means. I have known orchardists to pass a crop over a grading machine and include everything that came from the tree. The resulting pack was “machine graded” all right, but the three-inch wormy apples were right there cuddled up against the three-inch perfect ones just as they formerly were before any one tried to reform the fruit business.

The real grading takes place before the fruit reaches the machine and no mechanical device will ever be invented that will take the place of the brains and nimble fingers that are needed at this stage of the game. When the fruit is delivered from the machine it is ready to be packed for market and one of three packages is used for this purpose.

The barrel has long been the universal package for winter apples and is still the standard container for this fruit. It is used almost exclusively throughout the Eastern States and probably will continue to be for some time.

In packing a barrel of apples the container is filled "upside down." That is, the bottom of the barrel is taken out and the head end is packed first, usually with apples as nearly of the same size and color as is possible to select from the general run of the fruit. This, I consider a perfectly legitimate practice in that it does not employ a different grade of fruit for "facing" the barrel, but it does trim the package in such a way that it produces the best possible effect on the intending purchaser. At any rate it is so universal that if it were not done the grower would not realize nearly so much for his fruit as he otherwise would. Often two layers are placed in the barrel by hand, arranging them all with the stem end down (that is next to the head), and in concentric circles. After this "facing" of the barrel the fruit is carefully poured in until the package is about half filled when it is thoroughly shaken down by rocking the barrel vigorously back and forth over a hard floor and jolting it severely in the process. This is repeated when the barrel is filled and tends to settle the apples solidly in the package so that they will not "rattle," when

the head is put on. The barrel is filled so full that the apples stand about half an inch to an inch above the top of the staves and the fruit is arranged so as to present as level a surface as possible. The head is then placed over the fruit and a barrel press clamped on which will enable the packer to force the head into position. This work can be learned only by experience. I could write pages on the technique of heading an apple barrel, but until one has done the work himself no amount of reading will make him proficient. There is a "knack" about it that comes only with practice and some men learn it more quickly than others. I have one packer who has the record of heading a barrel complete in three and a half minutes and I have seen him maintain this speed for considerable stretches of time. Other headers, less experienced, will sometimes spend ten minutes or more struggling with a refractory head.

The label should go on the end of the barrel that is to be opened for inspection—that is, the one that was "faced." Consequently there should always be some identifying mark placed on this end of the barrel at the time it is packed for it is not often convenient to label the packages as they are put up—packing apples is a rush job, but labeling the barrels may easily be done in a slack hour after the rush is over.

The box package is steadily increasing in

importance not because it is being more widely used but because the box apple-growing centers are delivering more fruit. In 1919 there were actually more apples packed in boxes than in barrels, due to a big crop in the West and a light one in the East. In 1920 this condition did not exist as the crop conditions were reversed and the barrel returned to its dominant place in the market.

Packing box apples is a job that starts away out in the orchard before the trees come into bloom. Boxed fruit, by common consent and long trade usage, must be more perfect than barreled stock. In fact the western growers have built up a reputation for packing nothing but absolutely perfect fruit in their extra fancy grades and the public has come to realize that when it buys a box of western apples it will get one hundred per cent. perfect fruit. It is a strictly vegetarian package.

Some eastern growers attempted to use the box package and adapted it to eastern standards as they apply to the barreled apples. The consequence was that the public resented the finding of imperfect apples in a box and a buyer's strike resulted which injured the eastern box apple trade more than can be estimated. It is just as possible to grow box grade apples in the East as in the West—the point is that most growers do not. The few that have

made a success in this line have done so by building up a reputation for their own particular brands and when their public realized that any certain brand could be depended upon they gladly bought that kind and what is more they paid a premium for them over the price of the western fruit. This, of course, is as it should be because of the superior flavor of our eastern apples.

In box packing the fruit must be perfectly graded and accurately sized as otherwise the resulting package will show too great a variation to pass muster on the market. It is not desirable, however, to have all of the fruit exactly of the same size for a reason that will presently be shown.

The standard boxes measure ten and one-half by eleven and one-half by eighteen inches in size, inside measurements. The ends are made of single pieces of wood about three-quarters of an inch thick while the sides are of solid pieces three-eighths of an inch thick, making the ends and sides fairly rigid. The tops and bottoms consist of two pieces each, one-fourth of an inch thick or less and held in place with cleats at each end. The tops and bottoms being of thin stuff allow the package to bulge slightly and in that way a slight pressure is always maintained and bruising from "rattling" is avoided.

In packing, the box is first lined with cheap paper—news stock usually. This is put in in two sheets lapped over at the bottom and long enough to extend up the sides and lap over the fruit when the box is filled.

There are various packing formulas for filling an apple box, depending upon the size of the fruit that is being handled. Each size naturally takes a different style pack although many of them are so similar that the description of one method will suffice for all. The “three-two” pack is the most common and is adapted to many sizes of fruit. It is started by placing two apples in the lower corners of the box. The third is then placed midway between these two. Then two apples are placed in the spaces between the three end apples and form the second row. It is this arrangement that gives the style of pack its name. The third row is a repetition of the first one and so on until the bottom of the box is filled. The second layer starts not with three apples but with two, just reversing the order of the pack on the first layer. In this way the box is filled so that no apple comes directly above any other apple but always directly above a *space* between two fruits. So packed a box of apples acts as its own cushion and bruising is reduced to the minimum. If very slightly smaller apples are used in the ends of the box it will result in a

“bulge” over the middle portion which is highly desirable. As a matter of fact when the box is filled, the fruit should extend one-half an inch above the top at each end and about one and one-half inches in the middle. It is then ready for nailing on the top which is best accomplished with the aid of a box press which clamps the lid tightly over the apples. Both top and bottom being of thin material the boards will spring over the apples. A portion of the “bulge” will be forced down to the bottom of the box and the pressure will be evenly distributed throughout the package. A box so packed will stand shipment any distance and the fruit will arrive in perfect condition and more free from bruises than in any other type of package. In shipment, however, and in storing around the packing house and other places boxed apples must always be placed on their *sides* and not on the bulged top or bottom.

Usually apples packed in boxes are wrapped in thin tissue. This is cut in various sizes to accommodate different sized fruits. Ten and a half inches square is a customary size and will answer in most packs. The wrapping of the fruit is often a problem to the beginner as he finds trouble in picking up the tissue and often becomes badly confused in his pack as a result. It is best to arrange the packing table in such a way that the apples are on the opera-

tor's right and the tissue on his left, with the box directly in front. In this way he can pick up his wrapper without looking at it and with his right hand can select the particular fruit that he desires for his next operation. It is a case where one must not let his right hand know what his left hand is doing. Also a rubber thumb cott on the left hand will solve the difficulty of picking up a single sheet of tissue at a time. Holding the tissue in the left hand the worker places the apple in the center of it with the stem end upward. The four corners are then quickly folded over the stem with a slight twist and the fruit is placed in the box stem end down. This brings all of the folds over the stem in such a way that there is no chance for the stem of one apple to injure the skin of another.

It will readily be seen that box packages are more expensive to put up than are barrels, but there are many advantages in such a package and if the eastern growers as a class ever decide to go into this field seriously they will find that the extra expense will bring a profit that will make the trouble worth while. But as I said before box apples originate away back in the orchard.

In the last few seasons the bushel basket has been quite a factor in apple packing and may reasonably become a still more im-

portant one. The barrel makers are using tactics which may cause them the loss of the goose that has been laying their golden eggs for they have advanced prices without rhyme or reason simply because it appeared that the growers would pay any price asked. Barrels that could be bought for thirty cents about three years ago were sold as high as a dollar and sixty cents and even more, last fall. I happen to know something about the prices of raw materials in that particular game and I know that the increase is absolutely unjustified. It is a case of pure, or impure, profiteering from the ground up. As a result I know of many growers who will next year use baskets for their winter apples just as they have been using them for summer fruits for a long time. That such packages will be a success is abundantly evident from the fact that several growers have already tried them out. In the spring of 1920 I saw a large shipment of Delicious that had been held over in baskets and they were in perfect condition—just as perfect as though they had been in barrels.

Now after we have grown all these apples and gotten them packed in barrels or boxes or baskets, what are we going to do with them? That is the real question in the apple game and it is one that the growers have given less attention than they have any other branch of

their work. This is true not only in apple-growing but in all other branches of farm development. The experiment stations and the Department of Agriculture at Washington have urged the farmer to greater production, and he has responded only to find that the market for this greater production was about as tangible as so much thin air. It is probably not the business of the government agencies to market farm products any more than it is their duty to market any manufactured product. If a manufacturer works himself into a box by producing more than he can sell he works his way out either by reducing prices or by efficient sales efforts.

I can see no reason why a farmer or fruit-grower should let his work stop when he has produced his particular product. I can see no reason why he should not also develop into a good business man just as he has developed into a good producer. Nor can I see any reason why the farmer should ask for special legislation to help him out of difficulties which he is capable of getting out of by his own efforts.

In the past the fruit crop of the country has been handled chiefly through the medium of "commission men" who receive the fruit in the city markets and sell it to peddlers and grocerymen and other large users. Such men usually have well equipped stores, accept ship-

ments on delivery, pay transportation and other charges and handle the business dealings with the retail merchants. For this service they have received usually, ten per cent. of the gross sales and the general condemnation of the fruit-growing public and the consumer as well. As a matter of fact the commission men of the country have been performing a distinct service to both grower and consumer and much of the blame that has been laid at their doors is undeserved. I do not contest the statement that there are crooked commission men. Neither will any one contest my statement that there are crooked apple-growers. No matter what system of distribution we may use we will always find a certain share of crooks in our path, but to condemn all commission men as being dishonest would be just as unfair as to place all farmers in that undesirable class. Our city papers have for years carried a stock complaint against the "middle man"—meaning the commission man—when as a matter of fact the real culprit was the retail grocer. City papers will not print anything against retailers because they are an important factor in the advertising department. Consequently the commission man, who never advertises in the city papers, bears the brunt of the editorial wrath. At this writing I have in mind a case that was called to my attention last week. A certain grocer in

Indianapolis was found to be selling a very low grade of apples at twelve and one-half cents per pound. We found the same grade of apples on sale in the commission houses of the city for four dollars and fifty cents to five dollars and fifty cents per barrel. There are about one hundred fifty pounds of apples in a barrel. Figure out for yourself what profit that retailer was making. If this was an exceptional case I would never mention it but I have investigated too many similar cases to think that it is at all unique.

I do not see just how the grower can influence the retail market to any extent. It is a market with which he does not come in contact as a rule, especially if he is a large grower. However, if the retailers only knew it, they could very greatly increase their sales by reducing their profit and by selling fruit not in small units but in large ones. The buyer usually is influenced by the size of the unit quoted. If the housewife asks the price of apples and is quoted "ten cents a pound" she will probably place her order on a pound basis. On the other hand if the quotation is made in fractions of a bushel the chances are that the grocer would sell many times the amount of fruit that he will dispose of on the first basis.

The grower, as such, is interested always in the wholesale prices. He is interested in any-

thing which will tend to keep these prices up to a level which will leave him a profit on his labor.

Now, there are only two things which influence the price of apples. One of these is the supply and the other is the demand. It may be that in the future we will be able to get fruit-growers of the apple sections educated to the point where they will be willing to spend some real money to stimulate the demand for their products. The citrus-growers are doing this very thing and they are getting results. But at present the growers of apples are simply allowing the law of supply and demand to have its own way with them and they seem to be content to take whatever the market price may happen to be.

In the same way it may be possible for the growers to help out the situation as far as the supply is concerned. This country has never been over-supplied with good apples. The trouble has been that when we had a big crop it was usually concentrated in a few places where the fruit was so plentiful as to be almost worthless and in remote sections it was so scarce as to be almost priceless. We have never had intelligent distribution of this crop as we should have.

The citrus-growers of both California and Florida have advanced far beyond the apple-



A field crate for apples.



Top cover has been removed to show the appearance of the package as it would be when the buyer opens it.

growers in this matter of marketing. So have the vegetable-growers in many sections of the South. The peach orchardists of Georgia are well organized. While they can not "set prices" they can at least see that their product is not all shipped to one or two points to glut the market.

However, these are things that would require a tremendous organization and I doubt if the apple-growers of the country are ready to support such an undertaking.

Small apple-growers will do well to develop a direct to the consumer market. With the increase of road facilities in this country nearly every orchard is easily reached by automobile from some near-by city. This auto trade is developing yearly and it bids to become a real factor in the marketing of our fruits of all sorts. It is to be encouraged as a good thing from every standpoint as it gets fruit into the hands of the consumer at a reasonable price and still allows the grower a profit for his work. Even those orchardists who never sell an apple in this way are benefited by the system because it results in fewer apples reaching the city markets and it is not to be supposed that the "tourists" who buy fruit in the orchard represent a very large part of the whole apple-buying public.

The whole question of marketing is one that

is certain to undergo radical revision in the near future and it is up to the grower to take such an interest in the matter that he may profit by the developments even though he may have no hand in bringing them about. It is a side of his work that he must pay more attention to for it will profit him little to spend his time and money in producing an article for which he finds a scant sale after it has been produced. This is the real nub of the whole apple-growing business and will have much to do with the success or failure of the apple-grower of the future.

CHAPTER VIII

PEACHES

“A little peach in an orchard grew,—
A little peach of emerald hue;
Warmed by the sun and wet by the dew.”
—EUGENE FIELD.

ALTHOUGH the peach is not a native of North America it has become in many ways the most typically American of all the fruits we grow. Just as we Americans are the most temperamental of all peoples, so the peach is the most temperamental of all fruits. We might almost endow it with human qualities and call it a “nervous” fruit, for certainly no other is more capricious in its behavior in the orchard. Although the most sensitive to cold of any tree fruit of the North it sometimes shows surprising resistance along these lines and again it may give up the ghost before a slight frost that might otherwise pass unnoticed. Fortunes have been made and lost in growing it and “peach sections” in various parts of the country have come and gone. Localities have been heralded as “sure crop” districts only to see peach cul-

ture vanish with the passing years while the flirtatious fruit made friends in new neighborhoods where it had been previously unknown.

I know of several sections in my own state where peach orchards once furnished the main-spring of industry. To-day peaches are shipped into these localities from other districts. At one time the Traverse Bay section of Michigan produced many peaches. Now it produces almost none. New "Eldorados" are being discovered each year and peach planting goes on much as usual—first in one part of the country or state and then in another.

As a matter of fact the peach may be grown over nearly the whole of the United States. There are some areas in the South—along the Gulf and in Florida—where the climate is not suitable for our usual commercial varieties, but even in those sections certain sorts may be produced. In the North the boundary of practical peach-growing extends in some places even into Canada, the limiting factor being the minimum winter temperature. Where the thermometer makes a regular practice of going to fifteen or twenty degrees below zero every winter, or even every few years, peach-growing would best not be attempted, for the buds will almost certainly be killed even if the trees are not. There has been considerable discussion as to the amount of cold that a peach tree and the

fruit buds which it bears, can withstand. Some authorities state one figure as the minimum and some another, when the truth of the matter is that this low point varies with many varying conditions. Some varieties are much more resistant to cold than are others. The "quality" of the cold has much to do with it—trees and buds resisting a still, calm cold period much more easily than one accompanied by high drying winds. The general condition of the trees plays no small part in the way the buds behave under the influence of cold. A tree that has produced many crops of fruit, that has been weakened by insects or disease or neglect will frequently be killed outright while healthy vigorous trees near it may survive. We noticed this particularly a few years ago when we had a very severe winter with minimum temperatures of about twenty-five degrees below zero. Several thousand old trees in our orchards were killed to the ground while some three-year-old specimens not only lived but managed to bring a few blooms into being in the spring. Another factor which influences the resistance of the peach tree and buds to cold is the condition of the tree at the beginning of winter. After a warm moist autumn the buds sometimes open their protecting scales more or less and as a result they fall an easy prey to the first real nip of Boreas.

Spring injury is frequently just as much to be feared as the cold of winter. In fact the crop is sometimes lost in sections where the thermometer seldom goes to freezing during the whole winter. The Georgia peach crop has been wiped out by a spring frost after having passed through a winter of extreme mildness.

Aside from the climate the only other limiting factor in peach-growing is the soil, for not all soils are adapted to this fruit. Like all fast growing trees it requires much fertility and the moisture content must be nicely balanced. Soils that are subject to extremes of wet or dryness are not suited to the crop which requires a steady supply of moisture during the growing season. In the case of the apple a slight deficiency in the matter of fertility does not do any harm, but in the case of the peach we should select land that would grow an ordinarily good corn crop. We are accustomed to think of our good corn land as being low and flat, extending along the river bottoms. In such a case the quality of the soil might be all right but the "lay of the land" would be all wrong, for we must look to the hills and rolling ground to provide frost drainage. Elevation above sea level is of no particular importance, but elevation above the surrounding country is one of the prime essentials of success. In such locations we can sometimes see a definite frost

line following the contour of the hills—above this line we have a crop of fruit while below it we have a failure. If the orchard rows are planted so that they extend up and down the hill and consist of different varieties, we can sometimes note a difference in the hardiness between two sorts. I recall that one year the fruit on our Greensborough peach trees extended three trees lower down the hillside than any other kind, thereby proving the opinion that we have long held that this variety was one of the hardiest sorts.

Nurserymen usually offer the planter two sorts of peach trees, “yearlings” and “June buds.” These are produced by two different systems of propagation. Both are good if used in their rightful localities.

Ordinarily the nurseryman grows his peach trees by planting the seed very early in the spring. By July or August the little trees are large enough to bud. The buds inserted at this time remain dormant until the following spring when the seedling top is cut off and growth forced through the inserted bud. At the end of the summer the bud has produced a tree varying from two to six or seven feet in height. These trees are called yearlings and constitute the bulk of the peach stock sold in the North.

June buds are produced in the same way except that the buds are inserted in June and the

growth forced in the same summer. Such trees are always less vigorous and, of course, smaller in size. Planted in the southern peach-growing sections they make satisfactory orchard trees, but they should never be used in the North. A few growers north of the Ohio River have reported success with the June buds, but they are the exception proving the rule and the bulk of northern orchards have been and will continue to be grown from yearling trees. Peach trees more than a year old should never be planted.

The correct method for peach planting has been the basis of much argument for years. Growers vary in their opinions and they can no doubt justify their judgments by results in their own plantings. On most soils, however, twenty by twenty feet will be found a convenient distance. This spacing will allow room for cultivation and spraying and permit the trees to expand to their full size without crowding. In some sections, notably Georgia, I believe that a still greater distance would be a decided advantage as it would allow better air circulation—an important factor in the prevention of some peach diseases. I have seen some Georgia orchards planted so closely that at harvest time the branches of trees on opposite rows would be in contact. If warm wet weather happens to come during the ripening season such an orchard is a prey to brown rot.

In the past many apple orchards have been planted with peach trees as "fillers" between the permanent trees. There are several reasons why this is not good practice, but perhaps the best one is that the average grower does not remove the trees before they begin to interfere. We usually overlook the fact that the roots of a tree may be crowding its neighbor even if the branches still seem to have plenty of room. The old rule that the roots extend as far as "the drip of the branches" can not be depended on for under certain conditions they extend much farther than that. Recently we had occasion to open a ditch in the orchard and uncovered the root of an apple tree. As there was no tree close at hand we traced the root and found that it originated from a Yellow Transparent standing about twenty feet away. To judge from the top of the tree the roots should not have extended more than four or five feet at the most. We should remember too that the peach tree, being a fast growing sort, will send its roots out in search of food even farther than will the apple.

The pruning of the peach should start at the time it is planted—or before. It is a good plan to prune the trees before they are set in the ground. This can be done by the man who unpacks the box or bale as it comes from the nursery.

Any sort of fruit tree should be carefully inspected before being planted and the roots of the peach should be examined for the presence of the peach borer. This insect lives just below the bark of the tree, at or near the soil line. Its presence is usually indicated by the exudation of gum around the wound that it produces.

The roots should be pruned before planting, though not so heavily as are those of the apple. Usually about all that is needed is to take off any injured rootlets, leaving the main portions intact. The top should be pruned to a stub. No matter what length of stub I should advise you to leave there are peach-growers all over the country who would take exception to the statement, for it is another of those questions that have helped to keep horticultural societies alive. In our own orchards we usually leave the stubs about eighteen inches high. If the tree has been injured in the top so as to require more severe heading back we do not object. I have grown excellent trees from six-inch stubs. In any event pay no attention to the small side branches—take them all off. In some of the old books you will find pictures of a pruned peach tree at the time of planting, showing a much branched seedling with the branches shortened in to about half their length. I know of no first-class grower who follows any such system of pruning to-day. The stub's the thing.

At the end of the first growing season the stubs will have thrown out long whip-like sprouts—anywhere from three to a dozen or more. The best of these should be selected to form the framework of the tree and the rest be cut off. We should leave not less than three and not more than six and these should be cut back as to leave only one-third of their length. When a vigorous young peach tree has been pruned in this way you may expect some protest from the neighbors, many of whom will assure you that you have ruined the trees. As a matter of fact it's a pretty hard job to "ruin" a peach tree. The things seem endowed with such buoyant vitality that they recover from all sorts of ill-treatment and sometimes make a successful orchard in spite of indifferent care on the part of the pruner. It may be stated as a general principle, however, that it is better to over- than to under-prune during the first few years. The second year's pruning should be a repetition of the first except that each of the main branches is to be treated just as we treated the whole tree the first time we pruned it. I find it convenient in conveying this idea to new men in the pruning gang to tell them to consider each year's growth in exactly the same way they consider the nursery tree at planting time. We prune the nursery tree to a stub—from this we grow other sprouts, each one more

or less resembling the original tree as it came from the nursery. These sprouts are treated as was the nursery tree—they are cut back to stubs and the same process followed until the third or fourth year. By that time the tree will be large enough to begin to bear some fruit. (A tree *may* bear a few péaches earlier than the third or fourth year if it is left unpruned, but it is best to defer bearing until the tree is large enough to sustain a profitable crop.)

After the tree begins to bear the pruning is much less extensive than in the early years but, unlike the apple, some pruning should be done every year. The reason for this is that the peach bears its fruit on the wood of the previous season's growth and it is desirable to encourage a certain amount of new growth each season and thus provide for regular crops.

There is room for a difference of opinion regarding the methods of cultivation for the apple, but I believe that most growers agree that the peach thrives best under a strict system of clean cultivation. It must be remembered that it is a fast growing tree, demanding a constant supply of moisture and an unfailling supply of plant food. Nothing conserves moisture so well as does clean cultivation and the food must be supplied either in the form of natural fertility or by the application of manure and commercial fertilizers.

I always dislike to discuss the question of the use of fertilizers for peaches or for any other fruit because we really know so little about the whole subject. There have been a few disconnected experiments conducted at various experiment stations, but these give us no information of value beyond the fertilizer requirements of the plots where the experimental work was done. There is a point of soil fertility above which it is simply wasteful to apply fertilizers, a point where the soil contains all the fertility that the tree can use. To add more is simply providing material that can only remain inert. Whether a certain orchard or portion of an orchard requires the addition of fertilizers can only be told by experiment. The individual grower must find out by trial applications just which materials will do the most good—or whether they will do any good at all. In most orchards nitrate of soda has proved to be beneficial in promoting wood growth and in increasing the hardiness of the fruit buds. It is applied to newly planted trees at the rate of about an ounce per tree. This is gradually increased until the bearing trees six or eight years old get about two pounds per tree. The general problem of fertilizers, however, must be solved by the individual growers, suiting their practice to the needs of their individual soils.

Inter-crops grown between the trees in a

peach orchard should be of a sort that do not require cultivation late in the season as it is desirable that the trees have an opportunity to ripen their wood and to become perfectly dormant before winter sets in. For a long time it was thought that growing potatoes in a peach orchard produced the disease known as "yellows." It has also been thought that yellows and winter injury were related. Certain growers have felt that the digging of the potato crop started the trees into active growth and at least favored the occurrence of winter injury—or yellows. All of which is more or less theory but it is given here for what it is worth.

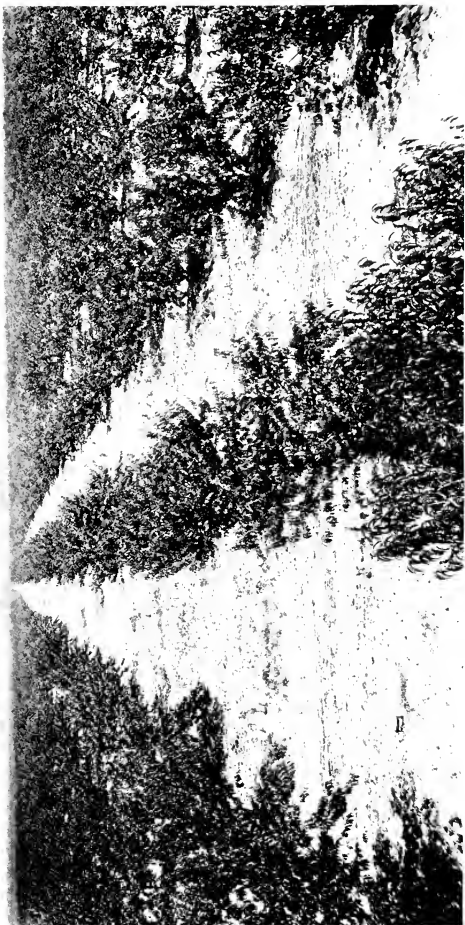
The peach has numerous enemies both among the insects and among the plant diseases, as have nearly all plants that have been introduced from other countries. The outstanding insect enemy is the peach borer which has already been mentioned. It is the larva of a rather pretty, clear-winged moth and does its damage by eating a little subway for itself under the bark of the tree—usually at or just below the soil line. The eggs are laid any time between the first of June and the last of September varying somewhat with the latitude. Frequently several borers will appear in the same tree and their enthusiastic feeding excursions may result in girdling the trunk. When this happens the tree usually dies or

throws up sprouts from below the bud which, if allowed to grow, may develop into a seedling tree. The old method of fighting the borers was to dig them out with a sharp knife and "kill them with a club." This involved endless labor, but when it was carefully done it was quite effective and is still practised in the majority of the commercial orchards. The new treatment is to kill the pests with paradichlorobenzine. You need not try to pronounce it and the method of use is more simple than you might suppose. A little soil is scraped away from around the trunk and a small quantity of the drug applied to the ground. This is then covered with earth and shortly after the borers go out of business. On very young trees this method may not be perfectly safe, but at Ft. Valley, Georgia, it has been found effective and harmless on trees six years old and older.

The plum curculio has long been the one prominent insect damaging the fruit of the peach. It is a native insect and I can just imagine it pæons of joy when the first trees of the delectable fruit were imported to this country. Having lived its entire previous existence on the native plums and haws it must have welcomed the peach and the European plums with open arms. It has certainly devoted itself to them most selfishly ever since at any rate.

The damage is done by the adult beetles

shortly after the husks fall from the growing fruit. At this time they lay their eggs in characteristic crescent shaped slits in the fruit and the eggs very quickly hatch and begin to work out their destiny. Inasmuch as the entire life of the greedy larva is passed inside the peach we have no method of slipping a dose of arsenic into his breakfast food, but we can certainly give his fond parent enough to quiet him—or her. The adult beetle lives over winter in any shelter that it can find and as soon as the first green leaves appear it proceeds to fatten itself. However, it is not a very hearty eater and later in the season probably eats little if anything. An arsenic spray shortly after the bloom falls will kill off the majority of these wintered-over adults and the injured fruit will be reduced to a minimum. Formerly these beetles were killed by jarring them from the trees on to sheets spread on the ground. When a sufficient number had been collected the sheets were swept off and the beetles poured into a can of oil. If you should happen to be one of those fruit-growers whose orchard operations do not extend beyond the back yard you might try this method. Simply spread sheets (if you can induce your wife to lend them to you) under the tree. Then jar the trunk and main branches vigorously and watch the “critters” accumulate. They seem to be ticklish, for as soon as



A peach orchard at Ft. Valley, Georgia.



A typical bearing tree in the Georgia peach district. Note that the head is low and that there is an abundance of fruit-bearing wood.

they are touched or jarred they let go "all holts" and tumble to the ground.

Like all fruit trees the peach is attacked by several scale insects all of which yield to the same treatment—a winter spray with commercial lime sulphur solution.

The most talked-of and the least important disease of the peach is the "yellows," which I have already mentioned. Specialists have worked on it for thirty or forty years and the sum total of their knowledge to-day is that it is a "physiological" disease—meaning that they do not know what it is. My own opinion for many years was that it was closely related to winter injury of some sort. I am still inclined to think that this is true in spite of the fact that it failed to make an appearance after the severe winter of 1917 when many trees were killed outright. It is characterized by a yellowing of the leaves, spotting of the skin and streaking of the flesh of the fruit with red and by the development of many clusters of slender wiry twigs. The yellow leaves may result from other causes, but when the disorder progresses to the point where the twig clusters are formed the tree should be taken out and burned. The disease is claimed by some to be contagious. Maybe it is. At any rate we can play safe by burning affected trees and maybe some day some one will learn just what causes the disease.

Leaf curl is a fungous disease that causes the leaves to curl up in an unsightly fashion. If they only became unsightly we might be able to overlook their condition and hope that they, like a freckle-faced boy, might outgrow it. Unfortunately they soon turn yellow and fall off, sometimes leaving the tree perfectly bare. Ultimately a new crop of leaves is put out, but in the meantime the young peaches have been crying for their food and there have been no leaves to elaborate it for them. The result is usually a much reduced crop—one of those annoying circumstances that the peach-grower prefers to avoid if possible. Fortunately this disease is easily prevented by a thorough winter spray applied as late as possible in the dormant season—the same one that is put on for the scale insects will also prevent the development of the leaf curl.

Scab and brown rot are two diseases of the fruit that can readily be prevented although there are sometimes seasons when the brown rot seems to persist in spite of everything that can be done. Scab produces the small round black spots that one finds on nearly all unsprayed peaches. It is surprising how much fruit we see in the city markets that has this blemish. A few growers still insist that it is a minor trouble and some even think it is inevitable. I remember that I once spoke to a grower

about it on the fruit in his orchard and suggested that he could prevent it by proper spraying. He laughed at me. "Why, mister," he said, "that ain't no disease. That variety of peaches *always* has them marks." In his orchard his statement was correct. That variety always had and always would have "them marks" until he began to use modern spray methods.

Peach blight is a disease that affects the twigs causing an exudate of gum. The buds may also be killed and the leaves dwarfed. Often on badly affected trees the fruit drops. This disease is probably widely distributed but more or less confused with other troubles. In Indiana I have known of its existence for more than ten years and during the last few seasons it has appeared to be more common. Since not much work has been done on it with a view of preventing its injury, we are short of information as to the best method for control. A strong spray of lime sulphur applied in winter seems to be the best method so far. For best results this should be applied early in winter in order to prevent the killing of the buds by the disease—which seems to do at least part of its work in the dormant season. Where blight is present it will probably be necessary to make two dormant applications of commercial lime sulphur diluted at the rate of one to six.

The first of these is applied as soon as the trees become dormant and the other as late in winter as possible. The first will control the blight and the second will prevent injury from the leaf curl. Both applications, of course, will kill any scale insects that may be present.

The first summer spray should be applied shortly after the trees have shed their petals in the spring. It consists of the self-boiled lime sulphur solution to which is added arsenate of lead (dry) at the rate of one and one-half pounds for each fifty gallons of spray material. This application is important in the control of the curculio.

The self-boiled lime sulphur is made by placing eight pounds of stone lime in a barrel and adding enough water to start it slaking. Immediately add eight pounds of flour sulphur and begin to stir, adding more water as needed to keep the slaking process vigorously at work. There must be enough heat present to cause some of the sulphur to combine with some of the lime, producing a slight coffee brown color. When this color is reached the barrel may be filled with water and the entire contents, sediment and all, used for spraying. A little experience will teach any grower just how to prepare this solution, the important point being to cook it just enough but not too much. A good batch should, after settling, show a clear sul-

phur color when viewed by transmitted light. Take up a glass full from the top of the barrel after it has stood for five minutes. If the clear yellow color is not present it means that the sulphur for some reason did not make connections with the lime—usually indicating poor lime or too much water added at the start.

The second spray is applied as the “shucks” fall from the young peaches. The materials used are the same as suggested for the first spray application.

In a normal season these two sprays should insure a clean crop of fruit on all early varieties, but if the weather is very warm and wet just prior to the ripening period it may be advisable to spray at that time to prevent brown rot.

On mid-season and late varieties a third spray should be applied a month before ripening to insure freedom from scab. (This will not apply to very late sorts such as Krummel which ripen six weeks after Elberta. They frequently require no later sprays than those given to mid-season sorts.) Sometimes a wet season will upset everything on the peach-grower's schedule and he will be forced to spray six or eight times to protect his crop.

“How close to picking time do you think it is advisable to spray peaches to prevent brown rot?” I asked one successful grower.

“Twenty-four hours,” he responded promptly, “in fact I don’t know but that I might spray the same day that I picked them if I expected to ship them any distance, for sometimes the rot will attack them in transit. I have known peaches to be packed in perfect condition only to arrive in market in a half rotten condition. Late spraying might help that.”

Where peaches are to be grown for the city markets we must select large fruited, yellow varieties that are known to produce big crops. The city buyers want a big yellow peach and the easiest one of that class to grow is the Elberta. This old sort is still holding its own against its newer rivals, the J. H. Hale and the Early Elberta. The Hale has been a disappointment to many growers both in vigor of tree and productiveness. The fruit is unquestionably better than the Elberta if we are to judge only by our preference in the matter of taste. The Early Elberta is promising as a comparatively new sort.

For local markets the finer quality, white fleshed sorts may prove profitable. Certainly they should be included in all home orchards as should some of the yellow varieties of the Crawford group. The Early and Late Crawford are splendid peaches as are also the Foster and Fitzgerald, but in most sections they bear such shy crops that they can hardly com-

pete with the reliable, though coarse, Elberta. Growing for market usually means growing what the market wants and until the city man learns to pay a higher price for a higher grade fruit he must be content with the cheaply grown Elberta.

CHAPTER IX

PLUMS AND CHERRIES

“Cherry ripe, ripe, ripe, I cry,
Full and fair ones, —— come and buy!”

—HERRICK.

PLUMS and cherries are closely associated in more ways than one, and we can well consider both fruits at the same time. To begin with, they are closely related botanically, they respond to similar methods of cultivation and they both suffer from the same diseases. Both of them were a little slow in achieving popularity in this country, owing to the fact that neither was ever largely used as a source of alcoholic beverages. Our early development in the field of peach- and apple-growing was entirely the result of the use of those fruits for the production of something to drink. It was long after Colonial times that fruit-growing as a means of increasing the food supply developed into an important industry. Consequently plums and cherries got a comparatively late start in the race for popularity. Even at the present time neither fruit is grown in sufficient quantity to

supply the markets of the country—this in spite of the fact that some centers of production have been confronted with problems of overproduction. Taking the country over we never have a sufficient supply of either fruit, and with the increasing transportation rates this will be still more apparent and should result in a more wide-spread planting of these trees as well as of other fruits. Centralized production will probably never again be such a conspicuous factor in any branch of the fruit industry as it has been in the past. The tendency will be more and more toward growing fruit in smaller orchards to supply local demands rather than to make large plantings with a view to distributing to customers on the other side of the continent.

Such an arrangement should work out easily enough with both plums and cherries, because some varieties of both fruits may be grown in nearly every state in the Union, and with development of special varieties for local use, the industry should be placed on a firm basis all over the country. Not every state nor every county in any one state may expect to produce all kinds of plums and cherries. Some varieties are extremely particular as to their soil and climatic requirements and will probably never be much grown outside of their present rather well-defined areas.

While plum- and cherry-growing was slow in reaching popular favor, there is no reason to believe that these fruits were unknown to the early settlers of the country. As a matter of fact some of the first French explorers and pioneers carried both kinds of trees into the American wilderness at a very early date. The old settlement of Mackinac Island in Michigan had its early plum and cherry trees as did Vincennes, Kaskaskia and perhaps other middle western points. As I have said, however, these early plantings did not arouse the enthusiasm that came from the other fruits which served as the basis for the "high life" of early days.

The plums commonly grown in this country to-day come chiefly from four sources—Europe, Asia, America and hybrids among these three. The native plums of the American woods have served as the parents of a long list of varieties of hardy sorts capable of withstanding many vicissitudes in the way of climatic conditions. Some of them are as resistant to cold as is the apple; some can be grown in soils so retentive of moisture that others would quickly perish. Altogether there are few places in the country where plums of some sort can not be grown.

Cherries are rather more particular as to their environment than are plums, but in many sections they can be grown with such little attention that they should be in every farm door-

yard. For the best results with plums the soil should be fairly rich and in texture a clay loam—although I know of some splendid plum orchards planted on very sandy soils. The cherry is at its best in a warm sandy loam and some varieties refuse to live on a diet supplied by clay soils. In the case of both fruits the subsoil must be of a loose nature; hard impervious subsoils are always to be avoided for they perhaps cause more failures than any other factor which enters into the game. Trees of plum and cherry are usually planted at from one to two years of age, depending upon the variety. Strong growing sorts often produce good-sized vigorous trees at one year while slow growing kinds take longer. As with all other fruits, the younger the nursery tree the greater the chances of getting it to grow, when transplanted.

The question of stocks is one which the plum- and cherry-grower must consider much more carefully than does the peach or apple orchardist. There has been in the past, and still is, for that matter, a great deal of confusion regarding the correct stocks on which to work these two fruits. In the case of plums the correct stock—or rather the ideal stock—has probably not yet been found. It may be that some of the recent importations from Asia may prove to furnish the best root system for this

fruit. Certainly there is much to be desired in this field of investigation.

The Japanese plums at the present time are grown chiefly on peach roots, and as a result they sometimes fail from the same causes that render most of our peaches short lived. If a really satisfactory stock for Jap plums can be found it will do much to render the plantings of this tree more permanent than can be claimed for them to-day. Where plums of any sort are to be grown in a sandy soil, however, the peach stock gives excellent results—perhaps better than any other root system, even that of the European plum. Many American varieties are worked (grafted) on native seedlings and such a combination results in an excellent tree in the sections where American plums are mostly grown. This area is in the Central West and in the South, where the European and Jap kinds fail to reach their greatest perfection.

In New York, Michigan and the Pacific Coast country, where European plums are grown in such a manner as to “out-Europe” Europe, the favorite stock at this time is the Myrobalan—a form of European plum that has been used as a stock for generations. In the matter of growing cherries there is also difference of opinion regarding the best stock, some nursery-men adhering to the use of the Mahaleb while others favor the Mazzard. Both of these are

European cherries, growing wild in many parts of the continent. The Mahaleb resembles to a certain extent our native wild cherry while the Mazzard is simply a primitive form of the sweet cherry. It would appear that the latter stock was the more logical form on which to bud or graft our cultivated cherries because of its obvious close relationship and many horticulturists have adhered to this theory, claiming that the resulting trees were more vigorous, showed greater resistance to cold, and were longer lived. In actual practice, however, the nurserymen found that the Mahaleb produced a better-looking nursery tree. Naturally the grower of trees wanted to grow as nice-looking stuff as possible because nursery stock, like many other things, sells on its looks. Then too, the Mahaleb stocks were cheaper than the Mazzard, they were more easily budded, and a larger per cent. of the buds adhered and grew. With those arguments in his favor it would be a very slow sort of nurseryman who could not convince the prospective planter that he wanted his trees budded on Mahaleb stock—provided the prospective planter was sufficiently informed to ask about the matter before buying the trees. Consequently, in this country, nearly all cherries are at present budded on Mahaleb stock regardless of whether it is the best cherry stock obtainable.

In the orchard the trees on Mahaleb roots usually show a greater adaptability to varying soil conditions, and in any soil they will probably make just as good or better trees than will the Mazzard, for the first eight or ten years of their life. After that, if they have lived at all, the Mazzard trees will probably show a gain on those having an under-pinning of Mahaleb. If I were planning a cherry orchard on soil that I knew to a certainty was adapted to the growing of cherries, I think I should prefer Mazzard roots simply because they are longer lived. If I had any doubt about my soil I should prefer to risk the Mahaleb as it would stand a greater chance of making a success in a questionable locality. It is probable, too, that when cherry trees are to be used as fillers in an apple orchard that the Mahaleb would be preferable to the Mazzard stock because the trees would likely come into bearing a little sooner.

Plum and cherry trees should be planted when not more than two years old. One-year-old trees are preferable, but some varieties make a poor growth in the nursery the first year and as a result are held until they acquire size. Occasionally some unscrupulous nurseryman will have a block of unsold trees at the end of the second year, which he will hold over to dispose of later. I once saw a case where a small nurseryman who had a place away back

in the hills held a block of sour cherries until they were five years old. These huge trees he was offering to buyers at a fancy price, claiming that by planting them they would secure "immediate results." There is no more wicked phrase in horticulture than that same "immediate results." It has been used to lure on the purchaser of fruit trees and grower of roses, it has tempted the home builder and has lead to disappointment on the part of many a man and woman who hoped to beautify their grounds. In the growing of anything in the way of trees or bushes the planter should remember that "immediate results" are a snare and a delusion. Art has nothing on horticulture when it comes to slowness and no man cursed with a scant store of patience should ever plant a tree of any sort. Cherry trees in particular are difficult to transplant even at one year from the bud and as they grow older they resent still more any change in their environment.

The standard planting distance for most plums is twenty feet, but this will vary somewhat with different sections and to a still greater extent with different varieties. Some of the strong growing sorts like the Red June, Burbank and Lombard require more space than the dwarfish kinds represented by the Green Gage and Damsons.

Cherries are planted from twenty to thirty

feet apart—depending again on the variety. The strong growing sweet sorts require at least the greater distance mentioned while sour sorts like English Morrelo may be planted as close as sixteen feet. Montmorency, a strong growing sour variety, should never be planted closer than twenty feet.

Both plums and cherries are sometimes used as fillers in apple orchards and usually with better success than peaches. The foliage of these fruits is less liable to injury from the spray which is applied to apples than is peach foliage. An exception to this statement should be noted in the case of the Japanese varieties of plums, the foliage of which is almost as tender as that of the peach. However, I have used Japanese plums as fillers in an orchard of Delicious apples and have so far escaped with very little injury caused by the apple spray blowing on the plum leaves.

I remember that when I was a boy I used to hear farmers talk about planting plums, and in our section there was a superstition to the effect that such fruits should always be planted in groups of seven—and preferably in a circle. It was supposed that if planted singly or in smaller numbers than seven, they would not bear. Like many other superstitions there was just enough truth in this statement to lend it color. The truth is that many sorts of plums



Clean cultivation in a cherry orchard at Traverse City, Michigan.



Thinning plums is a necessary operation with some varieties.

are "self-sterile." That term means that the pollen from a given tree will not fertilize the fruit on the same tree—or on other trees of that variety. The same thing is true to a large extent in the case of cherries and for that reason plantings of either tree should include more than one variety. Some sorts seem to be fertile when planted alone. Others appear fertile in one section and sterile in another so that it is not possible to give a definite list of sterile and fertile sorts and feel sure that such a list would be accurate for all localities where the fruits might be grown. It is far better to play safe by planting a number of varieties, making a shotgun prescription of it and being sure that there will be a sufficient assortment of pollen to insure fertility to all the varieties grown.

I have mentioned that the Japanese varieties of plums are largely grown on peach roots and the foliage is almost as tender as that of the peach. There is another similarity in that the trees should be pruned in almost the same way that peaches are. To start with, the trees are cut back to a stub about eighteen inches high at planting time. At the end of the first season these stubs should have produced strong shoots varying from a foot to three or four feet in length. These shoots are again shortened in—each one being treated exactly as was the young tree in the first place. After that the annual

pruning will consist of shortening in the new growth and removing those branches that seem to crowd. American and European plums require much less pruning. In fact there are growers who advocate almost no pruning on these sorts, but the most successful grower starts his trees as a stub and each year removes enough to keep the trees fairly open to allow plenty of air circulation among the branches. Some European plums have the bad habit of climbing skyward like a Lombardy poplar and these are the despair of the grower who desires low heads. In some cases the tendency can be corrected by removing the leader and forcing the growth to the lateral branches, but usually the European plum is a strong-headed individual and will make a graceful spire in spite of our desires to the contrary.

Cherries are pruned much less than are plums. The older growers sometimes advocated no pruning at all, but present practice recognizes the value of systematic thinning of the tops to allow sunlight and air to enter. The initial pruning at planting time varies somewhat from that of other fruits. Instead of being cut back to the conventional stub the cherry tree should be thinned so as to leave a few of the stronger side branches. These branches carry strong buds from which growth starts more easily than it would from the semi-

latent buds distributed along the trunk. Owing to the difficulty with which the cherry establishes itself in a new locality it is thought best to make it as easy as possible for the young tree to put forth its new shoots—hence the sparing of the bud-covered branches.

Sweet cherries, like most of the European plums, have that upright habit that pleases the artistic soul and drives the fruit-grower to distraction. Out of several hundred trees I have perhaps two or three in which this tendency has been overcome by pruning, but the rest are heading skyward as fast as their rather reluctant roots will let them. From my window I can see a single tree of the Napoleon variety, that finest of sweet cherries, and its top is as regular and tapering as a Lombardy. Having failed to change the habit of growth of one of my “pet” trees, one that stands daily before my eyes as a reminder of the futility of trying to correct its bad habits, who am I to tell you how it should be done?

Cherries and plums should both be given thorough cultivation. They resemble the peach in that they will not succeed in sod.—Yes I know that some of my readers will rise up and shout that they have trees growing in sod and that they always bear, etc. Save your postage—I know that it sometimes happens, but I suggest that you break the sod around those

neglected trees and watch the improvement in the size of the crops and the quality of the fruit. Cultivation should stop early enough in the summer to allow the trees to ripen their wood thoroughly before winter. In the latitude of Philadelphia this should be around the middle of July or the first of August, and the orchard should be planted with some cover crop such as rye, wheat, crimson clover, vetch or rape. Little or no fertilizer is needed on either the plum or cherry. We have recently been using small quantities of nitrate of soda on Japanese plums with what we think are good results—this, again, is in line with the close relationship that seems to exist between these fruits and the peaches. Humus in the soil we must have for neither plums nor cherries will succeed in a burned-out clay or loose sand. This is supplied by the cover crops that are turned under each spring—and the turning under should be started early enough that the work can be done with a heavy disk rather than with a plow.

Plums have a corner on two diseases that do not bother cherries. One of these is black knot, a disease causing blackened swellings on the branches of the European varieties. I have never seen it on Japanese plums and seldom on American sorts. There is but one way to get rid of it and that is to cut and burn the affected portions. In some sections it is such a serious

menace to the industry that European sorts can not safely be grown at all.

“Plum pockets” is the name of a disease that causes the fruit to swell into puffy distorted shapes. It is caused by a fungus and may be corrected by the application of a strong winter spray of commercial lime sulphur diluted at the rate of one to five.

Crown gall is a disease that may be found on nearly all fruit trees in the form of rough excrescences at or near the soil line. The trees as they come from the nursery should be inspected and if found to be diseased they should be burned. The grower who has crown gall in his orchard usually has only himself to blame, for he has probably planted it with his trees. Sometimes the most careful nurseryman may send out slightly infected trees through an oversight and sometimes the crooked tree man may trim off the galls and smear the wounds with mud—yes, that very thing has been done, and done recently. Therefore, look at your trees carefully before you plant them—and then look a second time to be sure.

Brown rot and shot-hole fungus are two diseases that attack the plum and cherry with almost equal impartiality. They are the bane of the stone fruit-grower’s existence for they sometimes attack with such virulence that the crop may vanish into thin air almost before we

know that the disease has appeared. The brown rot is a disease of the fruit, causing it to rot just at ripening time. Sometimes it becomes so thoroughly established in the orchard that it attacks the stems of the fruit shortly after the trees bloom. In such cases the crop is lost almost before it is formed. I have seen trees that were so badly infected in this way that the owners never secured any returns. We once leased an apple orchard in which stood a single sweet cherry tree. The owner did not know even the color of the fruit, never having seen a ripe cherry on the tree. We sprayed it and that year picked sixty gallons of perfect cherries.

Shot-hole fungus does not attack the fruit directly but injures the foliage to such an extent that the tree is unable to ripen its crop. Its first appearance is noticed when the leaves begin to turn yellow early in summer. Portions of the leaf frequently fall out, leaving holes such as might be caused by firing through the tree with a shotgun—hence the name. Ultimately the affected foliage falls from the tree, leaving the fruit to get along as well as it can. When we realize that all of the elaborate juices that go to fill the skin of any fruit, must first pass through the laboratory of the leaf we can realize the importance of keeping these structures in a healthy condition. It is for this rea-

son that the careful grower sprays his orchard every year, regardless of whether he has a crop of fruit or not. The leaf must always be considered the gauge of the health of the tree, regardless of what sort of tree it may be, and in the leaf is reflected, too, not only the crop which may be on the tree at the time but the crop of the next year, for the fruit buds are formed and must be nourished almost a year in advance of their blooming period.

Scale insects attack plum and cherry trees just as they do other fruits. The sour cherry, however, is considered rather immune to the much talked of San José scale, but it has a special scale of its own (the cherry scale) that sometimes becomes troublesome. Jap plums are frequently attacked by San José scale with all the enthusiasm which that pest exhibits for the peach—another similarity between the two fruits.

The fruit tree bark beetle, a tiny beast that bores knitting-needle-sized holes in the trunk and branches, is a common pest on all fruit trees but especially on cherries. It is, however, almost always a secondary parasite for it does not relish the juices to be found in a vigorous tree. It will nearly always be found in trees which have been injured through some other cause and is not to be feared by the grower who keeps his trees in a state of healthy activity.

The curculio is one classic insect pest of the stone fruits. Of course it does not confine its ravages to fruits of that class, but it is on the peaches, plums and cherries that it has made its most notable record. A native insect, ranging over the greater part of the fruit-producing United States, this beetle causes hundreds of thousands of dollars' worth of damage every year. Its economic importance is ten times that of the San José scale in spite of the fact that it has not been dignified by the passage of any laws against its existence. The creature attacks the fruit soon after it forms and cuts small crescent-shaped slits in the tender tissues. In these slits the eggs are deposited. The young grubs feed on the surrounding pulp until the fruit is either ruined or falls from the tree.

A spray program for plums and cherries can be worked out that will give a large measure of protection against nearly all of the diseases and insects mentioned. The curculio can, of course, be eliminated by providing a supply of arsenate of lead very early in the season. This can be applied at the same time that the first spray for brown rot goes on, which is shortly after the bloom falls. Some growers are now spraying immediately after bloom and again as soon as the calyx cups have been shed from the young fruit. The double dose will no doubt pay its cost in seasons that are marked by cool

wet weather. And remember, too, that a spray applied just before a rain is quite as valuable if not more so than one applied after the rain. We have so often heard the expression—"Too bad, but the rain washed off all the spray and now it will have to be done over again." Rain does not wash off all of a properly applied and properly mixed spray solution. Consequently if we can protect our trees before the wet weather arrives, they stand just that much better chance of resisting the attacks of the fungous diseases.

The best spray for either plums or peaches is the self-boiled lime sulphur solution, but it is so much trouble to prepare that many growers have been using commercial lime sulphur diluted at the rate of one to fifty. In some cases it is probable that this would injure the foliage of Japanese plums, but it appears to be safe on other kinds and all cherries. To each fifty gallons of spray is added one and one-half pounds of powdered arsenate of lead for the benefit of the curculio and any incidental leaf eaters that might happen to take a fancy to the foliage or fruit.

Later summer sprays are always advisable for both plums and cherries because the leaf spot (shot-hole) fungus frequently causes mid-summer damage. Consequently the best cherry-growers apply a spray shortly after the crop is

harvested. (I can just imagine some of the short-sighted "old timers" saying, "What's the use of spraying after the crop is off?") It is, again, a case of protecting the next year's crop—or rather a question of making that crop possible. For scale insects and incidental fungous spores, a winter spray of commercial lime sulphur is used at a strength of one to five. Some of my readers may wonder why I advise so strong a solution when they have been taught that a strength of one to nine will do the work. Without going into a detailed discussion here, I will simply say that I was probably among the first to use lime sulphur solutions in scale control work. After many years' experience I have come to the conclusion that the strengths formerly advised are too weak. I would much prefer to apply a spray at the one to five dilution every third year than to spray with one to nine every year. I feel sure that such a program would render an orchard perfectly free from scale insects at a much smaller cost of time and materials than would the annual program.

Harvesting plums and cherries and marketing them, present many problems than can only be touched on here. Both are perishable fruits that must be used quickly in most cases. The American varieties are particularly short-lived, suitable only for home use or for near-by markets. Some of the Japs, such as Burbank

and Red June, can be shipped hundreds of miles and arrive in perfect condition, while many European sorts can be sent across the continent. Cherries are very tender, particularly the sour sorts, and must be disposed of in local markets. Some sweet varieties are so firm and thick-skinned that by picking them slightly under-ripe they may be sent long distances. As a result many Pacific Coast cherries are marketed in the East every year. Cherries so shipped, however, do not represent the fruit at its best. Really to know a sweet cherry one must eat it close to the place where it grows, and it must ripen on the tree. Oregon, probably, produces the finest cherries in the world, but by the time they reach the Chicago market they have lost much of their choice goodness. Michigan and New York cherries are famous wherever they are known, and every year more and more of the crop is being canned for distant markets. A recent development in cherry marketing is to place the fruit in cold storage for future use. Such cold storage, however, is not like that which we know in connection with apples. Instead, the fruit is placed in large cans and is frozen solid, remaining so until ready for use. As a result of this development you may now buy a fresh cherry pie in New York or Chicago any day of the year—and it will actually be a fresh cherry

pie. Tons of Michigan fruit are disposed of in this way each season. I believe that in the future there will be less tendency to produce either of these fruits in such restricted localities as has been the practice in the past. New York, Michigan and Oregon will still lead in production, no doubt, but many small orchards will be, or should be, planted. Growers will seek out the small sections where some form of these fruits will succeed and there they will plant their orchards to supply local demand—all of which is as it should be and as such excellent fruits well deserve.

CHAPTER X

GRAPES

“The Grape that can with Logic absolute
The Two-and-Seventy jarring Sects confute.”
—OMAR.

I BEGIN this chapter on grapes with much the same feeling that Napoleon's soldiers must have had when they stood before the pyramids. Certainly, several centuries of grape-growers and grape-writers have preceded me and when I think of all they have accomplished I feel like a grain of sand in the desert.

There is no denying that grapes have had a tremendous effect on literature—in America there have been more books written about grapes than about all other fruits combined.—And the influence of grapes on other kinds of writing can not be estimated. One wonders, though, if Omar would have been as happy “underneath the bough” if his jug had contained only the Josephus Daniels' brand of grape juice. The making of “juice with a kick” was the reason back of the first cultivation of the grape, not only in world history but in the

history of this country as well. I have mentioned before that our horticulture is in reality based on the liquor business and this is to be emphasized in the case of grape-growing, for certainly no other fruit lends (or lent) itself so well to the making of alcoholic beverages as did that of the vine.

It was for this reason that grape-growing was among the earliest of the arts of the husbandman back in the dim past before the time of written history. It was for this reason too that grapes were among the first of the Old-World fruits that were introduced to the new continent. Not that they were particularly needed, for the shores of eastern America were a natural vineyard of native vines. So profuse were the wild grapes that the Norsemen who first landed on our shores gave the place the name of "Wineland." These wild grapes, however, were not to the liking of the French and English who followed, and they sent home for plants of the sorts with which they had been familiar, thinking that in a country filled with wild grapes the European sorts would certainly thrive. Unfortunately, their expectations were due to receive a jolt, for the introduction of the European sorts was a failure almost from the start. It is true the vines grew and perhaps for a time they produced some fruit, but inevitably they all died. Time after time the exper-

iment was tried, first in one colony and then in another, until it was conclusively proved that American soil was not suited to the European sorts.

Later a solution of the problem was found when it was discovered that a tiny insect on the roots was the cause of the failure of the imported grapes. The native sorts were immune to the pest and lived and thrived and grew apace, but the *Viniferas* from across the sea perished as the white men used to perish in a fever-ridden tropical country. This solution came so late in the day, however, that the growers had turned to native sorts which were improved by selection until we have to-day an enviable assortment of varieties all derived from indigenous grapes.

In California the European sorts are grown almost exclusively and with great success—all being grafted on native roots. The same method would no doubt prove a success with European sorts in Eastern America at the present time, but with our excellent native sorts of known hardiness there is less incentive for the growers to attempt the cultivation of the more tender exotic forms. The superior quality and flavor of European sorts may be great enough to tempt amateurs to grow them on native roots in the East, and there is no reason why such attempts should not succeed. As

a commercial proposition I doubt if it would ever be particularly attractive.

The grape, in some variety, is so widely adapted to soil and climate, and it withstands the vicissitudes of city life and can survive in cramped quarters so well that it has been called "the poor man's fruit." Many a city back yard even in the closely crowded sections is graced by a grape-vine and the family is enriched by the production of a lavish crop of fruit year after year even under conditions of almost absolute neglect. With a little care these vines could be made to yield much more than they do and other vines should be planted by every householder. Commercial vineyarding has its drawbacks, and it is in only certain sections that it becomes profitable, but a few vines about the farm-house or in the door yards in towns can be made a financial success with so little effort that they should never be overlooked.

I have said that some variety of grape could be found for almost any soil. This is true but the ideal grape soil, the sort that the commercial grower seeks, is one that is warm and loose. Like all fruits the grape does not thrive in a cold, wet, refractory soil. Neither does it do its best in a soil containing too much sand. A happy medium is best—one that is deep and well drained, not underlaid with a water hold-

ing hardpan, one that soaks up moisture in the winter and spring rains and retains this moisture through the dry summer months. Such a soil can be looked to confidently to produce vigorous vines and abundant crops of grapes. Such a soil too, need not be overly rich but rather one of those "good fruit soils" that I have already described at some length in previous chapters.

Like other fruits, grapes should be planted on land higher than the surrounding country in order to secure as great protection from frost as possible. A hillside sloping to the south is favored by many vineyardists as being the best exposure for the grape. So planted, the vines get the benefit of the full summer sun and it is thought that the fruit is of better flavor and quality than that grown on the more shaded hillsides sloping to the north.

The eastern commercial grape sections are chiefly located in New York, northern Ohio, Michigan and Missouri. In all of these states grape-growing has become almost a fine art, and the residents have acquired a skill in handling the vines that is not possessed by the average farmer or by the average general fruit-grower. Even the transient labor in such sections is more or less skilled in vineyard operation so that the owner can more readily care for his crop and for his vines. If one would start

a vineyard of any size in a section that is not already growing grapes on a commercial scale he must understand from the start that he would have to train his helpers "from the ground up."

The grape is one of the most easily propagated of all our fruits. If a new vine is allowed to remain in contact with the ground through the growing season it will likely be found to have developed roots at the joints and if severed back of these roots it will constitute a new plant which may be transplanted.

This tendency of the vine to root readily is the basis of the methods used by nurserymen to grow new stock. Cuttings are made in the winter while the wood is perfectly dormant. Often they are taken in the fall as soon as cold weather sets in and are kept in a cool moist place until early spring when they are planted in the nursery rows. Such cuttings consist of a section of wood of the previous summer's growth, having a joint at each end. In planting, the top joint is placed just at the ground line and from it the new shoot develops. The roots form from the joint that is placed under the ground. In the case of new or rare sorts it is possible to make cuttings which contain only a single eye or joint. These are planted a few inches below the surface and both roots and sprouts come from the same node.

Undesirable varieties that have shown themselves to be inferior or not adapted to a given locality, may be grafted to any sort the owner may desire. There are various ways of doing this, but the easiest is to dig the earth away from the vine for a distance of several inches below the soil. In this way the main trunk is exposed and it is then cut off two or three inches below the surface. The stub is split and a wedge-shaped scion is inserted much after the fashion employed in cleft grafting the apple. If the stub is an inch or more in diameter it will probably pinch the scion hard enough to hold it in place. If it is of less diameter one should use a bit of twine to bind the stub and thus secure a perfect contact. After the operation the wound should be wrapped with tin-foil or oiled paper and the earth replaced and mounded up slightly around the protruding scion. Such grafts inserted in strong old native vines have been known to make a growth of eighty feet in a single season. Some years ago a number of Italians purchased small farms in my neighborhood and one of the first things they did was to graft the wild grapevines they found growing in the hills. The sixth year after grafting one such vine one of the men reported gathering a "wagonload" of grapes from it. He did not specify the size of the wagon, but admitted that the grapes made a

barrel of wine. (Some grape-vine!) Grafting is not resorted to in commercial nurseries except for the growing of European sorts, which as I have stated, can not be grown in this country on their own roots.

The soil for grapes should be prepared by plowing or digging it very deeply. Ordinary plowing is hardly sufficient—especially as we habitually think of the term in this country. Our ordinary farm plows do not break the soil to a sufficient depth for grapes which are naturally deep-rooted plants. In the vineyard sections of the Old World the vineyard locations are prepared by hand and the soil is dug up much more deeply than we ever think necessary—perhaps this is one of their secrets of success. The surface should be harrowed and smoothed much as we would prepare it for any other crop, and the vine locations measured off and staked for each individual vine. The holes should not be dug until the plants are actually on hand and ready for setting as it is important that the roots have fresh turned earth in contact with them if they are to start into growth promptly and satisfactorily.

In the East vines are planted at various distances. Our own vineyard, planted in squares eight by eight feet, is too close. It is difficult to drive through and the vines overlap one another. Nine by nine feet is a commonly used

spacing, but probably nine by twelve is better with the nine-foot distance between the rows. The pruning of the grape starts when the vine is planted. Furthermore the young plant is pruned at both ends and the tops and the roots reduced to almost rudimentary proportions. The top should be cut back to one or two buds and most of the long fibrous roots should be cut off. When a large number of vines is to be planted it becomes quite a job to do this pruning, for the young grapes have a way of making a tremendous lot of fibrous roots. If planted unpruned, many of these roots would die anyhow and might prevent the young plants from doing so well as they should. I remember that when we planted ten acres of vines we thought we would never get through cutting off roots. Then some one had a bright idea. We got a section of a beech log and set it on end like a small butcher's block. Taking up a bunch of vines we placed the fibrous roots on the block and pruned a dozen or more at one swipe with a hatchet. This method proved effective and rapid and the vines so handled grew just as well as those that we had carefully prepared, one at a time, with a pocket knife. (And I might add that all of them grew excellently.)

I have mentioned that grape-vines are grown from cuttings containing two joints. From this

statement it follows that vines of different varieties will not be the same in size. Some sorts have long distances between the nodes, and the plants of such varieties are so long that they are planted with difficulty. Instead of planting them with the main trunk straight up and down, we made long holes and installed the plants in an inclined position, trying, of course, to get the bottom end as deep in the ground as possible.

There have been a number of books written around the general subject of grape pruning. It has been one of those tempting, controversial affairs that horticulturists have enjoyed mulling over. Some of the systems advocated remind me of automobile literature, as many of the features described are of value chiefly as "talking points." As a matter of fact almost any system of pruning will result in some fruit—just as will no system at all. After a vine gets a good start it is difficult to do anything to it that will keep it from bearing some fruit—although there are certain insects and diseases that seem to be able to accomplish this result with very little effort. I recall one time that I was consulted by a man who had just purchased an old farm. Around the house, covering the fences, were some neglected vines—a great tangle of them. My advice was wanted as to the best method of pruning them. The job looked absolutely hopeless and I advised cut-

ting them off at the ground in the hope that a new start might be made and that it might be directed into some semblance of symmetrical growth. My advice was followed. The first year, of course, the fruit was absent, but on the year following my friend had so many grapes that he did not know what to do with them. (And that was before the drought too.)

There is no great secret about the pruning of grapes. Any so-called "secret" rite owes its existence to the itinerant gentleman who goes about in the spring of the year shearing vines at a fancy price and charging for his expert services. One should bear in mind just one thing when he attacks a vine with a view of pruning it. That thing is that the fruit is produced on shoots which spring from the canes of last year's growth. Fix that fact firmly in your mind and you can safely prune any one's vines and feel sure that you will do no damage, for on it is based all modern and ancient systems of grape pruning. It is easy enough even for a child to determine the canes of last year's growth. These are thinned out if they are too thick and the remaining ones are shortened in. In this way the number of bunches that the vine might produce is reduced, but the individual bunches will be increased in size, owing to the reduced drain on the vines. Such is grape pruning.

If one cares to make a distinction between pruning and training, and I think we might do this in the case of the grape, he may have a wide variety of styles to choose from. You might plant a vine down by the barn and by careful training bring it around so that it will shade the front porch, or, as they do in the West, you might reduce it to a bush. There is one system of training, however, that deserves detailed mention because it is, to my notion, the most serviceable one for the average grower. It is technically called the "Knifin drooping system." By this plan the young vines are allowed to grow for one or two seasons, keeping the growth confined to one or two main stalks. At the end of the second season the main stalks or trunks are ready to tie to the wires. Two wires are used at heights of three and six feet above the ground. One of the trunks is headed so that it comes to the lower wire and the other so that it reaches the top one. From these main stems lateral branches are allowed to develop so that a vine is trained out along the wires on each side of the main stems. If there is only one main stalk it supports all four of these lateral branches, two of which are allowed to grow at the height of the lower wire and two at the upper.

At the end of their first year's growth these

lateral branches, called canes, are shortened in until from four to eight buds or joints are left. From these four to eight buds will spring new shoots which will droop from the wires and on which the fruit will be produced. During the early summer it is the practice to go over the vines carefully and remove all of the fruit from those shoots which are nearest the trunk—that is, the four new shoots nearest the trunk are allowed to grow without fruit. At the next pruning the old wood is all removed except the virgin shoots from which the grapes were taken early in the year. These shoots are then bent upward and are tied in place on the wires and form the points of origin of the next season's fruit-bearing shoots. From the description I realize that it sounds complicated—like the description of the gear shift in an automobile. In practice, however, it is quite simple—just as the instruction book says. This system of pruning results in a maximum yield of fruit and it produces a wonderfully attractive-looking vineyard or arbor. Unfortunately, if a hard winter comes along and kills back a lot of your vines, or if the seventeen-year cicada goes on a spree and ruins the tops of the trunks, your beautiful system may go to pieces so fast that it will make your head swim. In that case thank your stars if you have anything at all left to prune and remember that the fruit is always borne on

shoots which spring from canes of last year's growth. If you remember that one fact you are not likely to go very far wrong in any man's vineyard.

Intensive cultivation of orchards is a comparatively new thing, but we have ample evidence in the Bible that vineyards were cultivated in those days. Several references are made to "digging" the vineyards which show that even then the value of stirring the soil about the roots of the vines was recognized as a beneficial practice. It is valuable to-day no less than it was two or three thousand years ago and the modern viticulturist recognizes the fact.

There are a number of insects which attack grapes, and in some sections and some seasons they are very injurious. The first to make its appearance is the grape-vine flea beetle, a steely blue insect about a quarter of an inch in length, which feeds on the opening buds of the vine. I have seen them so numerous and so vigorous in their attack that the vines appeared to have been killed. Later, other buds, weaker ones of course, were put forth and the life of the vine was continued. The injury can be prevented by spraying with arsenate of lead at the rate of two pounds to fifty gallons of water. The larval form of the beetle feeds on the leaves. It is automatically poisoned in

regularly sprayed vineyards. However, since the insect lives on wild vines, it should be watched for each year whether the vineyard has been sprayed or not.

The grape berry moth is an annoying pest, the larval form of which feeds in the fruit. Repeated sprays of arsenate of lead are needed in sections where it is common. The spray solution should also contain enough soap to enable the spray to spread over the surface of the grape and prevent it from drying on in drops. If the soap is not added the young larva will readily find uncoated surfaces through which it can penetrate unharmed.

The grape root worm has caused serious damage in vineyards in many sections. The larval form feeds on the small roots of the vine, reducing its vitality and ultimately causing its death. Clean cultivation is of some value in this connection. The adult beetles feed on the surface of the leaves and many of them can be killed by spraying. There are a number of injurious diseases that affect the grape in different ways. Several forms of rot may attack the fruit. The importance of these diseases varies with the location to a great extent. In some sections the vines are fairly free from such trouble while in other places the crop may be almost entirely destroyed by rot.

Most careful vineyardists spray three or

four times during the season, applying the first spray just as the buds are breaking. The second application is made just after the bloom falls and the third when the fruit is the size of a small pea. In some years additional sprays are put on just before the bloom, and two weeks after the small pea stage has been reached. In all cases Bordeaux Mixture is used as the basis of the spray solution and to it is added two or three pounds of arsenate of lead. As above mentioned, soap should be added to some of the sprays in order to secure good spreading quality.

The small grower often can not go to the expense of spraying. Sometimes indeed he may have good results without it, but nearly always the quality and appearance of the fruit is improved by proper use of the spray machine. Where this is impossible, or where grapes are grown on a small scale, the individual bunches can be protected from insects and to some extent from fungous diseases, by tying them up in small paper bags. A two-pound sugar bag such as is used by grocers everywhere serves admirably for this purpose. It is slipped over the bunch of fruit when the berries are the size of peas or smaller, and tied firmly around the stem. In addition to keeping the fruit free from insects and rot these paper bags protect the cluster from dirt and dust of

all kinds and the fruit comes out in the fall beautifully clean and perfect. Those who grow grapes for home use should always take extra time and trouble to bag a portion of the crop at least, for the fruit when so protected will remain in good condition long after the exposed bunches are gone. I have frequently had them in perfect shape late in November and there is nothing more refreshing than to open a bag of grapes on the vine some crisp cool morning when the frost is on the pumpkin and the fodder has all been hauled into the barn.

The question of marketing the grape crop has undergone very severe revision in recent years. Formerly a good portion of the fruit was converted into wine, as has been the case since Bible times. With the advent of prohibition this outlet for the crop was eliminated and for a time it appeared that the vineyard owners would have to tear out their vines and turn their attention to some other crop. In a few instances this was actually done, but the growers who held on have made money by doing so. After the country went dry there appeared an increased demand for unfermented grape juice. (Whether the increased demand for raisins had any partnership in this I do not know.) To-day a large part of the crop is converted into this temperance beverage and the grape-growers should at least

extend their gratitude to one W. J. B. for the free advertising which he gave them. There has also been a marked increase in the demand for fresh grapes and consumers pay a price far above that which was obtainable a few years ago, and apparently offer no objections. Even with these higher prices, however, the growers of to-day do not have altogether easy sailing. Increased costs of distribution have reduced the profit, not to the point of loss to be sure, but to a place near that. With a readjustment of freight rates it is probable that the grower will still obtain a good price for his product and take his own profit instead of turning it over to the carriers. Unless a very material revision of these rates is made, the grape-grower will be in the same box with all the other fruit-producers, and the answer will be a more widely distributed system of producing. Local production for local markets will take the place of centralized production for distant markets.

CHAPTER XI

SMALL FRUITS

“Doubtless God could have made a better fruit than the strawberry—but doubtless God never did.” —I. WALTON.

THE desire to get something for nothing, to play without working, to transmute lead into burning gold, are weaknesses of the human race so ingrained that they are not easily overcome. They represent longings that we all have, some to a greater extent than others, perhaps, but down under the surface we are much alike. I always think of these things in connection with small fruit-growing because in that particular business this frailty of the human clan is so often exposed.

It may be that the name “small fruits” has a misleading tang about it. Being small, I presume that some prospective growers have felt that it would be but little work to grow them. Surely a lot of mere bushes, many of which grow wild with no care at all, would not require any special attention if planted on some out-of-the way corner of the farm. We

have all seen blackberries, raspberries, gooseberries, and other forms growing with seeming thrift along the roadsides. Why, then, should these same fruits require any real attention when transplanted to our gardens?

So doubtless have thought many farmers, only to come to grief as they watched their berry plantations sicken and die without producing any return to pay the labor of the original planting. As a matter of fact I know of no branch of fruit-growing that requires greater skill or more intensive cultivation than does the growing of the small fruits. And in this connection I use the word "cultivation" in its widest sense, to include all the tricks we practise upon our growing things.

To begin with the soil must be right, the planting be properly done (and with good plants), the field thoroughly cultivated and the pruning, spraying and harvesting carefully looked after. Neglect one of these points and you court failure as surely as summer follows spring.

And what, you ask, constitutes the "right soil"? The answer varies somewhat with the kind of small fruit you propose to plant, though in every case it should be fairly rich in quality. If it is not so by nature then I advise you to be liberal with the applications of manure which you put on before the field is set. Perhaps a

light clay loam, well under-drained, is the best for the majority of our bush fruits and for strawberries as well. We may have success with wide variations from this ideal, but such success depends upon the local treatment of the soil in question. For instance, I have seen many fine fields of strawberries growing in what appeared to be almost pure sand, but investigation usually revealed the fact that such beds had been prepared either by turning under heavy crops of clover or other green stuff or by providing humus in the form of heavy applications of manure. Then too the question of soil is interwoven with the question of variety. In the case of strawberries this is especially true. An Aroma berry plant will thrive and grow great on a heavy soil that would cause a Klondyke to perish. In no case should the soil be of such a heavy character that it will form a stiff hard crust quickly after a rain—leave the good “baking quality” to the flour millers, but avoid it in the berry patch.

Small fruits are propagated in various ways, according to the sort of fruit that is being grown. In all cases, however, new varieties are produced from seed—just as are the new varieties of practically all plants. Many of these new varieties, too, come as “chance seedlings” in fence corners, along streams and in other waste places where the seeds have been

carried by birds or other accidental agencies. As the generations of small fruits are much shorter than those of the tree fruits it has been a promising field for the plant breeder and much good has been accomplished by systematic growing of seedling plants. This field though has been by no means exhausted and there is a wealth of opportunity for the patient worker who is not afraid to labor and who will not be too greatly disappointed when he finds that the financial reward for his skill does not amount to much.

Blackberries are propagated from shoots which originate from the old roots and spring up all about the parent plant. If neglected, these shoots soon form dense clusters of canes, sapping the life of the parent plant and rendering fruit production difficult.

Raspberry plants are formed in quite a different way, for the tips of the new canes take root where they touch the ground. The next year these rooted tips throw up shoots, the connecting cane dies and a new plant is established. Red varieties of raspberry are propagated like blackberries, however, as their canes do not have this faculty of rooting at the tip.

Gooseberries and currants are grown from cuttings, while strawberries throw out "runners" which root at the joints and form new plants.

In every case it is essential that the plants be strong, healthy, well-grown specimens and that they be kept moist from the time that they are taken from the nursery until they are established in their new home. Probably more trees and plants are injured by drying out on their way from the nursery to the planter than in any other way, and this injury should be prevented as much as possible. A good nursery will usually send out its products in excellent condition and properly packed, but even so a delayed freight shipment may ruin the consignment. For this reason it is well to buy from some reliable grower and then have the plant material shipped by express.

If the ground is not ready for planting when the plants arrive they should be heeled in carefully until they are needed. In the North the best time for planting most sorts of small fruits is very early in the spring—just as early as the ground can be prepared, or, as the Irishman said, “earlier if possible.” And after planting, the first thing the grower has to do is to begin to cultivate. One strawberry grower that I know makes a practice of cultivating his newly set patches as soon as the plants are in the ground—and keeps at it through the growing season. No form of fruit-growing is so dependent upon thorough cultivation as is the growing of small fruits. Weeds not only rob

the soil of the moisture which the roots must have, but they also shade the plants and keep from the leaves that sunlight which they demand and without which they quickly perish.

The blackberry is a truly American fruit and all the cultivated forms which thrive in the East are derived from the wild plants which were on this continent when the white man came here. The Himalaya berry, an introduced form, seems to thrive in some places on the Pacific Coast, but in the East it is a miserable failure. At first advertised as being hardy and growing wild on the high slopes of the Himalaya Mountains, it was sold to many planters through the Northern States. Like many other novelties it failed to make good, for the "hardy" plants died to the ground each winter.

In planting blackberries the rows should be spaced far enough apart to allow thorough cultivation even after the patch has reached full maturity. This means a spacing of eight or ten feet, with the plants three or four feet apart in the row. The apparent waste between the rows can be avoided the first year by growing a crop of potatoes or some other low growing vegetable.

When the plants are two or three feet high, six inches of the top should be cut off to cause the canes to branch out and to stiffen enough



Strawberries grown in the matted row system.



The Lucretia dewberry.

to hold up the crop of the next season. If they are allowed to grow to their full height they will often sprawl all over the place and make life miserable for every one who comes near them. The fruit is always produced on one-year-old canes. Those shoots which have once fruited are of no further use and should be removed as quickly as the crop has been harvested.

It will be seen from this that the pruning of the blackberry consists of only two operations, cutting back the tips of the growing canes as soon as they have reached the desired height and removing the old canes as soon as they have been relieved of their fruit. We might add that the removal of excess suckers around the roots constitutes another form of pruning, but this usually is taken care of by the tools used in cultivation. In time the row becomes a solid mat of roots and the original plants lose their identity. Carelessness in cultivating will soon cause this condition to become general over the patch and the rows will merge so as to form a thicket through which "Brer Rabbit" can wend his way in peace, but which effectively excludes all but the most hardy pickers. The fruit should be harvested when the berries have reached a full black color and not before, as the partly colored berries never develop the perfect flavor of the ripe fruit.

Being a juicy fruit, blackberries are not suited to long distance shipments, but must be consumed within a comparatively short distance from where they are grown. They are at their best when allowed to become fully ripe on the bush and then used as soon as possible. For this reason, only the grower or one who goes to the country and gathers his own fruit can know the real goodness of the blackberry. Fully ripened and made into a delicious cobbler and with real cream, the native blackberry need offer odds to few other fruits. It is a delicacy from the Elysian fields in spite of what doctors may tell us of its affinity for the human appendix.

It is natural that many varieties of this fruit should have been introduced. It is also natural that only a comparative few should remain as standard sorts. Of these the Agawam, Ancient Britton, Early Harvest, Eldorado and Snyder have remained as standard sorts. From this list we should perhaps take the Early Harvest because of its tendency to winter kill; also because it is often badly attacked by orange rust, a fungous disease of the foliage.

Dewberries are simply trailing forms of the blackberry which require some support for their vine-like stems. The "Lucretia" is the most popular variety.

Blackberries are not subject to injury from

many insects or diseases. The orange rust, which produces brilliant colored spore pustules on the leaves, is the most conspicuous and the most injurious. Some varieties are more liable to be attacked than others and for that reason growers are trying to avoid susceptible sorts. Anthracnose, a fungous disease of the canes, is best kept in check by removing and burning the canes, as soon as they have fruited. Stalk borers sometimes cause injury which shows itself in the wilted canes. It is good practice to cut and burn any plant which shows an abnormal condition.

One other "insect" is almost certain to be found in blackberry fields and that is the harvest mite or "chigger." This crawling and burrowing pest makes life burdensome for the pickers unless they take the precaution of dusting themselves thoroughly with fine flour sulphur. The sulphur either kills the mites or repels them—at any rate one so protected is immune from their attack.

Raspberries are closely related to the blackberry—the chief difference being that the berry in the former case separates readily from the receptacle on which it grows, coming off like a thimble from a finger. With blackberries the entire receptacle is picked and forms a part of the fruit. Practically all of our commercial raspberries are derived from

the wild forms of the woods although there is a European raspberry of the red type. In this country it has not shown itself the equal of the varieties we have originated from our own stock. In Michigan and other Northern States there are thousands of acres of burned over land more or less covered with wild red raspberry bushes. Some seasons these yield tremendous quantities of fruit which is used locally and to a certain extent shipped to market. These wild berries are the equal in flavor of any cultivated sorts and some, with the mark of romance upon their brows, will claim that they are even of better flavor. Doubtless this claim is due to the fact that the fruit had been eaten when it was served with that sauce of the out-of-doors—Michigan air.

Cultivated berries excel their wild progenitors chiefly in being more productive. One would need but a small patch of carefully tended, cultivated berries to enable him to harvest as much fruit as might be gathered from some acres of wild bushes. I own a wee island of a few acres in the west end of Lake Huron to which I retreat during the hay-fever season. It is called "Raspberry Island" because of the supposed abundance of that fruit which grows there, and yet I imagine that it produces fewer berries than one could grow on a well tended patch twenty feet square planted on good soil.

Various systems of planting are used with raspberries, depending upon the variety and upon accepted practice in various districts. Red sorts are often grown in "hills," confining the plant to its location by removing excess suckers and tying the fruiting canes to a stake. The black varieties are more often grown in rows eight feet apart and with the plants three feet apart in the row. Sometimes the plants are allowed to support their own weight and in other districts they are tied to wires in various ways. In fact the methods of training raspberry plants exceed in number those used for training grape-vines, each section developing its own pet method. Where the canes are pinched back to a height of not more than three feet and the lateral branches are not allowed to grow too long, the plants of the black varieties will usually need no support. The same may be said of the red varieties although it is often more convenient to tie them to a trellis of some kind.

In nearly all other respects the directions given for growing blackberries will apply as well to their cousins, the raspberries. They are subject to the same diseases except that the anthracnose is much more severe on the black raspberries than on any of the other members of the berry tribe.

The Cumberland, Kansas, Plum Farmer and

Gregg are probably the best varieties of black raspberries. The Hoosier, a new sort that originated in Indiana, has been very successful at its place of origin but has not been entirely successful elsewhere. Among the red kinds, the Cuthbert has remained at the head of the list for many years. The St. Regis, a red "everbearing" variety, is an excellent fruit to come in ahead of the Cuthbert. Most of its crop is borne in the spring, but in favorable years it bears a light crop in the autumn and a few berries at a time all through the summer. Columbian is a purple sort, partaking of the characters of both red and black raspberries and is a good addition to the home garden although it is not much grown for market.

Currants and gooseberries have never held a prominent place in the American market, although they have both been widely grown and for a long time. Most of our cultivated varieties are derived from plants of European origin, although the European varieties of both fruits are not entirely successful here. English gooseberries are especially difficult to grow in our climate, though just why this should be so is rather confusing. In America, with drier air, the foliage is attacked by mildew and the plants soon ruined. This is contrary to what is known of fungous diseases thriving in moist-air conditions.

As both currants and gooseberries start into growth very early in the spring it is advisable to plant them in the fall. In very cold sections they should have some protection during the first winter, but after that they should be able to withstand the climate with no protection at all. Some varieties may be found which will succeed even beyond our northern borders and wild currants and gooseberries are probably to be found farther north than any other fruit with the exception of the cranberry.

Both fruits should be given a moderately rich soil and an occasional application of manure will not be thrown away upon a bearing plantation. Care must be exercised, especially in the case of the currant, to see that the plants do not suffer from a lack of moisture. I know of no other fruit which withstands drouth conditions so poorly as does this one.

Currants and gooseberries are tolerant of shade and may be used as intercrops in orchards or vineyards with good success. They are planted five or six feet apart or in rows six feet apart and the plants set four feet apart in the rows. The first year any garden crop may be grown between the rows to help pay for the cultivation that is given to the bushes.

Currants are readily picked as the bushes are thornless, but as much can not be said for the gooseberry which is heavily armored. As

the fruit is nearly always gathered while it is still quite green and hard, it may be stripped from the bushes by using heavy leather gloves. More or less leaves and twigs will come with the fruit, but this does not seem to injure the plants and may readily be removed by passing the berries through an ordinary grain fanning mill.

The imported currant worm is the most conspicuous insect of these two fruits and annually eats the leaves from practically all unsprayed bushes. It is easily killed by a small dose of arsenate of lead, applied either as a dust or in the form of spray. Scale insects will attack the currant with great relish and sometimes put an end to it in short order. They may be killed by spraying with commercial lime sulphur solution diluted at the rate of one to six any time during the dormant season. Plant lice sometimes attack both of these small fruits and may be eliminated by the use of any of the commercial preparations of nicotine or by spraying with an infusion made from tobacco stems. Borers will show their presence by the wilting of the canes and the only remedy is to cut and burn the infested stalks.

There are several minor diseases that attack the growing parts but in most cases these cause but little damage—not nearly so much as does lack of proper cultivation and poor soil. One of the diseases is of interest, however, as it is

caused by one of those fungous forms that has an alternation of generations, living first on the currant or gooseberry and then on the white pine. On the pine it causes what is called the "white pine blister rust," a fatal disease that threatens to become very wide-spread and very destructive. Many states now have regulatory laws relative to the planting of the gooseberry and currant bushes and these measures may become more drastic in the future. Neither plant may be imported into the United States from other countries.

Strawberry culture differs from that of the bush fruits in many technical points but the fundamental principles of good soil and good tillage apply to all of them. Probably no other small fruit is so widely grown or so generally liked as is the strawberry and for good reasons for it has long been recognized as being the "best berry that God ever created." The plants are usually set in the spring as early as possible, after it has been assured that the soil is in good condition. It is usually unwise to plant strawberries on sod land as it is more often than not infested with white grubs. These worms, the larva of various June beetles, eat the roots of the new plants and may ruin the plantation.

The plants are set a foot apart in rows three feet apart and are given thorough cultivation

from the very start. As the season advances they throw out runners which root at the joint and form new plants. These runners may either be trained to follow the row and thus form what is called the "matted row system" or they may be kept cut off and force all the strength of the plant into the parent stool. This last, called the hill system, produces the finest berries, but probably not so many of them to the acre. There is always a temptation with a matted row to allow it to become too wide, thus providing too many plants for a given area of soil. The inevitable result is a short crop of small berries. If the rows are kept narrow, say not more than a foot wide, they may obtain considerable nourishment from the feeding roots which extend into the cultivated spaces.

After the first severe freeze in the fall the strawberry bed should be covered with a light layer of straw to prevent winter injury. This covering should not be put on too early as the extra warmth might start the buds and later cause them to be injured. Also a certain amount of freezing is essential to good fruiting the next year. In the spring of the year following that in which the plants were set, the mulch is partly lifted and pulled away from around the plants so that they can readily force their way through. Some growers remove the

mulch entirely from alternate rows and run through the space with a cultivator. The mulch is then put back into the cultivated space and the untouched portions gone over with the soil stirrer. In every case the mulch is finally returned to the rows so that the berries may be protected from the earth as they ripen. While there is nothing much better than a clean ripe strawberry, there is nothing much worse than a sandy one.

A word of caution to the new grower who is marketing strawberries for the first time is not out of place here, especially as I have seen so many cases where it was needed. The big difficulty in growing strawberries is in the harvest. Picking is often done by women and children, and too often they are careless in their methods. They will "grab" the berry and wrench it from the plant in any way possible regardless of how much damage they may do to the fruit. Their ambition is only to fill as many boxes as they can during their working hours. This carelessness results in the fruit reaching the market in what the commission men describe as a "leaking condition." The bruised berries shed their life blood during the trip to town and the crates are dripping with the berry gore when they go on the market. Of course the commission man gets the blame when it rightly belongs to the picker.

No strawberry picker should ever permit his fingers to come in contact with the fruit with which he is working. He (more often she) should grasp the stem of the berry and snap it off not more than an inch from the fruit. Handled in this way the berries remain unbroken and reach the market in clean fine condition and bring the grower the highest price. Further, an experienced picker will pick just as many by this method as by the old rough-shod method that we see too often practised.

I hesitate to say anything about strawberry varieties as these pages will be read in many states and what is good in Michigan may be worthless in Maryland. If you will gather a collection of recommended strawberry lists from several experiment stations you will see a wide variation among the names that head the list. There are a few sorts like the Aroma, Dunlap, Pokomoke, Gandy and Haverland that seem to have a wide range of adaptability to both soil and climate. In the South the Klondyke is the berry par excellence, while in the North it is not well thought of. In planting any fruit it is wise to learn what your neighbors have used but this is of even greater importance with strawberries. If you are a pioneer in the business you may as well take a chance with one sort as another always remembering

that some varieties are self-sterile and will require that some other sort be planted near them. These sterile varieties are always so indicated in the catalogues so you can not go far wrong in that one respect.

Blueberries, or huckleberries, are native American fruits, some kinds of which are now being grown commercially. This seems to be a more promising field in the South than in the North where many acres of wild plants still furnish a considerable quantity to the New England markets. And when I speak of huckleberries I do not include that notorious fake that has been offered to the public periodically under the name of "garden huckleberry." It is, of course, not a huckleberry at all but a member of the night-shade family—edible, if you are hungry enough and if it is doctored up with sugar and perhaps a bit of spice. Your grandfather knew them as well as he did their relatives the "husk tomatoes," but neither of them ever became popular in his garden.

The unscrupulous nurseryman has preyed upon the public in this way many times, re-introducing old varieties under high-sounding names to catch those of the class of which it is said one is born every minute. We are all of us impressed more or less by distant objects. Old things seen in a new environment or shown

under a new name become enchanting. The distant hills are blue and beautiful, but they are of the same rock and clay that we have under foot and their trees are the same green as those that shelter us.

My wife's mother came home from California one time filled with enthusiasm for a new and rare variety of tea that she had discovered in that magic state. Knowing my liking for the beverage which "cheers but not inebriates," she had brought in her trunk several boxes of this delectable product. My curiosity aroused, I could hardly wait until the treasure was forthcoming—but when it came it proved to be in a familiar yellow box and bore the name of "Lipton."

CHAPTER XII

APPLE VARIETIES

“By their fruits ye shall know them.”

—MATTHEW VII:20.

PLUTARCH once remarked that it was a very difficult thing to “trace and find out the truth of anything by history.” He would have made the statement even stronger if he had lived in the present time and had attempted to investigate the history of some of our modern apples. Even those sorts which belong to the aristocracy among fruits, the pomological “upper ten” have most uncertain family trees so far as genealogy is concerned.

The history of some of our best known sorts is already lost and we know but little more of the origin of the Ben Davis than we do of the use of apples by the ancients. On the latter subject we know that apples were used by the lake dwellers in Switzerland before the time of written history. We know this because some of those amphibious Swiss were very poor housekeepers and allowed a lot of trash to accumulate about their premises. Modern college professors have

unearthed these prehistoric garbage piles and have reconstructed the breakfast menus of that early time. Among other things they found were the charred remains of apples—not unlike some of the apples which we have to-day. Not the same varieties perhaps,—that is too much to expect,—but at least fruits that belong to the same botanical class.

The apple of cultivation belongs to the botanical division known as *Pyrus Malus* and was unknown to the American continent before the coming of the white man. The Indians used wild crabs and certain of the haws, but these were poor substitutes for the “regular” apples which the earliest settlers brought with them. Most of the varieties which we have in our orchards to-day originated in this country, but in every case they are derived from imported stock. The native crab has never been improved to any extent. There are a few varieties of crab apples in cultivation now which have in them some of the native blood, but these varieties are rare and for the most part inferior. The wild fruit has remained as wild and untamed as it was in the days when it was the only representative of its family on these shores. As a matter of fact the wild crab apple of our woods makes a preserve that is second to none made from the cultivated crabs.

The wild haws, of certain sorts, all relatives of the apple, make a beautiful jelly that has a flavor all its own.

Frequently "wild apple trees" will be found in the woods and many farmers and almost all city folks believe them to be truly wild trees. As a matter of fact they are what the botanist calls "escapes"—meaning that they are forms which have escaped from cultivation. In the woods near my house stands an old gnarled apple tree that has every appearance of being "wild." It is certainly a "part of the picture." As a matter of fact it is wild in the sense that it was never planted by any man. Probably the seed was carried to the woods with the winter store of some small animal, a squirrel or a mouse, and was lost. In time it germinated and formed the tree as we now see it—a wild, worthless seedling.

New York State, one of the older colonies, early developed a great apple-growing business, and from the first orchards have come wild seedlings which occupy fence rows and neglected pastures. These of course are, in the botanical sense, European apples for they belong to the same group of plants that were cultivated even by those Swiss lake dwellers many centuries ago. In no sense of the word are they "native," though they may be "wild."

Among the early apple planters in the Middle

West, one figure stands out clearly in the person of John Chapman, otherwise known as Johnny Appleseed. Before the hardiest homesteader had broken his first field in the wilderness, there came tramping and canoeing through the woods, this most interesting voyager of that early time. He worked without pay and without hope of reward, preparing orchards for the settlers that he knew would follow him. With his spade and axe and his bundle of fruit trees he traversed the unbroken forests and made clearings in which he planted fruits. Doubtless some of these trees are still standing. Several years ago I saw one that stood near Spiceland, in Henry County, Indiana. It had no fruit on it at the time, but an old resident of the neighborhood told me that when he was a boy and the tree was in its prime, it produced large crops of fruit which they then considered excellent. On May 5th, 1916, the Indiana Horticultural Society unveiled a monument to the memory of John Chapman in the city park at Ft. Wayne, Indiana. The old man died and was buried near that town in 1843.

I have said that all of our commercial apples have either been introduced or have originated from seeds of introduced sorts. The majority of the varieties growing in our orchards to-day have at some time grown from seeds planted on

American soil. In spite of this fact the exact place of origin of many sorts has been lost. We know from the tree character that they belong to the European family of apples, but where the first seedling stood we do not know and probably never will.

Beach, in his wonderful monograph on *The Apples of New York*, has included much historical data, but out of some five hundred apples listed, one hundred and twenty-three have no known place of origin. New York State is credited in the same publication with the production of one hundred and twenty-six varieties, being the only locality on the list that had more varieties to its credit than did the "unknown column." Russia produced the next largest number of varieties with a list of fifty-five, while Pennsylvania is credited with thirty-two. The large number of varieties credited to New York is perhaps due to the fact that the monograph deals only with those varieties known to have been cultivated in that state. There are, of course, in every locality, some sorts that are grown only in that neighborhood. For that reason a carefully compiled list of varieties from any of the older states would show a considerable number of varieties of local origin.

There are perhaps to-day some valuable new apples in existence that have never become

known outside of their own locality. The best fruits we have to-day originated as chance seedlings and their discovery has been more a matter of accident than of design. In a few cases they have not been received with enthusiasm at first, but have had to win their way on their virtues after being introduced. This has been particularly true of the Delicious, a variety that was grown by its originator under the name of the Hawkeye for some years before it became prominent. When first introduced to the public, many fruit-growers did not believe that any apple could have all of the good qualities that were attributed to this new acquisition. They were in very much the position of the farmer who saw the giraffe for the first time and after taking one good look said, "There ain't no sech animal."

In the following list of a few of our standard apple varieties I have tried to give what is known of the history of each particular kind, together with some information as to the quality and adaptability of the variety.

Akin

In 1831 a seedling apple appeared on the farm of W. J. Akin, near Lawrenceville, Illinois. It probably attracted no more attention than would any bit of "brush" on the average farm. In some way this little tree managed to

live and eventually its fruit attracted the attention of nurserymen. It was not until the tree was thirty-six years old, however, that it was propagated for sale and offered to the public. Even then it did not attract wide attention until 1890 when it was awarded a premium as a "new variety good enough to be recommended." The Akin, often called Akin's Red, is a really good apple, but has never become very popular outside of a rather restricted district in Southern Indiana and Illinois. The fruit is excellent, but the tree characteristics are not so good as they should be for a first-class commercial apple. The trees have a tendency to grow very tall and even the most skilful pruning does not seem to improve them much in this respect. They are also shy bearers until they reach the age of from twelve to eighteen years—and most of us are impatient. I know I am and for that reason there is not an Akin tree in our orchards in spite of the fact that I really like the fruit.

Baldwin

The Baldwin has been called the Ben Davis of New England. In a way this statement is truly descriptive if we consider it as the leading commercial sort of our Northeastern States. In quality it is better than Ben Davis, but is still regarded as one of the inferior

apples in a section of the country that is famous for fine fruit of this type. Personally I like the Baldwin and enjoy its rather mild quality, but it is a sort that is better suited to northern climates and with us it becomes almost a fall apple.

It is one of the very old commercial sorts and dates back beyond the time of the revolution—the American Revolution. (They are becoming so common these days that we must differentiate.) About 1740 the Baldwin came up as a chance seedling on the farm of John Ball, Wilmington, near Lowell, Massachusetts, and for forty years its cultivation was confined to that immediate neighborhood. Later a Mr. Butters bought the Ball farm and gave to the apple the name of “Woodpecker” because birds of that variety seemed to take particular delight in hammering on the original tree. We might say that they were the first “knockers” of that variety. Deacon Samuel Thompson, a surveyor of Woburn, brought the apple to the attention of Colonel Baldwin, of the same town; the Colonel recognized its value and propagated and sold trees of the variety as early as 1784. It took its name from him. It was not until the middle of the last century that the Baldwin became a prominent commercial variety—a hundred years after it first produced fruit.

For the Northern States it is still one of the

best and is one of the most widely known of our American apples. When grown in the North the fruit keeps well and always sells for an average price, never at the top of the market and seldom at a loss. The tree is strong and vigorous and bears large crops after it once starts. Often it is slow in coming into bearing, however, and this one fact has caused planters to turn to other sorts in many cases.

Ben Davis

Probably more trees of Ben Davis have been planted than of any other apple. It has also inspired more literary endeavor than any other I know. If there is a humorist in the land who has failed to poke fun at the Ben Davis I have failed to read his books. In Indianapolis, Kin Hubbard writing under the caption of "Abe Martin" has so continuously and so successfully ridiculed the Ben Davis that it is practically impossible to sell that variety in that city—at least under its own name. In that city's municipal market I have seen people buy Ben Davis under the name of "New York Pippin," "Rome," "Gano," "York," "Greasy Pippin," "Kentucky Red Streak" and others. Probably the most of them never knew the difference because the apple is of fair quality when used late in the season, and I have noticed that many folk are not very discrimi-

nating in their apple taste. Last summer I was in a store in northern Michigan when a friend purchased some fine-looking large apples. After sampling them she praised them highly and offered me one. I declined because I recognized them as "Wolf River"—one of the few varieties that is rated by pomologists as being inferior to the Ben Davis in quality.

The Ben Davis was planted so widely because of its wonderful bearing habit. The trees produce fruit practically every year regardless of climatic conditions. They withstand neglect to a marked extent, and the apples are certainly fair to look upon. If they only tasted as good as they look and smell they would be without rival. The variety is now scarcely ever planted and the old orchards are dying out rapidly as the trees are not long-lived. In a few years the apple will disappear from our markets to be replaced with better sorts which I hope the apple public will appreciate.

Black Ben and Gano

The Black Ben and the Gano are two other varieties of the same tribe. Many writers have thought that all three apples were identical. Others have contended that the three sorts were distinct. Personally I think I could argue the case from either side for there is evidence to support either contention. Certainly all

three are very similar in many respects, but the Gano and Black Ben are perhaps of better quality than the old type. A man who lives near me in Indiana harvests Ganos from the top of a certain tree and Ben Davis from the lower branches. Taking the two sorts to the apple show he won prizes on both varieties—and the tree had not been top worked either.

Delicious

I have no doubt that the decline in the planting of Ben Davis has been largely due to the recent introduction of very high quality varieties. Of these none is more important or more prominent than the Delicious. There is no variety on the market to-day that is more popular or that deserves higher praise. It has given the public a new standard of apple quality with which the older varieties find it very difficult to compete. The flavor is so distinct and so different from that of any other apple that the buyer is not likely to forget it or to confuse it with the flavor of any other sort. Also no other variety can successfully be sold as a "Delicious," provided the buyer has once tasted this new and well-named fruit. The habits of the tree also make the variety a favorite with orchardists because they are healthy and vigorous and in many places come into bearing at an early age. In our own

orchards they have not produced fruit so early as we expected, but after they once start they are as reliable as Ben Davis in this respect. We have a neighbor who has harvested large crops from a small group of Delicious trees since they were ten years old. In seven years they have not missed a crop, bearing more than most sorts even in 1919 when the apple crop was badly damaged by an April freeze. On the market the variety always brings the top price, as is readily shown in the government price reports. Some growers have made the mistake of allowing the apples of this variety to hang too long on the tree in an effort to secure high color. This is always a mistake for it develops its best quality when harvested just before its best color is attained. For this reason some growers have reported unfavorably on the variety, but where it is properly handled it has met with universal approval.

The variety originated on the farm of Jesse Hiatt, near Peru, Iowa. It was a chance seedling. (Notice how often those two words will be used together in these pages.) When first noticed it was a sprout growing from the stock of a Yellow Belleflower tree that had been broken off. What a fortunate thing it was for American horticulture when that Belleflower suffered an accident; otherwise the root of the Delicious tree might never have had a chance

to exhibit its fruit to the world. For several years Mr. Hiatt propagated the variety and it was grown locally under the name of Hawkeye. In 1895 Stark Brothers introduced the variety and gave it the name it now bears. It has been widely planted in all sections of the country.

Some growers have felt that the planting of Delicious was being overdone, that there would come a time when the variety would be produced in such large quantities that the market would not be able to care for all of them. Such a thing is possible of course, particularly with a variety of this sort that is not so good a keeper as are some of the other kinds. However, we are still planting this variety, but at the same time we are not overlooking the late keeping sorts.

A new yellow apple has just recently been introduced by Stark Brothers which they call the Golden Delicious. It resembles the old Delicious in shape, when grown in the West, but its flavor is quite distinct. It is a beautiful clear yellow color, of fine flavor and keeps better than Grimes which will be its nearest competitor. It is still too new for us to have any very definite information on its orchard performance, but appears to be the most promising introduction of many years.

Esopus Spitzenburg

You can buy a certain apple in New York under the name of Esopus while the same sort grown in the West is sold as a Spitzenburg. This is the "Esopus Spitzenburg," a variety that has been in cultivation in New York for more than a hundred years. The apple is of the highest quality but is not adapted to a wide range of soils. For this reason it is not grown so extensively as its antiquity and its quality would seem to justify.

Fameuse

The Fameuse is one of the oldest varieties and like all other old sorts much of its history has been lost. It is commonly called the "Snow" apple and in certain sections of the country is known only by that name—probably because the French name does not fit the average American tongue well.

The apples are bright red in color, the flesh is snow white and the flavor is rated as being of the best. They are rather small in size and do not keep well, but during their season, which lasts from October to the middle of December, they are popular on the markets. The variety is subject to apple scab, but in the light of what we now know about this disease no grower should be deterred from planting them on this

account. They are adapted chiefly to the northern apple districts. When grown farther south they ripen too early and do not have as fine quality as when grown in the North.

Grimes Golden

More than a hundred years ago the Grimes originated in some eastern state, probably West Virginia. It was brought west along with the Ben Davis and has been planted in much the same region that that variety has rather monopolized. The apples are of high quality and find a ready sale. They do not keep well, however, and the trees are short-lived when grown on their own roots. For this reason the variety should always be top worked on some more vigorous stock.

Hightop Sweet

The Hightop Sweet is mentioned here only because it is one of the oldest varieties we have and because of its peculiar name. It is believed to have originated in the old Plymouth Colony and was named because the trunk always grows with a very long straight stem. The fruit is not worthy of cultivation alongside our modern varieties.

Jonathan

As late as 1845 the original tree of the Jonathan was still standing in New York. It

is supposed to be a seedling of Esopus which it greatly resembles in many ways. It is one of those unusual sorts that has been like the prophet—without honor in its own country, for it has been but little planted in New York. Farther south and west it has been one of the standard commercial sorts—an apple of fine quality, with equally good tree characteristics. In recent years, however, the Jonathan has become very unpopular with growers because of a disease which attacks the fruit. This malady, the Jonathan fruit spot, causes black sunken blotches to appear on the skin. We do not know the cause of this trouble and of course know of no remedy. One of the curious and exasperating things about the disease is that it develops on perfect apples that are in storage. One season we packed some of the finest Jonathans that we ever grew. Six weeks later they were covered with black spots and had to be sold for less than they would have brought at picking time.

King David

Growers have been hoping for an apple of the Jonathan type that will take its place in the market and that will not be subject to the fruit spot. Some of us think we have it in the King David, a new apple recently introduced, that is, comparatively recently. It has been tested long enough to establish the fact that it is a reliable

cropper and that the fruit is of high quality. It comes into bearing at a very early age,—I think it is perhaps the earliest bearer we have. It has a tendency to bear large crops and probably will require some attention at thinning time. It is an apple well worth watching.

Northern Spy

No orchard anthology would be complete without some mention of the Northern Spy, one of our good, old-time favorites. It originated in an orchard of seedling trees planted by Heman Chapin about the year 1800, at East Bloomfield, New York. The original tree died before it had produced any fruit, but a neighbor had taken some sprouts from around the tree to plant in another orchard. The first fruit was produced from one of these sprouts. This is another case where a good variety had a hair's breadth escape from being still-born. A monument was erected to the Northern Spy in 1912 bearing the following inscription:

“The original Northern Spy apple tree stood about 14 rods south of this spot, in a seedling orchard planted by Heman Chapin about 1800. The Early Joe and Melon apples also originated in this orchard.”

To many persons the “Spy” is the standard of apple quality. It has a certain sprightliness

about it that makes it a favorite with a very large number of apple lovers. My father always regarded it as the one best apple—but he was not familiar with either the Delicious or the Stayman. The Spy is at its best in the latitude of northern New York or Michigan. When grown farther south it lacks quality and ripens early. It is always rather slow in coming into bearing, but after it once starts it is a reliable biennial cropper. The trees are very hardy and vigorous and are often used as stocks for such sorts as Grimes that have poor root systems.

Oldenburg

The American Pomological Society has a way of ignoring long established custom in the matter of apple names and frequently makes a decision that fails to stick. The Duchess of Oldenburg is a variety introduced from Russia many years ago. The Society tells us that we must call it only by its last name, but in every apple section the fruit is grown and sold as “Duchess” and probably will continue to be. When the name of a variety has once become established on the market it seems to me to be very poor policy to attempt to change it.

The Duchess, Alexander, Tetofsky and Red Astrachan were all brought over by the Massachusetts Horticultural Society about 1835.

Although all are Russian varieties they were first imported from England where they had been in cultivation for some time. Since then many Russian sorts have been tested, but none of them has proved superior to the old Duchess of Oldenburg. Some of them, however, have been the parents of American seedlings that show great promise.

The Duchess is one of the best early apples as it produces large crops of marketable fruit at an early age. It has been extensively planted as a "filler" between the permanent trees in commercial orchards. For this purpose it is one of the best.

Pippins

Pippins are not necessarily pippins at all. Many persons, particularly city buyers, think a pippin is a variety of apple. It is not, unless it has some qualifying word coupled with it, such as "White Pippin," "Newtown Pippin," etc. The word pippin is old English and signifies a "Pip" or "kernel" and was formerly applied to seedling apples to distinguish them from grafted or budded fruit. Taken literally Newtown Pippin means "the seedling which came from Newtown" and does not imply even a type of apple. We have no apple in cultivation which can correctly be referred to simply as "Pippin."

Ralls

When I was a boy we grew many Jenitons, or as the word was sometimes spelled Genitons. This variety is now correctly listed as Ralls for some dark reason that has not been made clear. It is an old French variety, said to have been introduced by the French Minister who presented some of the trees to President Jefferson. The Frenchman's name was Monsieur Genet, and it is supposed that the variety took its former name from him. The apple was one of the old-time favorites and I still think it is the best apple of its season. It is really not ready to use until spring and at that season is as full of juice as it can well be. It positively squirts when you bite into it and the cider made from it would tempt even Pussyfoot Johnson. The variety has some bad characteristics, however, and is now seldom planted. In the first place it is often late in starting to bear. Then the trees overproduce and as a result the fruit is small in size. Its worst fault, however, is that it cracks badly on the tree and as a result its normal keeping quality is ruined. It is also subject to disease of various kinds and will try the patience of any grower. It is an old-time favorite and I hate to see it go, but we have no time in this age to fool with backward varieties when good ones are to be had.

Rambo

A blind man who knew anything about apples could always identify the Rambo by its aroma. I do not know of any other apple that smells just as it does. Other apples may have a wonderful odor, witness the Ben Davis, but it is never of the peculiar spicy quality that clings to this old sort. Coxe, writing in 1817, mentioned the Rambo as an old favorite. We do not know where it originated, but we do know that it was in nearly every collection of apples in the pioneer days. It is now seldom grown because it is a poor keeper and because the crop is not to be depended upon. We have one old tree that bore five good crops in succession then for three years it loafed on the job. Such bearing habits are not conducive to winning favor with the commercial orchardist. Still I am glad that we have the one old tree as the fruit is certainly popular in the family while it lasts. I may even go so far as to take grafts from this tree and top work one of our Ben Davises. A Ben Davis more or less will not matter and it will be worth something to have a few Rambos occasionally if for no other reason than just to smell.

Red June

Of all our varieties I know none that is more happily named than is the Red June. It

sometimes misses the calendar by a few days but it is certainly always red. The variety originated some place in Carolina and has been widely planted over the southern part of the apple belt. It does not do well in New York, but farther south it is a splendid sort and well worth a place in both home and commercial orchards. It is probably our best summer apple and always brings a good price on the market. The fruit does not ripen uniformly and must be picked several times to secure the best results, but this is true of nearly all summer apples.

Rome

The Rome Beauty, as it was formerly called, originated in Lawrence County, Ohio, about seventy years ago. A monument has recently been erected to the memory of the original tree. In southern Ohio and in parts of Indiana and Illinois it is one of the standard sorts, and growers have made fortunes from this variety. While the apple is not of high quality it has certain characteristics that make it a very desirable market sort. In the first place it produces tremendous crops of large-sized apples. These sell well, particularly to the hotel trade as they are especially adapted for baking. It is perhaps the most popular apple in the Central West for this purpose. The trees bloom late and for this reason sometimes

escape spring frosts that injure other kinds. As a rule the crop is very uniform in size of fruit and the apples hang well to the tree because of their long slender stems. Short-stemmed apples often drop badly, but the Rome Beauty is never bothered in this way. The tree is, as a rule, not so long-lived as it should be and is sometimes badly injured by blight. It also has a tendency to grow very "twiggy" and often a lot of pruning is needed to keep the tree in good condition.

Stayman Winesap

The most interesting member of the Winesap family is the Stayman. The name should be shortened to the one word to prevent confusion with the old Winesap which is a distinct apple. Doctor J. Stayman, of Leavenworth, Kansas, originated the variety—another of those chance seedlings,—about 1875. He endeavored to get various nurserymen to propagate it on a large scale, but as it was a new and untried sort it did not meet with much favor. In 1895 he wrote to Stark Brothers urging them to grow the tree and advertise the variety. He was an enthusiastic old man and he often said that the time would come when every one would want this then new variety. The time has come for to-day the Stayman is recognized as one of our best

sorts. In fact if I could have but one apple tree that tree would be a Stayman. No other apple, not even the Delicious, fills its place with me, for it has a flavor and quality that just seem to "hit the spot." The trees grow vigorously and bear at an early age. The fruit is large except on old trees when there is a tendency to overbear and produce undersized apples. This can, of course, be overcome by thinning. In certain seasons and in some localities, the apples crack to some extent, but in our orchards they have not done so. It is truly a splendid apple and the prediction of its originator has come true—every one wants it.

Wealthy

In 1912 a monument was erected near Excelsior, Minnesota, bearing the following inscription:

"This tablet commemorates Peter M. Gideon
Who grew the original
Wealthy Apple Tree
From seed on this his homestead, in 1864.
Erected by the Native Sons of Minnesota,
June 1912."

The native sons did a good day's work that time all right, for the Wealthy is "some apple" and a credit to any man or any state.

With us in Indiana it ripens late in August, but farther north it is almost a winter apple. It is one of the best commercial sorts of its season and is both a reliable producer and of high quality. On old trees the fruit has a tendency toward smallness, but this can be avoided by careful thinning. The trees bear at an early age and are sometimes planted as fillers.

Winesap

In 1817 Coxe wrote that the Winesap was the "most favored cider fruit in West Jersey." From this we know that it is a very old sort. Also we realize that a hundred years ago apples were more used as a drink than a food. Winesaps still make good cider and they are still popular for almost every purpose for which apples can be used. The tree bears at a very early age and produces reliable crops. The fruit keeps as well or better than any other kind we have and is of high quality too. The apples are not usually of large size, but they make up in flavor and sprightliness what they lack in circumference. In our own orchards the variety shares first place with the Stayman and Delicious.

Yellow Newtown

The Yellow Newtown was one of the first apples to be cultivated in Colonial times. I

have no idea where they managed to secure such a fine variety at that early day. The history of the apple is mixed up in international affairs more than any other sort, for Benjamin Franklin took the first one to England. We can just imagine the old chap seated before the evening light of an English fire, passing around his fine American apples. Collinson, who was then "botanist to the King," wrote to John Bartram, the American botanist, for scions. Poor Richard must have shared his store with the King himself. Later, during the first year of Queen Victoria's reign, the American minister presented the young lady with several barrels of this variety and she was so pleased with them that she removed the import tax from Newtowns. Since then this has been one of the most popular apples in the English market.

It is one of the finest apples grown and is ranked at the top along with the Delicious, Grimes and Spitzenburg, but unfortunately the tree does not adapt itself to a wide variety of soils. It does well only in certain favored localities and for this reason its production is confined to a restricted area. Were it not for this one fact it might easily be our leading apple to-day for it is a true aristocrat in every sense of that much abused word.

York Imperial

Charles Downing, one of our pioneer horticulturists, is given credit for naming the York Imperial. For many years the variety had been known as Johnson's Fine Winter—which was certainly an unalluring name for an apple. When Downing was shown the fruit he commented on it by saying that it was the “imperial of keepers.” As it was grown near York, Pennsylvania, it took the name of York Imperial from the above incident.

In certain sections it has become an important commercial sort, but it has many objectionable qualities. In the first place the trees are subject to blight and are frequently killed by this disease. I have seen orchards where this was the only variety attacked, although sorts like Yellow Transparent were growing near by. The fruit does not always ripen uniformly and a certain per cent. of the crop is liable to be undersized. The shape of the apple is also against it, as it is decidedly “lopsided,” so much so that it is often difficult to pack. In quality the apple is only fair, but the fact that it produces large crops has made it a favorite with some growers.

CHAPTER XIII

PEACH VARIETIES

“The ripest peach is highest on the tree.”—RILEY.

THE word “peach” has almost from the beginning been the cause of confusion. It is connected in some remote etymological way with “Persia” and for a long time that country was supposed to have been the native home of the peach. Early Greek writers spoke of peaches as “Persian apples.” On the other hand, the Indians of our Southwest learned to know peaches first of all the introduced fruit and they developed a root word meaning peach. Later they referred to plums as little peaches and to apples as big peaches. For centuries Persia was credited with being the native home of this delectable fruit and it has only been in the last few years that any satisfactory theory to the contrary has been advanced.

It is no doubt true that the Persians cultivated the fruit at a very early date but then, they had a way of annexing anything good

that happened to be lying around loose and taking it for their own. Those old Persians were good "livers," and if there had been a peach tree any place in the known world they were pretty likely to have found it. From there it was introduced into Southern Europe, but from what we know now the Chinese had cultivated it long before the Persians grew it in their orchards.

Frank Meyer, the explorer for the Bureau of Plant Introduction, found a wild peach growing in the hills of China which he felt sure was the original wild fruit. He had searched the world over looking for it and I, for one, would risk his judgment in a question of that sort. Additional evidence of the antiquity of peach culture in China is found in the literature of that country. In a collection of poems, all of which were written at least five centuries B. C., we find the following:

In Praise of a Bride.

Graceful and young the peach tree stands;
How rich its flowers, all gleaming bright;
This bride to her new home repairs;
Chamber and house she'll order right.

Graceful and young the peach tree stands;
Its foliage clustering green and full.
This bride to her new home repairs;
Her household will attest her rule.

Superstition often antedates history. The Chinese have many superstitions connected with the peach and they are woven through many of their legends. In a bulletin issued by the Bureau of Plant Introduction is published the following interesting myth that is well worth preserving. “—A fisherman got lost one day and penetrating up a river finds himself in a creek bordered with many peach trees full of bloom, at the end of which he comes upon a small mountain in which is a cave which he traverses and enters on a new country where there is every sign of prosperity, every one is courteous to each other, kindness and contentment prevail, but they wear a garb of the times of the First Emperor some five centuries previous and have been lost to the rest of the country ever since. The fisherman returns after a sojourn with them, and tells his fellow villagers of this wonderful country and stirs up so much interest that finally the governor of the province joins in the search for this wonderful country, but it is all to no avail and at last the fisherman realizes that he will never more see the peach blossom days of his youth with its rosy dreams and ideals that come but once in a lifetime.”

The best authorities now agree that the peach originally grew wild in what is now the Chinese Empire. From China it was taken to

Persia and later was introduced into southern Europe. It was brought to America by the very early Spanish colonists, and before the advent of the eastern colonies it had become established in "New Spain" and had even "taken to the woods." It adapted itself to our soil and climate to such an extent that many early botanists regarded it as a native tree. It was so familiar to the Indians of the Spanish territory that they used it as a basis for naming and judging later fruit introductions.

The middle of the fifteenth century saw the peach cultivated in Virginia, but peach culture of that time differed widely from what it does to-day. In those early times fruit was grown to be drunk—not eaten, and the crop was used for the making of peach cider and brandy. At that time, according to Captain John Smith, "few of the upper class planters drank any water." The peach, converted into various beverages, quenched their thirst—but why dwell on so unpleasant a subject?

It was not until about 1800 that the first budded peach trees were grown in America. It is presumed that at about this time peaches came more in demand as an article of food and growers desired to have orchards of uniform varieties and also desired to perpetuate what good seedlings they had. Previous to this

time the seedling orchards had been of necessity a collection of mixed varieties. It is a noteworthy fact that, in spite of the peach being of Chinese origin and in spite of the fact that it had been under cultivation for many centuries in other lands, practically every commercial sort that we have to-day originated as a seedling in this country.

Admiral Dewey, Alexander, Triumph

Among the earliest peaches which we have are the Alexander, Admiral Dewey, and Triumph. Alexander is the parent of the other two and all three share honors as being among the first to ripen. Outside of this one character they are all "weak" varieties, and if they ripened later would never have attracted any particular attention.

For years we had two or three trees of Alexander in our orchards and I do not believe that we ever sold a peach from them. In the first place they were always shy bearers, and as they were the first to ripen they were eagerly eaten at home.

Admiral Dewey comes nearer being a commercial variety than either of the others. The name indicates that it is not an old variety, having been introduced shortly after the Spanish War, just about the time when so many boy babies were being named after the

popular naval hero. The fruit has yellow flesh, and the skin is a beautiful red. Although introduced as a freestone it fails in that character in some sections, and for this reason alone has been discarded by many growers. The fruit is often undersized and is subject to scab and to brown rot, both of which make no appeal to the commercial man. As a peach for home use where the financial consideration does not enter into the equation it is a good variety to plant as it is one of the best of its season.

Triumph is earlier than Admiral Dewey, in fact one of the very first to ripen. It is also yellow-fleshed and under some conditions is a freestone. In our locality, however, the flesh sticks tight to the stone. It is an extra hardy variety and bears heavily almost every year, but the fruit is of poor quality and is characterized by the most remarkably fuzzy skin of any peach that I know. At the present high prices of fur the things might almost be grown for their pelts, or as one writer suggested, they should be shaved before being offered for sale.

Alton

About twenty years ago Stark Brothers introduced a new peach under the name of Alton and it has since then become very popular. The variety originated in Texas

and for a time was sold in a local way under the name of Minnie. Being a southern variety it has not done well in the northern peach districts such as Michigan and New York, but in the South Central West it is a desirable fruit. The fruit ripens fairly early and is above medium size, beautiful in color and with attractive white flesh. Unfortunately the peach is, in some localities, not a perfect freestone and this one bad quality prevents it from becoming as popular as it otherwise would be. Many of our white-fleshed peaches are of far better quality, but for some reason the city markets prefer the inferior yellow-meated kinds. Elberta will invariably sell for more money on the market than will the highest quality white peach. On the farm this prejudice does not hold, and many growers produce a few white-fleshed kinds for their own use. For this purpose Alton is one of the best. It is also good for small town markets—but keep it away from the large centers, where the people want big yellow peaches, the bigger and yellower they are the better they like them. High quality is not appreciated.

Arp

I never see the name Arp in print but that I think it must be an abbreviation of some longer word. Formerly this variety was

called Arp Beauty, but the American Pomological Society with its well-known proclivity for boiling down names cut the beauty out of this one. The peach is the best early yellow peach that we have, ripening about a month sooner than Elberta. It originated at Arp, Texas, near the beginning of the present century and has been tested over a wide extent of territory. Like nearly all varieties of southern origin it does better if not planted too far north.

The tree is healthy, vigorous and a fairly reliable bearer. For so early a peach the fruit ships well and in some districts is well regarded as a market variety. The only objection to the variety is that it is not a perfect freestone, the flesh clinging rather tightly to the stone.

Belle

Most fruit-growers are familiar with the old Belle of Georgia, which has long been a standard market variety in the Southern States. In the large peach-growing section of the South it has been one of the best and, for a white-fleshed sort, it has had great popularity on the northern markets. In recent years it has not been so largely planted, giving way to peaches of better quality. In the North it has never been in favor with the growers. This statement perhaps should be somewhat qualified

because of the fact that an occasional grower may have had success with it. The same thing holds true with nearly all varieties. With a fruit as variable as the peach we may expect to find occasional instances of marked success where failure is the rule and are just as apt to find the contrary to hold good.

Captain Ede

The Captain Ede peach originated in 1870 as a seedling in the dooryard of Captain Henry Ede, Cobden, Illinois. In the half-century that has passed since then it has been rather slow in gaining popularity, but in the last ten years has been more widely planted. It is a very fine, white-fleshed variety that ripens a week or more ahead of Elberta. Its excellent quality should give it a place in all home orchards and in those commercial orchards that supply the small-town trade. It will never compete with the yellow varieties in the city markets. In some places it has a reputation of being a shy bearer. I doubt if this will hold good over the greater part of the North Central peach districts.

Carman

Considering the fact that it originated in Texas, Carman has adapted itself to a very wide variety of soils and climates. It is per-

haps the best white-fleshed peach of its season, ripening a month before Elberta. The tree adapts itself to almost any condition and produces reliable crops of large and handsome fruit. The peaches ship better than do many other white varieties and retain their quality for a considerable time. Brown rot seems to make but little impression on the fruit, although other sorts in the same orchard may be ruined by it.

Champion

In *The Peaches of New York*, Hedrick makes the statement that, "Champion is the white-fleshed peach *par excellence* in quality—rightly used as the standard to gauge the quality of all other white-fleshed peaches." He may be right, but if he is then I never saw any Champion peaches. We had a large block one time that was planted for that variety, but they did not equal in quality any one of several other white sorts. The peach as we grew it was a small, handsome freestone, better than the average in quality but not so good as Carman, Alton or Captain Ede. It had a strong tendency to overbear, and the peaches were so subject to brown rot that it was almost impossible to ripen them. They would hang on the tree in perfect condition up to the time when they were ready to ship, then the whole

mess would rot overnight. The boys used to say that they rotted between the tree and the packing shed. It was positively wonderful how those peaches would go to pieces. We finally stopped shipping them and sold them to neighbors, or gave them away. They were reported as being very fine for peach butter—that at least concealed any tendency to decay that might have been inherent in the fruit that was used. The trees were vigorous and, as I have said, productive, and any one who wants to wear his young life away spraying might plant a few. I will assure him of plenty of exercise.

Crawford Peaches

For many years the Crawford group of peaches furnished the bulk of the market crop. They were superseded by the Elberta and its kin because the latter varieties were more productive, more adaptable to soil and climate—and the market buyers did not notice the inferior quality. Chair's Choice was perhaps the best of the Crawford type and was very popular with growers for many years. It is possibly the best yellow peach in cultivation to-day and is well worth a place in any home orchard. In those localities where it succeeds best it still has value as a market peach, but like all of its group it is very particular as to soil. The fruit is large,

round in form and delicious in quality. The tree has many qualities to commend it as it grows large and is vigorous and hardy. If it produced more fruit it would to-day have no rivals in the orchard or in the market.

Fruit-growers of a generation ago were more familiar with the Early and Late Crawford peaches than we are to-day. At that time these were the two chief varieties of yellow peaches. Both originated in the orchards of William Crawford, Middletown, New Jersey, early in the nineteenth century and were the standard sorts for either home or market until they were superseded by the Elberta type a quarter of a century ago. I am often asked why we do not grow more Crawford peaches and less of the recently introduced and poorer quality fruit. The same answer applies that covers the question as to why we do not grow more of the old Yellow Belleflower and Vandevere apples. They are not reliable producers and they are slow in coming into bearing. But for these two faults the Crawfords and the popular old apples would still be on the market in large numbers. Fruit-growing, however, is a business proposition, and the orchardist can not be expected to grow those sorts from which he can not make a profit. Both the Early and Late Crawford are, in most localities, unprofitable sorts. In a few

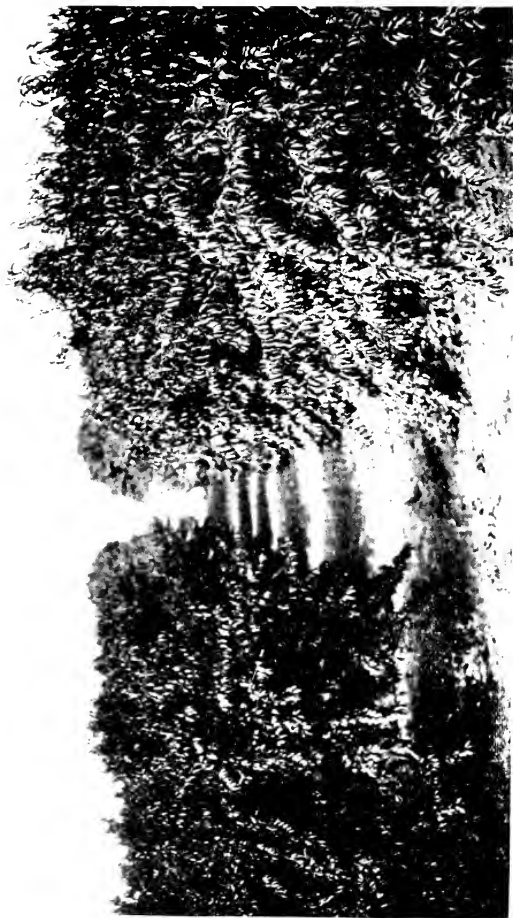
places they produce fairly abundant crops. Unfortunately I do not live in one of those places or I would have a lot of trees planted. The fruit is unrivaled by other peaches as both early and late strains are the best of their respective seasons. For the home orchard they should not be overlooked, and even in those places where they are shy and late bearers they should be in the home orchard. Even though they were not the very best of yellow peaches, even though they were unfit to eat, they should have a place in any home garden simply on account of the beauty of their fruit. That exemplary Oriental, Confucius, once said that if he had but two coins that he would buy bread with one and with the other would buy hyacinths for his soul. If he could have seen a well-grown Crawford peach he might have served soul and body both and had a coin to keep.

Elberta

The Elberta, and please notice, all of you, that the name is spelled with an "E" at the front and not an "A," has been the most planted, the most talked about and the most eaten peach in America. There has been so much discussion as to how the variety originated that I feel justified in taking the space to give the facts in the matter.



The Elberta is still the leading commercial peach.



An Indiana peach orchard.

The variety originated from a seed planted by S. H. Rumph at Marshallville, Georgia, in the fall of 1870. The seed came from a Chinese Cling peach gathered from a tree that stood near Early and Late Crawford trees and trees of Oldmixon Free and Oldmixon Cling. The seedling was named in honor of Mr. Rumph's wife, Clara Elberta Rumph. Another stone from the same Chinese Cling tree was given to L. A. Rumph, and from this grew Belle of Georgia, a variety that has already been mentioned. The above facts in the case are taken from Hedrick's volume on *The Peaches of New York*, a splendid book from which I have not hesitated to draw freely for the purpose of this chapter.

The Elberta is to-day the leading commercial peach in America and will probably remain so for many years. Its splendid orchard habits are such as to make it a favorite with every grower who produces fruit to sell. I think very few peach-growers would plant this variety for their own use, but it must be remembered that commercial growers like to grow what they can sell—they don't have to eat their product. At that, the Elberta is not such a bad peach when it is allowed to ripen on the tree. Unfortunately those peaches that reach the city consumer are not so ripened. Most peaches must be gathered a little green

if they are to be shipped without loss. In this respect the Elberta excels all other sorts for it can be gathered while still perfectly hard and will ripen in transit. Often the hard green peaches are gathered days or weeks before they are ready to eat and are sent to distant northern markets. Being large yellow peaches, the buyers in the cities pay fancy prices for them and, not being familiar with what a really good peach ought to be, they think they are fine. The Elberta has become so widely known that its name is almost synonymous with "fine big yellow peach." If I should send a shipment of Crawford, or Fitzgerald or Kalamazoo to market to-morrow the chances are ten to one that they would get to the consumers' hands under the name of Elberta. The public wants Elberta peaches and the commission dealers see that they get them regardless of whether they were grown on an Elberta tree or not. All of this of course has helped the reputation of the Elberta and many persons honestly believe that it is the one best peach—though they will admit that "sometimes they have purchased baskets of them that were very poor."

The Elberta is not quite so hardy as some other sorts, but is fairly reliable in spite of this tenderness. When permitted to do so it will outyield all other sorts in the orchard.

It also comes into bearing at an early age, lives a long time and is resistant to rot to a marked degree.

Many nurserymen have introduced special strains of this variety under names such as Late Elberta, Improved Elberta, Mugwump's Elberta, etc. In general such "improvements" are to be examined very carefully before any large planting is made. We once planted a dozen different varieties introduced by a certain small nursery and when they came into bearing we found not a single peach that was fit to ship and only one of the twelve varieties was even desirable as a fruit for home use. As an exception to the above rather sweeping statement I might say that the Early Elberta, which is just now attracting a good deal of attention, seems to be a promising variety. It is of course not an Elberta at all but a distinct variety that resembles the older sort and ripens somewhat earlier. In order to extend the picking season, it should be planted with Elberta and not as a substitute for it.

Fitzgerald

Fitzgerald is a Canadian variety that has been under cultivation for at least thirty years and has "made good" in many places. It is of the Crawford type which means that it is

a top-notch variety as regards quality. Many growers report that it is not productive, but it is certainly much more so than the older varieties of its family. As a commercial peach it will not compete with heavy producers such as the one we have just been considering, but for a discriminating trade it might be profitable. It ripens along with the Early Crawford and Carman.

Greensboro

I will always have a warm spot in my heart for the Greensboro peach for it was one of the most reliable varieties that we ever grew. Also it was the first commercial peach to be harvested each year in our orchards and it was always something of an event to gather those first peaches. The trees are very hardy in both wood and bud and if the cold weather of winter and early spring left anything at all in the peach orchard it was sure to be on these trees. When allowed to ripen on the tree the fruit is first-class in quality, but is unfortunately not a perfect freestone. Some specimens almost qualified for this class, but the majority of the fruits adhered quite tightly to the pit. It is a white-fleshed sort, ripening considerably in advance of Carman. As an evidence of the resistance to frost which this variety showed in our own orchards I might mention an

experience we had one year with a late frost. The rows of trees extended up and down a certain hillside. Below a certain point all varieties were stripped of fruit except the Greensboro—on this one variety we gathered peaches four rows farther down the hill than on any other kind.

Heath Cling

Hedrick says that the Heath Cling is “unquestionably the oldest named American peach now under cultivation.” Aside from the fact that it is an old variety and therefore entitled to our reverence it has nothing to commend it. The fruit is about as poor as a peach well can be. It has long been popular however, for the making of “pickled peaches” and when thus used with an abundance of sugar and plenty of spices it becomes quite edible. As a fruit to eat from the tree it is a joke when compared with some of our really fine sorts. The grower objects to it also because it is very subject to rot and the curculio take especial delight in using it as a breeding-ground. As a result the fruit is often riddled with the larvæ of these small beetles. In spite of the fact that I was once an entomologist by profession I am very much inclined to be a vegetarian in my diet—when I am eating vegetables.

Illinois

Another fine white peach of the early mid-season is the Illinois, originated by E. H. Riehl near North Alton, Illinois. It is a beautiful fruit, but unfortunately ripens at a season when we have plenty of other fine sorts to compete with it. Being white-fleshed it is not adapted to the larger markets.

J. H. Hale

Commercial fruit-growers are all familiar with the name of J. H. Hale, the famous peach "king" who owned orchards in several states. For many years he was one of the largest peach-growers in the country and the peach which now bears his name originated as a chance seedling in one of his orchards. When he first saw it he was at once struck with its large size and beauty. It is truly a wonderful peach, having every character that a good commercial peach should have. It is, as a rule, larger than Elberta, even solidier than that standard sort and of somewhat better quality. It does not compare with the Crawford type of peach in texture or flavor, however, as it is more of the Elberta type—a type that is hard to beat for market purposes. Owing to the most extensive advertising campaign that was ever launched for any new peach, this variety has been extensively planted all over

the country. The reports which come from these different plantings have not confirmed the expectations of the fruit-growing world. It is true that it has made good in some situations, but unfortunately it has failed to measure up when planted in other places. In our own orchards we planted about fifteen hundred of the trees when they were first offered to the public. They promptly gave up the ghost and to-day I do not believe we have a single tree growing. In a neighboring orchard I know of a few trees that have lived—that is about all. They have not made a growth in any way comparable with other varieties. In still other localities the tree is reported as growing well, but does not equal the Elberta in productiveness. In fact, all the evidence available seems to point to the fact that the variety is not so adaptable to varying soil conditions as is the old Elberta. Where it grows and bears abundantly there is no doubt but that it will replace the old standby, but as yet we do not know the limits of these localities.

Kalamazoo

One of the best of the various peaches that ripen in the Elberta season is the Kalamazoo, a Michigan variety that has been grown to a considerable extent in the last thirty or forty years. In some sections it is almost as good

as Elberta from a commercial standpoint and excels that variety in that it is far more edible. The fruit is sometimes small, but in our Indiana orchards it averaged nearly as large as the Elberta and was almost as productive. I do not recall that it ever brought any more on the market—another indication that the buyer does not as a rule appreciate quality in what he buys.

Krummel

Another peach that should be more widely planted to supply the late markets is the Krummel, a very hardy, vigorous, yellow free-stone that deserves to be better known. It ripens even later than Salwey, and is the latest peach that we have. In China there are said to be some varieties of winter peaches that can be packed away much as we pack apples. In this country the Krummel almost amounts to a winter peach. We have frequently had them on the trees after a hard frost, and one year the ground froze before they were all ripe. They stuck on the branches, however, and we had peaches to ship long after all other varieties of this fruit were gone and forgotten. This late ripening will probably prevent the variety from being planted in the northern districts, but from the latitude of central Indiana south it should be a very desirable sort. The quality is all that

could be asked for in so late a fruit. It is not so good as the best of the mid-season peaches, but in October we are not so apt to be particular as to flavor. Almost "any old peach" tastes mighty good. In the "winter of the big freeze," a few seasons back, the Krummel was one of the few varieties in our orchards that survived the cold. They resisted a continued temperature of twenty-five degrees below zero which killed outright many trees of Elberta, Heath, Champion, Kalamazoo and other standard sorts that are rated as fairly hardy. Under the circumstances I can not be blamed for feeling kindly toward the variety. If I intended to plant another large peach orchard I would see that this variety had a prominent place in the list. However, I have no such intentions. I am a reformed man, and opposed to all forms of gambling—unless I can have a reasonable "look in" for my money. This I am satisfied I do not have when I plant peaches in central Indiana.

Niagara

One of the comparatively new varieties is the Niagara, a sort that I have never seen, but which I mention here because it has been received with considerable favor in New York. Professor Hedrick says that it is of the Crawford type, probably a seedling of the Early

Crawford. Like all peaches of that sort it is of the very finest quality and should be more thoroughly tested in various sections. According to Hedrick it promises to excel the old Crawford's in adaptability and productiveness.

Salwey

I have already mentioned the fact that practically all of our commercial peach varieties have originated in this country. The Salwey is the only one that I know of that was introduced, having been brought from England many years ago. It is a good yellow variety, ripening nearly a month after Elberta, and of excellent quality for a market peach. In certain districts subject to spring frost the crop is sometimes lost, but aside from this inclination to tenderness the variety is excellent from almost every standpoint. Personally I would not plant a peach orchard without a liberal number of these trees. They ripen at a time when other peaches are scarce and usually sell at a good price. The variety was formerly known as "Salway," but the spelling has recently been changed to the form I have used. It was named for a certain Colonel Salwey, and the presumption is that the Colonel knew how to spell his name and that nothing would be gained by an American revision of it.

Yellow St. John

Some years ago, the Yellow St. John was planted to a considerable extent, but it has now largely been replaced by more reliable sorts. The fruit was of good quality, but, like many other good sorts, was unproductive. That one feature has eliminated many good kinds from the American orchards.

CHAPTER XIV

PLUM VARIETIES

“—— then are the wicker baskets cramm'd
With Damask and Armenian and Wax plums.”

—COLUMELLA.

IN SPITE of the fact that the cultivated varieties of plums number several thousand, this fruit has never attained the wide popularity that has been accorded our other orchard products. The reason for this has, I think, been overlooked. Of all the fruits indigenous to temperate climates, the plum is the only one that never has been used for making alcoholic beverages. If we will examine the history of any of our fruits we will find that they were first used as a source of supply of the exhilarating juice. From the time of old Omar Khayyam, the Persian poet, with his

“—Book of verses underneath the Bough,
A Jug of Wine, A Loaf of Bread—and Thou
Beside me singing in the wilderness—”

on to the time of the first American colonists, fruit was not eaten but drunk. Had prohibi-

tion come in a hundred years earlier it is almost certain that the fruit business in this country would never have attained the magnitude which characterizes the industry to-day. And yet, to-day, fruit-growers as a class have the reputation of being the most temperate citizens existing. Personally I do not recall ever knowing a fruit-grower who was an habitual drunkard.

Certain it is that we have learned to eat fruit only within the last century, and I think this fact accounts for the general neglect which the plum suffered until recently. Even now plums are not grown nearly so extensively as are other fruits, but the commercial plantings are every year increasing—further proof that our tastes in food and drink have undergone a tremendous revision.

The plum is a cosmopolitan sort of fruit and in some variety is to be found throughout the temperate regions of the earth. In America there are a number of wild species which were used by the Indians to a limited extent before the advent of the white race on this continent. The Indian being "pure" by nature, did not know alcohol and ate most of his fruit instead of drinking it. These native plums have been the source of a large number of improved varieties that are now grown in our orchards. Some of these named varieties which we

grow with tender care are simply wild forms that developed spontaneously in the woods.

The European plums, the finest representatives of this class of fruit, were not commonly grown in America until long after the first colonies were established. It is true that the early French settlers in Canada made limited plantings of them, but it was not until after the American Revolution that they attracted any particular attention from our own growers.

Robert Prince, who established nurseries on Long Island about 1730, was perhaps the first to introduce European varieties to our shores, long after orchards of peaches and apples and vineyards of grapes had been yielding up their life-blood to furnish conviviality to the social gatherings of that early time. John Bartram too, a botanist of Philadelphia, imported European varieties at about the time Prince was introducing the new fruit. Bartram must have been an interesting old chap, hobnobbing with the fruit-growers and botanists of many countries, and always interested in anything new that he thought might be of value to his own countrymen.

Although they are the finest representatives of their race, the European plums have not had an altogether easy time of it in this country for they are a prey for several insects and diseases that are unknown in their native

home. Chief among these is the black knot, a fungous trouble that is hard to control and that in some sections renders the growing of these plums almost an impossibility. The curculio too, a native insect, takes particular delight in jabbing its eggs into the fruit of the European plums. In some seasons it is almost impossible to grow this fruit to perfection on this account. On the other hand, there are sections where these insects and diseases do comparatively little damage. On the Pacific Coast the plum is as much at home as it is in Europe—more so if possible, for probably nowhere in the world are such fine specimens of the fruit produced.

Prunes are simply varieties of European plums. A prune is only a plum that has been dried, and certain sorts are so well adapted to this purpose that they are called prunes even in the fresh state. As a rule they are characterized by firm flesh and tough skin and contain a relatively high per cent. of sugar. A nice juicy Wild Goose plum would not amount to very much in the prune line, for after it is dried there is little left except skin and bones. The so-called Japanese plums, which have recently been introduced into our country, are in fact natives of China, no wild plums occurring in Japan at all. These sorts have long been cultivated in Japan, however,

and were imported to our western shores from that island. They constitute a valuable addition to our orchards and will be more and more appreciated as time goes on. They are, fortunately, best adapted to those parts of the country where the European varieties fail and in this respect will supply fresh plums to a section that has not heretofore been able to supply its own wants in this respect.

The three classes of plums which have been mentioned constitute the source of the majority of the varieties grown to-day, with the exception of those which have been produced by crossing two of the races. Some of these hybrids are extremely promising fruits and show a tendency to combine the good qualities of both parents. On the other hand there have been hundreds of new varieties thus produced that are worthless from almost every standpoint.

An interesting point in this connection, which serves to save the face of the introducer in many cases, is that plums vary greatly with difference in environment. A plum that is a great success with the originator may be a regular frost when grown by another orchardist a hundred miles away. The Omaha is an example of this fluctuation. I understand that in some sections it is an excellent sort—with us it is not worth planting. The

purple-fleshed plum, a recent introduction, is said to be of good quality where it originated. In our orchards it is not worth the space it occupies. On the other hand the America has been a wonder with us, and may fail with some grower whose soil or climate is not exactly suited to its proper development. Altogether the plums as a class are almost as capricious in their soil and climatic preferences as are the strawberries—and they are about the most temperamental fruits that a man can grow.

Abundance

One of the most talked of plums in the country to-day is the Abundance, a "Japanese" variety that was imported by Burbank in 1884. Unfortunately, there has been much confusion in regard to the variety owing to the fact that the importers did not know the Japanese language. It would seem that such knowledge is essential if serious blunders are to be avoided. The first trees of this sort came over bearing the label "Botan." Thinking this was the name of the plum, American nurserymen sold it under that caption. Later, more "Botan" trees were sent over and were widely distributed. In the meantime some one renamed the variety Abundance. Every time a new shipment of "Botan" plums came from Japan they were promptly tagged with the American name and sent on their way

rejoicing. In a few years a howl went up from the planters. The new plums proved to be of many varieties and it was then discovered that the simple Japanese nurserymen had sent many sorts of plums under the one name—and that name freely translated means “Red.” Consequently we can find all sorts of “Abundance” plums in our orchards and they all vary except in color. The true Abundance is a very fine plum, one of the best, if not the best, of the Oriental sorts. The trees may be known by their upright growth, slender twigs and abundant fruit. The plums are, as a rule, not a solid red in color but are more or less marked with a yellow ground tone. The skin is tender, almost too tender to ship well, and the flesh is juicy and delicious—altogether the best flavored of any of its species. The name Abundance, which was given to this sort, might better have been applied to the Burbank, as the last named variety bears much heavier crops of fruit. As a plum for home use outside of the districts where European plums succeed the Abundance is the one best bet. For commercial planting I can not speak so strongly—better banish it from your list unless you have a near-by market.

America

The America is a cross between the Jap and the American wild plum and has the best char-

acteristics of both sorts. It looks something like a very large and fine Wild Goose plum, but excels that variety in many respects. In our orchards the trees have withstood a temperature of twenty-five degrees below zero, and in 1919 bore a crop of fruit after going through a temperature of twenty-four when the trees were in full bloom. I think it is as near frost-proof as a plum can be and it is very resistant to rot and other fungous troubles. The fruit is excellent for cooking, but it is not to be compared with many other sorts for eating from the tree. However, this season we left a part of one tree to ripen fully. I wanted to see just how the fruit would be when it was "dead ripe" on the tree. I managed to get two plums in that condition and they were better than I had expected them to be. The rest of the crop left to ripen had a very uncanny way of walking off the place after dark so I presume the fruit was entirely satisfactory to the neighbors. I have meant to interview them on the subject, but the psychological moment has not yet arrived. This variety should not be confused with the American, a native sort of but little promise, or with American Eagle, another native sort that I have never seen but that is said to be good.

Arch Duke

Arch Duke is one of the newer European plums that has attracted considerable attention in this country and promises to be one of the best commercial sorts where plums of that type can be grown. It is a large blue free-stone. There are other plums of better quality, but few that combine so many good points as does this variety. The trees are very productive and are resistant to disease to a considerable extent.

Arctic

Except in hardiness, Arch Duke is superior to Arctic, a sort that originated in Maine. In keeping with the usual eccentricity of the whole plum family, Arctic seems to be hardy in some places and not so hardy elsewhere. Originating in Maine it should be a very resistant variety to the effects of cold, but in Michigan it is reported as being actually tender. If this is true it is unfortunate for the variety, for it has little else to commend it. The fruit is inferior in quality and the trees are small in size and not overly productive.

Bavay

One of the best of the European plums is the Bavay, a seedling of the Reine Claude. It originated in Belgium nearly seventy-five

years ago and in the plum-growing portions of our country has been grown for half a century. It is a beautiful greenish-yellow in color and the quality is of the very best. The trees, like all European plums, are not so vigorous nor do they bear so early as do the Japanese sorts. As a rule, however, they are longer-lived if given the proper care.

The Bavay is increasing in popularity owing to the fact that it is a very good desert plum and in addition it retains much of its high quality after it is cooked. In addition the growers like it because it keeps and ships well. In fact it is an "all-around" fruit of its class.

Bradshaw

Nurserymen exert a tremendous influence on horticulture in ways that at the time are not suspected. When the undecided grower goes to buy his trees it is ten chances to one that the nurseryman will sell him the kind of which he has most. This explains why there are more Bradshaw plums than any other variety planted in New York State. The Bradshaw makes a fine-looking tree in the nursery, it is easy to grow, and as a result nurserymen grew tremendous quantities of them. The variety, of course, is not without merit as the trees are large, vigorous and very productive, and the fruit is large and attractive. However, the

trees are slow about starting to bear, are rather subject to disease and the fruit is of inferior quality. Several other sorts are better adapted to commercial planting.

Burbank

Probably few plums have ever had the advertising that has been given the Burbank, a Japanese variety introduced about forty years ago. In many respects it is one of the best of its class, but it has serious faults that render it less desirable than some other kinds. The trees have a peculiar flat-topped habit of growth that gives them a very "Japanesey" appearance and suggests their use as small ornamental trees for use among large growing shrubs. They are laden with white flowers very early in the spring and later the branches are clothed with reddish-purple plums. The trees are inclined to overbear and as a result the fruit is often small and the branches require props to prevent breaking. The quality of the fruit is very poor, not to be compared with Abundance in any way. The fruit also rots badly unless carefully sprayed, and both wood and bud are inclined to be too tender for northern planting.

Climax

One of the best Japanese plums is the Climax if we are to consider only the quality of the

fruit. Few other plums of its class equal it, but it is very difficult to grow because of brown rot. The trees are neither vigorous nor hardy and worthy only of the attention of amateurs who will give them especial care.

Damson

The name Damson is applied to a group of similar plums as well as to one member of that group. They are all small dark blue or nearly black fruits, characterized by rather astringent flesh. Practically none of them is suitable for eating from the tree, but they are all good for making preserves. The Damson plums take their name from the ancient city of Damascus where they were first largely cultivated. From old descriptions which we have of this fruit it appears to have changed very little in character during the twenty-five centuries that it has been grown. The best of the group is perhaps the Shropshire Damson, a variety that is hardy and very productive. The fruit is possibly a little less sour than most Damson plums and is of better quality than most of them. It originated in England in the seventeenth century and was one of the first plums to be introduced to this country by Prince, whose work on Long Island has already been mentioned.

De Soto

The De Soto is a native American plum and said to be one of the best of its class. I have never grown it and am not familiar with either the tree or fruit.

Golden

Some years ago Luther Burbank introduced a new plum under the name of Golden, but did not sell any considerable number of the trees. Shortly afterward the variety was sold to Stark Brothers, who re-named the variety "Gold." It is under the last name that the plum is principally grown, but the American Pomological Society has retained the first name. A great deal of confusion might be avoided if more care were used in the classifying of the names of our common fruits. As it stands to-day the principal distributor of this variety sells it under a name that we are assured by the authorities does not exist. Regardless of the name the plum appears to be a very promising new variety. It has the same parentage as the America and to a certain extent resembles that variety, but is not of such good quality. Also, with us, the trees have not proved to be good growers and are late in starting to bear. It may be that in some sections these defects will not be so apparent for, as I have already said, plums vary to a consid-

erable extent with their environment. At any rate Mr. Burbank has said that this is "the best plum ever produced."

Stark Brothers have recently introduced another new plum under the name of Mammoth Gold. So far the American Pomological Society has not interfered with this name and it may stick. I have never seen the new variety, but from all that is claimed it appears to be promising as a very early Japanese sort.

Neither the Golden nor the Early Gold should be confused with the fine old European sort known as the Golden Drop. Neither of these Jap varieties can compare with the wonderful quality of some of the Old-World sorts. Unfortunately the Golden Drop does not succeed in America except on the Pacific Coast where it grows to perfection and is used for all purposes for which a plum is adaptable. It is even used for prune making and, being a yellow plum, the product is known as "silver prune." In the East the variety fails in vigor and hardiness and the fruit is very subject to brown rot. It is, however, grown by amateurs to a limited extent and is worth trying by any one who will take the time and trouble to look after it as carefully as it deserves. In our day we are too much inclined to rush our work and to devote our attention only to those things which promise the greatest results with

the least labor. And this generality applies to fruit-growers as well as to coal miners.

Grand Duke

In spite of the fact that the quality is not quite up to snuff, Grand Duke promises to become an important commercial fruit wherever European plums can be grown. The trees are a little slow about getting to work, but after they once start they bear abundant and fairly regular crops. In New York it is regarded as a favorite late market plum. Like many other large blue plums the fruit lacks quality and sells chiefly on its looks. The market pays just as much for skin-deep beauty as it does for genuine worth that extends from cover to cover. Consequently the commercial grower produces those varieties that look well and are not too particular about how they are cared for.

Hand

The Hand plum was formerly known as the General Hand, but the military title was lopped off some time ago—presumably in the interests of the society for the promotion of peace. If the variety were only more prolific it would be recognized by amateur and professional growers alike for it is a large, beautiful yellow plum of fine quality. If you have any notion

that European plums might succeed on your land, I suggest that you try a few trees of the Hand variety. They may fail to bear much fruit, but the chances are that you will prize what they do bear.

Lombard

The Ben Davis apple, the Elberta peach, the Kiefer pear and the Lombard plum all occupy the same place in their respective groups of fruit. They are all rather cosmopolitan in their soil requirements and are more reliable and productive than others of their sorts. They are also the poorest representatives when quality of the fruit is considered. The Lombard plum has been widely planted chiefly because it will grow and produce a lot of plums almost any old place. It is hardy and vigorous and almost every year will have a crop of fruit to test the breaking point of its branches. As a fresh fruit the Lombard fails, for it is so poor in quality that the novice would recognize its deficiencies. When cooked with enough sugar and spice to give it character it makes a very good product and it is for such purposes that it is now chiefly used. It is a handsome bluish-purple plum that has long been under cultivation. There are probably many other named varieties that should be classed with it as its seedlings do not vary greatly from the parent

type. It is of value only where the grower insists upon planting European sorts and can grow no other variety of that class.

Monarch

The Monarch is an English plum of comparatively recent introduction that promises to gain some favor in this country. The fruit is of good size, dark purple, nearly black, in color. It is of good quality and seems to be productive enough to justify being planted as a market sort. It is not likely that it will meet success outside of the well-known range of European varieties.

Ogon

Another Japanese plum that has suffered through having its name tampered with is the Ogon. (I am using the nomenclature of the American Pomological Society in spite of the fact that I do not always agree with it.) Ogon is the Japanese for "yellow," and several plums are commonly grown in that country under that name. This variety has also been called the "Shiro" and is now being sold by some nurseries under the name of Early Gold.

The true Ogon is an excellent early Jap variety that should be more widely planted. I have seen Ogon trees that looked like a solid mass of fruit—and the fruit was all perfect too. In quality the plum is good for an early sort

and in some seasons might be called excellent. Tending to bear very heavy crops usually cuts down the size of the individual plums and for the best results the trees should be thinned. The variety is said to be less favorably known in the European plum districts than it is in the Central States. This can readily be accounted for by the variation in fruit due to soil conditions—as I have already mentioned two or three times. I only mention it again so that the reader won't forget it. I don't want to be held accountable for making some statement that fails to accord with some other grower's experience.

Pearl

In *The Plums of New York*, Professor Hedrick mentions the Pearl as being “unsurpassed in quality by any other plum.” I am sorry to say that I have never had the pleasure of seeing this variety, as it is one of comparatively recent origin. I certainly do fancy fine plums—being one of those who are not addicted to alcoholics and appreciating good fruit more than the juice. Professor Hedrick says further that the trees are only medium in vigor and that the variety in New York is rather unproductive. Any amateur can, of course, tolerate such weaknesses if the fruit is excellent, but the professional grower wants something more reliable—regardless of quality.

Red June

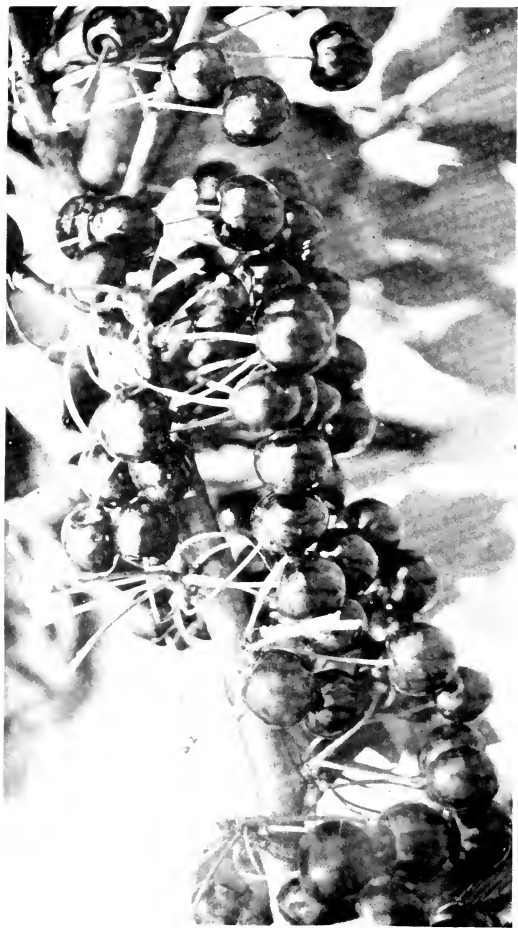
The very best early Japanese plum is the Red June, a very dark, almost black plum of fairly good quality and with a good record for production. It ripens at least two weeks before Burbank, three weeks before Abundance and with those two sorts forms a triumvirate of Japanese sorts that is hard to beat in the commercial orchard. Our Red June plums have uniformly sold for more money than any other sort, largely because of their season of ripening. We prefer other sorts for home use, but always look forward to the Red June season because it brings us the first of the plum crop—and the first fruits of the year are always good. If the same fruit were offered to us later in the season after the keen edge of our appetite had been removed we might reject it as unworthy.

Reine Claude

In many sections of the country the Reine Claude is better known under the name of Green Gage. The Green Gage is the recognized standard of excellence among plums. The name is also loosely applied to a group of plums having similar characteristics and possibly all of the same remote ancestor. These plums originated in France several centuries ago and were introduced into England by the



The America, a cross between a native plum and one from Japan.



The Bing cherry is popular both in the East and in the West.

Gage family. The original ancestor of the variety no doubt came from Armenia or some place in that part of the world for it is said that wild sorts similar to the Green Gage are still to be found there. Whether the Reine Claude actually originated in France or was simply introduced and given a French name I do not know—and probably no one else does. We only know that it was named for Queen Claude, wife of Francis I. When the Gage family imported the variety into England it was brought with a number of others and the label was lost from this tree. The gardener, not knowing what it was, named it “Green Gage”—a name that sticks in English-speaking countries to the present time. It was probably one of the first plums cultivated in this country as Prince lists it among those he grew at his Long Island nursery.

Wickson

Wickson is probably the largest of the Japanese plums, often measuring over two inches in diameter and somewhat greater in length. It is dark red in color, sort of an old wine color—if you know what I mean. The tree grows very upright, more so even than Abundance and this makes the fruit difficult to harvest. However, I have not noticed that this feature worries the average grower of Wick-

son because there is so seldom any fruit *to* harvest. Its habit of shy bearing is one of its worst faults though it is also rather tender, and in wet seasons the brown rot is difficult to control. In some sections of the South it is reported as doing well and producing regularly. Unless it is known to succeed in your neighborhood it is best left in the nursery.

Wild Goose

The name of this plum is as interesting as its history. Many of our plums bear labels that are difficult to account for, but the Wild Goose is certainly entitled to the appellation it has carried for so many years. About 1820 M. E. McCance shot a wild goose in Tennessee. His wife in dressing the goose (that was back in the days when the women did the work), found a plum seed in the craw. This was planted in the garden on the McCances' farm near Nashville and the tree which grew from it was called the "Wild Goose tree."

In this way originated one of the most popular native plums, a variety characterized by hardy healthy trees and by the fact that the fruit is very uniform and is produced in great abundance. During its season, which is rather early, it is the chief plum on the markets in the Central States and is preferred by housewives for the making of jelly, jam and pre-

serves. It is a real honest-to-goodness native and I am glad that it bears the name of a very noteworthy American bird. In a few years, unless otherwise instructed, our children will think of a wild goose as a variety of plum only; for the bird is rapidly passing to the realm of memory,

CHAPTER XV

CHERRY VARIETIES

"My faith is all a doubtful thing,
Wove on a doubtful loom,—
Until there comes, each showery spring,
A cherry tree in bloom."

—DAVID MORTON.

THERE is something about a cherry tree that has a peculiar and universal human appeal,—something that suggests the habitations of men, and an established home life. Perhaps it is because men and cherries have been so long associated that this is true, for the cherry was one of the very first fruits to be brought out of its natural wild state and made to serve the purposes of the human animal. Cherry-stones are found in the ruins of the most ancient civilization and even in the ruins which were left by the peoples not recognized as being one bit civil. The wild cherry of our woods was used by the Indians to a limited extent, and if we judge by the stones found in the monuments of the mound builders even that ancient people used this fruit.

In Europe cherries were used before the time

of written history and their systematic cultivation must have been a very early branch of horticulture.

The cherries grown for fruit fall into two great natural groups, the sweet and sour sorts. The sour cherry, *Prunus cerasus*, is more widely known than the sweet form, *Prunus avium*, because it is less exacting in regard to soils. It will and does grow almost any place where it can find space for its roots. It withstands neglect better than any other fruit tree and its product is enjoyed by every one. This hardy, cosmopolitan fruit must have been cultivated from very early times for it is now difficult to say where it originally grew wild. Botanists have stated roughly that it, and the sweet cherry also, came from southeastern Europe and the adjacent parts of Asia. From this region which cradled the human race have come many of our fruits placed there by an all-wise Providence for the benefit of the first men. Maybe the Garden of Eden really did exist in those parts. Horticultural facts certainly do not dispute such an assertion. At the present time the sour cherry has been very widely disseminated over the civilized globe and except in the tropics it seems to thrive wherever it is placed. In all sections where it has been long grown it has become wild through having its seeds distributed by the birds. Not so wild

that you must slip up on them in the dark, but merely escaped from cultivation, gone vagabonding down country lanes and along neglected fence lines.

The sweet cherry too has escaped from cultivation in the older parts of the country, and in Europe it grows spontaneously over the whole continent south of Sweden.

Cherries were brought to America by the first French settlers in Canada and by them were distributed over the territory under French control. Even at an early day these fruit-loving people had established cherry trees at such remote points as Kaskaskia and Vincennes. In one of Maurice Thompson's novels which is said to be historically accurate, a cherry tree in old Vincennes plays an important part and makes a graceful picture of pioneer life in the early colonies. Later Vincennes became rather famous in the cherry world by virtue of its being the center of production for young cherry trees. The largest cherry nurseries in the world were said to be located there. The English brought cherries to the old Plymouth Colony during the first few years of its existence and from this start we really trace our cherry industry in this country to-day. As early as 1629 "Red Kentish" cherries are mentioned as being cultivated in this place. An old reference by one John Josselyn, an English

traveler of the seventeenth century, indicates that cherries, like other fruits, were used by the colonists as drink rather than as food.

“It was not long before I left the country that I made Cherry wine, and so may others, for there are good store of them both red and black.” Continuing with the same paragraph he made some statements concerning plant diseases that are as interesting as is the cure which he proposes.

“Their fruit trees are subject to two diseases, the Meazels, which is when they are burned and scorched by the sun, and lowsieness, when the woodpeckers jab holes in their bark; the way to cure them when they are lowsie is to bore a hole in the main root with an Augur and pour in a quantity of Brandie or Rhum, and then stop it up with a pin made of the same tree.”

I am not saying it won't work,—but why waste the “Brandie.”

Even on the Pacific slope the cherry was one of the very early established fruits for it was brought by the first Franciscan monks to the missions of the early times. It has since been an important Californian product, but that state has now been outstripped by Oregon in the production of this fruit. Probably the finest sweet cherries to be found anywhere in the world are grown in Oregon and their intro-

duction into that state is still to be classed as almost recent history.

In 1847, Henderson Lewelling set out from Iowa to the Northwest, carrying with him a fine lot of selected fruit trees of various kinds. I presume he had a premonition that fruit would do well in that then, new, territory, and his notion certainly was well grounded. He settled at what is now Milwaukie, Oregon, a few miles south of Portland, and established his fruit plantation. One of the interesting results of this trip of Lewelling's was a change in the name of one of our best-known sweet cherries. Among his collection of trees was a specimen of the Napoleon, an old variety that has been known by that name for many years. In the trip across the mountains, the label was lost from this tree and when it finally fruited he did not know what it was so he gave it a name of his own. From that time on the Napoleon has been grown in the West as "Royal Ann," and the error is now so firmly fixed that it will probably never be corrected. Even eastern buyers, who do not know about cherry varieties, specify Royal Ann cherries when they purchase their canned goods. Technically speaking, from a pomological standpoint, there is no such variety.

Henderson Lewelling was succeeded by Seth Lewelling, who carried on a nursery business

for many years. Due to the difficulty in securing stocks on which to bud the known varieties of cherry, Seth planted many stones of the sweet cherries then bearing in his orchards. From these seedlings he secured not only stocks to use in propagating nursery stock, but accidentally originated a number of new varieties that have been an important factor in the development of the Oregon cherry industry. Probably his two most noted introductions were Republican, and Bing, both excellent fruits that will perhaps be as good in other sections as they have been in their home state.

It has been indicated that the cherries of cultivation were not native to this continent. Our only indigenous cherry of any great importance was the wild black cherry of the forests. It was valuable chiefly on account of its hard dense wood which was used in cabinet making. The fruit was used to a limited extent as was that of the choke cherry. Even in recent times, "black cherry bounce" was not entirely unknown to many who were able to secure "the makings."

The sand cherry which grows along the shores of our northern lakes is the most nearly edible of any of our native cherries. It grows in the form of a low straggling bush never more than a few feet high which never by any stretch of the imagination could be called a tree. The

fruit is not half bad—when you have been away from civilization for a few weeks, and the Indians regularly gather them either to be eaten fresh or for the purposes of making jam of various sorts.

Prunus pseudocerasus, the flowering cherry of Japan, has been introduced as an ornamental in certain parts of the country. I have a number of them growing—hardly growing either, living, out back of the house. Some day they may get a start and surprise me, but at present they are having a very hard time of it. The *Prunus tomentosa*, however, another ornamental from central Asia, has made a perfectly wonderful growth in the five years I have had it. It is truly a “bush cherry” for the many stems do not grow over six or eight feet in height and form a compact shrub of great beauty and possibly of some usefulness for its fruit. The cherries are of medium size and are said to be pleasantly acid. I can not say from experience for so far the bushes have failed to set any fruit, although they bloom abundantly. Even though they never produce a cherry I would not part with them for we have nothing more enchanting in the early spring. They bloom early in April before almost any other shrub has had the courage to swell its buds and the twigs and branches are clothed in masses of softest pink. I have

never known the buds to be winter killed and with us they have stood a temperature of twenty-five degrees below zero.

Bing

Among the cultivated varieties of sweet cherries none is better or more interesting than the Bing. When I first heard the name I thought some one must be joking, for I could not imagine such a fine fruit bearing such an absurd title. Later I learned that it had been named for a Chinese workman—probably one of Lewelling's faithful assistants. It is one of the most widely cultivated "black" cherries of Oregon, and if you will stop at the first fruit stand you see next summer and examine the layout of sweet cherries there are about ten chances to one that you will find the Bing prominently displayed. It is a fruit of high quality, the equal of any known cherry, and where the trees will grow, it is one of the very best to plant. Unfortunately, like many others of its race, the trees are not adaptable to a wide variety of soils and sometimes fail for this reason. It has, however, been successfully grown in many of the eastern cherry sections and promises to become a leading commercial sort just as it has in the West. In northern Michigan I have seen as fine Bings as could be grown any place.

Black Tartarian

One of the earliest sweet cherries to ripen, as well as one of the first to be introduced into this country, is Black Tartarian. As its name indicates it is a black cherry of Russian origin. It has been in cultivation for many years and was first grown in England in 1794. Throughout eastern America it is one of the favorite sweet varieties for the home orchard and is also planted widely for commercial purposes. The trees are very strong, hardy and vigorous, and usually bear abundantly. The fruit is almost black in color, not so large as some other sorts but of very fine quality. It is rated as one of the best cherries for dessert use, but is just a trifle too soft for the best results in canning. However, it is canned to a limited extent and the product, while not so firm and attractive-looking as some others, is of delicious quality. One good point about the variety that deserves mention is the fact it is very resistant to brown rot, one of the worst enemies of the cherry-grower. For this reason it is a desirable sort for the amateur who, perhaps, is less skilled in fighting diseases than is the professional grower.

Dyehouse

One of the very early sour cherries is the Dyehouse, so named after the originator and

not because of any lavish spread of color on the fruit. It is a bright red fruit, sour and refreshing, but in no way excelling Early Richmond, another early sort. Its chief claim to consideration is that it ripens before any other good sort and in this way will extend the cherry season at the forward end.

Early Richmond

Early Richmond has for a long time been the standard early cherry and promises to remain so. Hedrick calls it the most cosmopolitan of all cherries and probably for this reason we find it in more situations than almost any other variety. It will apparently thrive under neglect, and after the other fruit trees about the neglected farm-house have perished from lack of care, the Early Richmond will continue year after year furnishing an abundant supply of food for the birds. The fruit is not so good as that produced by some of the later varieties but makes excellent pies and is now being canned to a considerable extent.

This is the old Kentish cherry of English writers and in that country is still listed by nurserymen under the old name. It is certainly an old sort and the true history of it will never be known. It has been thought by some to have been brought to England by the Romans and by others is credited with being

a variety from Holland or Flanders. At any rate it is a good early cherry and should be in every home collection and in all commercial orchards where it is desirable to extend the season of ripening.

English Morello

Among sour cherries English Morello is the best of the late sorts and in the markets is almost as popular as the Montmorency, a standard sour sort. The fruit is too sour to be attractive to the casual prowler through the orchard, but when cooked it has a flavor that is not excelled by any other sort. Ripening late in the season it comes on the market at a time when cherries are scarce and always brings a high price. The trees, however, are not very satisfactory for they have a tendency to grow small, and unless they are planted very close together the crop is not large enough to be profitable. Also the trees are not so adaptable to soils as are some other sorts and unless the variety is favorably placed the returns may be unsatisfactory. The branches droop in a peculiar way that marks the variety for any one who has ever seen one of the trees. In some sections this variety is sold under the name of "Wragg," and many growers maintain that the two sorts are separate. Personally, I can see no difference in the two kinds that

could not be explained by environment. When I have seen them grown together they were identical.

Lambert

The work of the Lewelling brothers in Oregon was mentioned in connection with the Bing cherry. Although they did not originate the Lambert they were indirectly connected with its appearance. The tree appeared as a seedling under a Napoleon tree that Henderson Lewelling had planted in the orchard of J. H. Lambert, Milwaukee, Oregon. This seedling was grafted to May Duke and later was transplanted. Some years later, about 1880, the May Duke top died and a sprout from the seedling root formed a new top. All those years that seedling root had been furnishing strength for the old May Duke top and had been held down by the top. When its chance came it thrust its sprouts heavenward and produced the first Lambert cherries—a sort that shares the popularity of the Bing in the Northwest. I have often wondered how many other good varieties have been lost to the world because the seedling roots were prevented from growing by the vigor of some old top of an established sort. There have been any number of “hair-breadth” escapes in the annals of horticulture and several of them have been mentioned in

these chapters. The Lambert is one of the most striking of these.

The fruit of the Lambert, as grown in Oregon, is all that can be desired and the tree is vigorous and productive. Unfortunately, in the East the variety has not maintained its reputation. The fruit as grown here is still of fine quality and produces abundantly, but for some reason is very much inclined to crack. If the weather remains dry during the ripening period everything may be all right, but if a few brief showers appear to give the ground a little extra moisture the Lamberts seem to be unable to contain themselves.

Late Kentish

Late Kentish is a very old American variety that was conspicuous in the orchards and around the homes of the first colonies in the Eastern States. It is no longer grown, but some old trees of the variety still remain. It played an important part in our early horticulture and although it has been replaced by better sorts it should not be forgotten. It was called Late Kentish, because at that time it was considered a seedling of Early Richmond which was known among the colonists as Kentish. It ripens about two weeks later than the supposed parent sort.

May Duke

May Duke is one of a class formed by crossing the sweet with the sour cherry. All of this class have some of the characteristics of both species. They are neither so sour as are the true sour cherries and seldom so sweet as the sweet kinds, but have a flavor in which are blended both the sweet and the sour. The result, as can be imagined, is excellent and the Duke cherries have long been popular. Many of these sorts are unsatisfactory, however, from the commercial standpoint as they do not produce as heavy crops as the unmixed strains of either the sour or sweet cherries.

May Duke is a very old favorite and we find it mentioned by name as far back as 1688. Since that time it has gained popularity as a fruit for home production, but is not looked on with favor by commercial growers generally. One of the commercial objections to it is that it ripens over quite a long period and several pickings are needed if the fruit is to be at its best. It costs much more to pick any fruit in this way than when the entire crop can be handled at one time. Even for home use this is a valid objection, but in spite of it the variety is still popular and is still being planted over a wide extent of territory.

Montmorency

Fruit-growers will argue about the "one best" variety of almost any other fruit except the cherry. All are agreed that the Montmorency is the one best bet of the cherry-grower. No other variety seems to be so altogether desirable in every way. The tree is hardy, vigorous and as healthy as an oak. It will apparently grow and bear fruit in almost any soil and is equally well adapted for either home use or market. The fruit ripens fairly late in the season, not so late as English Morello, but apparently just at the exact psychological moment when every one wants cherries. The early varieties have all been disposed of and the housewife has just about decided that she missed her chance to buy cherries for canning purposes when along comes a farmer with a load of Montmorencies. The housewife asks no questions, but pays the price and is glad that she did not get left altogether. The fruit is not of such high quality as that of some other sour sorts, but this would not be noticed by any one except a cherry "specialist" who made a business of going around tasting fruit from every grower who would allow him to roam at will through his orchards. Personally I think the quality of a well ripened Montmorency is excellent, and I would be willing to challenge any one to consume more of them in a day than I can.

For culinary purposes this cherry is pre-eminently the best of its class—that means that it is the best cooking cherry in existence, and canning factories prefer it to any other variety. The canned product holds its shape and color and has an excellent flavor. There are several strains of the Montmorency cherry and nurserymen have not helped the grower to distinguish between them. Nearly every nurseryman has his own “pet” strains of this fruit and sells them under his own pet names. As a result we have a confusing list of Montmorency This and Montmorency That, and the prospective purchaser does not know whether he is getting what he wants or what some one wants him to have. The plain ordinary Montmorency without any tails or appendages to its name is the standard cherry, and planters should insist upon getting it in its undiluted purity. The Large Montmorency is a well recognized form, distinct from the one I have been discussing. Its fruit is said to be of better quality and larger than the standard form, but on the other hand it is a very shy bearer. This reason alone prevents it from becoming popular as it otherwise might. It is a very old variety, originating in France more than a century ago.

Napoleon

Alongside the Montmorency, Napoleon takes its place as the leading variety of sweet cherries. It is a fruit of almost indescribable beauty, and, contrary to the old adage, this beauty is more than skin deep for the Napoleon is almost the standard of quality among cherries. It is an old sort, two hundred years old at least, and was long grown in Europe. In our own country it is at its best in the Northwest, although on favorable soils it succeeds well in the East. It is not adaptable to a wide range of soils, however, and except where conditions are to its liking it often refuses to strike root and dies almost as soon as it is planted. It also has a reputation for sterility when planted in certain sections. This is true in my own district. A neighbor had a very large old tree of this sort that had never produced any fruit although it bloomed abundantly every year. We sprayed the tree for him one year and as a result he picked sixty gallons of fruit that season. It was sterile because the infection of brown rot had become so bad that every cherry fell off before it had a chance to ripen. The variety is rather subject to rot, however, but this has not the terrors for the careful orchardist that it once had.

The fruit is a favorite on the markets and is probably more extensively canned, commer-

cially, than any other cherry except Montmorency. In the can the fruit retains its exquisite red and yellow color better than almost any other sort. In the West it is grown as Royal Ann and when canned in that section the incorrect name is inscribed on the cans so that many who are really familiar with the cherry do not know it under its right name.

In old orchards this variety was often known as "Ox Heart" and I have no doubt that the sweet cherry tree in my grandfather's orchard which we knew as Ox Heart and in which I first learned to like cherries, was in reality Napoleon. It was certainly a mighty good cherry—as I remember it.

Republican

One of Lewelling's creations in the cherry world was the Republican, a large black sweet cherry. I have never seen it in fruit but Hedrick, in *The Cherries of New York*, speaks highly of it. He says further that in some soils it fails to make good which would indicate that like many other sweet cherries it is not adaptable to varying conditions.

Royal Duke

Royal Duke is a mid-season cherry of the Duke class, a cross between a sweet and a sour cherry. It has the upright growth of the sweet

cherry tree and the fruit resembles the sour kinds. It is of excellent quality and is perhaps the best of its kind. None of these cherries are so adaptable to soil and climate as are certain of the sour cherries, but where they can be grown they are very welcome additions to the home orchards. They also make excellent market sorts in some sections because the fruit is attractive and of good quality. The habit of ripening their fruit unevenly makes them very often unprofitable for the market grower.

Schmidt

Aside from the fact that it originated in Germany, Schmidt is a good black sweet cherry. It is hardy, vigorous and adaptable to a wide variety of soils; probably one of the most adaptable of the sweet cherries and certainly one of the most resistant to brown rot. It has not been widely planted commercially, but seems to be gaining favor as a home orchard fruit. The late Professor Van Deman considered it the best sweet cherry for planting in the East.

Windsor

As might be expected from the fact that it originated in Ontario, the Windsor is a very hardy variety of sweet cherry. The fruit is large, beautiful in form and almost black in

color. It is one of the most solid cherries that I know, the flesh being almost plum-like in its firmness. There are few cherries as good in quality and probably none any better.

Unfortunately the trees have some faults that prevent the variety from being as widely planted as it otherwise would be. In the first place they are inclined to grow very tall and as a result it is difficult to harvest the crop. They do not come into bearing at an early age and in some localities never produce heavy crops. In most places where the sweet cherry is commercially grown, however, the Windsor is a profitable sort and in Michigan and New York is the standard late variety. The fruit ships well and is resistant to brown rot and is also "resistant" to the worst enemy of the cherry-grower, the birds. For some reason the bonnie robin redbreast does not take as heavy toll of the Windsor as he does of many other kinds—perhaps by the time it ripens he has had his fill of cherries and has turned to a less strictly vegetarian diet.

Wood

For many years the Wood, or the Governor Wood as it was called before the American Pomological Society operated on its name, was one of the favorite varieties of sweet cherries for the home orchard. It has never been

grown to any extent commercially as the fruit is too tender to ship well. Its high quality and adaptability to various soils make it one that the non-professional grower will appreciate fully. For the amateur it is perhaps the one best sweet cherry in spite of the fact that it has some bad habits. The fruit is somewhat liable to rot, but this can be prevented by the careful spraying that the lover of fruits for their own sake is apt to give his trees. It seldom bears large crops of fruit, but the high quality makes up for lack of quantity. It was originated by Doctor Kirtland of Cleveland, Ohio, about 1842 and was named for Reuben Wood, who was at one time Governor of Ohio.

Yellow Spanish

I mention one last variety of cherry, the Yellow Spanish, not because it excels other sorts but chiefly because it is probably one of the oldest sweet cherries in cultivation. Some writers claim to have traced its history back to the first century—certainly it was cultivated in Europe several centuries ago. Even now, except for one or two faults, the Yellow Spanish might maintain its place as a leading commercial variety. Its smaller size and the fact that it often rots badly keep it from competing with the Napoleon—the variety which it most closely resembles.

In this list of varieties, too long for any one planter to attempt to grow, I have but touched upon the field of variation in the cherry. There are many other sorts that I could write about, but the hour grows late and the candle is burned almost to its holder. For one who seeks to know all there is to know about this tempting fruit I would refer to Professor U. P. Hedrick's splendid monograph, *The Cherries of New York*. There he will find some hundreds of varieties discussed at length and color plates that will "make his mouth water" with their realism.—A book to dream over on the long winter evenings when the wind howls about the hilltops and we plan our orchards of a future day.

CHAPTER XVI

GRAPE VARIETIES

“Ah, with the grape my fading life provide.”—OMAR.

THE CULTIVATION of most of our modern fruits dates back many centuries, but of them all the grape was perhaps the first to be cultivated on an extensive scale. Its history is lost in remote antiquity and we will never know who were the first to plant vines and to make wine from the ripened fruit—for the two have gone hand in hand from the very beginning. We do know that the vine was often mentioned by the early Bible characters and that grapes were grown by the Egyptians long before the time of written history. The fact that this was one of the first of the cultivated fruits is still further emphasized by the knowledge that grape culture has changed but little in thirty centuries and that the directions for the care of the vine published a thousand years B. C. still conform to modern practice,—when applied to the growing of European varieties.

The ancient grapes were identical with the

European grapes as we know them to-day in the vineyards of southern and central Europe and in California. These grapes all belong to one species (*Vitis vinifera*) and differ from the grapes of eastern America in one outstanding character—the skin adheres firmly to the pulp. In all varieties that are derived from our native wild grapes, the skin slips from the pulp when the berry is crushed.

I have emphasized the fact that the majority of our orchard fruits have been introduced from abroad. In this list occurred our apples, peaches, cherries and to a certain extent our plums. The eastern American grapes, however, present a striking contrast to this condition of affairs, for almost without exception every important variety of grape grown at present has been derived from our native vines—and this within the space of a comparatively few years. For several hundred years after the discovery of this continent by Columbus, efforts were made to grow only the European sorts and the history of these attempts reads like a romance. Indeed it is a romance, a horticultural romance, dramatic at times and at others touched with tragedy because the early growers in spite of their abiding faith in the new industry were foredoomed to failure.

Probably the Spanish were the first to bring European varieties to our shores and of all

the early attempts theirs were the only ones to carry any measure of success. This favorable outcome was due to the fact that they planted in the South and Southwest, eventually as far as California—in the only part of the country where the exotic varieties had a chance to show what they could do.

Among the English colonies repeated endeavors were made to establish vineyards along our eastern coast and as early as 1616 Lord Delaware imported cuttings for this purpose. The early colonial literature is full of references to attempts at wine making and frequently expert growers and wine makers were brought over from France. The greatest care was used in growing the vines, but without exception they all “took a sickness” and died. So insistent were the early colonists that the country be made to produce its own wine that the assemblies repeatedly passed laws requiring the planting of grapes or granting a bonus to those who would produce a given amount of wine in a given length of time.

The last notable effort at growing of *Vitis vinifera* was in 1802 when a colony of Swiss settled at Vevay, Indiana, and there planted a large acreage on the hills overlooking the Ohio River. They no doubt thought that in the newer “western” soil they would avoid the trouble which had followed all the earlier ven-

tures. Their attempt failed, however, as had all the rest and by 1835 their vineyards were all extinct. At about the same time, Nicholas Longworth, known as "the father of American grape culture," was experimenting with the foreign varieties. In 1846 he wrote, "I have tried the foreign grapes extensively for wine at great expense for many years, and have abandoned them as unfit for our climate. * * * I obtained 5,000 plants from Maderia, 10,000 from France— * * * all failed; and not a single plant is left in my vineyards. I would advise the cultivation of the native grapes alone, and the raising of new varieties from their seed." All of the early grape-growers were intent upon producing grapes for the purpose of making wine, no doubt holding with our old friend, Omar, who wrote a thousand years ago:

"I wonder often what the Vintners buy
One half so precious as the stuff they sell."

But in spite of all their efforts they failed to grow the introduced vines and to quote Omar again:

"The worldly hope men set their hearts upon
Turned ashes—"

and finally European grape-growing in eastern America became a thing of the past.

For long no one knew what the "sickness" was that prevented the growing of these grapes, but it is now known that the trouble was caused by a very minute insect, the grape *phylloxera*, a louse-like creature that sucked the juices from the roots. It was a native insect to which the native vines had become resistant, but to which imported forms fell an easy prey. Later this same insect was imported into France and for a time the vineyards of that country were threatened with extermination. All that saved them was the fact that some one had the bright idea of grafting European grapes upon American roots. This means of relief was tried and is still being practised with the result that the vines are now resistant to this former terror of the vineyard.

In the meantime, however, attention had been directed to the development of our native sorts, and in a surprisingly short time many valuable kinds had thus been evolved. Consequently our eastern grape culture is dependent entirely upon our native varieties—or in a few cases upon varieties produced by crossing one or more of the native sorts with the European kinds.

Although neglected by the colonists our native grapes attracted attention from abroad about the year 1001 when Lief the son of Eric, brought his little crew of Norsemen to our Atlantic shores. On what is now our New Eng-

land coast they found grapes growing in such abundance that they named the new continent "Wineland." (A number of years later, Pusyfoot Johnson and William J. Bryan were produced by this same continent, strange as it may seem.)

The early English colonists also found an abundance of wild grapes which nourished their hope that the Old-World sorts might do well here. In attempting the cultivation of the imported sorts they neglected the improvement of the wild vines. Doubtless they did not realize that improved strains of the wild sorts were possible and the wild vines furnished an abundance of fruit such as it was. In Virginia quantities of wine were made from the wild grapes which was said to have been as good as the imported article—in fact one early account states that it was so "good" that the second glass would make one tipsy.

In New England, however, very little wine was made—those sturdy pioneers preferred their "rum," and it was more easily and more quickly made. Also it had more of the justly famous "kick" than did wine. Thomas Jefferson was one of the first if not exactly the first to advise the growing of our native grapes, for in 1809 he wrote; "I think it will be well to push the culture of that grape (the Alexander) without losing time and efforts in search of

foreign vines, which it will take centuries to adapt to our soil and climate." It was not until the native sorts were first propagated by William Robert Prince at his Long Island nurseries that the native grapes really got a start in American vineyards. This was done about the year 1830 and prior to that time no one had taken any great amount of trouble to attempt a systematic cultivation of native sorts.

At this time the Catawba and Isabella were the two varieties chiefly grown, and it was not until after the introduction of the Concord in 1852 that any noticeable improvement was made. Two years later, John Fisk Allen, of Salem, Massachusetts, produced the first hybrid between the American and European races of grapes. This was accomplished by crossing the Chasselas Golden with the Isabella and the resulting grape was named Allen's Hybrid. It was the first of a long list of such crosses, some of which have resulted in greatly improved varieties. This work, started in the middle of the last century, is still progressing and the plant breeders of to-day can find few plants that are more interesting than the grape. After more than a half-century of this work, however, we have not yet obtained a hybrid that can equal some of the native varieties in those characters which make a grape successful commercially.

Agawam

One of the most successful of the hybrid grapes is the Agawam, a variety originated by Edward S. Rogers, a Massachusetts gentleman who lived in Salem. His work with grapes should be known to all fruit-growers for he did much to promote the development of viticulture in America. Although he had only the space of a city back yard to work in, he originated forty-five hybrid grapes, some of which have become of great importance. Others are no longer grown, but all were interesting in their time. Later, he made further crosses between American and European grapes, but none of these excelled his earlier list of forty-five.

Agawam was long known as Rogers' Hybrid No. 15. It is a large red grape ripening a little later than Concord, but excelling that variety in keeping quality. I have a friend who has kept them in good condition until Christmas. Like all the hybrid grapes it is particular as to soil and does not flourish in all locations, preferring heavy soils to those that contain too much sand. The vines are rather subject to the grape mildew, but in spite of this and in spite of the fact that other grapes are of better quality it is grown in commercial quantities in some states. At the present time it is not being planted extensively.

Alexander

The Alexander deserves a place in this list only because of its historical importance. It is no longer grown and the planter would have some difficulty in finding any vines of the variety to-day. It is of note as being one of the first native vines to be cultivated in this country and for a long time was the chief wine grape of the Eastern States. Speaking of wine made from this sort, Thomas Jefferson said, "It is worthy of the best vineyards of France."

It is possible that this old variety, considered a pure native sort, was in reality a natural hybrid between one of the native vines and some of the early planted European sorts, as it came up as a seedling in a section where the imported sorts had been planted extensively. The same thing may have happened in many other cases and the accidental introduction of the foreign blood may have had more influence on our modern varieties than we suspect to-day.

Barry

Another of Rogers' hybrids that deserves mention is the Barry, a cross between the native vine and the Black Hamburg. It resembles the latter parent in fruit and is one of the finest grapes that can be grown in eastern America. Although it ripens with Concord it

keeps well into the winter. Hedrick states that in New York it remains in perfect condition until the last of February. As grown farther south it does not keep so well, but is still to be listed as one of the best late keeping sorts. In our own vineyards we have not been able to grow this sort owing to unfavorable soil conditions. I hope, however, to get it to grow later by grafting it on some established sort.

Brighton

Brighton is another hybrid grape, originated in New York about 1870, that has become prominent in eastern vineyards. In its native state it is a promising commercial sort because of its high quality, but with us it has not been productive and the fruit has not been attractive enough to make it desirable for home use. The bunches of red berries as we have been able to grow them, have been poorly filled out and the fruit has been very subject to diseases. In some cases the vines were killed by severe winter weather.

Brilliant

T. V. Munson, of Texas, deserves great credit for his extensive work in improving our native grapes and in producing many new hybrids. The Brilliant is one of his sorts that has attracted wide attention from amateur growers

over the country. At its best it is a fine sort, but is decidedly "cranky" as to its choice of soils. After seven years' experience with it I have not yet grown a bunch of grapes that even remotely resemble the "catalogue picture." The fruit is of high quality, however, and wherever the variety will succeed it should hold an important place as a choice red grape. It resembles the Delaware in many respects, but although larger in size it is not so fine in flavor as that old sort.

Campbell Early

One of the new grapes that has attracted much attention is the Campbell Early, a fruit of Concord type, but of better quality than that old sort. It has been widely advertised and as widely planted, but unfortunately it has not come up to the expectations of the introducers. The vines are hardy and resistant to disease, but do not bear regular or large crops of fruit. Aside from this one point of failure the variety is an excellent one and as an early grape for home use it deserves to be planted. I would hesitate to advise planting it for commercial purposes except in those places where it has been known to bear regular crops.

Catawba

One of the oldest American varieties is the Catawba, a fine red grape that first attracted

attention early in the last century. After more than a hundred years it is still the leading variety of its color and is planted extensively for both home and market use. The place of its origin and its parentage will never be known but from the character of both fruit and vines we can well suspect that it has in it some strain of European blood introduced by way of those first vineyards of the early colonies. On account of this supposed admixture of foreign blood the variety is rather more susceptible to insects and disease than it should be to reach the greatest usefulness as a commercial sort. It ripens its fruit rather late and if properly stored will keep well into the winter. It was formerly much used as a wine grape and the product was said to be of fine quality. On this point I can not speak at first-hand but am willing to take Longfellow's word for it when he wrote:

“Very good in its way is the Verzenay
Or the Sillery, soft and creamy,
But Catawba wine has a taste more divine,
More dulcet, delicious and dreamy.”

Columbian Imperial

If an amateur grape-grower desires to produce a few bunches of fruit that will be notable for the large size of the berries I would suggest that he plant a vine (one vine) of the

Columbian. The berries will average an inch in diameter and the vines are very resistant to disease—a refreshing characteristic when one has attempted to grow some of the tender hybrids. Some of the Wandering Willies who sell trees and vines on the basis of catalogue pictures and who have no fixed place of abode and no very definite business connection, delight to exhibit pictures of this variety. Its great size always attracts the prospective customer and, as I have said, one vine of it will not be out of place in the amateur's vineyard. Aside from size, however, it is without value.

Concord

The Concord grape, along with the Kiefer pear, Elberta peach and Ben Davis apple, occupies an almost unique place in the list of fruits. No other variety is so widely distributed or so successful under a great diversity of soils. Introduced in 1852, the Concord has become our chief commercial grape and is also more widely grown by the average back yard vineyardist than any other sort. Although there are many kinds that excel it in quality, it is unsurpassed in hardiness, vigor and productiveness. It will grow in almost any soil where its roots can find a foothold and will bear crop after crop under conditions of almost absolute neglect. In recent years there have

been a number of other kinds introduced to take its place, but the market still depends upon this old sort for the bulk of the crop. The public has become educated to the Concord grape and as a result many better black grapes are sold under that name—just as many good yellow peaches are sold as Elbertas.

In south central Indiana we have found that although the Concord is somewhat subject to fungous diseases, it is not so weak in this respect as are most other kinds. Farther south it becomes still more subject to disease and can be grown only by thorough spraying. It originated in Concord, Massachusetts, about 1850, having been grown from the seed of a wild grape by E. W. Bull.

Delaware

In spite of its many faults Delaware is still one of the most popular grapes grown in eastern America. Personally I must admit that I prefer other varieties, for its small size and weak vine make no appeal to me either in the vineyard or on the table. It is true that the berries are of excellent quality—in fact those who should know assure us that the Delaware is the standard of excellence for American grapes, but for my part a few vines will supply my wants. In spite of its small size and the fact that the vine is weak and some-

times tender, the Delaware is widely grown in a commercial way. This statement is particularly true in the southern sections where the fruit is ripened quite early and reaches the northern markets at a time when few other grapes are to be had. In warm rich soils the fruit is somewhat larger but never attains any considerable size. As a vine for the garden it is a desirable variety because of the dwarf habit and the rich flavor of the fruit.

Diamond

One of the best white grapes is the Diamond, originated by Jacob Moore, of Brighton, New York, about 1870. Except that the fruit is of much better quality, it might be described as a white Concord—being a seedling of that variety. It contains a little European blood which no doubt accounts for its excellent quality. I think that it may correctly be listed as our best variety of its class, and I know that it will make good in all home plantings. It is already grown to a very large extent as a market grape.

Goethe

Goethe is another of Rogers' hybrids that should be mentioned on account of its high quality. In all respects it resembles its European parent including both the high quality of the fruit and the tenderness and sus-

ceptibility to disease. I have never known it to be grown in commercial quantities, but for the amateur who is willing to devote especial care to the vines it is a fine sort. The fruit ranks with the best of the Old-World sorts—and is almost as difficult to grow. The bunch and berry are both large and of a pleasing red color, ripening after Concord and keeping very late. In the North the seasons are not long enough to ripen this variety properly, but in the latitude of central Indiana it usually matures before severe frosts. Farther south it is still more certain to produce a crop, and sometimes the vines overbear and the fruit is small as a result.

Herbert

Of all the Rogers' hybrids that it has been my pleasure to grow or to taste, the Herbert is the best of the lot. It is a large black grape closely resembling the Black Hamburg—one of its parents. Herbert is more vigorous than the Concord and when planted beside that variety outgrew it and produced more fruit to the vine. A few years later, however, its faults began to show up and in one severe winter we lost about fifty out of one hundred and fifty vines that we had planted. As the vines grew older they also became much more subject to black rot until now we have great difficulty in obtain-

ing any fruit from them at all. The variety is so excellent, however, that I have refused to abandon it and will make one more effort to get the fungous disease under control next year. If I do not succeed then the vines will have to make room for some less delectable but more manageable sort. Even if I have to pull the vines from the vineyard I will certainly have one or two tucked away in some spot where they can be given some extra care, for the fruit is good enough to entitle it to unusual consideration. In fruit characteristics it is the one best black grape.

Isabella

The Isabella is now obsolete in American vineyards, but it should be mentioned as being one of the first grapes cultivated in the Eastern States. Prior to the introduction of the Concord it was the leading black grape. It is now of importance only from an historical standpoint.

Jefferson

Few red grapes equal the Jefferson, a sort originated by J. H. Ricketts, about 1880. In quality it is all that can be desired and in addition it keeps well into the winter. In the North it is not hardy, however, and it is subject to disease—as are all hybrids. It is well adapted

to the purposes of the amateur for it will repay the extra care that it requires.

Ricketts originated many fine hybrid grapes, but none of them is well adapted to commercial growing. His seedlings totaled several thousand. Out of this number there are several that are fine in quality and well adapted to the small grower who will give them winter protection and a little extra care in the spraying season.

Lady Washington

Another of Ricketts' fine seedlings is the Lady Washington, a very beautiful white grape characterized by large size in both bunch and berry. It is capricious as to soil and in some situations fails entirely. In other places it is distinctly a "show" grape and should be tested by all growers who are interested in producing fine fruit for home use.

Moore Early

The Moore Early is very similar to Concord in every way except that it ripens about a week to ten days earlier. It is not adapted to such a diversity of soils as the Concord, but where it succeeds it makes a very good market grape. We have but few vines of the variety and except in the difference in season I can see little to distinguish the two sorts. Some

growers consider the Concord the better of the two grapes. Perhaps it is, but to my taste they are so similar that I can see no difference. However, I am not particularly unreasonable about my grapes and when a fairly good one ripens ahead of some other sort I am perhaps inclined to think pretty well of its ambitions.

Niagara

Niagara is a beautiful white grape similar in many respects to Diamond but falling short of that variety in hardiness and perhaps in some other characteristics. Except that it is more tender I have not been able to note much difference between this variety and the Diamond. It is just about an even race as to which sort is better for commercial growers—there are several better ones for the amateur.

Norton

If this chapter had been written a few years ago the Norton would have been entitled to a conspicuous place, for it is one of the best wine grapes grown in this country—and it is fit for little else. It can not be grown successfully in New York, but in southern Ohio, Indiana and on west to the grape districts of Missouri it was a very largely cultivated sort. As wine is now obsolete in this country the

Norton grape soon will be. I do not know what will become of the vineyards of this variety. You may be sure I am pleased that there is none among our five thousand vines.

Vergennes

One of the best pure American grapes is the Vergennes, a very late-keeping sort that is grown to a considerable extent for market purposes in New York. It is sufficiently good in quality to entitle it to a place in the home vineyard as well, and in addition to its fairly high quality it is almost as easy to grow as Concord—the standard of easy culture.

Winchell

I have sometimes thought that Winchell was the best white grape we have, but this was no doubt due to the fact that it was the first of its kind to ripen and my weakness for early fruit of any sort may perhaps have warped my judgment. At any rate it is a fairly good sort and should find a place in the home vineyard even if not grown commercially. Some years the bunches are not well filled and the berries are small. In other seasons both bunch and berry are large and attractive, but with us the vines have never been sufficiently productive to entitle the grape to commercial consideration.

Woodruff

One day a friend of mine who lives in Muncie, Indiana, and who grows many fine grapes in his back yard, walked into my office with some choice bunches of fruit. One bunch of large red grapes attracted my attention from the first and when I tasted them I at once pronounced them excellent. They reminded me of the wild fox grapes of the woods, a variety that I learned to enjoy when I was a small boy. My friend laughed at me at the time because I liked this particular grape, and he never hesitates to criticize my taste in such matters, for the variety was the Woodruff, a sort that all authorities agree is one of the very poorest kinds in cultivation. At that time I had not learned that the real connoisseurs considered a "wild" taste as being enough to condemn any grape that grew. I am free to admit that I like a touch of the wild flavor and I can still eat a bunch of Woodruff grapes and enjoy them. A wild or, as the grape experts call it, "foxy" taste is supposed always to be fatal to the success of any grape. I, however, thought Woodruff was pretty foxy—using the term in the slang sense. Aside from the unfavorable reputation that the flavor of the fruit has, (from others than myself), the Woodruff is a good grape to grow as the vines are vigorous

and healthy and usually are productive. In appearance the grape is excelled by but few other sorts.

Worden

Concord is and for many years has been the standard black commercial grape, and its chief rival to-day is one of its seedlings, the Worden. The new variety is reported as producing larger berries and bunches than its parent, ripening a little earlier, hanging to the vine not so well and being more fastidious as to soils. In our vineyards these characteristics have not been emphasized. The fruit is so nearly like the Concord that the two varieties can not be distinguished except by taste. The Worden claims a better flavor and more desirability as a table grape. In season of ripening we have not noticed enough difference to affect the harvesting of the crop materially. Both varieties are gathered at about the same time and both seem to hang to the vines after they are fully ripe equally well. Some years I have thought that Concord kept better and the next year my opinion would be reversed. Although we have several thousand vines of the two varieties, they are not yet old enough to have established themselves perfectly and as the seasons pass the differences may be more marked. I know that this deduction has already been true of some sorts which promised well at first and

then fell by the wayside from one cause or another.

If Worden ripens even a little earlier than Concord, as it probably will when it settles down to work, it will be a valuable trait in our latitude—south central Indiana—for it will enable us to get our fruit on the market before the big crop comes down from Michigan and New York.

In spite of the fact that the fruit is of better quality than Concord it does not bring any better price—in fact I am reasonably sure that most of it is sold under the old name.

Many other varieties might be included in this list, but enough have already been mentioned properly to confuse the prospective planter. If the enthusiast desires to know all that is known on the subject and further if he likes to look at beautiful fruit pictures on cold winter nights I would refer him to Hedrick's *The Grapes of New York*.

THE END

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